SUZUKI

GV700GL

SERVICE MANUAL

99500-36040-03E
(英)

GV700GL SUZUKI MOTOR CO., LTD. APRIL, '84 PRINTED IN JAPAN 99500-36040-03E

FOREWORD

The SUZUKI GV700GL has been developed as a new generation motorcycle to the GS-models. It is packed with highly advanced design concepts including a V-4 engine, a liquid cooling system, a new highly efficient combustion system (TSCC), a fully transistorized ignition system, a shaft drive mechanism and a full-floater suspension system. Combined with precise control and easy handling the GV700GL provides excellent performance and outstanding riding comfort.

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 an extremely useful repair guide. This manual contains the most 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 GS and GV model Suzuki motorcycles that were manufactured after January 1, 1978 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 GV700GL 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.

SUZUKI MOTOR CO.,LTD.

Service Publications Department
Overseas Service Division

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VIEW OF SUZUKI GV700GL

RIGHT SIDE

LEFT SIDE

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GENERAL INFORMATION

1

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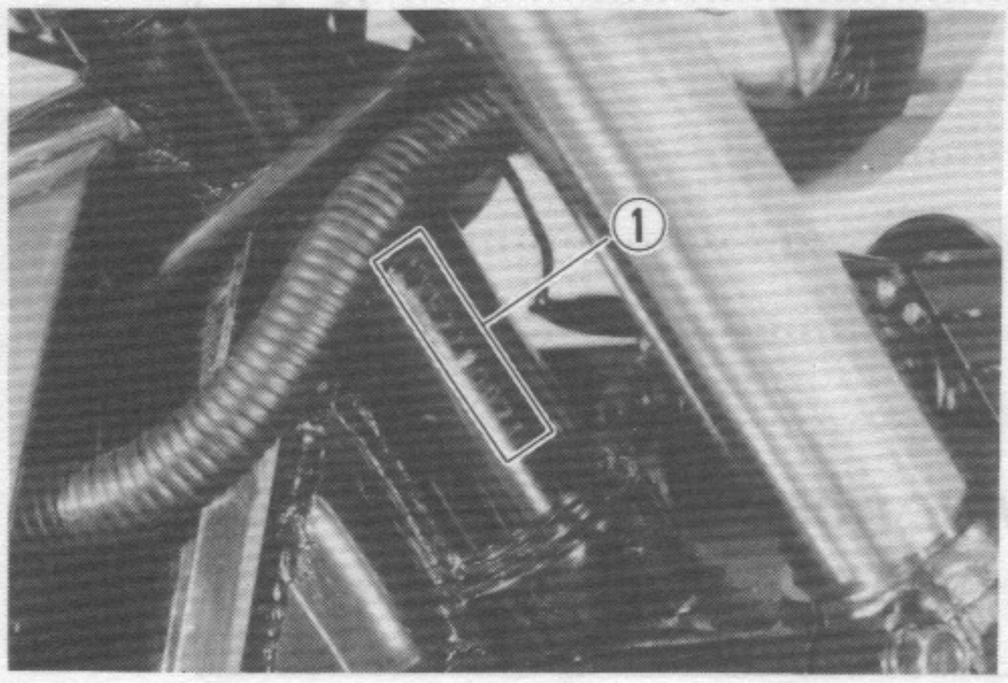
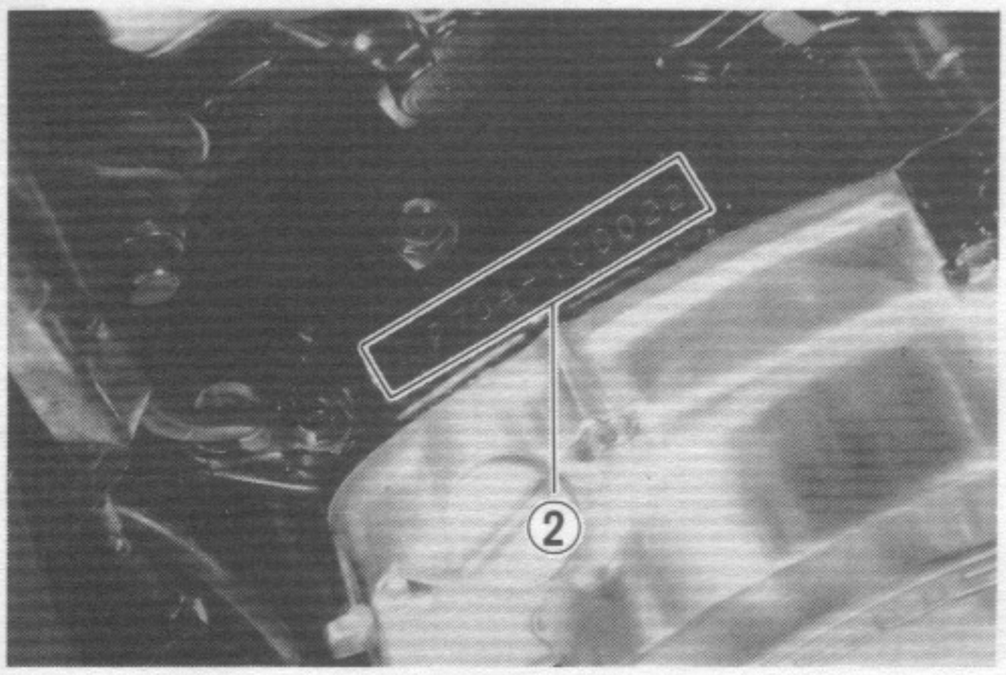
SERIAL NUMBER LOCATIONS

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 right side of the crankcase. These numbers are required especially for registering the machine and ordering spare parts.





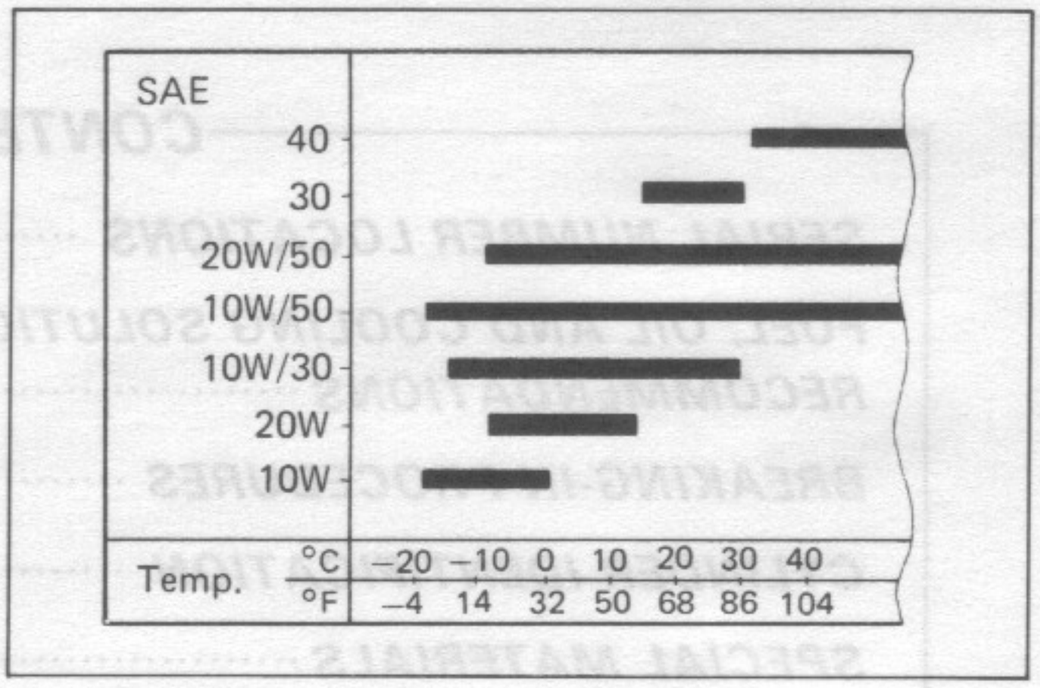
FUEL, OIL AND COOLING SOLUTION RECOMMENDATIONS

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:



GEAR OIL (SECONDARY AND FINAL DRIVE)

Use SAE 90 hypoid gear oil which is rated GL-5 under API classification system. If you operate the motorcycle where ambient temperature is below 0°C (32°F), use SAE 80 hypoid gear oil.

BRAKE FLUID

Specification and classification:	DOT3 or DOT4

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.**

FRONT FORK OIL

Use fork oil # 15.

COOLING SOLUTION

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

WATER FOR MIXING

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

ANTI-FREEZE & SUMMER COOLANT

The coolant performs as corrosion and rust inhibitor as well as anti-freeze. Therefore, the coolant should be used at all times even though the atmospheric temperature in your area does not go down to freezing point.

SUZUKI recommends the use of SUZUKI GOLDEN CRUISER 1 200 anti-freeze & summer coolant. If this is not available, use an equivalent which is compatible with an aluminum radiator.

REQUIRED AMOUNT OF WATER/COOLANT

Solution capacity (total): 3 500 ml (3.7 US qt)

For coolant mixture information, refer to cooling system section, page 5-3.

CAUTION:
Mixing of anti-freeze & summer coolant should be limited to 60%. Mixing beyond it would reduce its efficiency. If the anti-freeze & summer coolant mixing ratio is below 30%, rust inhibiting performance is greatly reduced. Be sure to mix it above 30% even though the atmospheric temperature does not go down to freezing point.
Every new unit contains Bar's leak.

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:

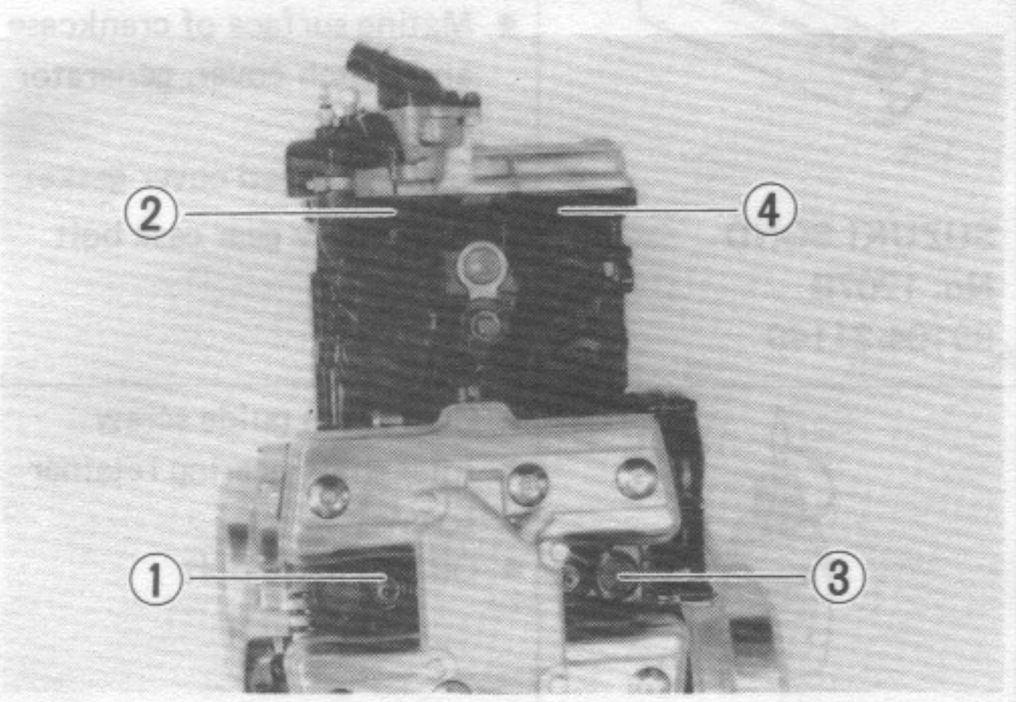
- Keep to these breaking-in engine speed limits:

Initial 800 km (500 mi)	Below 4 000 r/min
Up to 1 600 km (1 000 mi)	Below 6 000 r/min
Over 1 600 km (1 000 mi)	Below 10 750 r/min

- Upon reaching an odometer reading of 1 600 km (1 000 mi) you can subject the motorcycle to full throttle operation.
  However, do not exceed 10 750 r/min at any time.
- Do not maintain constant engine speed for an extended time period during any portion of the break-in. Try to vary the throttle position.

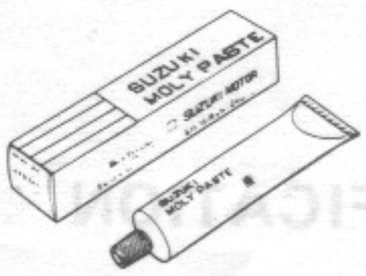
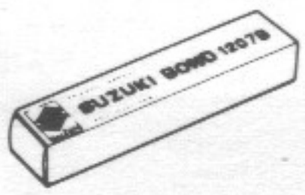
CYLINDER IDENTIFICATION

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



SPECIAL MATERIALS

The materials listed below are needed for maintenance work on the GV700GL, 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	• Oil seals	4-8, 19, 28, 30	• Cushion lever dust seal • Wheel bearings • Sprocket mounting drum bearing • Swingarm bearing and dust seal • Brake pedal shaft • Centerstand spacer	9-40 9- 4 9-39
	• Throttle grip • Speedometer cable • Gearshift lever linkage and mounting boss			
	• Final driven bevel gear coupling	4-36	• Steering stem bearings and races • Clutch lever and release	9-24
	• Starter motor oil seal	8- 9	• Side stand	
	• Propeller shaft coupling	9-41	• Final gear spline • Rear brake camshaft	9-30 9-31
SUZUKI SILICONE GREASE 99000-25100	• Caliper axle	9-10		
 SUZUKI MOLY PASTE 99000-25140	• Valve stem	3-35	• Starter motor housing end bushing	8- 9
	• Cam shaft journal	3-76	• Clutch master cylinder pushrod	9-45
	• Conrod big end bearing	3-45		
	• Crankshaft journal bearing	3-62		
	• Countershaft • Drive shaft	3-56		
	• Propellar shaft splines	4-18		
 SUZUKI BOND No. 1207B 99104-31140	• Mating surfaces of upper and lower crankcase	3-64	• Water temperature gauge • Engine thermo-switch	5-15 5-13
	• Mating surface of crankcase and clutch cover, generator cover	3-67 3-84	• Oil pressure switch • Mating surface between swing-arm and final gearcase	6-23 4-19, 4-36
	• Cylinder head cover gasket	3-82		9-41
	• Secondary gear case bolt	3-67, 4-15	• Front fork damper rod bolt	9-17
THREAD LOCK SUPER "1361A" 99104-32020	• Cam chain guide screw	3-38		
	• Idler shaft bearing retainer screw	3-68		
	• Oil pan plate bolt	3-65		

Material	Part	Page	Part	Page
THREAD LOCK SUPER "1363A" 99104-32030	• Gearshift arm return spring stopper • Generator rotor bolt • Oil pump case screw • 2nd drive gear	 3-66 3-53 3-54	• Secondary driven bevel gear shaft nut • Final drive bevel gear shaft nut • Final gear case bearing retainer screw • Final driven joint bolt	4-11 4-28, 4-31 4-30 9-30
THREAD LOCK cement 99000-32040	• Carburetor bracket screw • Front fork damper rod bolt	6-19 9-17		
THREAD LOCK "1363C" 99104-32050	• Generator stator securing screw • Generator lead wire guide screw • Countershaft bearing retainer screw • Chain tensioner bolt • Gearshift fork shaft stopper screw • Gearshift cam guide screw • Oil sump filter screw	3-52 3-52 3-68 3-74 3-60 3-60 3-65	• Throttle valve screw • Starter motor housing screw • Secondary driven bevel gear housing bolt • Secondary drive bevel gear cover bolt • Idler shaft drive chain tensioner bolt • Water pump drive sprocket bolt • Final gear bearing case bolt	6-16 8-10 4-14 4-15 3-70 3-71 4-36
SUZUKI BAR's LEAK 99000-24240	• To prevent leakage of cooling solution from small hole.	2-8 5-3		
THREAD LOCK "1360" 99104-32130	• Pre-muffler mounting bolt • Disc mounting bolt	3-5 9-5		
SUZUKI GOLDEN CRUISER 1200 99000-24120	• Coolant			

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.

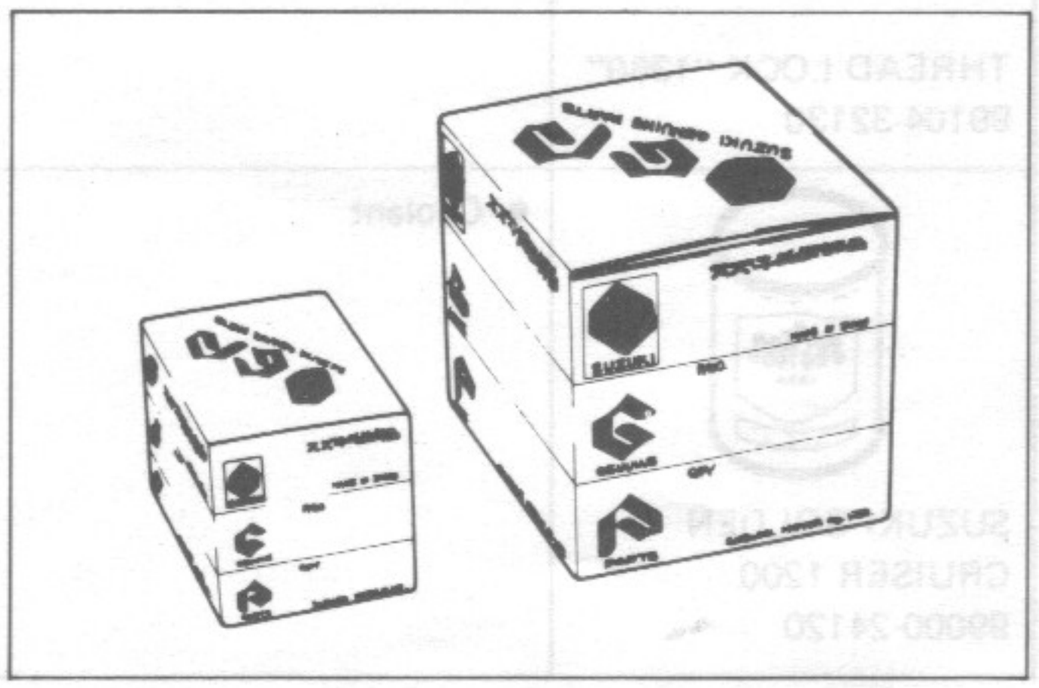
WARNING . . . . . When personal safety of the rider is involved, disregard of the information could result in injury.

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	2 225 mm (87.6 in)
Overall width	870 mm (34.3 in)
Overall height	1 220 mm (48.0 in)
Wheelbase	1 575 mm (62.0 in)
Ground clearance	145 mm (5.7 in)
Seat height	735 mm (29.0 in)
Dry mass	228 kg (503 lbs)

ENGINE

Type	Four-stroke, water-cooled, DOHC, TSCC, 82-degree V-four
Number of cylinders	4
Bore	69.0 mm (2.717 in)
Stroke	46.7 mm (1.839 in)
Piston displacement	698 cm^3 (42.6 cu. in)
Carburetor	MIKUNI BDS33, four
Air cleaner	Polyester fiber element
Starter system	Electric
Lubrication system	Wet sump

TRANSMISSION

Clutch		Wet multi-plate type, hydraulically operated
Transmission		6-speed constant mesh
Gearshift pattern		1-down, 5-up
Primary reduction		1.897 (74/39)
Secondary reduction		1.067 (16/15)
Final reduction		3.091 (34/11)
Gear ratios,	Low	2.500 (35/14)
	2nd	1.777 (32/18)
	3rd	1.391 (32/23)
	4th	1.153 (30/26)
	5th	0.960 (24/25)
	Top	0.806 (25/31)
Drive system		Shaft drive

CHASSIS

Front suspension	Telescopic, pneumatic/coil spring, oil damped
Rear suspension	Full floating suspension, oil damped, spring pre-load fully adjustable
Steering angle	37° (right & left)
Caster	60° 30′
Trail	116 mm (4.57 in)
Turning radius	3.0 m (9.8 ft)
Front brake	Disc brake, twin, hydraulically operated
Rear brake	Internal expanding
Front tire size	110/80-19 59H
Rear tire size	140/80-16 68H
Front fork stroke	160 mm (6.3 in)
Rear wheel travel	115 mm (4.5 in)

ELECTRICAL

Ignition type	Transistorized
Ignition timing	10° B.T.D.C. below 1 500 r/min and 35° B.T.D.C. above 3 500 r/min
Spark plug	NGK D8EA or NIPPON DENSO X24ES-U
Battery	12V 50.4 kC (14 Ah)/10 HR
Fuse	10/10/10/10/10A
Circuit breaker	30A
Headlight	12V 60/55W
Tail/Brake light	12V 8/23W
Turn signal light	12V 23W
Speedometer light	12V 3.4W
Tachometer light	12V 3.4W
Neutral indicator light	12V 3W
High beam indicator light	12V 1.7W
Turn signal indicator light	12V 3W
Side stand check light	12V 3W
Cooling solution temperature meter light	12V 3W
Fuel level indicator light	12V 3W
License plate light	12V 8W

CAPACITIES

Fuel tank including reserve	13.0 L (3.4 US gal)
Reserve	3.0 L (3.2 US qt)
Engine oil	3 200 ml (3.4 US qt)
Cooling solution	3 500 ml (3.7 US qt)
Front fork oil	479 ml (16.2 US oz)

* These specifications are subject to change without notice.

PERIODIC MAINTENANCE AND TUNE-UP PROCEDURES

2

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PERIODIC MAINTENANCE SCHEDULE

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

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 kilometers, 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
	month	2	12	24	36	48
Battery (Specific gravity of electrolyte)		–	I	I	I	I
Air cleaner element		Clean every 3 000 km (2 000 miles) and replace every 12 000 km (7 500 miles),				
Spark plugs		–	C	R	C	R
Fuel lines		I	I	I	I	I
		Replace every four years				
Engine oil and oil filter		R	–	R	–	R
Carburetor		I	I	I	I	I
Clutch hoses		I	–	I	–	I
		Replace every four years				
Clutch fluid		Change every two years				
Radiator hoses		I	–	I	–	I
		Replace every four years				
Cooling solution		Change every two years				
Secondary and final gear oil		R	–	I	–	I
Brake hoses		I	I	I	I	I
		Replace every four years				
Brake fluid		Change every two years				
Brakes		I	I	I	I	I
Tires		I	I	I	I	I
Steering stem		I	I	I	I	I
Front fork		–	–	I	–	I
		Check air pressure every 6 months				
Chassis bolts and nuts		T	T	T	T	T

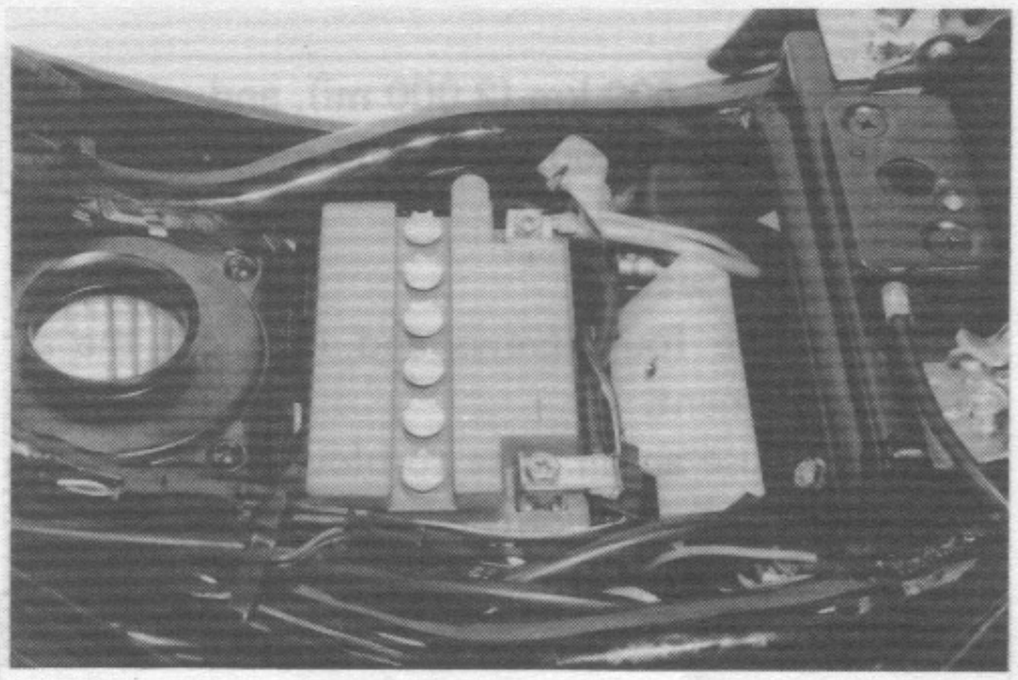
NOTE: T = Tighten, I = Inspect, R = Replace, C = Clean

MAINTENANCE AND TUNE-UP PROCEDURES

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

BATTERY

Inspect: 6 000, 12 000, 18 000, 24 000 km (4 000, 7 500, 11 000, 15 000 mi)

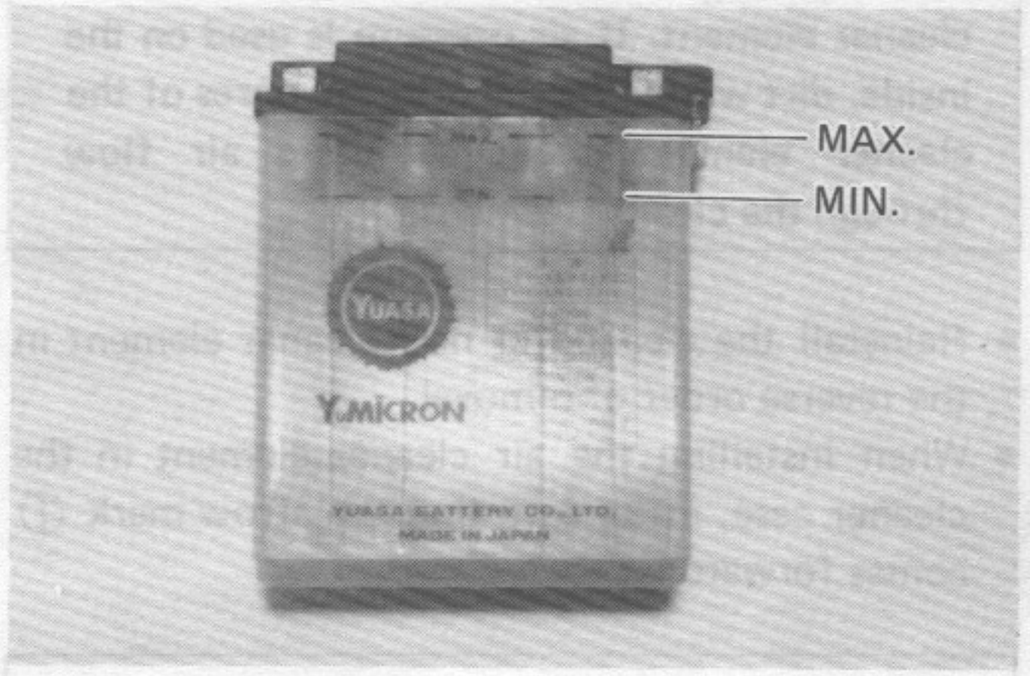


- Remove the seat.
- Check electrolyte for level and specific gravity. Add distilled water, as necessary to keep the surface of the electrolyte above the MIN. level line but not above the MAX. level line.
- For checking specific gravity, use a hydrometer to determine the charged condition.

09900 - 28403	Hydrometer

Standard specific gravity	1.28 at 20°C (68°F)

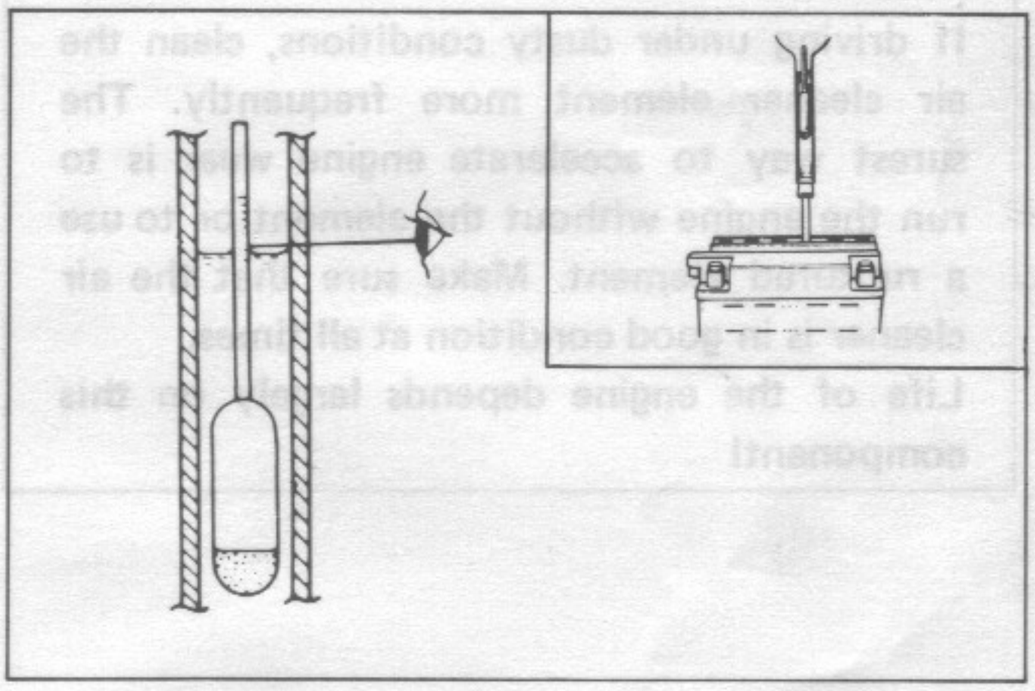
An S.G. reading of 1.22 (at 20°C) or under means that the battery needs recharging. Remove the battery from the machine and charge it with a battery charger.



CAUTION:

*** Never charge a battery while still in the machine as damage may result to the battery or regulator/rectifier.**

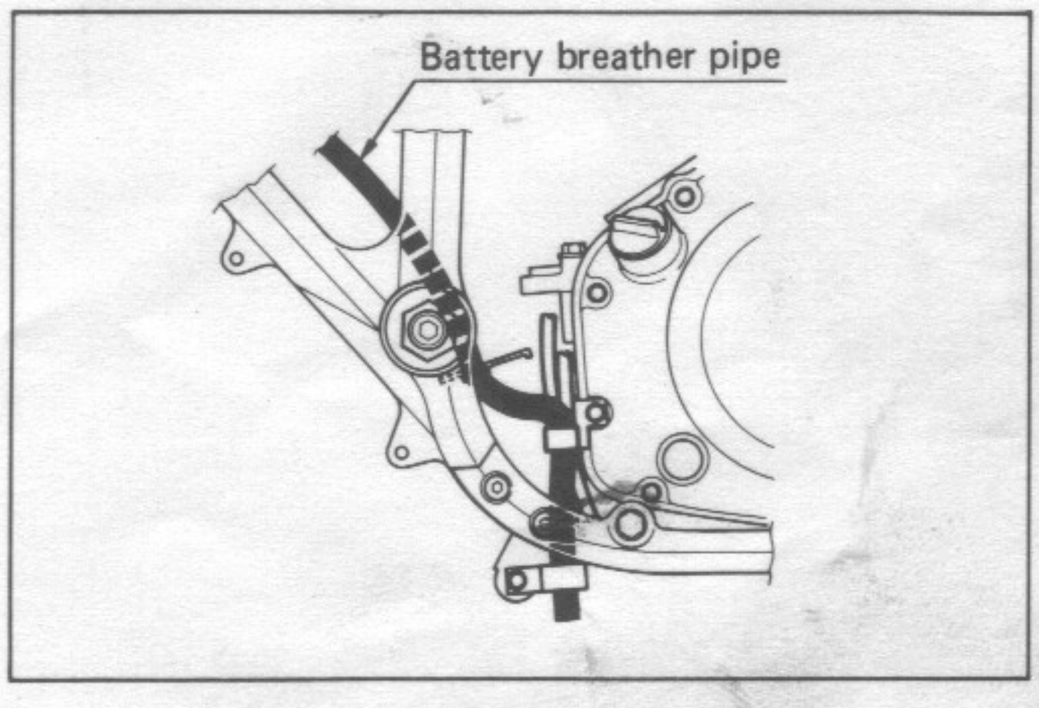
*** Be careful not to bend, obstruct, or change the routing of the air vent tube from the battery, make certain that the vent tube is attached to the battery vent fitting and that the opposite end is always open.**



WARNING:

When installing the battery lead wires, fix the ⊕ lead first and ⊖ lead last.

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

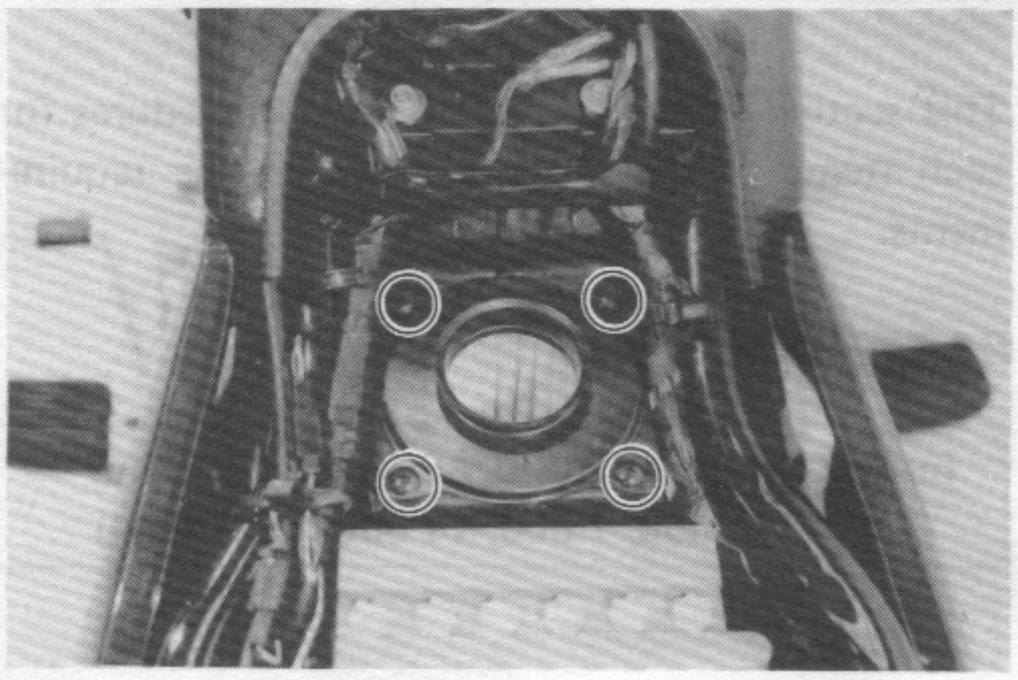


AIR CLEANER

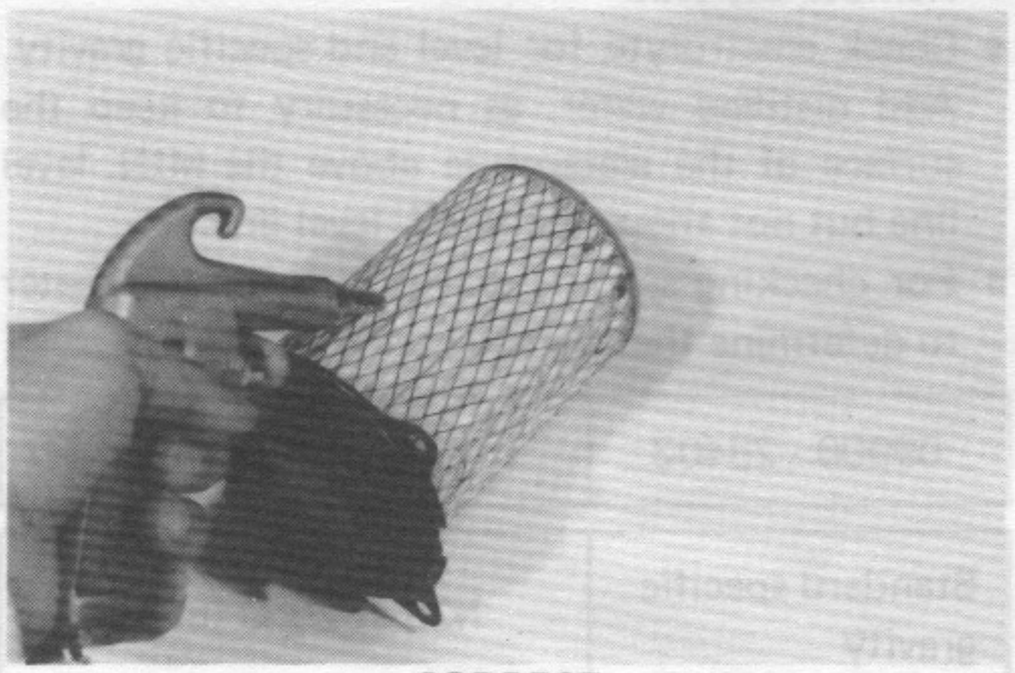
Clean Every 3 000 km (2 000 mi), and replace Every 12 000 km (7 500 mi)

- Remove the seat.
- Remove the four screws and take off the air cleaner element.
- Carefully use an air hose to blow the dust from the cleaner element outside.

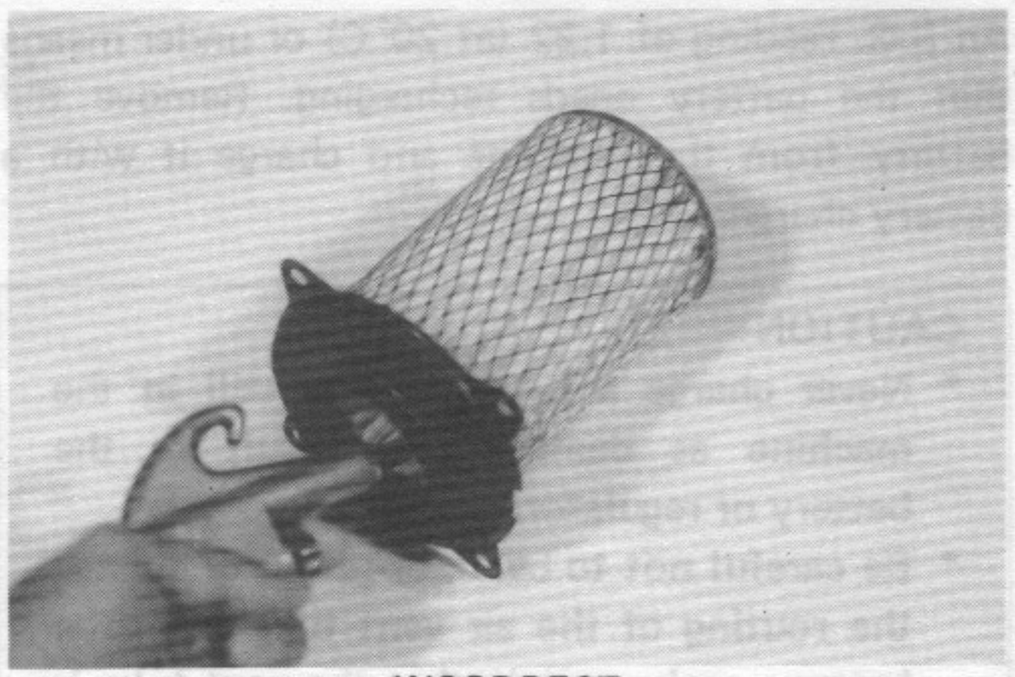
CAUTION:
Always use air pressure on the outside of the cleaner element. If air pressure is used on the inside, dirt will be forced into the pores of the cleaner element thus restricting air flow through the cleaner element.



- 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 arrow mark ① comes forward.

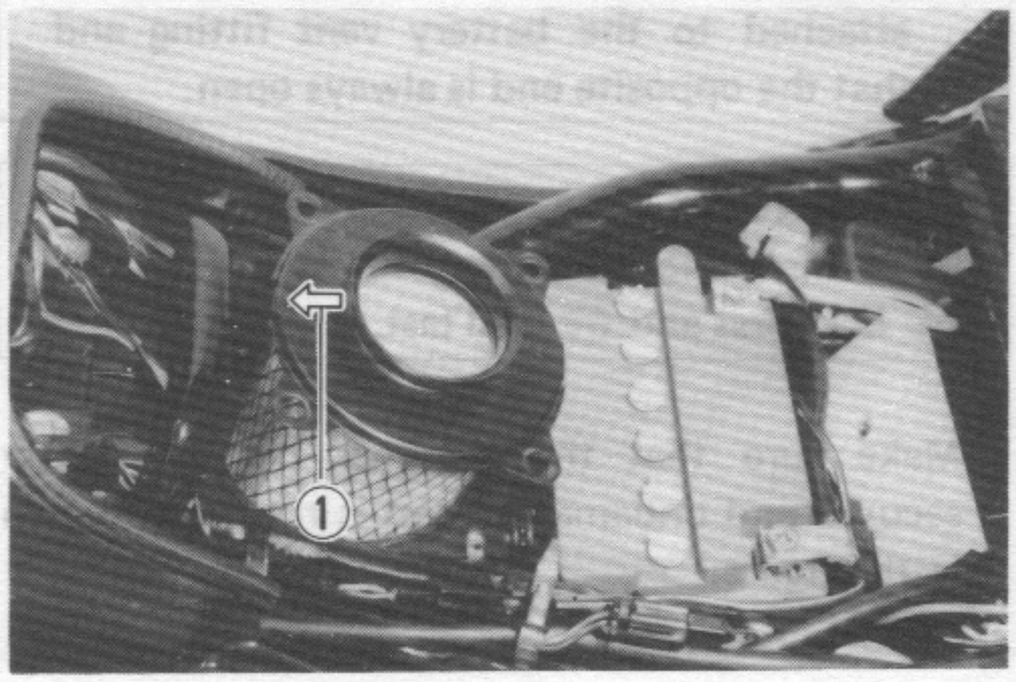


CORRECT



INCORRECT

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!



SPARK PLUG

Clean:	6 000 , 18 000 km (4 000, 11 000 mi)
Replace:	12 000, 24 000 km (7 500, 15 000 mi)

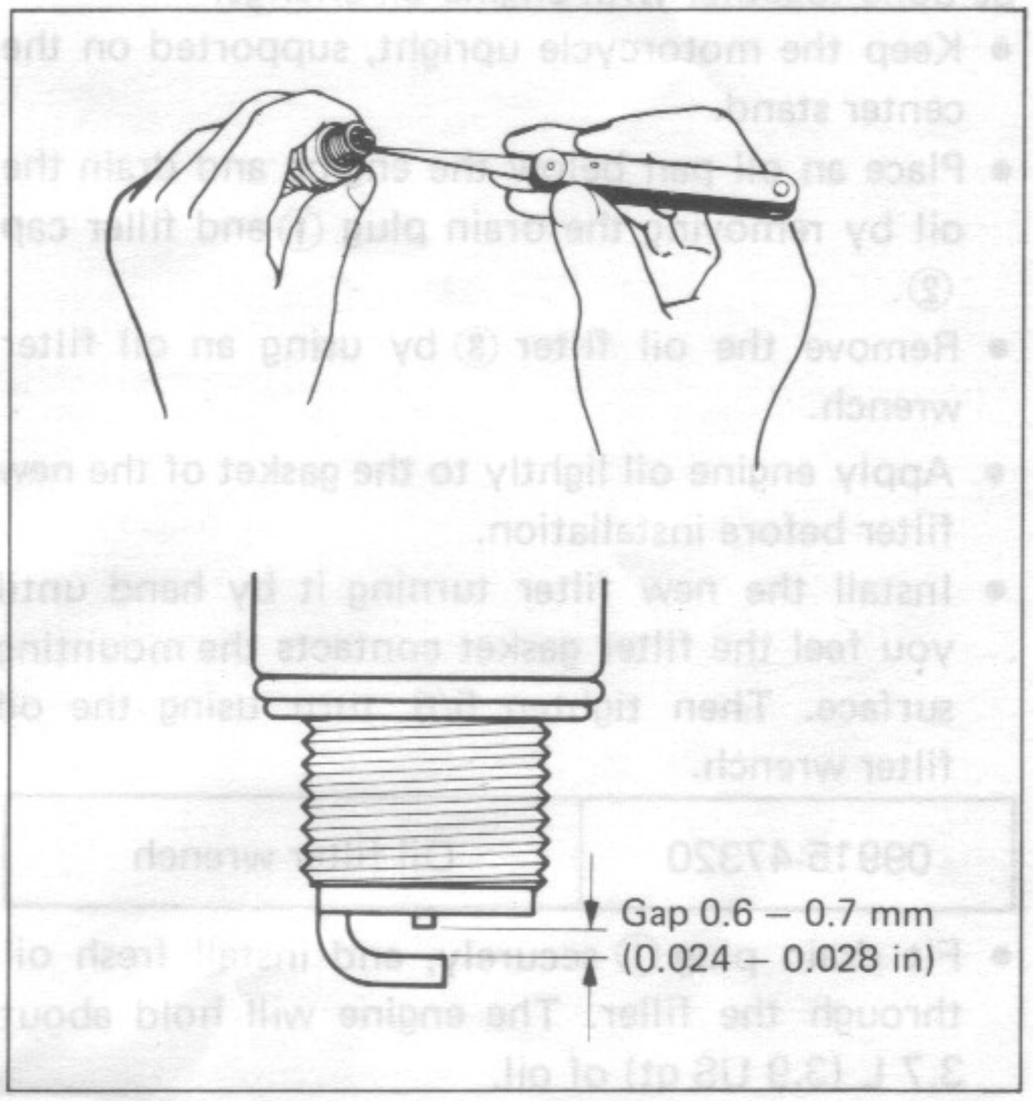
The plug gap is adjusted to 0.6 – 0.7 mm (0.024 – 0.028 in). The gap is correctly adjusted using a thickness gauge. When carbon is deposited on the spark plug, remove the carbon with a tool with a pointed end. If electrodes are extremely worn or burnt, replace the plug. Also replace the plug if it has a broken insulator, damaged thread, etc.

09930 - 13210	Socket wrench
09930 - 14530	Universal joint
09914 - 24510	T handle
09900 - 20803	Thickness gauge

NGK D8EA or NIPPON DENSO X24ES-U 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 plugs need to be replaced, it is recommended that the standard plugs listed in the table be selected. Remove the plugs and inspect the insulators. Proper heat range would be indicated if all insulators were light brown in color. If they are blackened by carbon, they should be replaced by a hot type NGK D7EA or NIPPON DENSO X22ES-U.

NOTE:
To check the spark plugs, first make sure that the fuel tank contains unleaded gasoline, and after a test ride if the plugs are either sooty with carbon or burnt white, replace them all together.

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
D7EA	X22ES-U	If the standard plug is apt to get wet, replace with this plug. Hot type.
D8EA	**X24ES-U**	**Standard**

REVISED

FUEL LINES

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

ENGINE OIL AND OIL FILTER

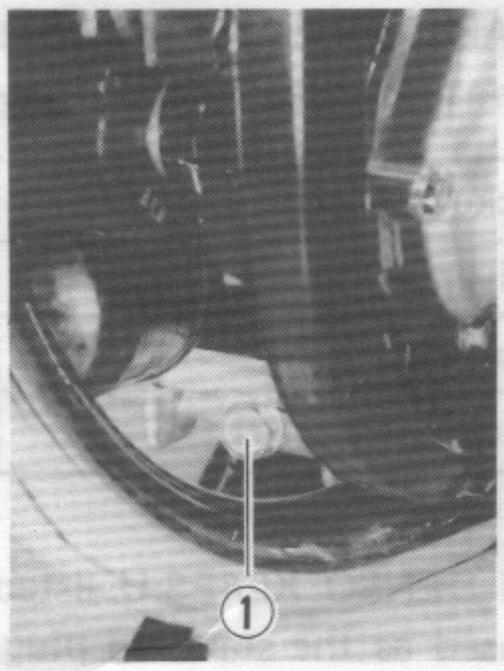
Replace (Change): 1 000, 12 000, 24 000 km (600, 7 500, 15 000 mi)

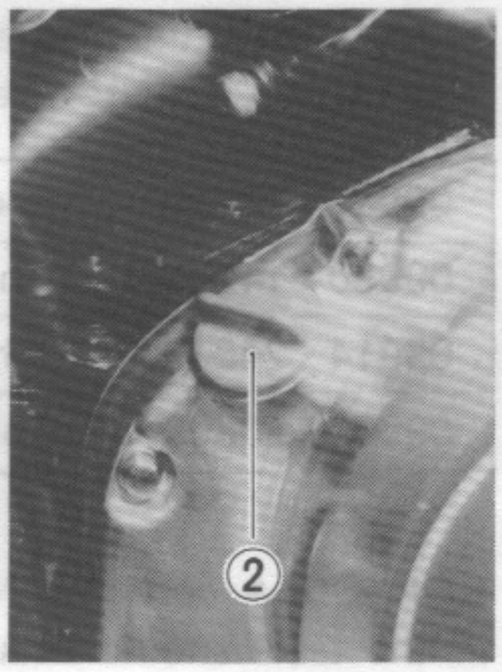
The oil should be changed while the engine is hot. Oil filter replacement at the above intervals should be done together with engine oil change.

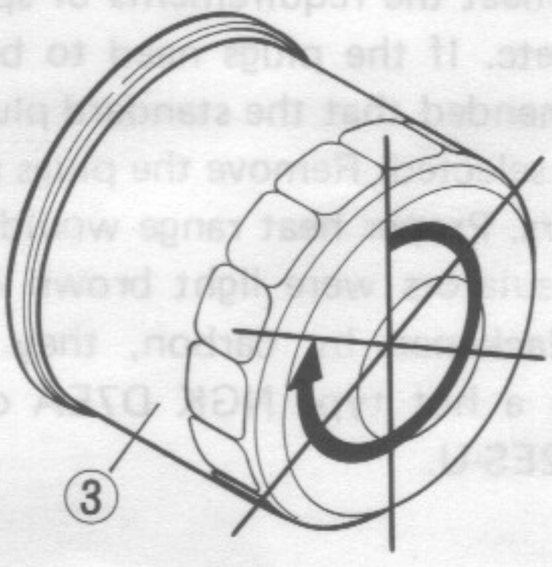
- Keep the motorcycle upright, supported on the center stand.
- Place an oil pan below the engine and drain the oil by removing the drain plug ① and filler cap ②.
- Remove the oil filter ③ by using an oil filter wrench.
- Apply engine oil lightly to the gasket of the new filter before installation.
- Install the new filter turning it by hand until you feel the filter gasket contacts the mounting surface. Then tighten 5/6 turn using the oil filter wrench.

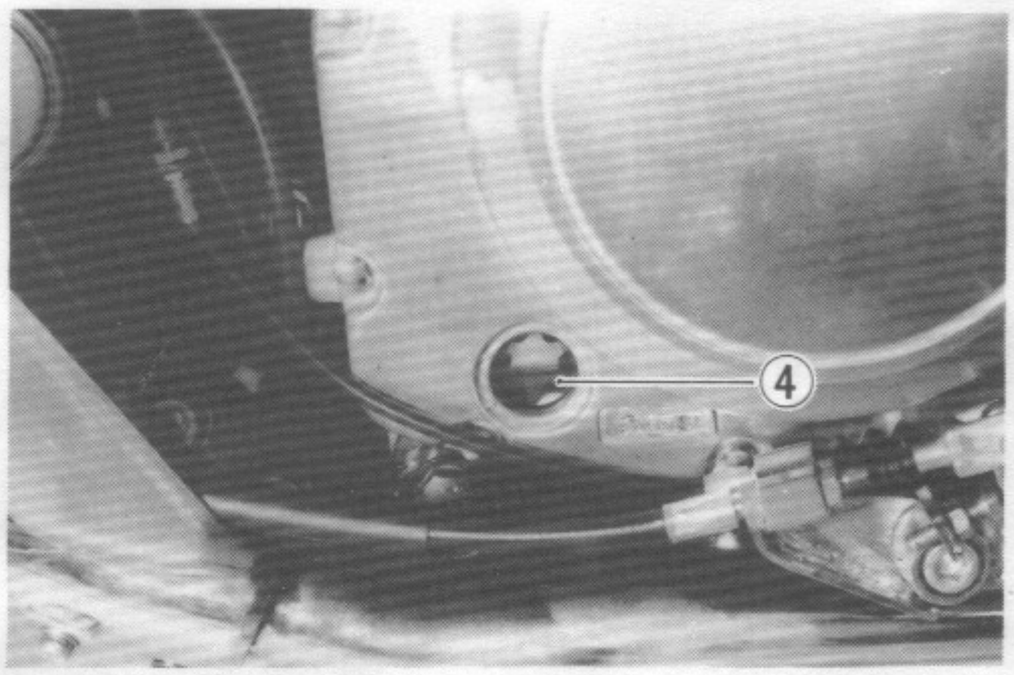
09915-47320	Oil filter wrench

- Fit drain plug ① securely, and install fresh oil through the filler. The engine will hold about 3.7 L (3.9 US qt) of oil.
  Use API classification of SE or SF oil with SAE 10W/40 viscosity.
- Start up the engine and allow it to run for several seconds at idling speed.
- Check for oil leakage around the oil filter.
- Turn off the engine and wait about one minute, then check the oil level through the inspection window ④. If the level is below mark "F", supply oil to that level.









NECESSARY AMOUNT OF ENGINE OIL

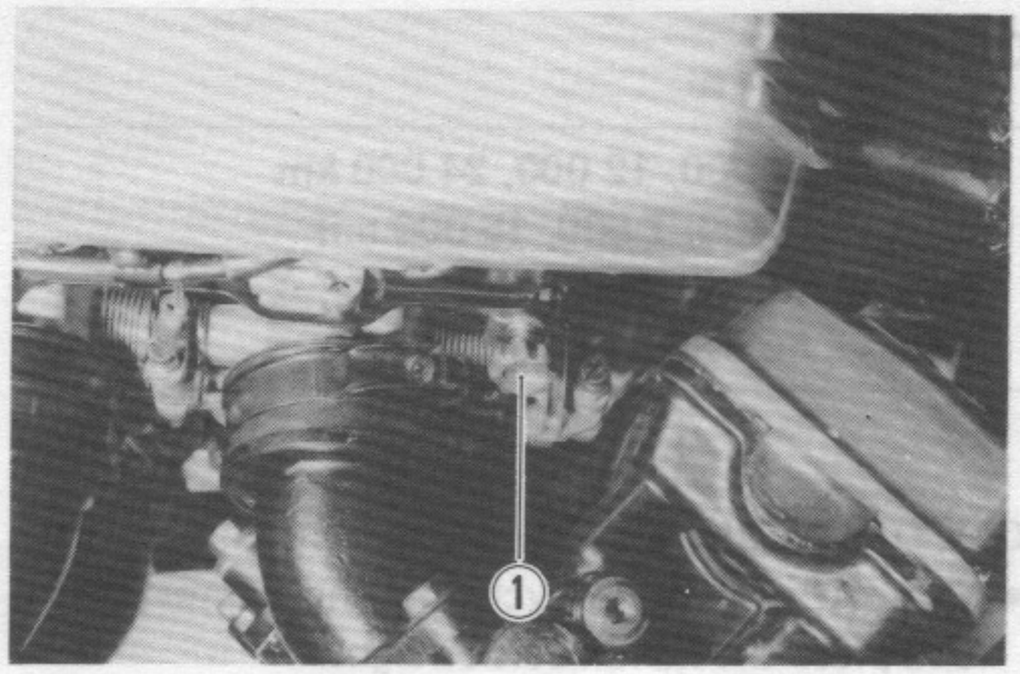
Oil change	3.2 L (3.4 US qt)
Filter change	3.7 L (3.9 US qt)
Overhaul engine	4.2 L (4.4 US qt)

CARBURETOR

IDLE RPM

Inspect:
1 000, 6 000, 12 000, 18 000, 24 000 km (600, 4 000, 7 500, 11 000, 15 000 mi)

NOTE:
Make this adjustment when the engine is hot.



- Start up the engine and set its speed at anywhere between 1 000 and 1 200 r/min by turning throttle stop screw ①.

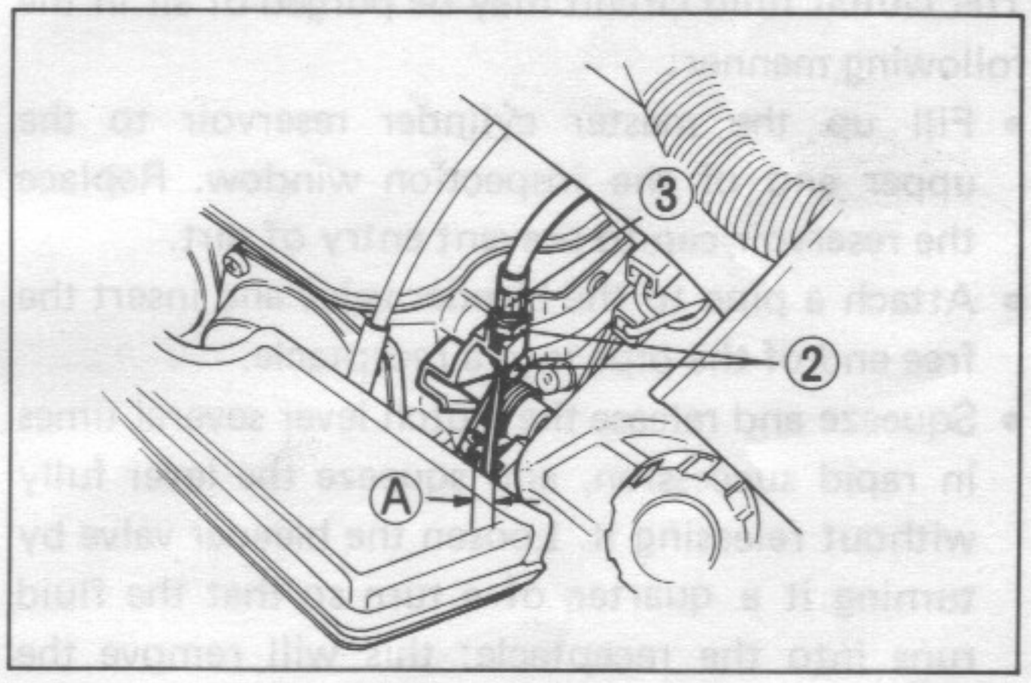
Engine idle speed	1 100 ± 100 r/min

CAUTION:
No adjustment except the procedure mentioned above is necessary because calibration is performed by carburetor manufacturer.

THROTTLE CABLE PLAY

There should be 2 – 3 mm (0.08 – 0.12 in) play Ⓐ on the throttle cable. To adjust the throttle cable play:

- Remove the seat and fuel tank.
- Push the throttle cable to check the amount of play.
- Loosen the lock nuts ② and slide the adjuster ③ upper or lower until the specified play is obtained.

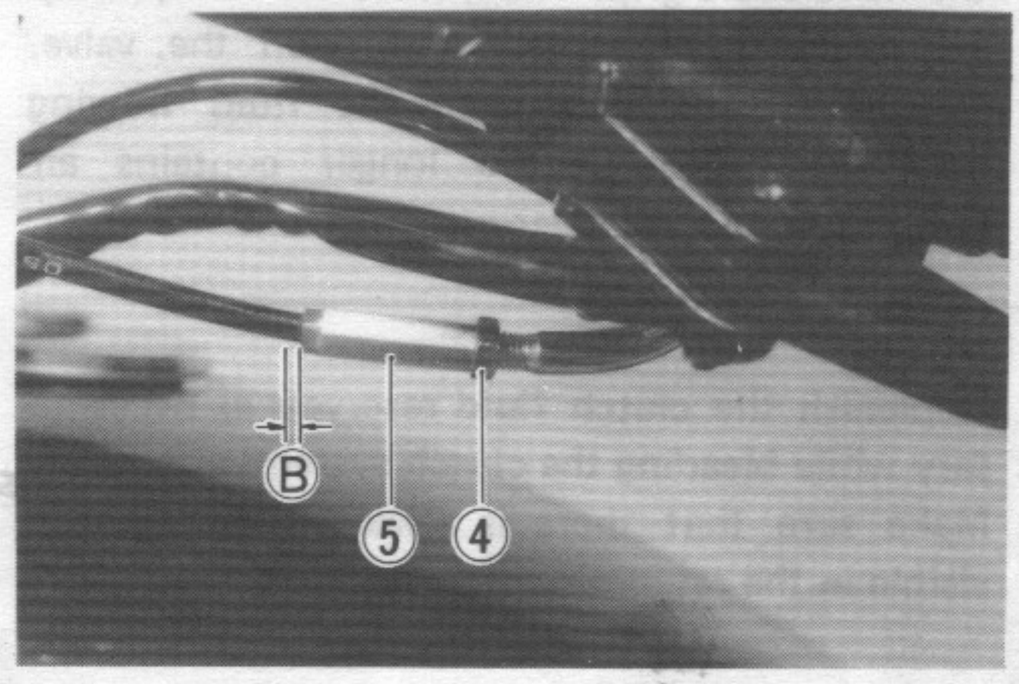


CAUTION:
To remove the carburetor cover may cause the imbalance of the carburetors. Do not remove the carburetor cover when adjusting the throttle cable play.

CHOKE CABLE ADJUSTMENT

- Loosen the lock nut ④ and turn the adjuster ⑤ to adjust the cable play.

Choke cable play Ⓑ	0.5 – 1.0 mm (0.02 – 0.04 in)



CLUTCH

Inspect: 1 000, 12 000, 24 000 km (600, 7 500, 15 000 mi) **Change fluid Every 2 years** **Replace hoses Every 4 years**

CLUTCH FLUID LEVEL

- Support the motorcycle on the center stand, and place the handlebars straight.
- Check the clutch fluid level in the reservoir.
- If the level is found to be lower than the lower mark, replenish with BRAKE FLUID that meets the following specification.

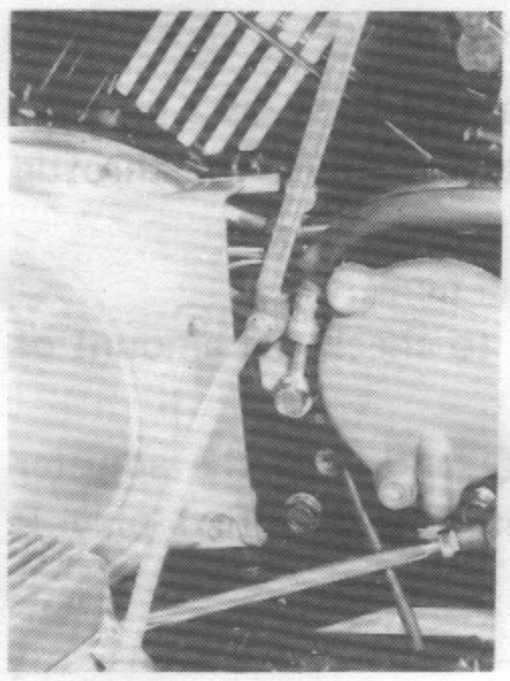
Specification and classification	DOT3 or DOT4

WARNING:
The clutch 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.

BLEED AIR FROM THE CLUTCH FLUID CIRCUIT

The clutch fluid circuit may 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 bleeder valve and insert the free end of the pipe into a receptacle.
- Squeeze and release the clutch 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 fluid runs into the receptacle; this will remove the tension of the clutch 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 of the inspection window.

Bleeder valve tightening torque	6 – 9 N·m (0.6 – 0.9 kg-m) (4.5 – 6.5 lb-ft)

NOTE:
Replenish the clutch fluid reservoir as necessary while bleeding the clutch 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.

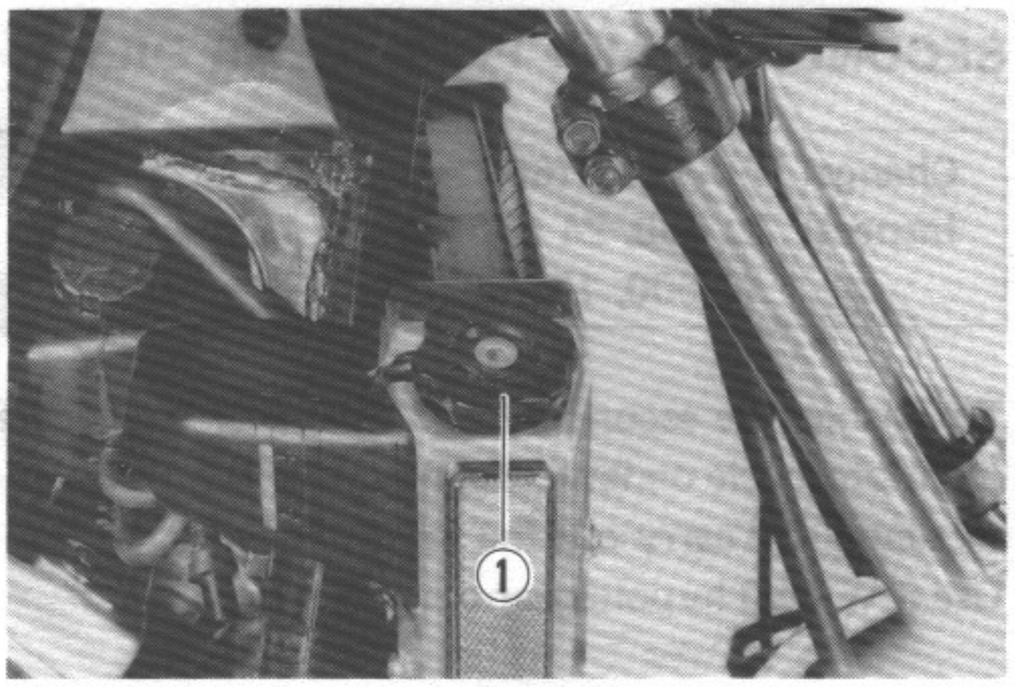
COOLING SYSTEM

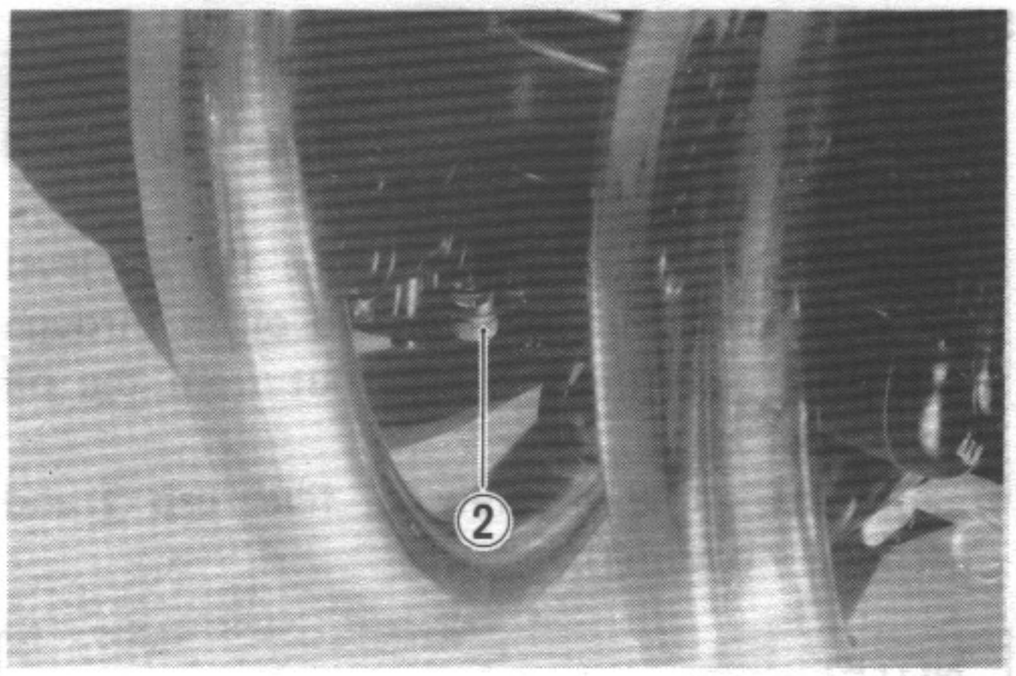
Inspect: 1 000, 12 000, 24 000 km
(600, 7 500, 15 000 mi)
Change cooling solution Every 2 years
Replace hoses Every 4 years

- Remove the radiator cap ① and drain plug ②.

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

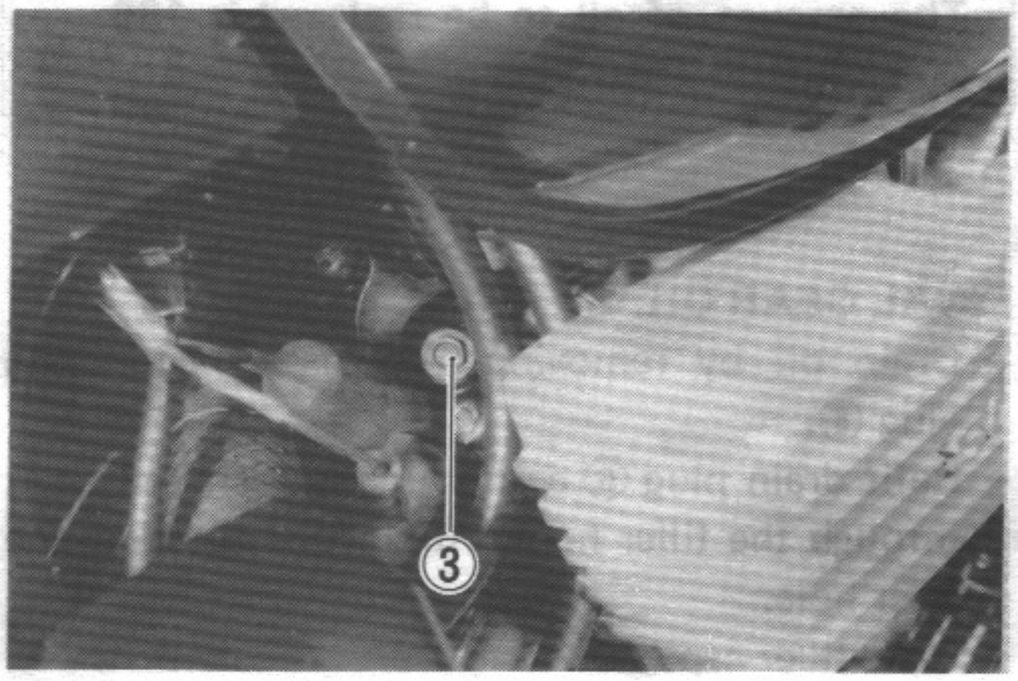
WARNING:
Cooling solution may be harmful if swallowed or if it comes in contact with skin or eyes. If cooling solution gets into the eyes or in contact with the skin, it should be flushed thoroughly with plenty of water. If swallowed, induce vomitting and call physician immediately.





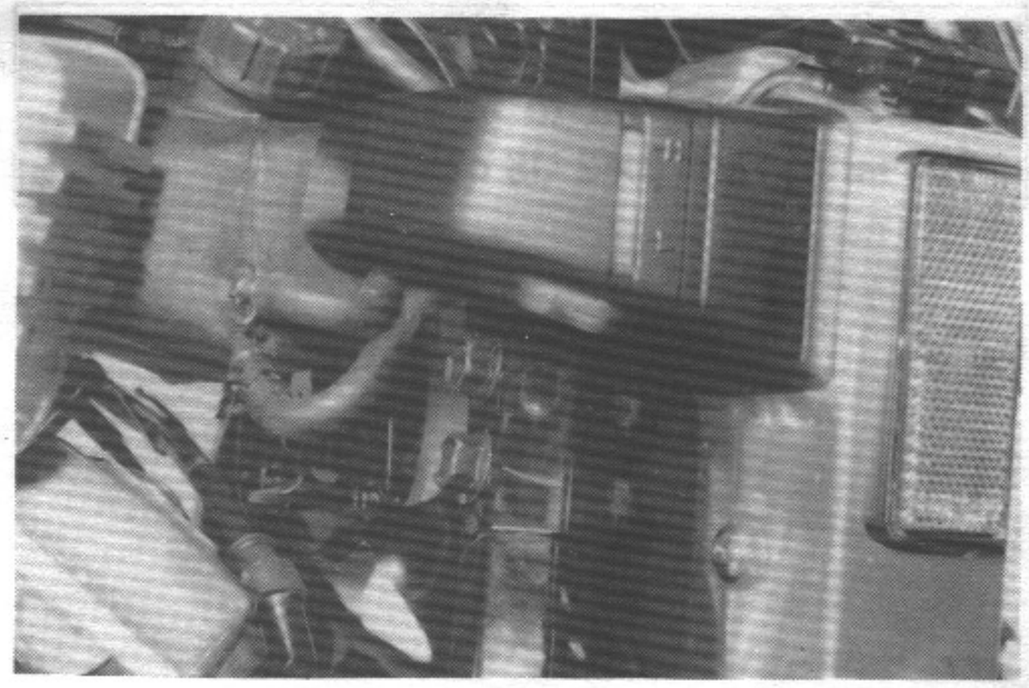
- Flush the radiator with flesh water if necessary.
- Tighten the drain plug ② securely and loosen the air bleeder ③.
- Install the specified cooling solution upto the radiator inlet hole and tighten the air bleeder ③.

NOTE:
For cooling solution information, refer to "cooling solution" section, page 5-3.



- Close the radiator cap securely.
- Fill the reservoir tank to the "H" level with cooling solution.
- After warming up and cooling down the engine, check the cooling solution level of the reservoir tank and install the cooling solution to the "H" level if the level is below "H".

3 500 ml (3.70 US qt) including reservoir tank
450 ml (0.48 US qt) reservoir tank



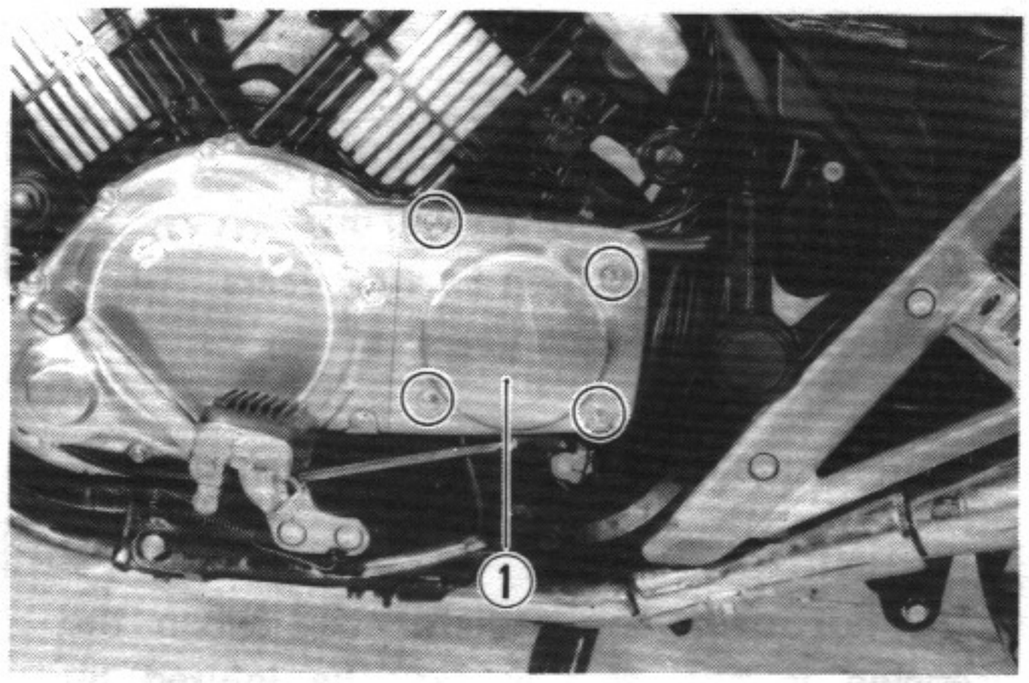
- Add 2 pks of anti-leakage material (Ber's leaks) in the cooling solution.

99000-24240	Bar's leak

SECONDARY AND FINAL GEAR OIL

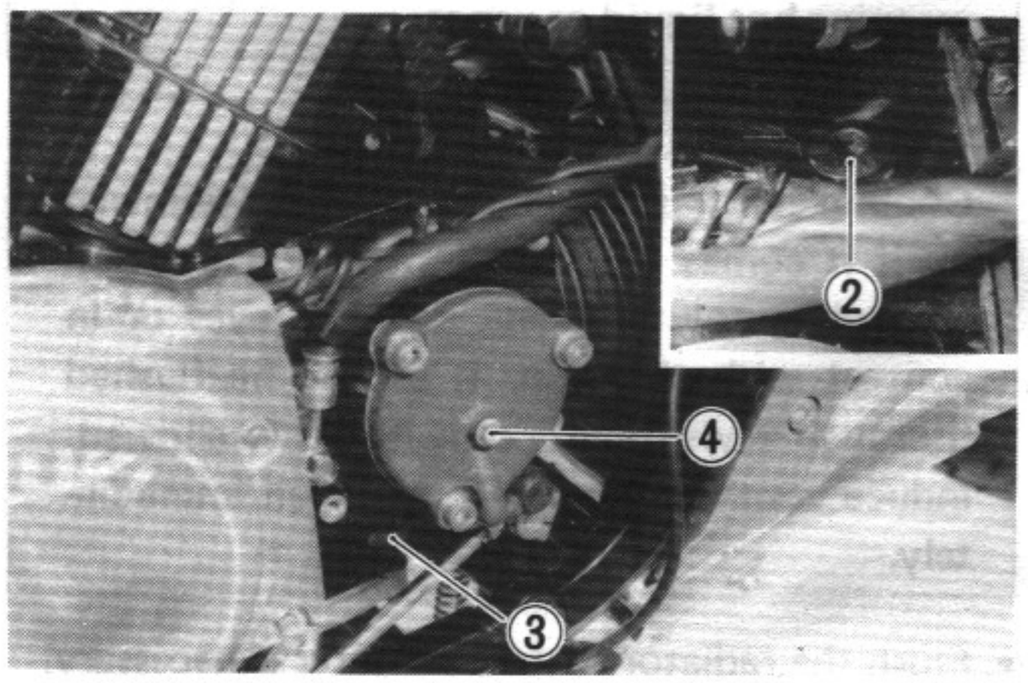
Change: 1 000 km (600 mi)
Inspect: 12 000, 24 000 km
(7 500, 15 000 mi)

To change the secondary and final gear oil, locate the motorcycle on level ground, place it on the center stand and carry out the following steps.
Use SAE #90 hypoid gear oil.



SECONDARY GEAR OIL

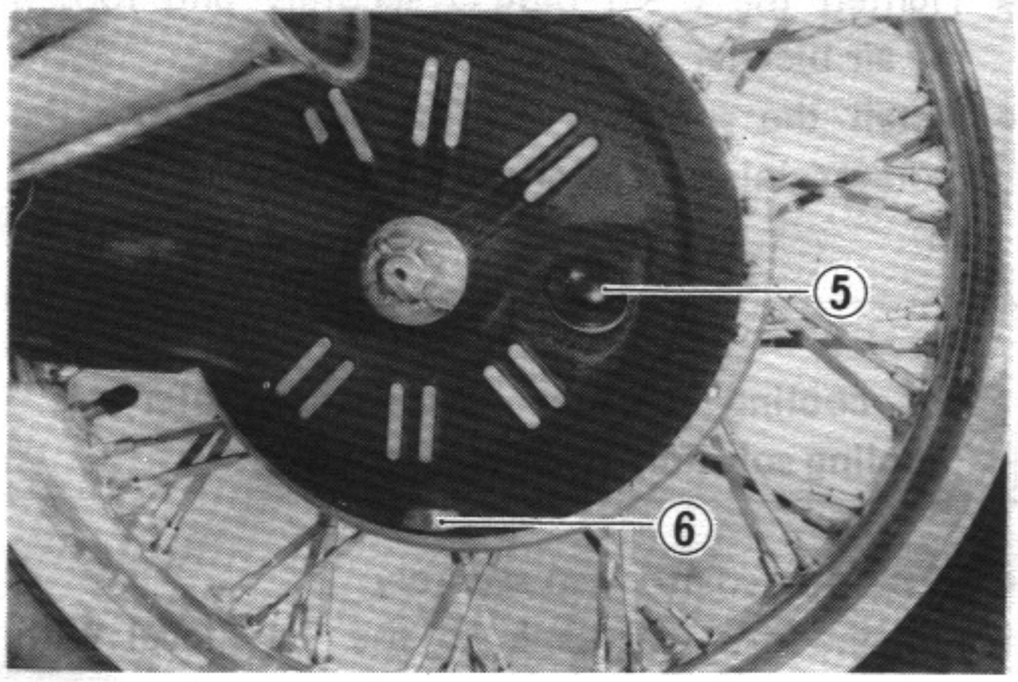
- Remove the secondary cover ①.
- Drain oil by removing the filler cap ② and drain plug ③.
- Refit the drain plug ③, remove the oil level screw ④ and pour the specified oil in through the filler hole until it runs out from the oil level hole.
- Refit the oil level screw ④, filler cap ② and secondary cover ①.



NOTE:
The amount of oil to be replaced is 180 – 200 ml (6.08 – 6.76 US oz)

FINAL GEAR OIL

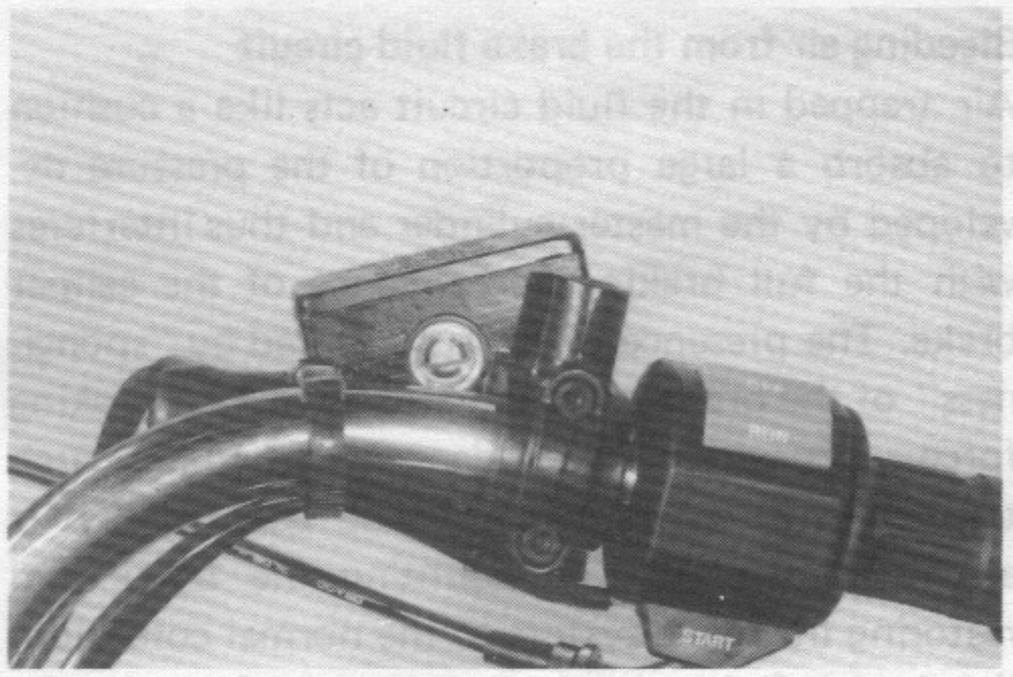
- Drain oil by removing filler cap ⑤ and drain plug ⑥.
- Refit drain plug ⑥ and pour the specified oil in through the filler hole until it runs out from the filler hole.
- Refit filler cap ⑤.



NOTE:
The amount of oil to be replaced is 170 – 190 ml (5.75 – 6.42 US oz).

BRAKES

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



FRONT BRAKE

Brake fluid level

- Support the motorcycle on the center stand, and place the handlebars straight.
- Check the brake fluid level in the reservoir.
- If the level is found to be lower than the lower mark, replenish with brake fluid that meets the following specification.

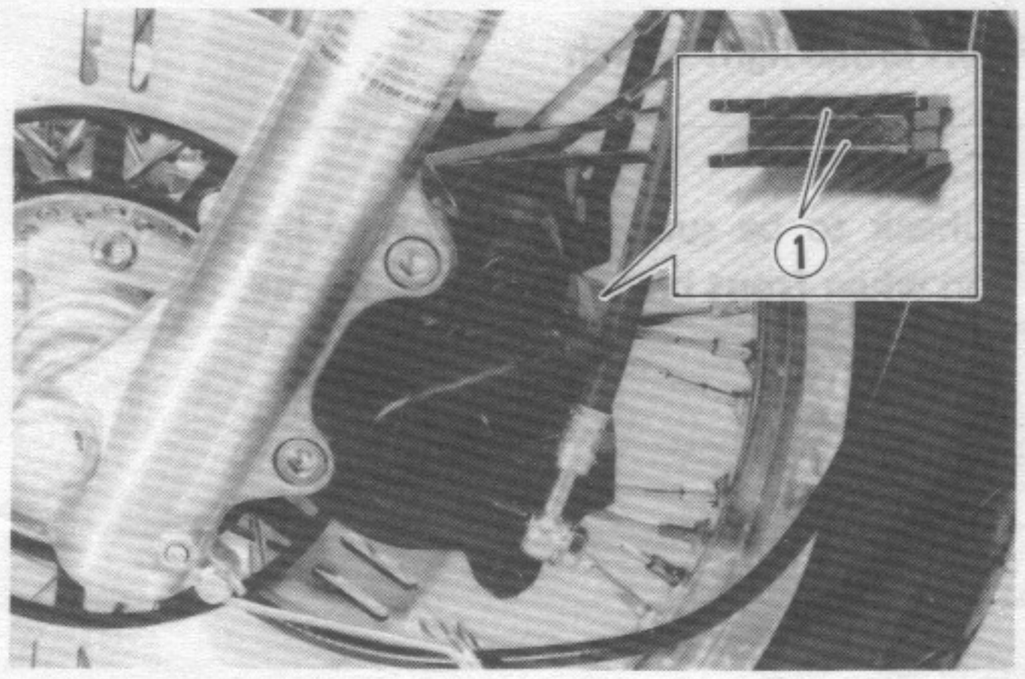
Specification and classification	DOT3 or DOT4

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 fluid for refilling the system, otherwise serious damage will be caused. Do not use any brake fluid taken from old or 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 discolor painted surfaces.
Check the brake hoses for cracks and hose joint for leakage before riding.

Brake pads

Wearing condition of brake pads can be checked by observing the limit line ① marked on the pad. When the wear exceeds the limit line, replace the pads with new ones. (See page 9-6)

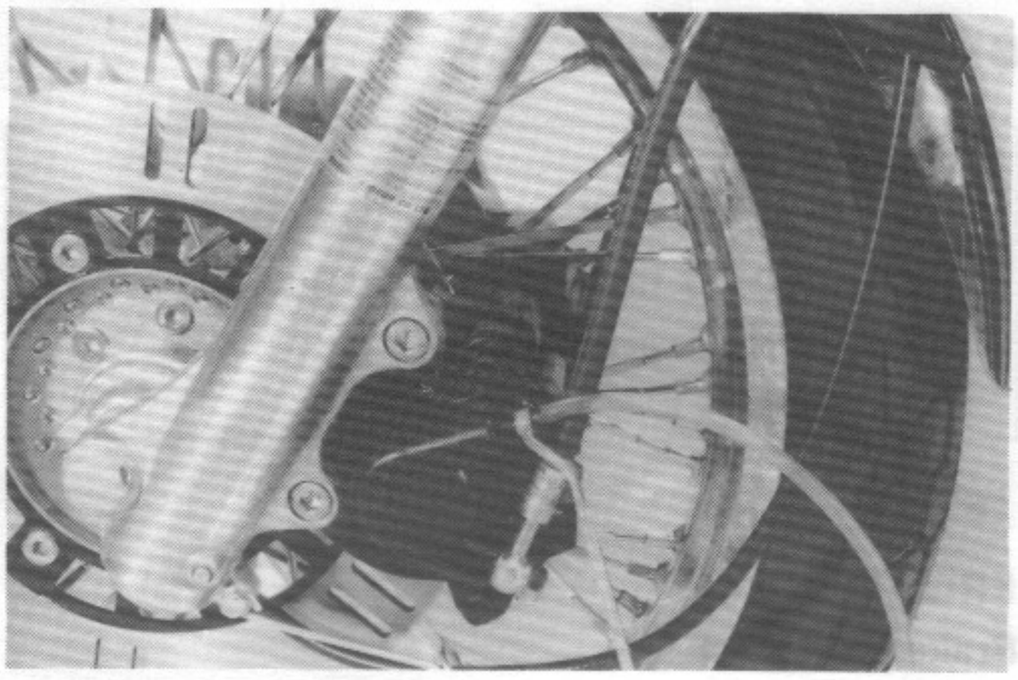


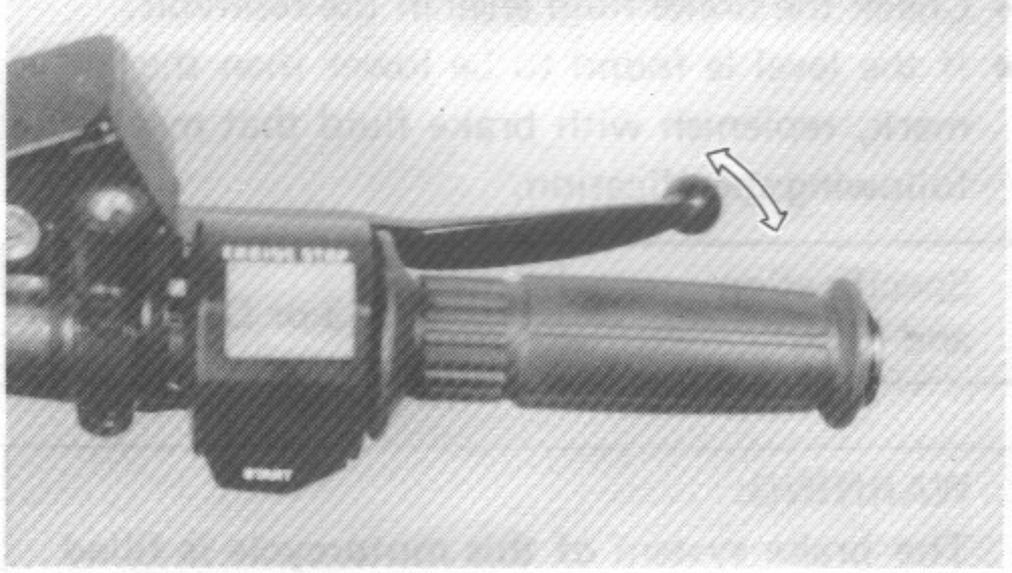
Bleeding air from the brake fluid circuit

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 caliper brake. 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 of inspection window.

Bleeder valve tightening torque	6 – 9 N·m (0.6 – 0.9 kg-m) (4.5 – 6.5 lb-ft)



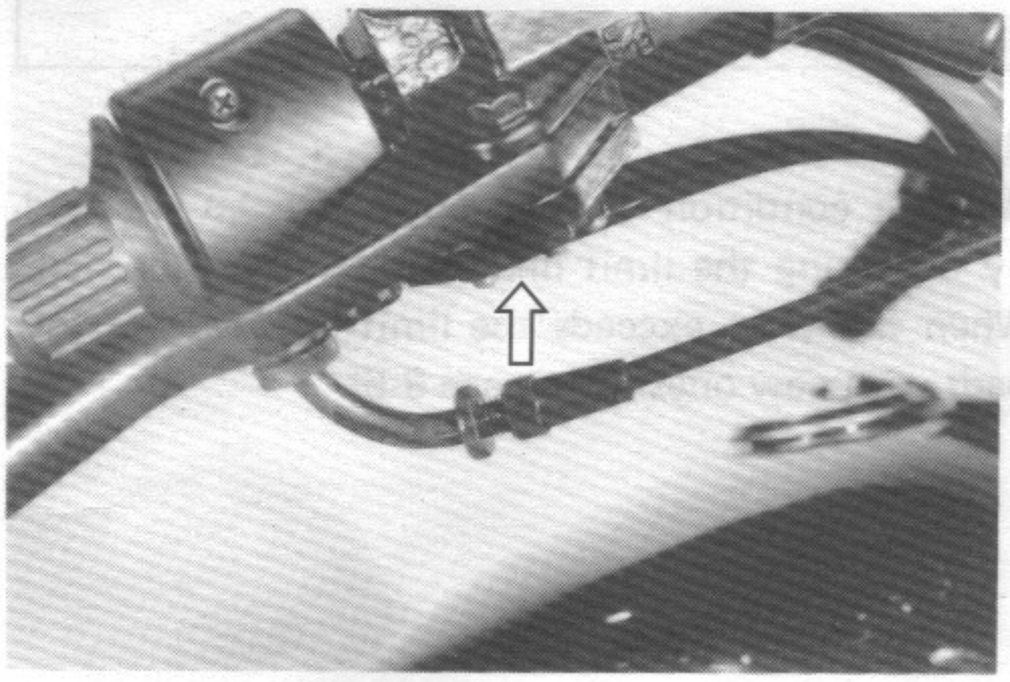


NOTE:
Replenish the brake fluid reservoir as necessary while bleeding the brake system.
Make sure that there is always some fluid visible in the reservoir.

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

Front brake light switch

CAUTION:
Check to be sure that the brake light comes on when front brake lever is squeezed.



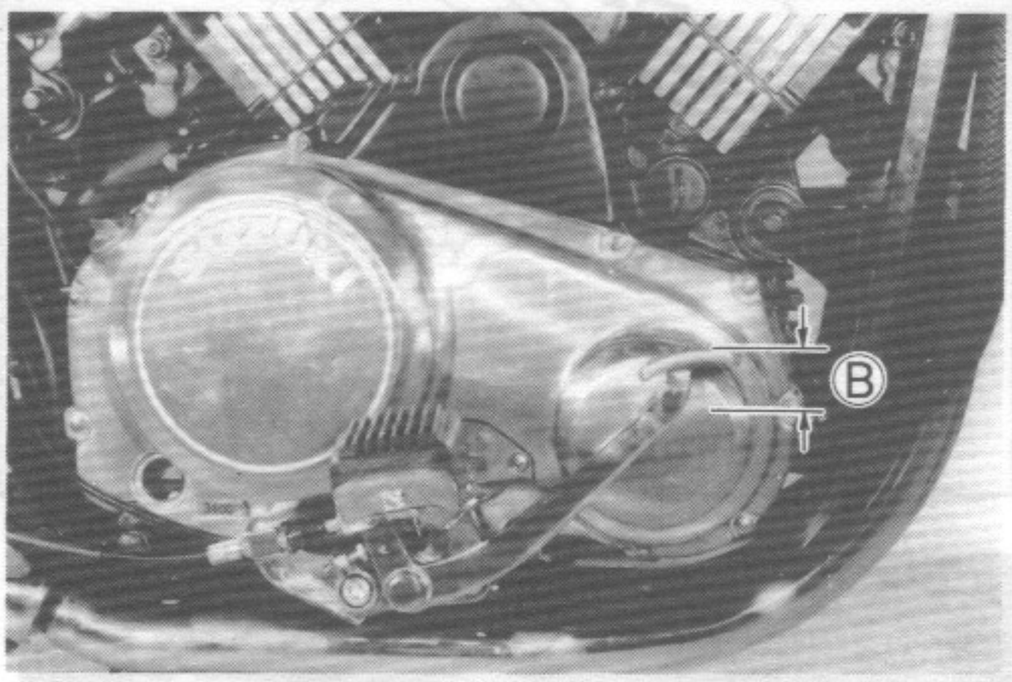
REAR BRAKE

Brake pedal height and free travel

Bring the brake pedal to a position about 15 mm Ⓐ (0.6 in) above the footrest as shown in photo. This is effected by turning the adjusting bolt ①. Be sure to tighten the lock nut ② good and hard after setting the bolt.

By repositioning the adjusting nut ③ on brake cable, set the pedal play to between 20 and 30 mm Ⓑ (0.8 – 1.2 in) as measured at pedal tip.

Brake pedal height Ⓐ	Above 15 mm (0.6 in)
Brake pedal free travel Ⓑ	20 – 30 mm (0.8 – 1.2 in)

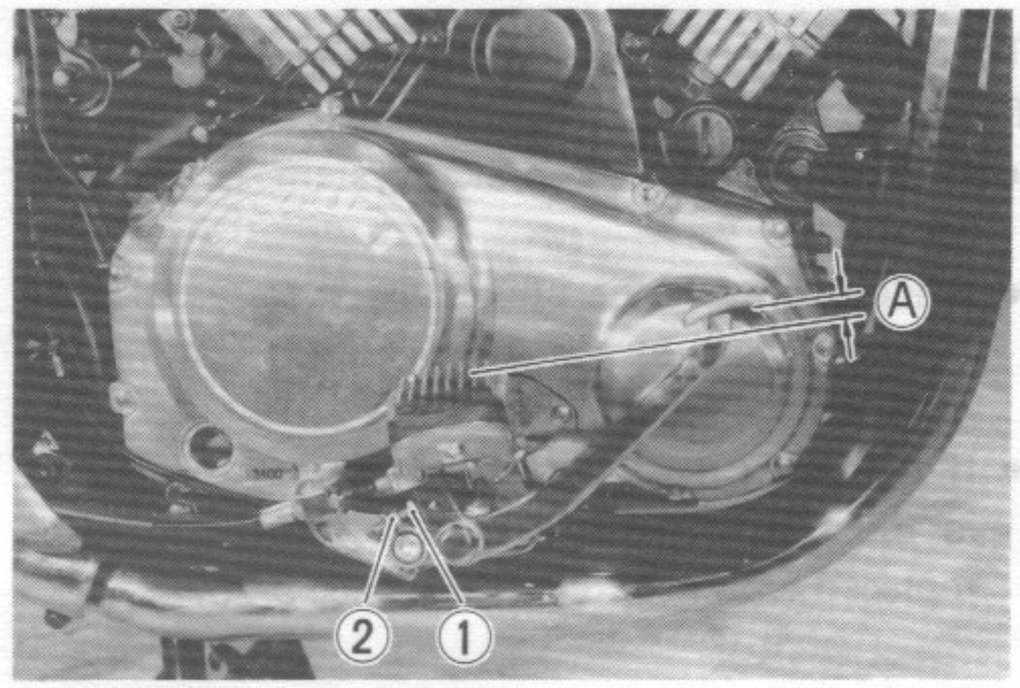


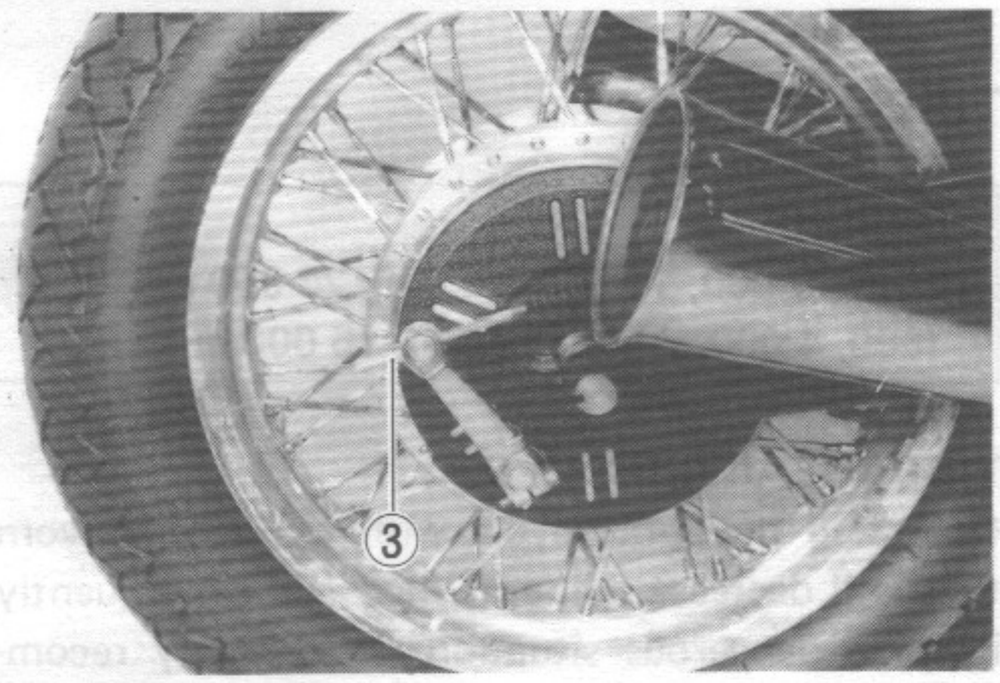
Brake light switch

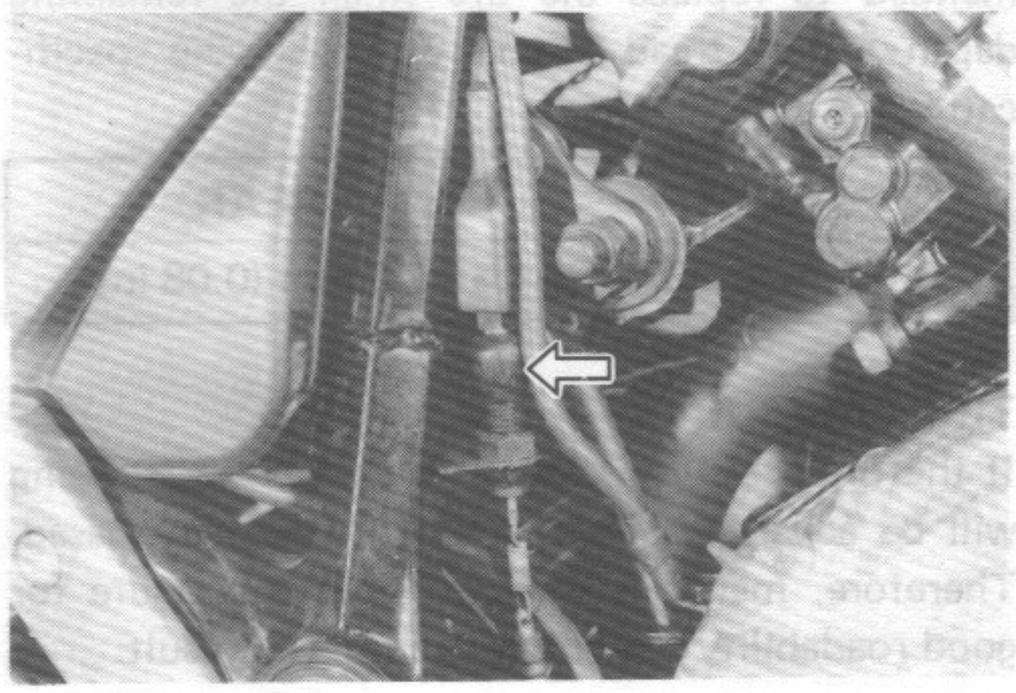
Check to be sure that rear brake light comes on when the pedal is depressed to take up the play. To adjust the brake light switch: raise or lower the switch so that the brake light will come on just before a pressure rise is felt when the brake pedal is depressed.

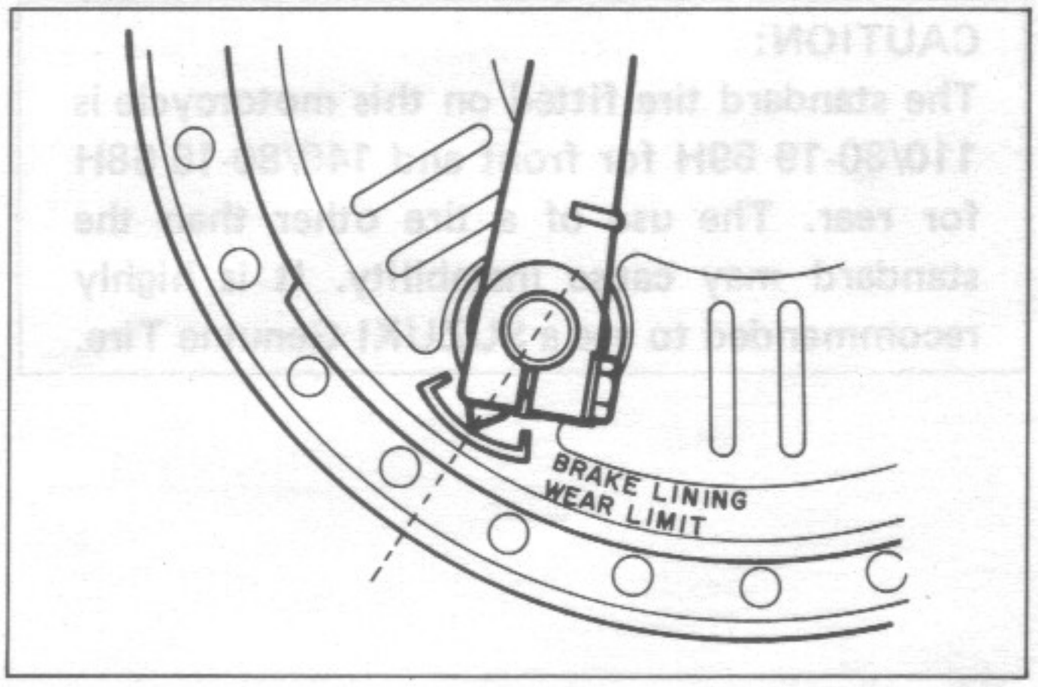
Brake shoe wear

This motorcycle is equipped with brake lining wear limit indicator on rear 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.





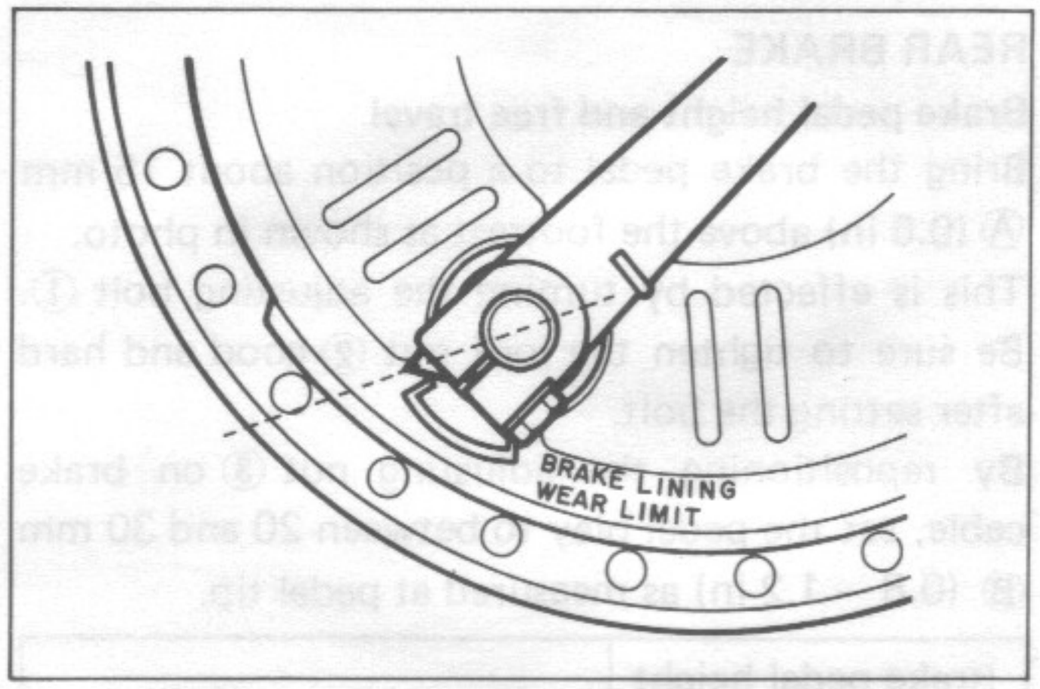




The extension line of the index mark is within the range.

To check wear of the brake lining, perform the following steps.

- First check if the brake system is properly adjusted.
- While operating the brake, check to see that the extension line of the index mark is within the range on the brake panel.
- If the index mark is beyond the range as shown in the Fig., the brake shoe assembly should be replaced with new ones. (See page 9-25)



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

TIRES

Inspect:
1 000, 6 000, 12 000, 18 000, 24 000 km
(600, 4 000, 7 500, 11 000, 15 000 mi)

TIRE TREAD CONDITION

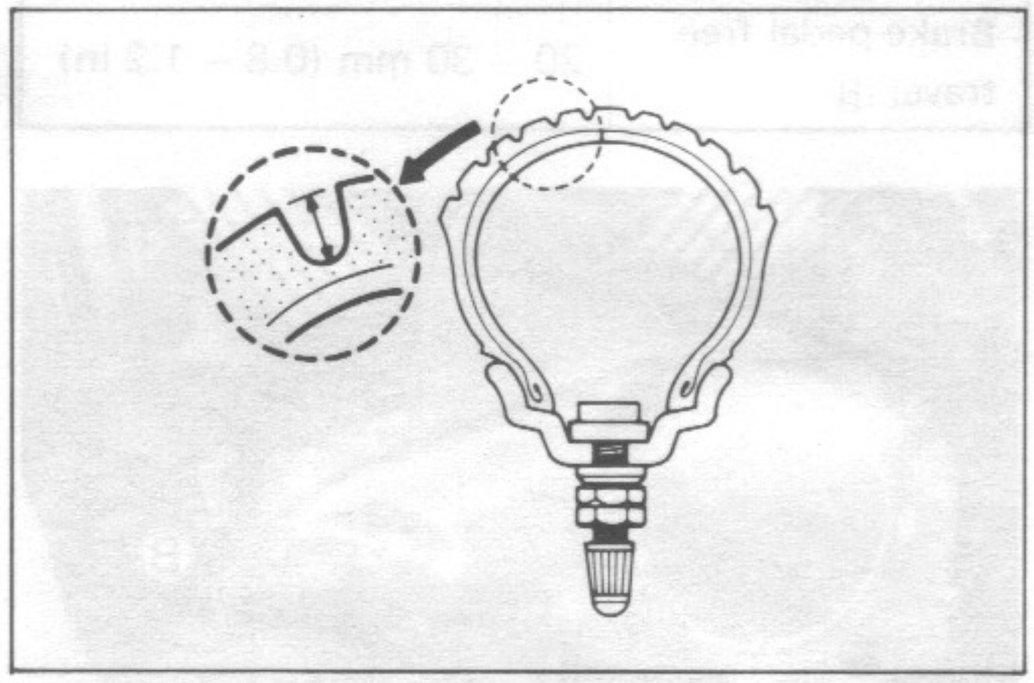
Operating the motorcycle with excessively worn tires will decrease riding stability and consequently invite a dangerous situation. It is highly recommended to replace the tire when the remaining depth of tire tread reaches the following specifications.

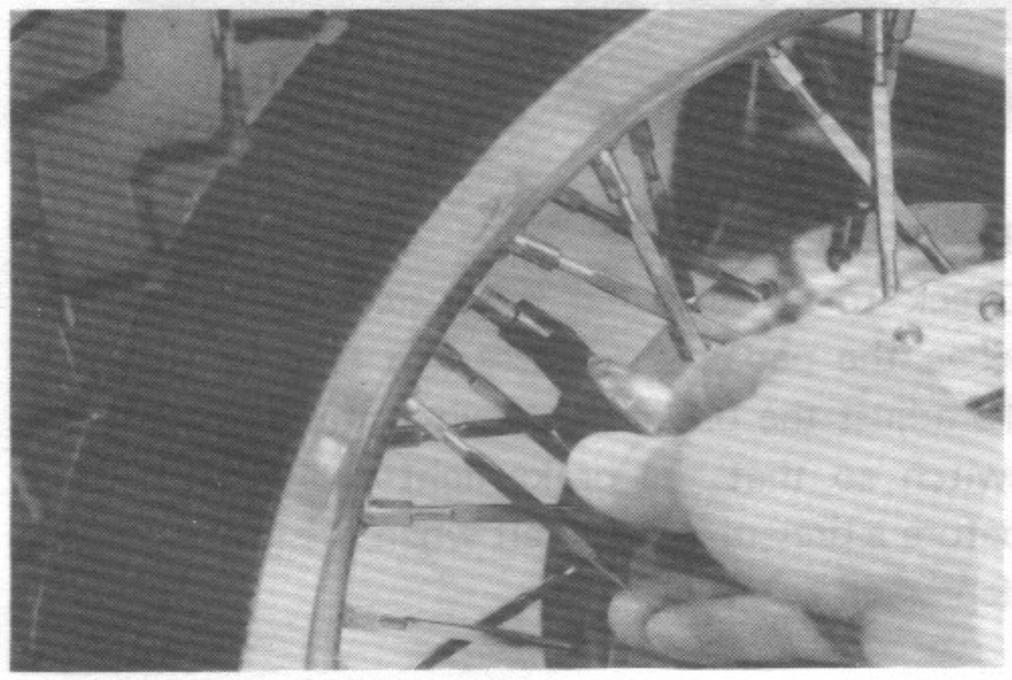
FRONT	REAR
1.6 mm (0.06 in)	2.0 mm (0.08 in)

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.

CAUTION:
The standard tire fitted on this motorcycle is 110/80-19 59H for front and 140/80-16 68H for rear. The use of a tire other than the standard may cause instability. It is highly recommended to use a SUZUKI Genuine Tire.





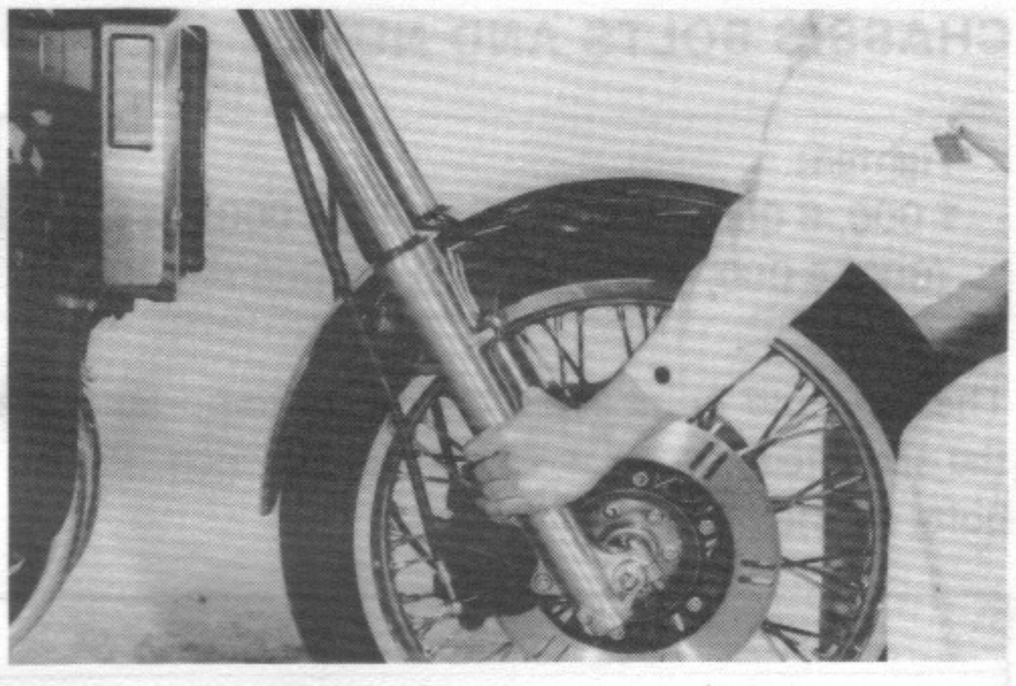
Cold inflation tire pressure is as follows.

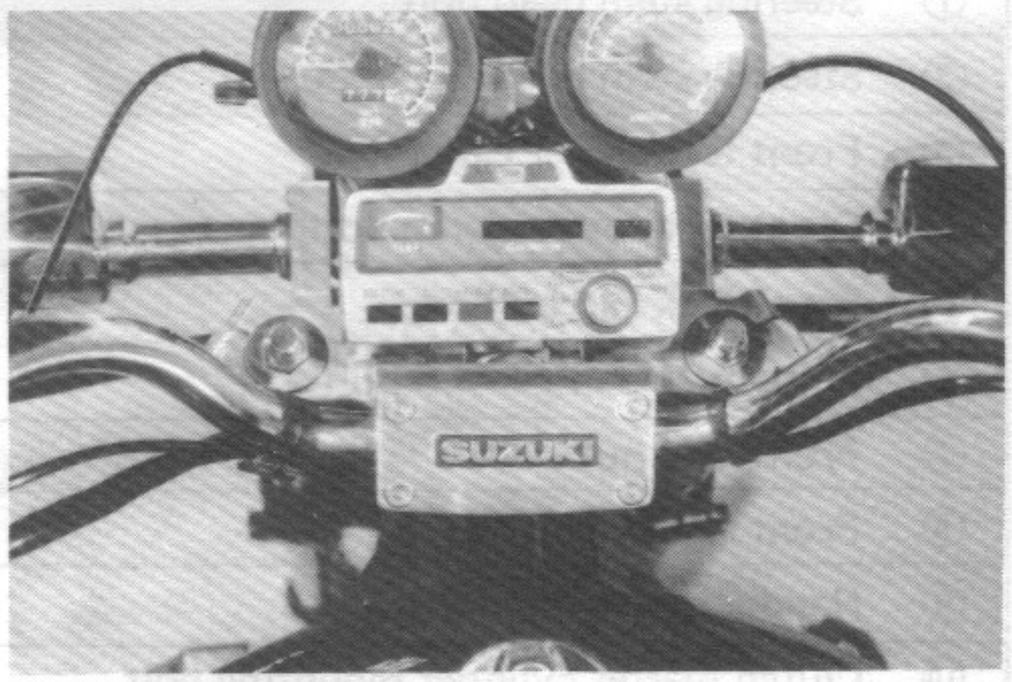
	FRONT			REAR		
	kPa	kg/cm^2	psi	kPa	kg/cm^2	psi
Solo riding	200	2.00	28	225	2.25	32
Dual riding	225	2.25	32	280	2.80	40

STEERING

Inspect:
1 000, 6 000, 12 000, 18 000, 24 000 km
(600, 4 000, 7 500, 11 000, 15 000 mi)

Taper roller type bearings are applied on the steering system for better handling.
Steering should be adjusted properly for smooth manipulation of handlebars and safe running.
Too stiff steering prevents smooth manipulation of handlebars and too loose steering will cause poor stability.
Check that there is no play in the front fork assembly by supporting the machine 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 9-24 of this manual.



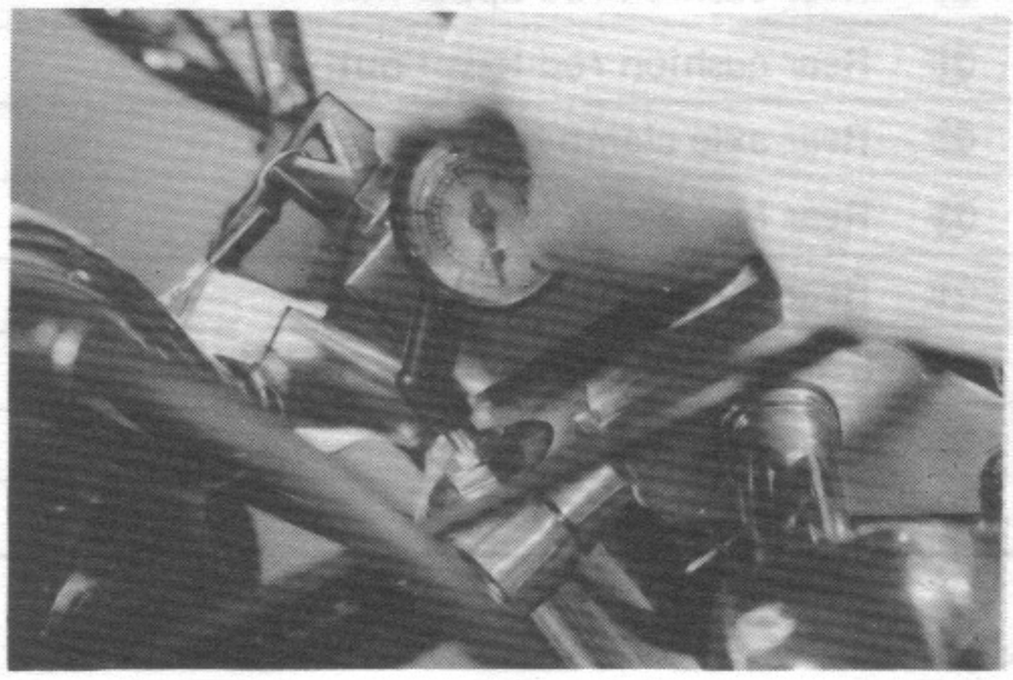


FRONT FORK

Inspect: 12 000, 24 000 km
(7 500, 11 000 mi)
Check air pressure Every 6 months

- Inspect the front fork oil leakage, scoring and scratches on the outer surface of the inner tube and replace the defective parts, if necessary. (See page 9-13).
- Check the front fork air pressure, when the fork is cold.
- Support the motorcycle on the center stand, and keep the front wheel off the ground.
- Measure the air pressure by pressure gauge on the valve.

Specified air pressure	30 kPa (0.3 kg/cm², 4.3 psi)



- Adjust the air pressure if necessary, use a hand type pump to raise the fork air pressure. (See 9-19)

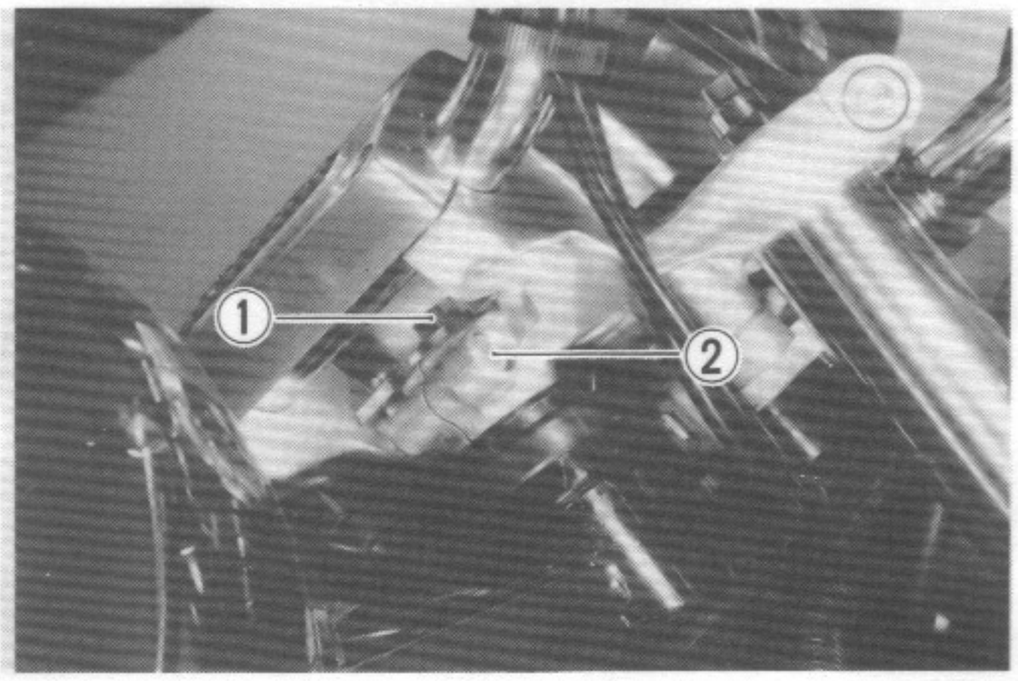
NOTE:
Before charging the air confirm that the valve is tight.

CHASSIS BOLTS AND NUTS

Tighten:
1 000, 6 000, 12 000, 18 000, 24 000 km
(600, 4 000, 7 500, 11 000, 15 000 mi)

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 2-16 for the location of the following nuts and bolts on the motorcycle.)

Item	N·m	kg-m	lb-ft
① Steering stem head bolt	20 – 30	2.0 – 3.0	14.5 – 21.5
② Steering stem head clamp bolt	15 – 25	1.5 – 2.5	11.0 – 18.0
③ Front fork upper clamp bolt	20 – 30	2.0 – 3.0	14.5 – 21.5
④ Front fork lower clamp bolt	15 – 25	1.5 – 2.5	11.0 – 18.0
⑤ Front fork cap bolt	15 – 30	1.5 – 3.0	11.0 – 21.5
⑥ Front fork damper rod bolt	32 – 42	3.2 – 4.2	23.0 – 30.5
⑦ Front axle nut	36 – 52	3.6 – 5.2	26.0 – 37.5
⑧ Front axle clamp nut	15 – 25	1.5 – 2.5	11.0 – 18.0
⑨ Handlebars clamp bolt	12 – 20	1.2 – 2.0	8.5 – 14.5
⑩ Clutch master cylinder mounting bolt	5 – 8	0.5 – 0.8	3.5 – 6.0
⑪ Front brake master cylinder mounting bolt	5 – 8	0.5 – 0.8	3.5 – 6.0
⑫ Front caliper mounting bolt	25 – 40	2.5 – 4.0	18.0 – 29.0
⑬ Front caliper axle bolt	15 – 20	1.5 – 2.0	11.0 – 14.5
⑭ Brake hose union bolt	20 – 25	2.0 – 2.5	14.5 – 18.0
⑮ Air bleeder valve	6 – 9	0.6 – 0.9	4.5 – 6.5
⑯ Front disc bolt	20 – 30	2.0 – 3.0	14.5 – 21.5
⑰ Swing arm bearing holder bolt	3.5 – 4.5	0.35 – 0.45	2.5 – 3.0
⑱ Rear unit fitting nut (Upper & Lower)	40 – 60	4.0 – 6.0	29.0 – 43.5
⑲ Rear cushion lever nut	70 – 100	7.0 – 10.0	50.5 – 72.5
⑳ Rear cushion rod-upper nut	20 – 30	2.0 – 3.0	14.5 – 21.5
㉑ Rear cushion rod-lower nut	20 – 30	2.0 – 3.0	14.5 – 21.5
㉒ Rear axle clamp bolt	25 – 35	2.5 – 3.5	18.0 – 25.5
㉓ Rear brake cam lever bolt	5 – 8	0.5 – 0.8	3.5 – 6.0
㉔ Rear torque stop bolt	80 – 110	8.0 – 11.0	58.0 – 79.5
㉕ Swing arm bearing holder bolt lock nut	100 – 120	10.0 – 12.0	72.5 – 87.0
㉖ Rear axle nut	50 – 80	5.0 – 8.0	36.0 – 58.0
㉗ Spoke nipple	4 – 5	0.4 – 0.5	3.0 – 3.5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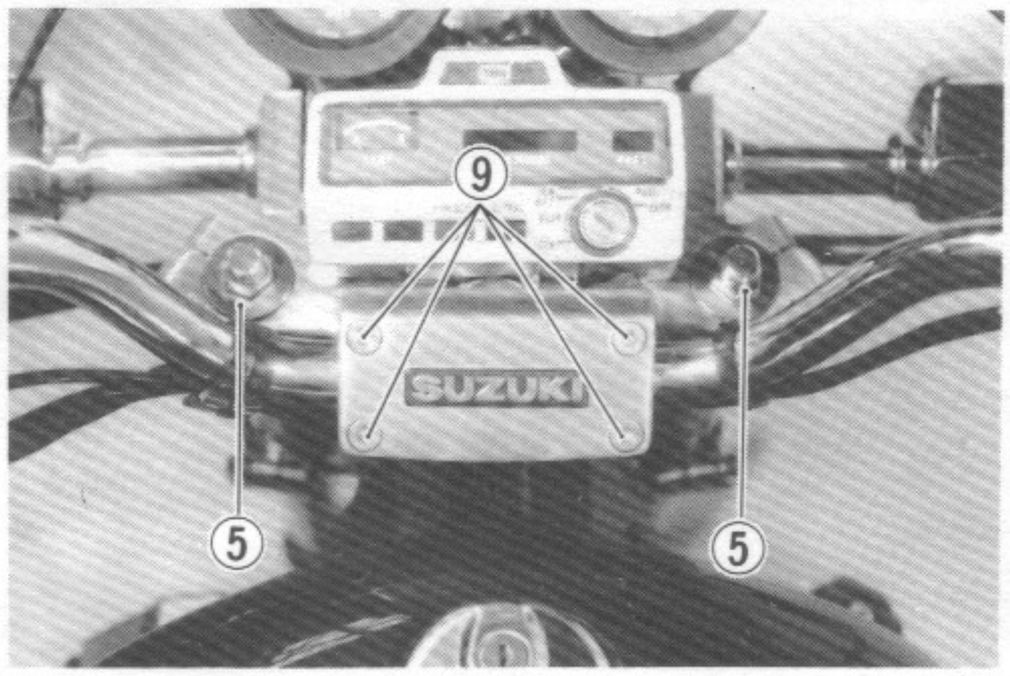
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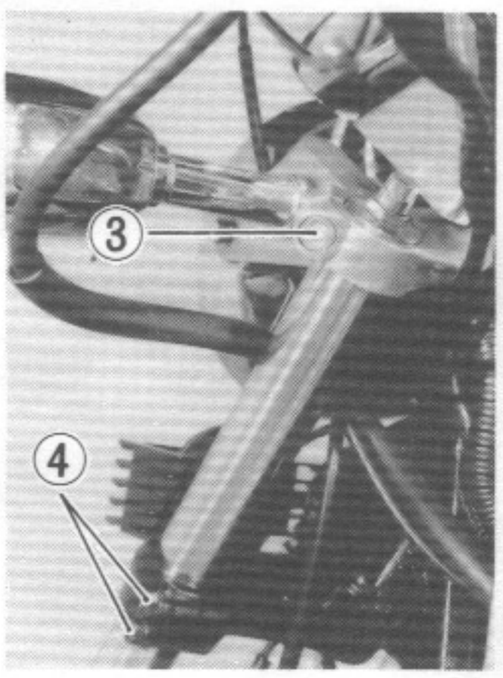
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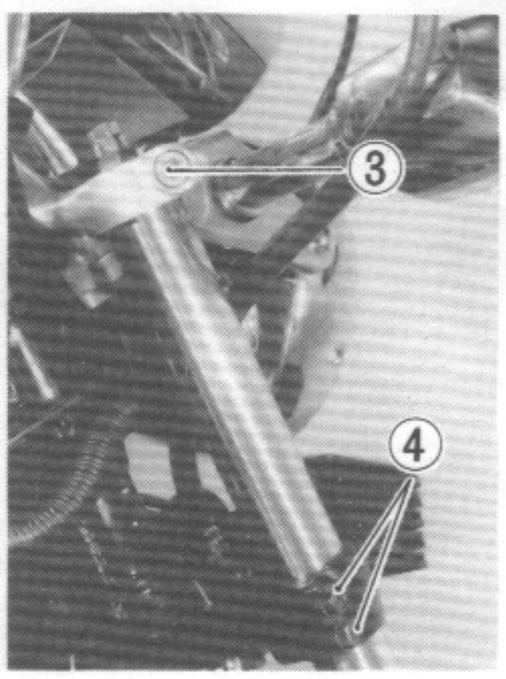
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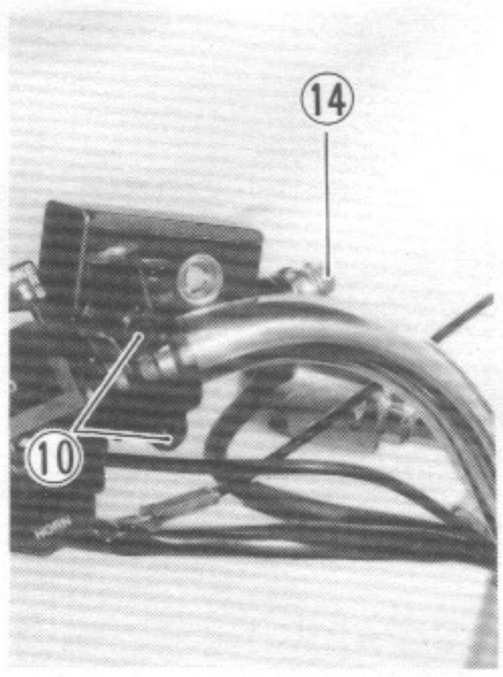
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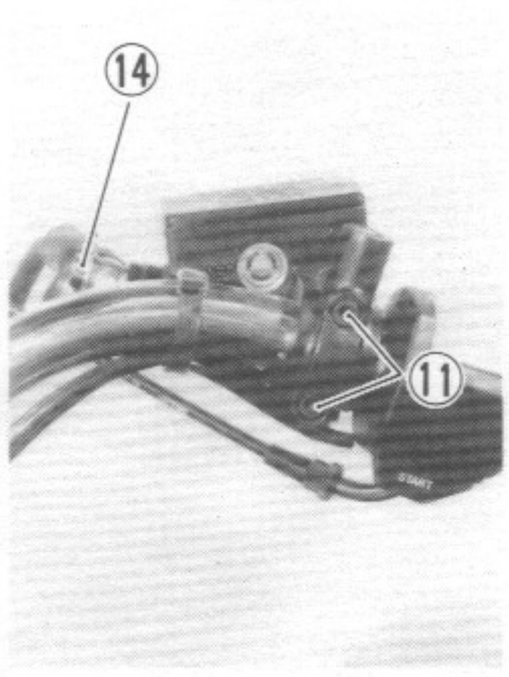
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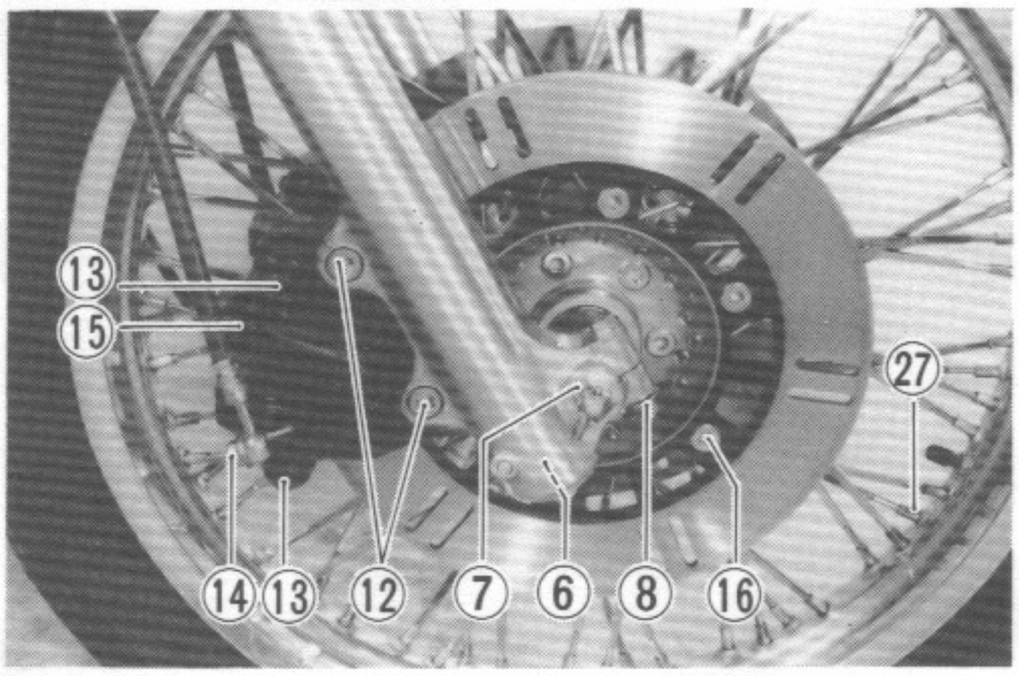
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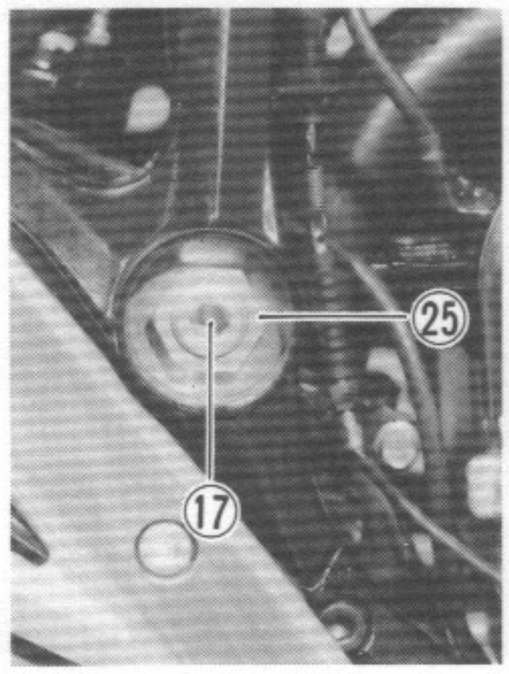
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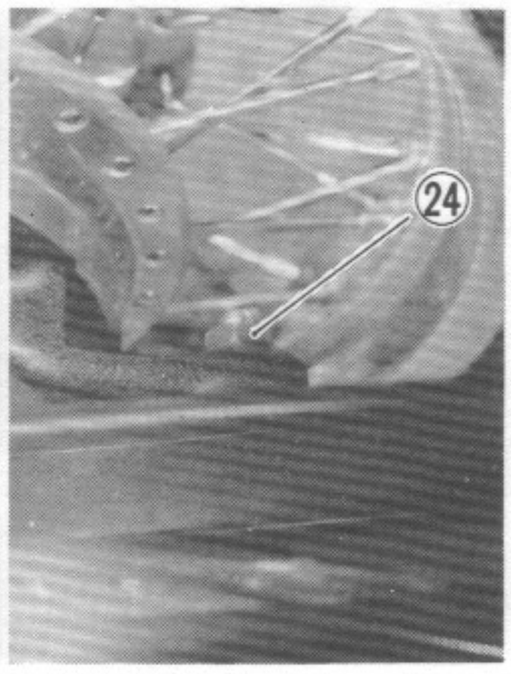
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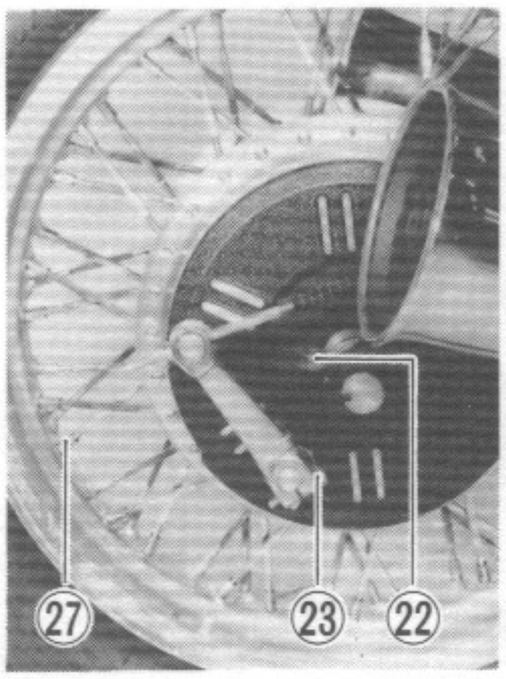
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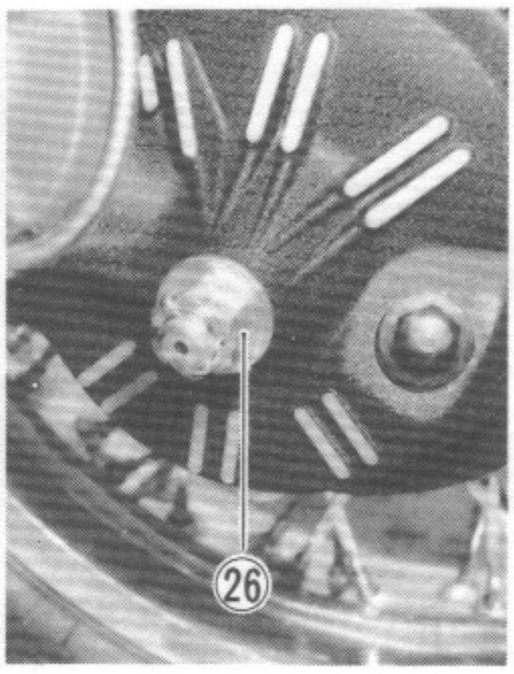
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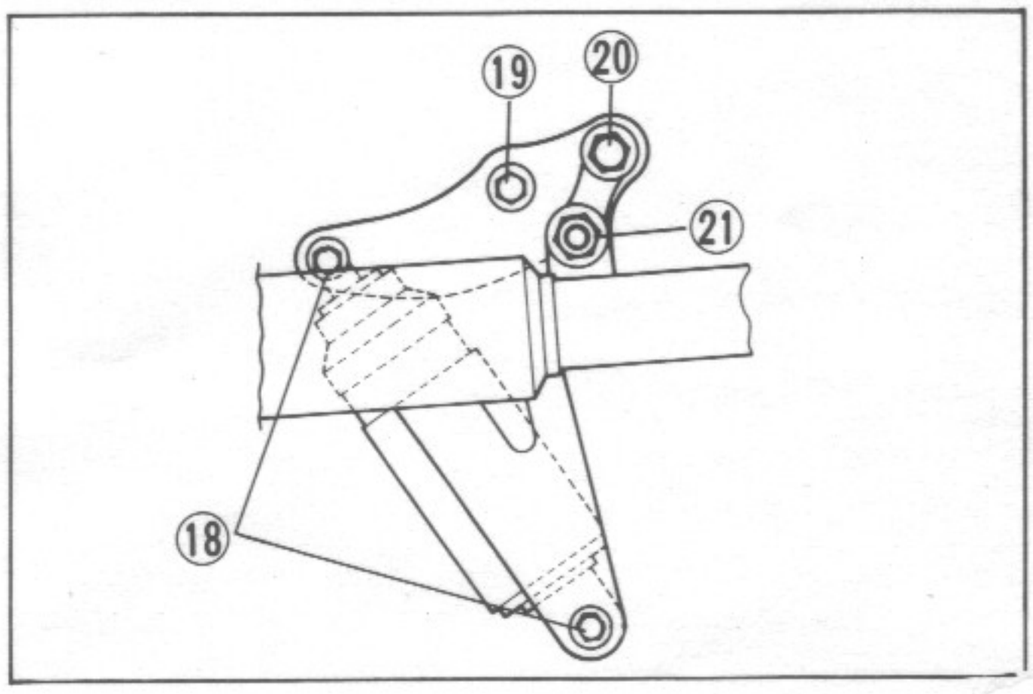
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ENGINE SERVICING

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COMPRESSION CHECK

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

COMPRESSION

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

Low compression pressure can indicate any of the following conditions:

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

Overhaul the engine in the following cases:

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

COMPRESSION TEST PROCEDURE

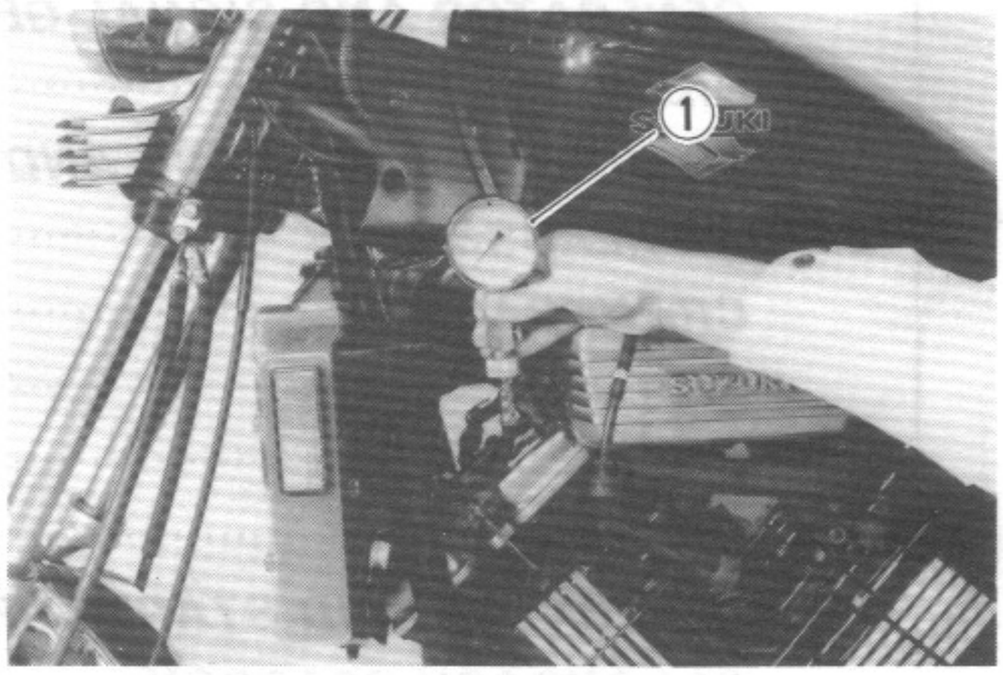
NOTE:

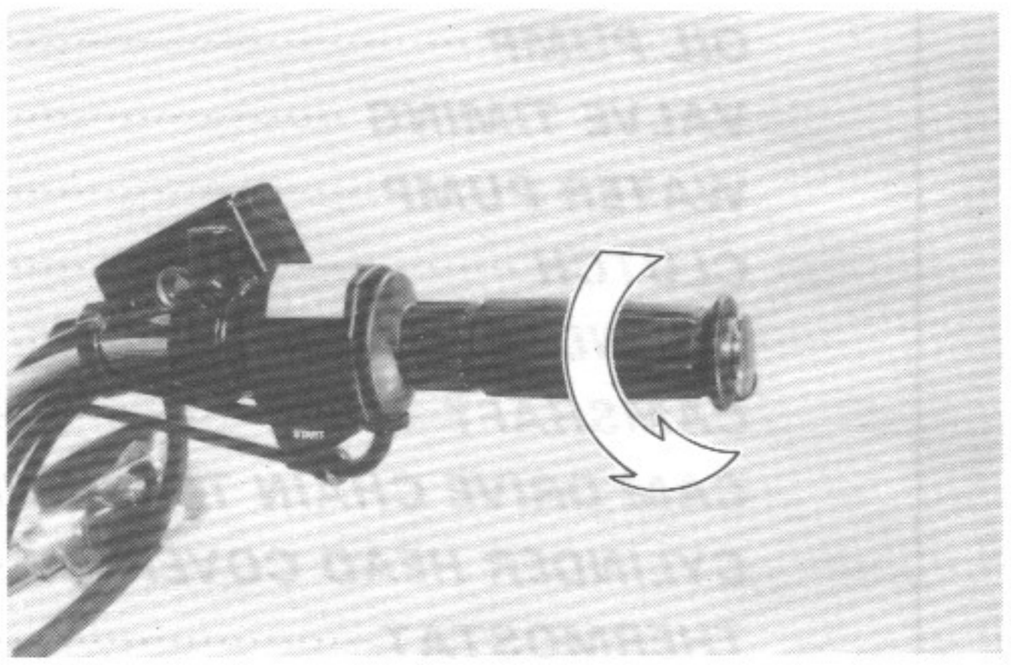
*** Before testing the compression of the engine, make sure that the cylinder head bolts and nuts are tightened to specified torque values.**

*** Warm up the engine before testing.**

- Remove the fuel tank. (Refer to page 3-3).
- Remove all the spark plugs.
- Fit the compression gauge ① in one of the plug holes, while taking care that the connection is tight.
- Twist the throttle grip full open.
- Crank the engine a few seconds with the starter, and record the maximum gauge reading as the compression of the cylinder.
- Repeat this procedure with the other cylinders.

09915-64510	Compression gauge
09913-10720	Adapter





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 and reinstallation instructions.

ENGINE LEFT SIDE

	See page
Gearshift lever	3- 7
Secondary bevel gearbox cover	3- 7
Secondary bevel gearbox	3-20
Generator cover	3-20
Starter pinion assembly	3-20
Clutch cylinder	3-20
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Gear position indicator switch body	3-24
Generator stator	3-52
Signal generator	3-52

ENGINE CENTER

	See page
Radiator and cooling fan	3- 4
Front exhaust pipe and muffler	3- 5
Oil filter	3- 5
Carburetor	3- 8
Throttle cable and starter cable	3- 8
Cylinder head breather cover	3-14
Cam chain tensioner (Front)	3-14
Cylinder head cover (Front)	3-14
Thermostat	3-14
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Camshaft (Front)	3-15
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Oil pan	3-21
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ENGINE RIGHT SIDE

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Clutch cover	3-16
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Water pump drive chain	3-17
Primary driven gear	3-17
Water pump assembly	3-18
Oil pump assembly	3-19
Gear shifting shaft	3-19

ENGINE REMOVAL AND REINSTALLATION

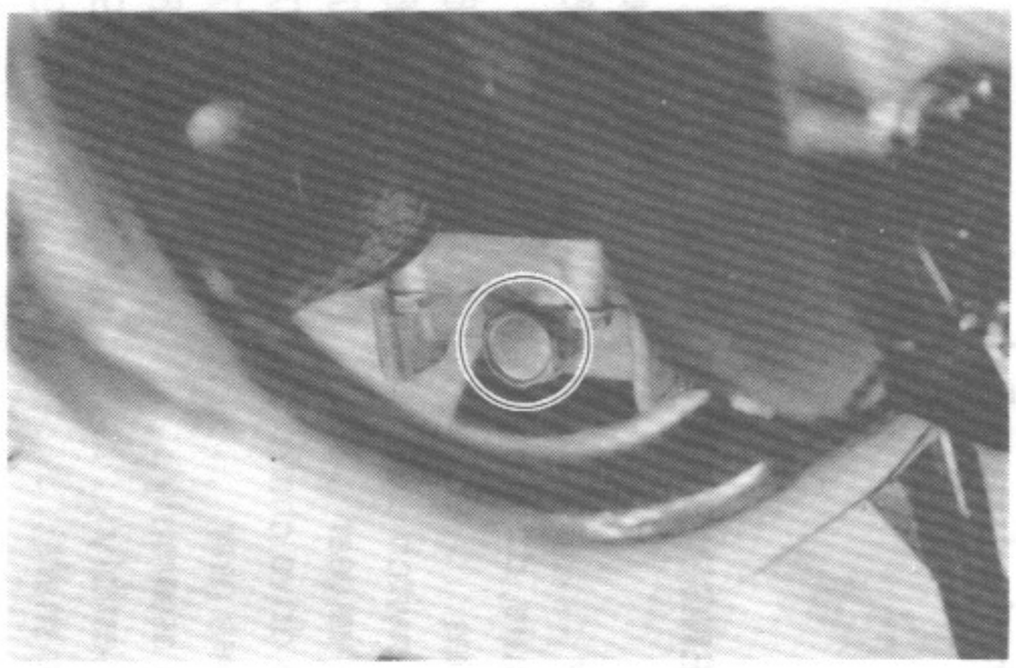
ENGINE REMOVAL

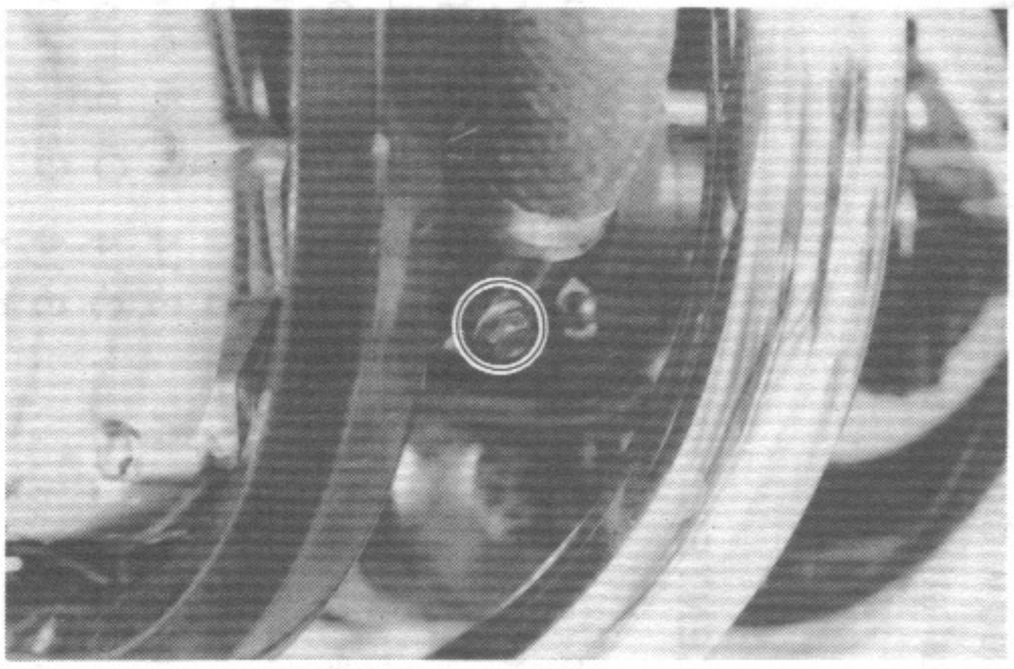
Before taking the engine out of the frame, wash the engine and drain engine oil and cooling solution etc. The procedure of engine removal is sequentially explained in the following steps, and engine installation is effected by reversing the removal procedure.

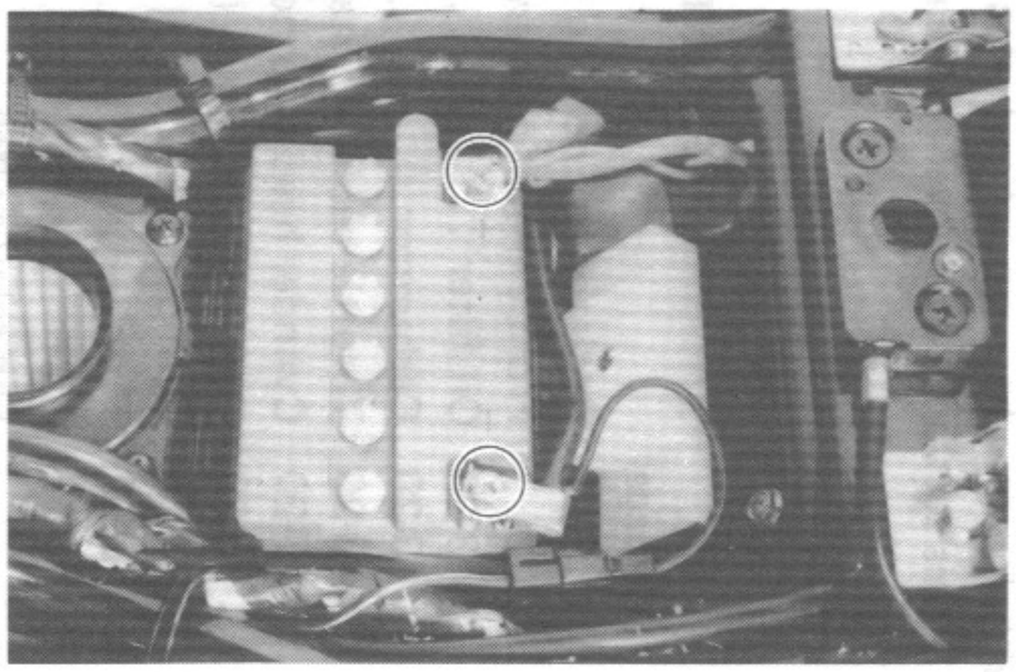
- Place an oil pan under the engine and remove the oil drain plug and filler plug to drain out engine oil.
- Remove the radiator cap and drain plug, and drain cooling solution completely.
- Remove the seat and remove the right and left frame covers.

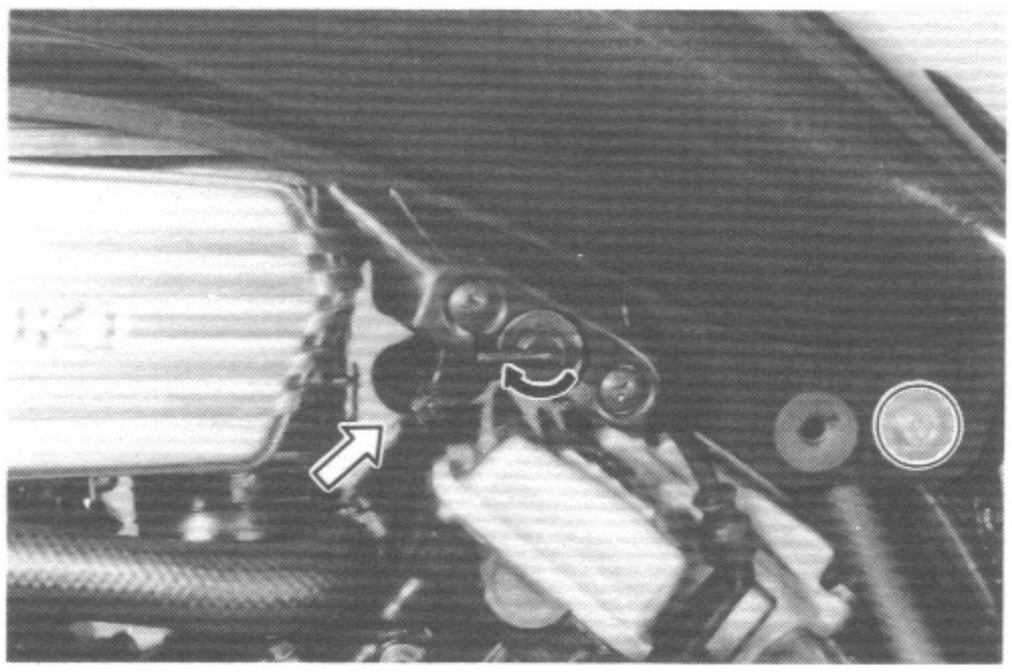
NOTE:
To prevent damage to the frame cover, the seat must be removed before frame cover is detached.

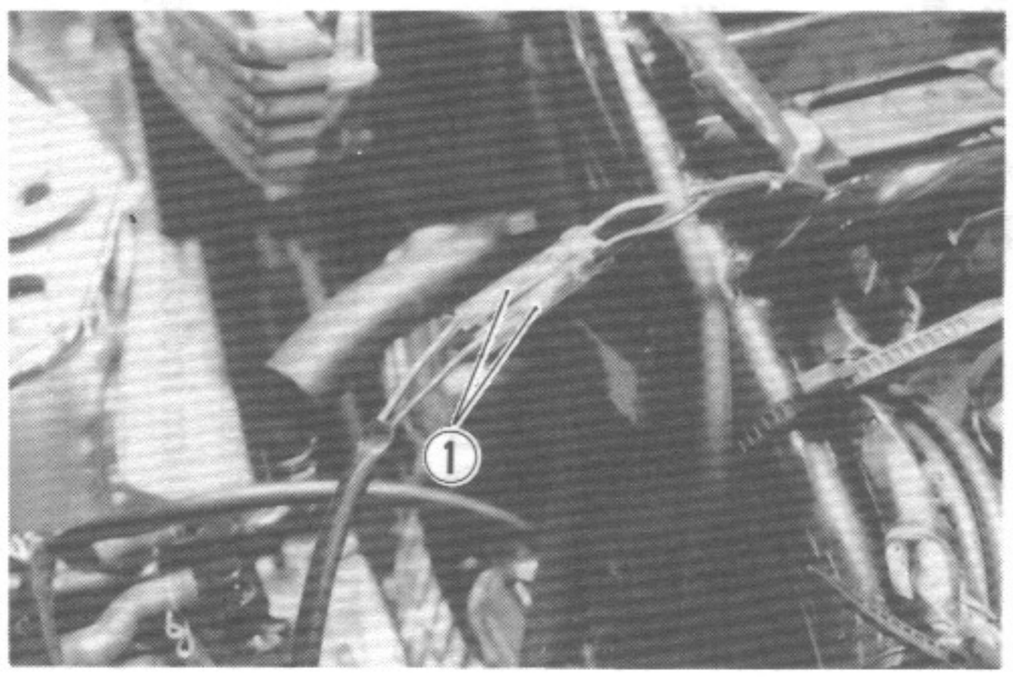
- Disconnect the battery ⊖ and ⊕ lead wires from the battery terminals.
- Remove the two bolts at the rear of the fuel tank.
- Turn the fuel cock lever to OFF position and shift the hose clip sideways and disconnect the fuel hose from the fuel cock.
- Disconnect the fuel level indicator switch lead wires ① and remove the fuel tank from the frame.



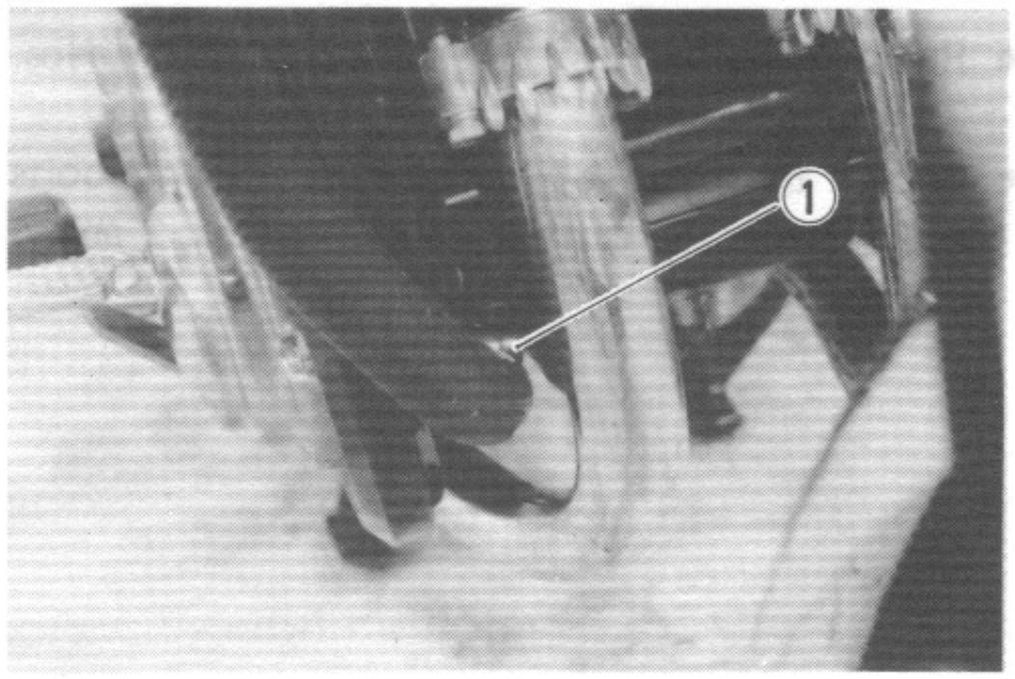


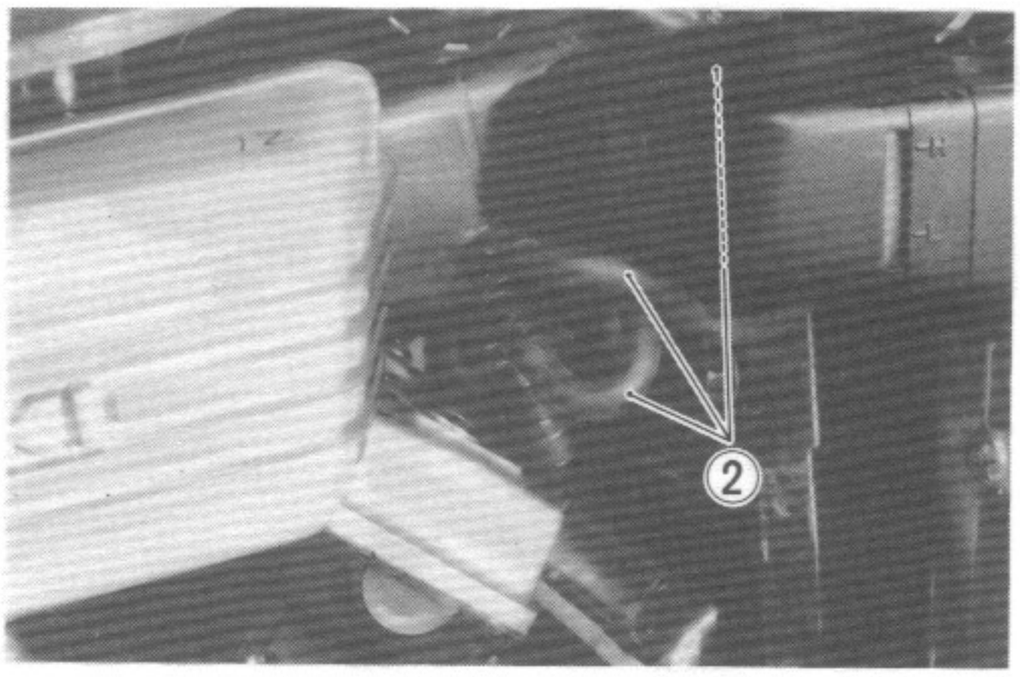


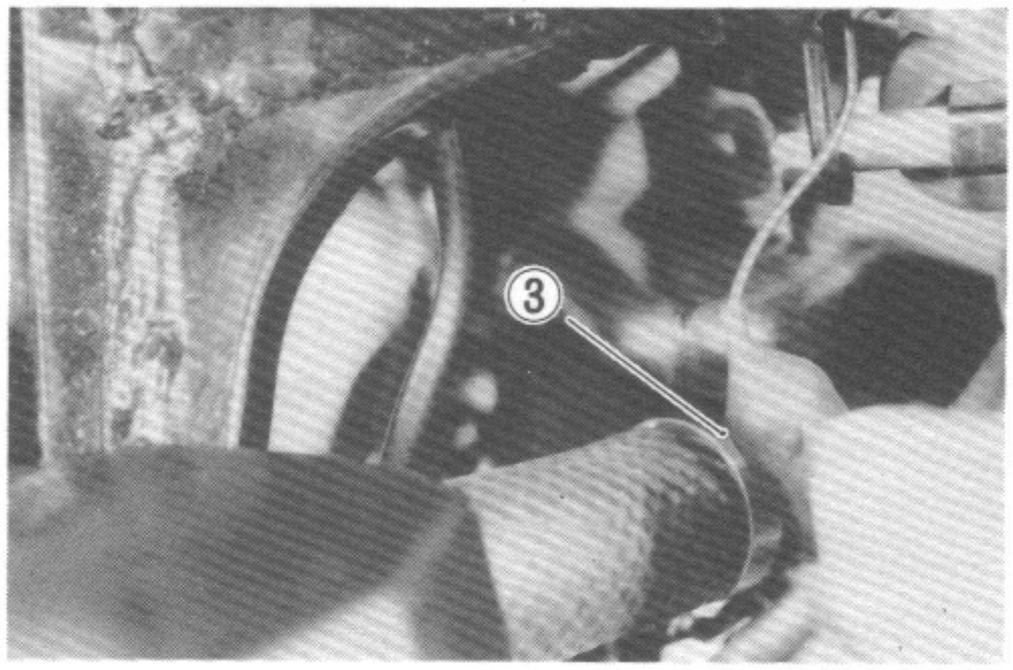


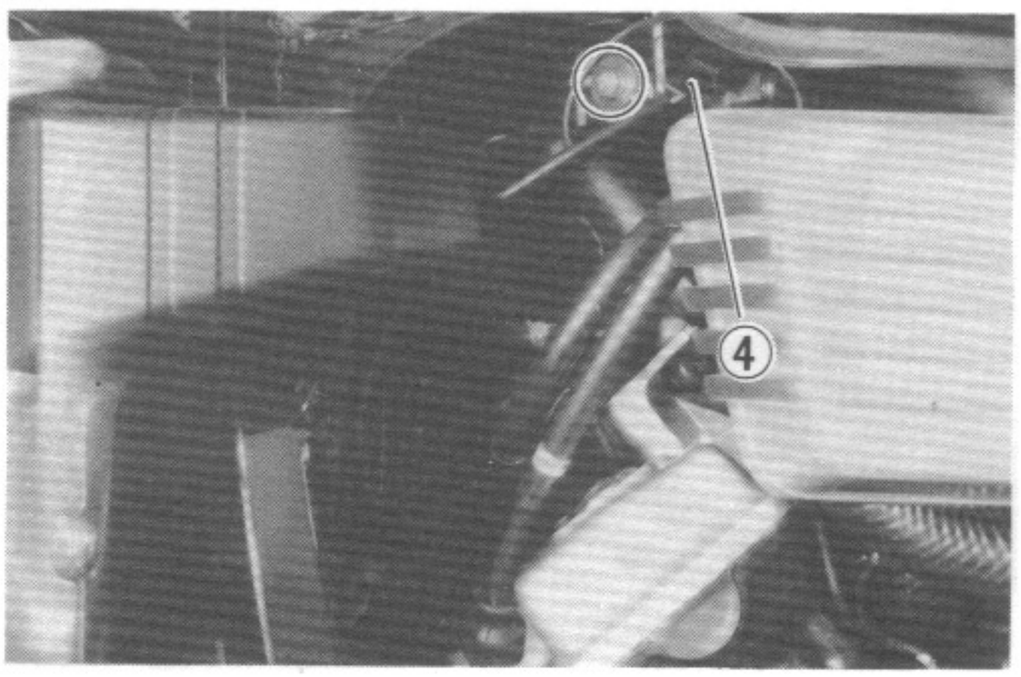


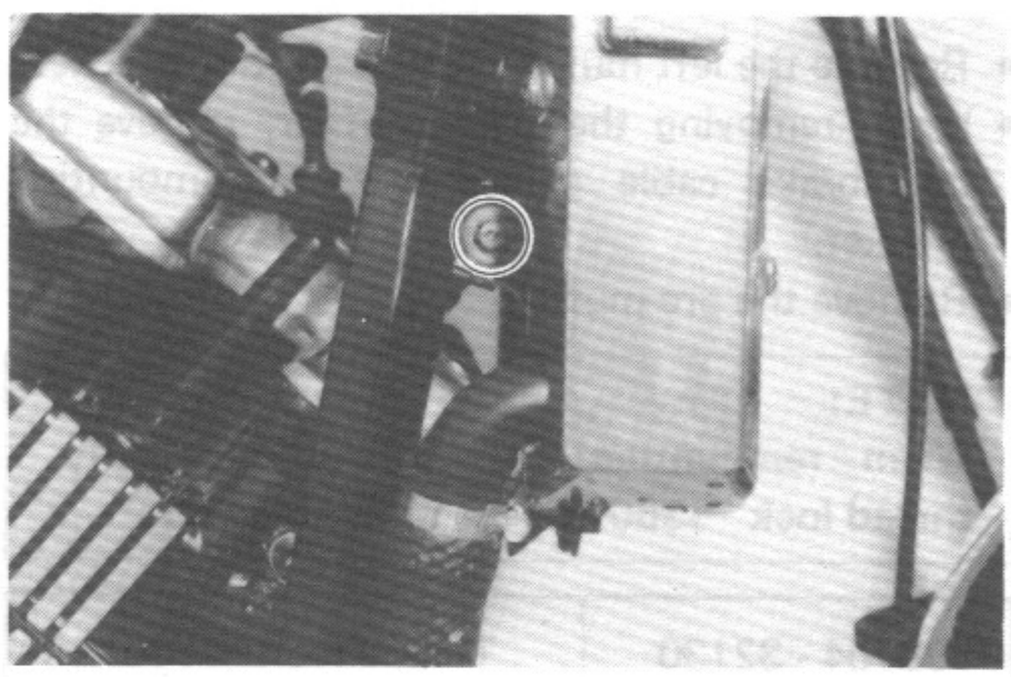
- Loosen the clamps and disconnect the following hoses.
  ① Radiator to water pump hose
  ② Radiator to reservoir tank hoses
  ③ Cylinder head to radiator hose
- Disconnect the electric fan lead wire ④.
- Remove the radiator with electric fan and fan motor.
- Remove the reservoir mounting screws and dismount the reservoir.

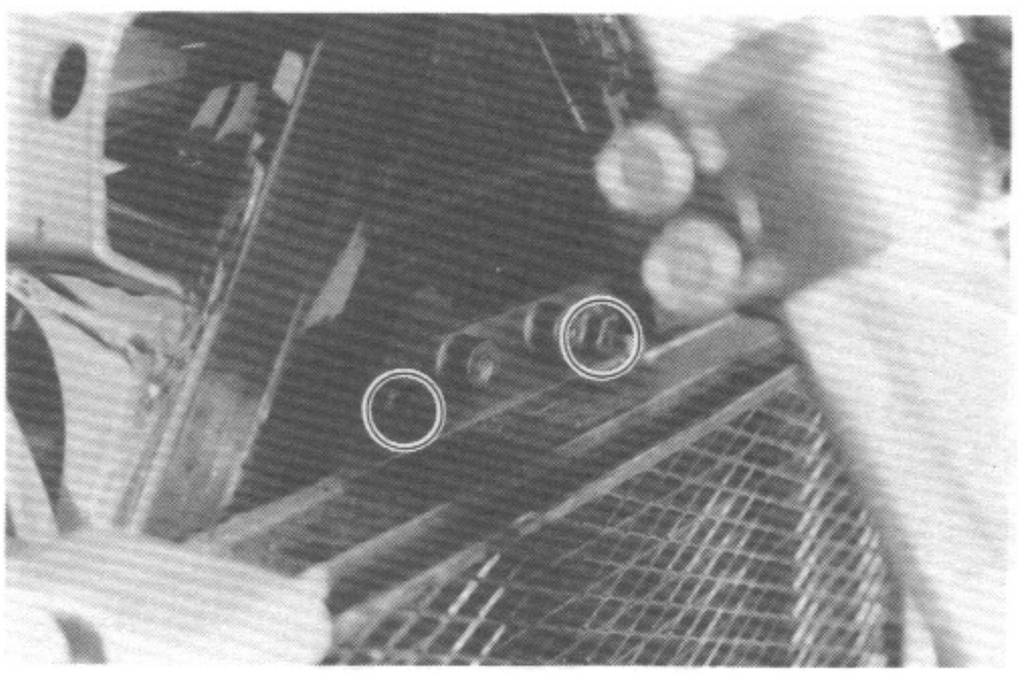


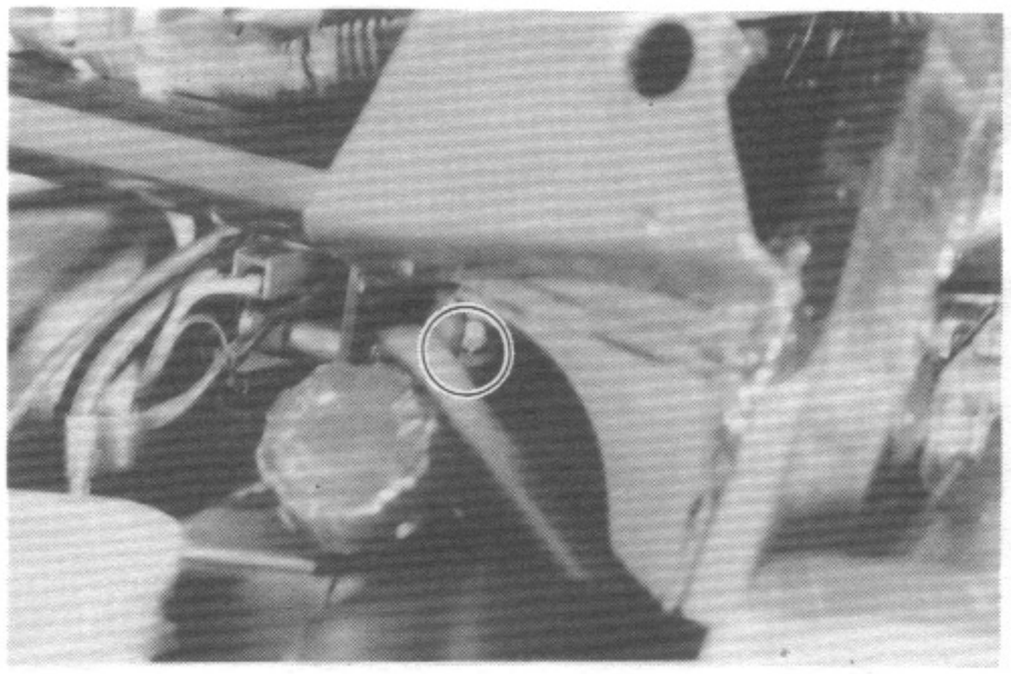




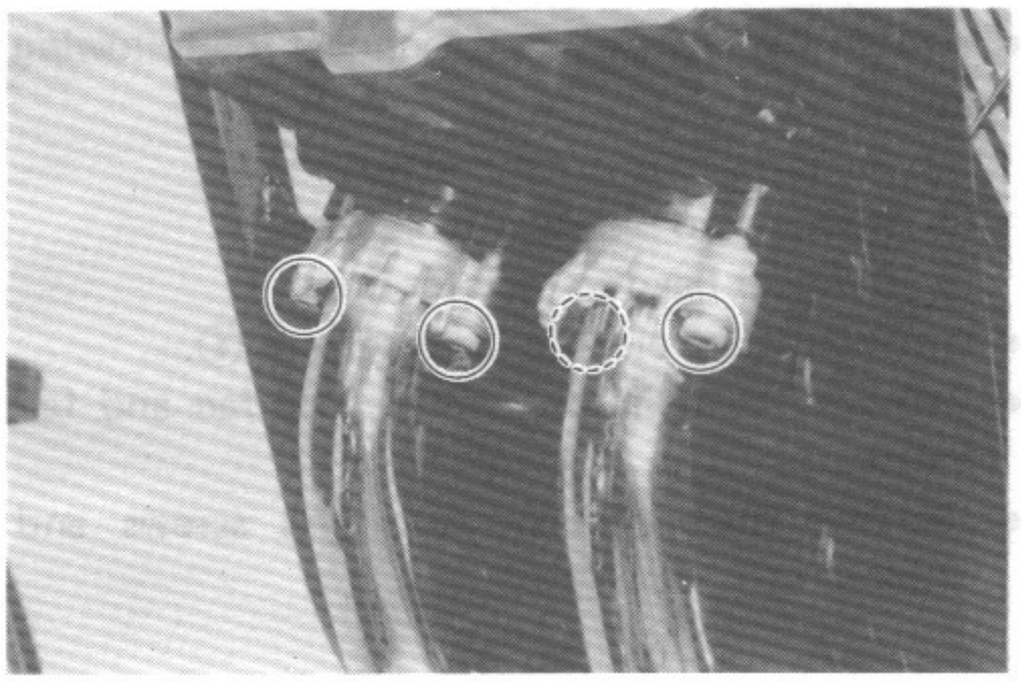


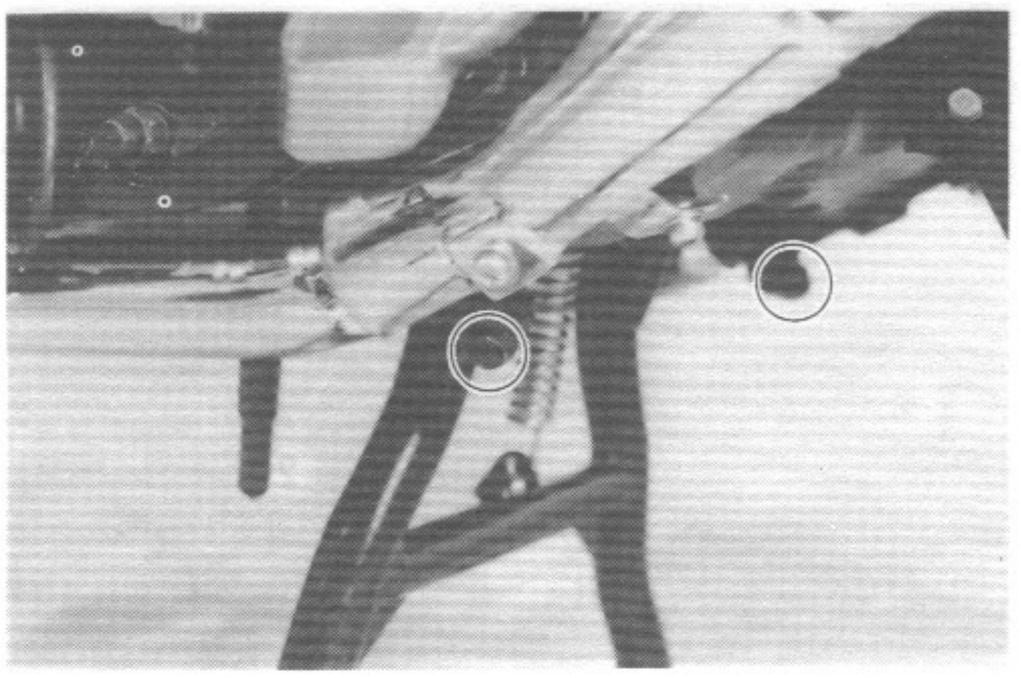






- Remove the exhaust pipe clamp bolts for Nos. 2 and 4 cylinders.
- Loosen the exhaust pipe-pre-muffler clamp bolts and remove the exhaust pipes for Nos. 2 and 4 cylinders.

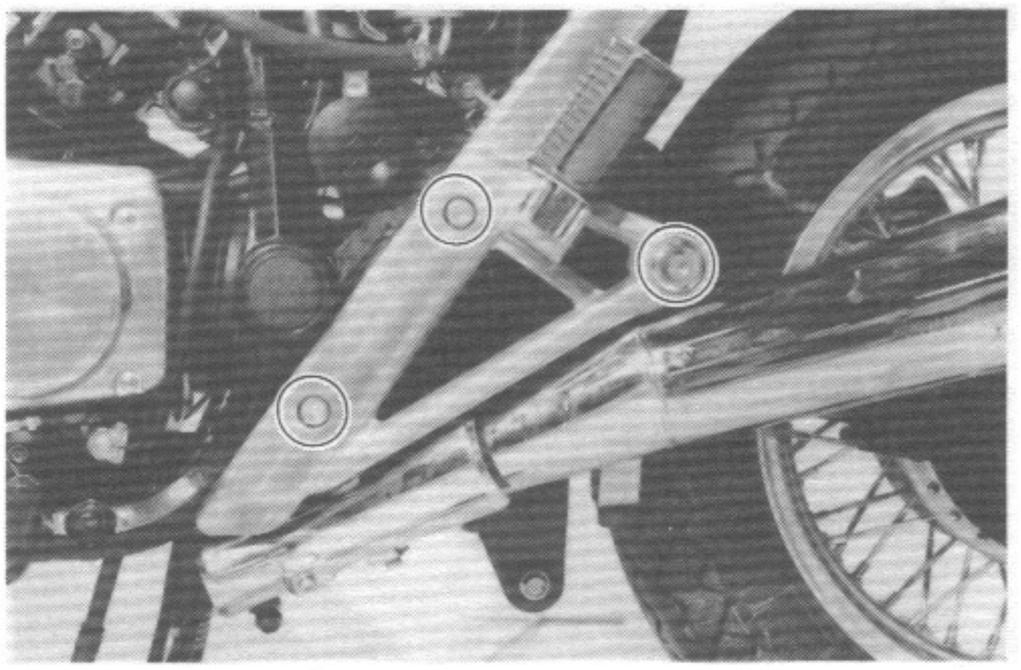


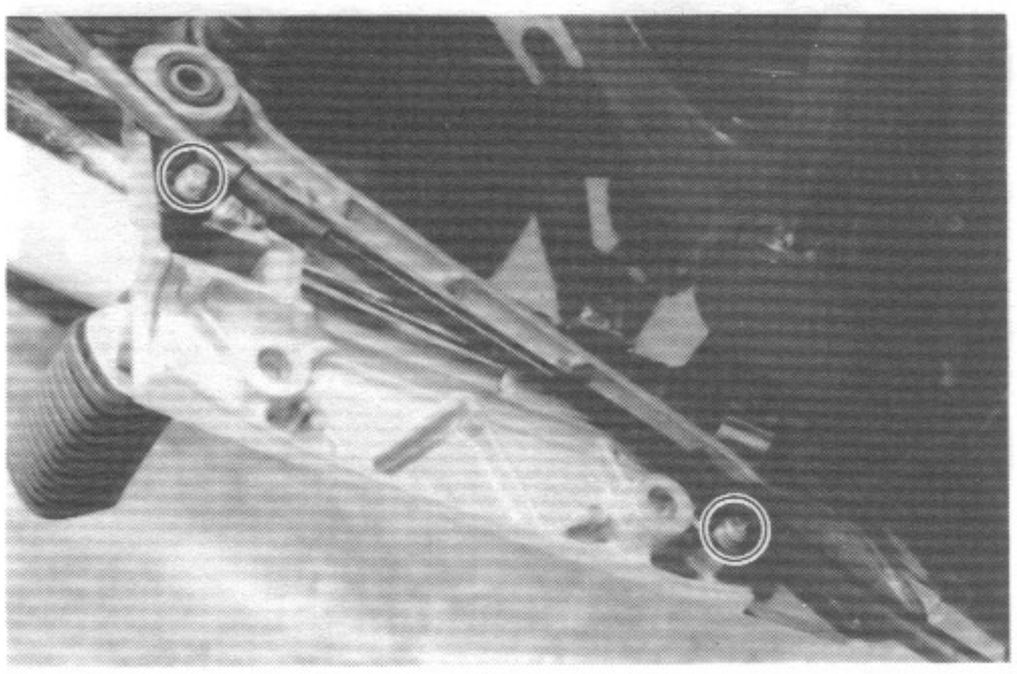


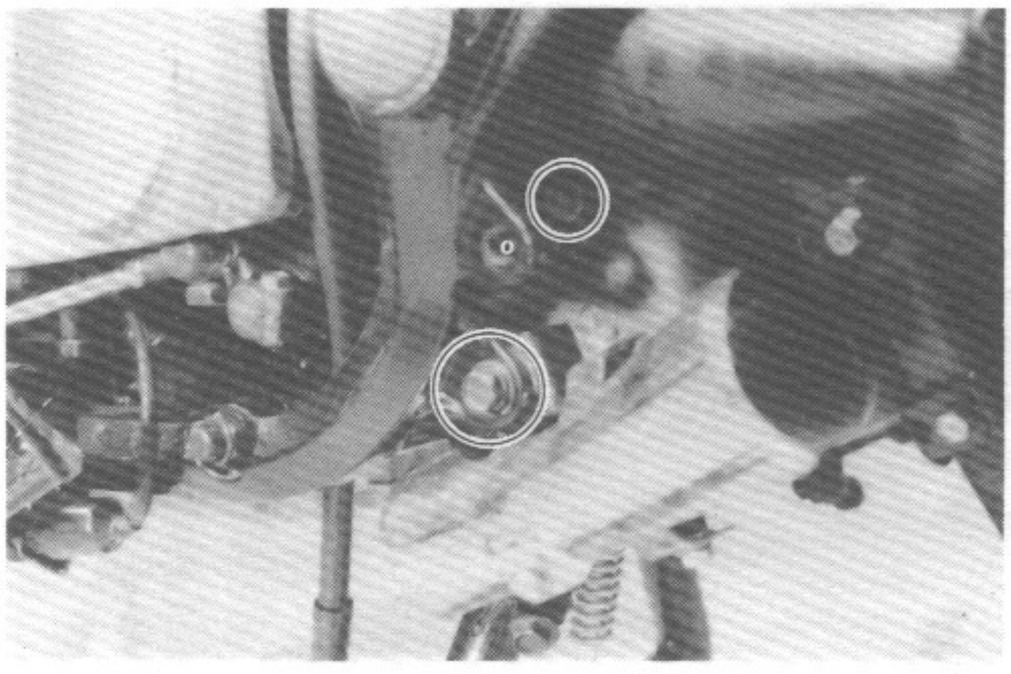
- Remove the left muffler with mounting bracket.
- When removing the right muffler, remove the rear brake cable guides from the mounting bracket.
- Remove the pre-muffler.

NOTE:
When remounting the pre-muffler, apply thread lock "1360" to the mounting bolts.

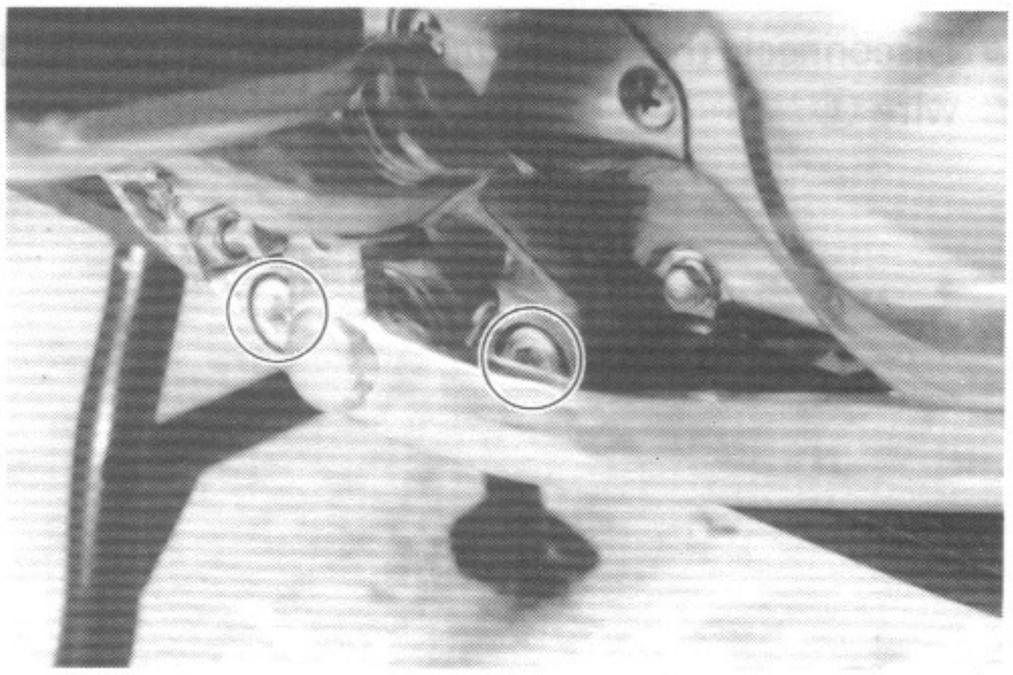
99104 - 32130	Thread lock "1360"

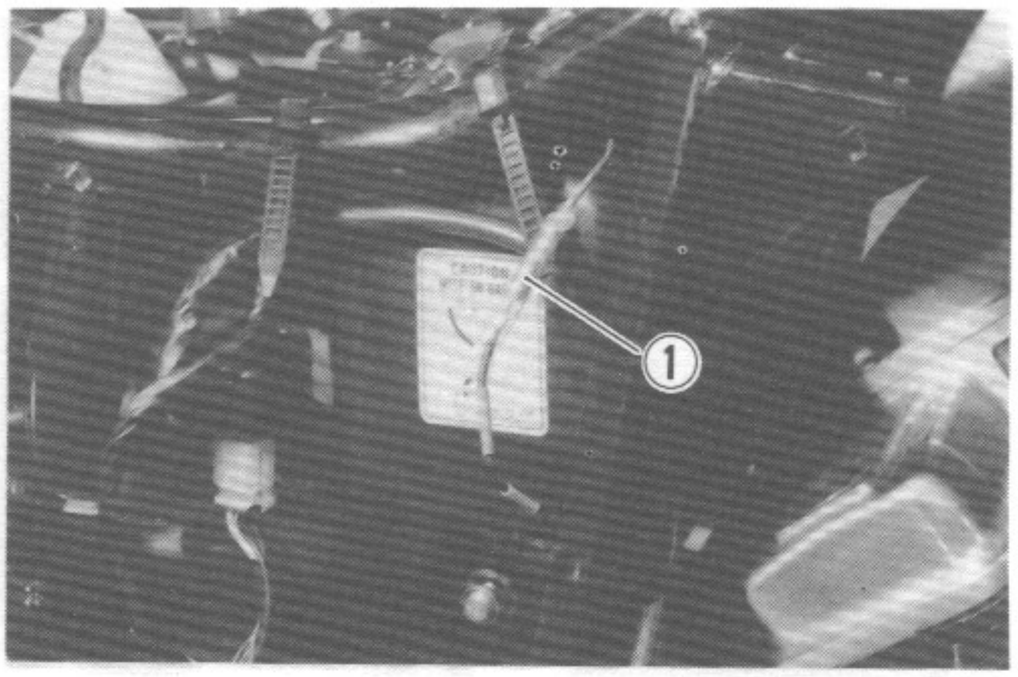


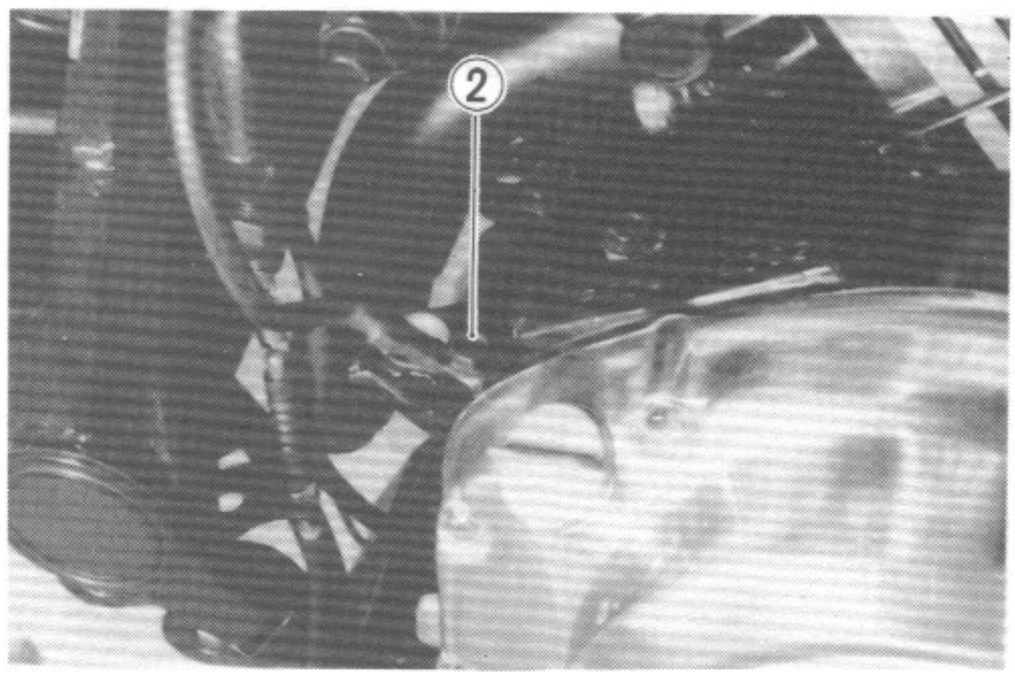


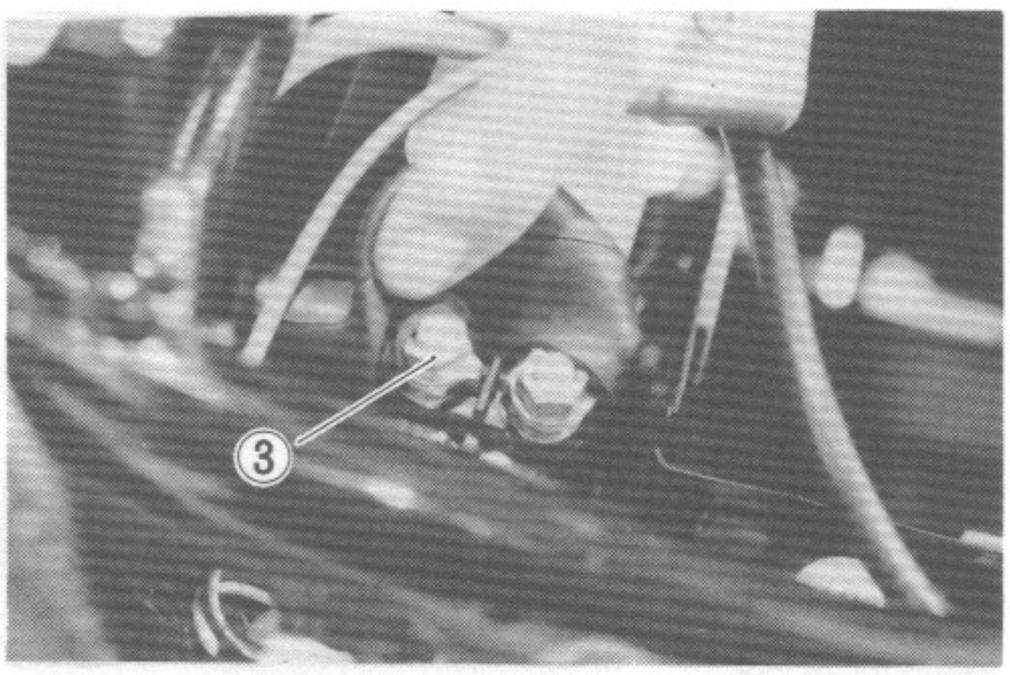


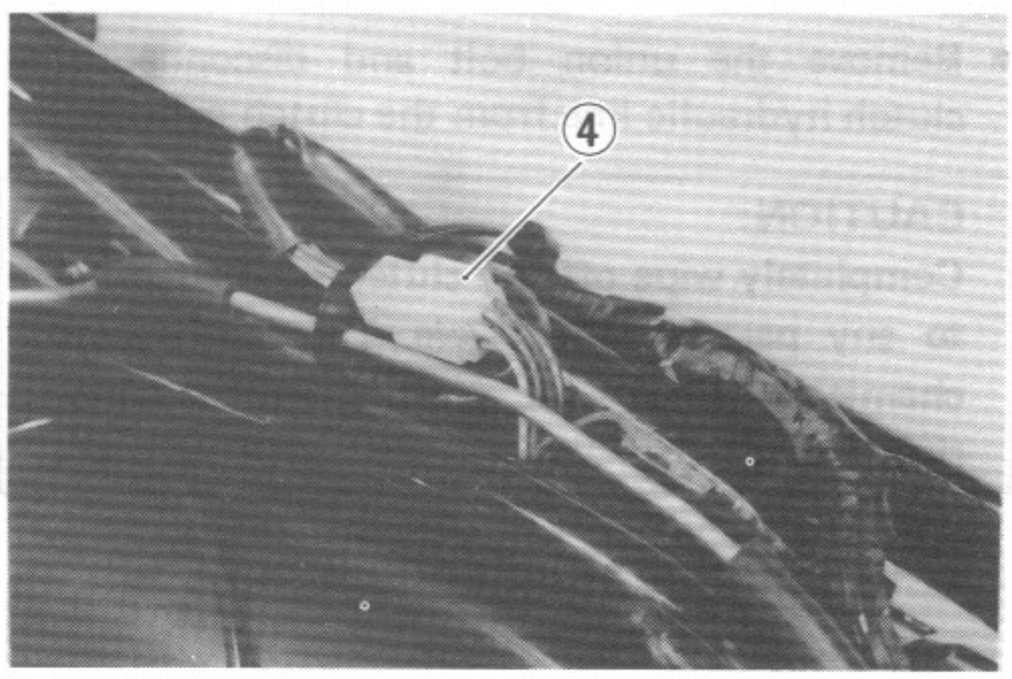
- Remove the right footrest and rear brake pedal.
- Disconnect the various lead wires
  - ① Oil pressure switch lead wire
  - ② Engine ground lead wire
  - ③ Starter motor lead wire
  - ④ Gear position indicator lead wire
  - ⑤ Generator lead wire
  - ⑥ Signal generator lead wire

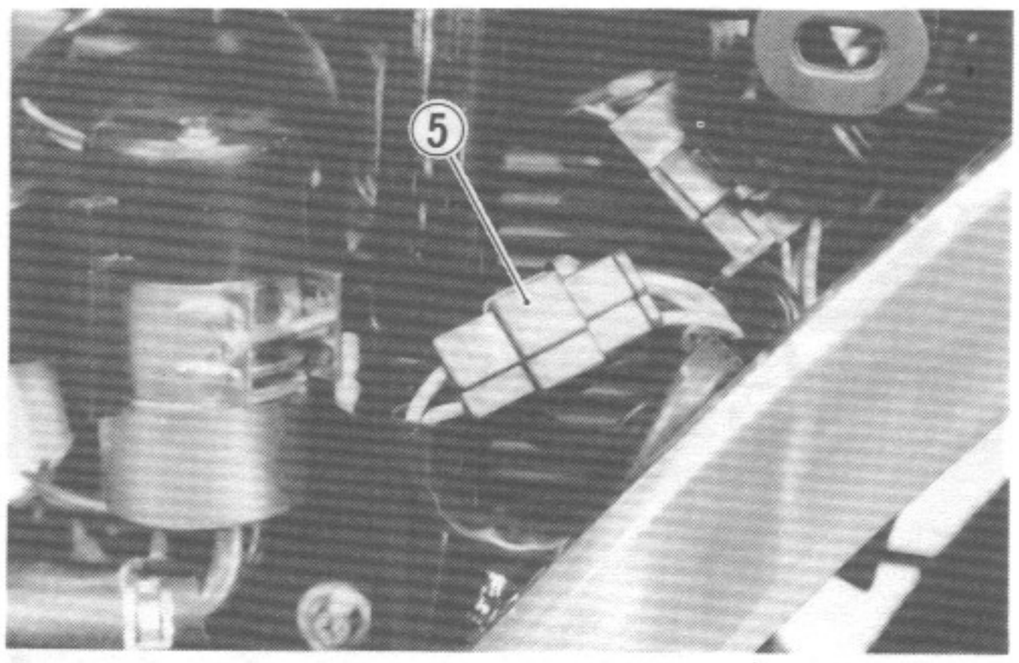


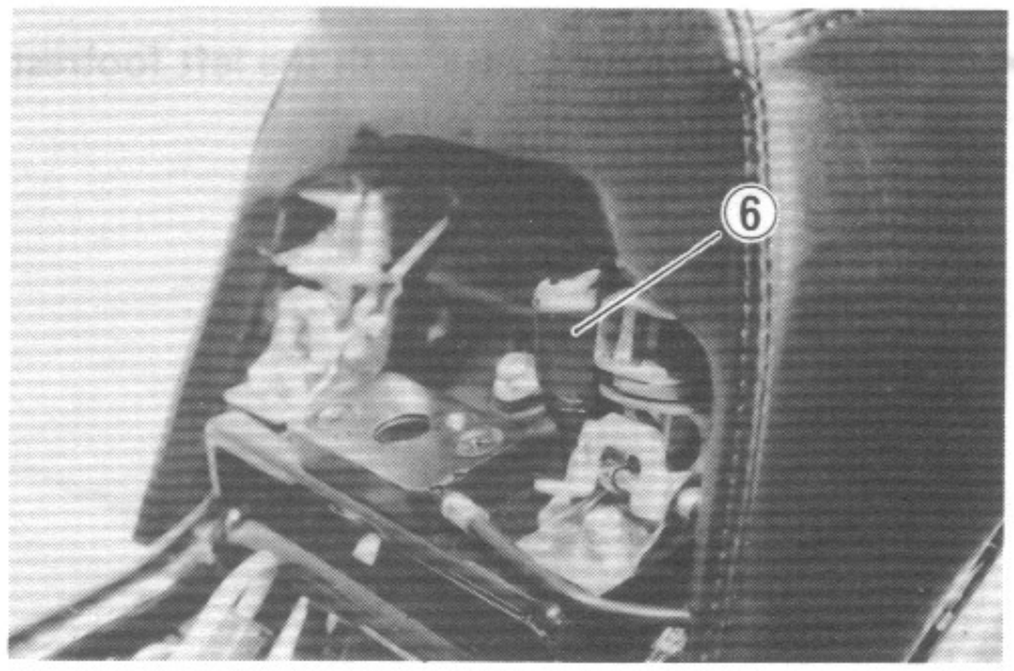




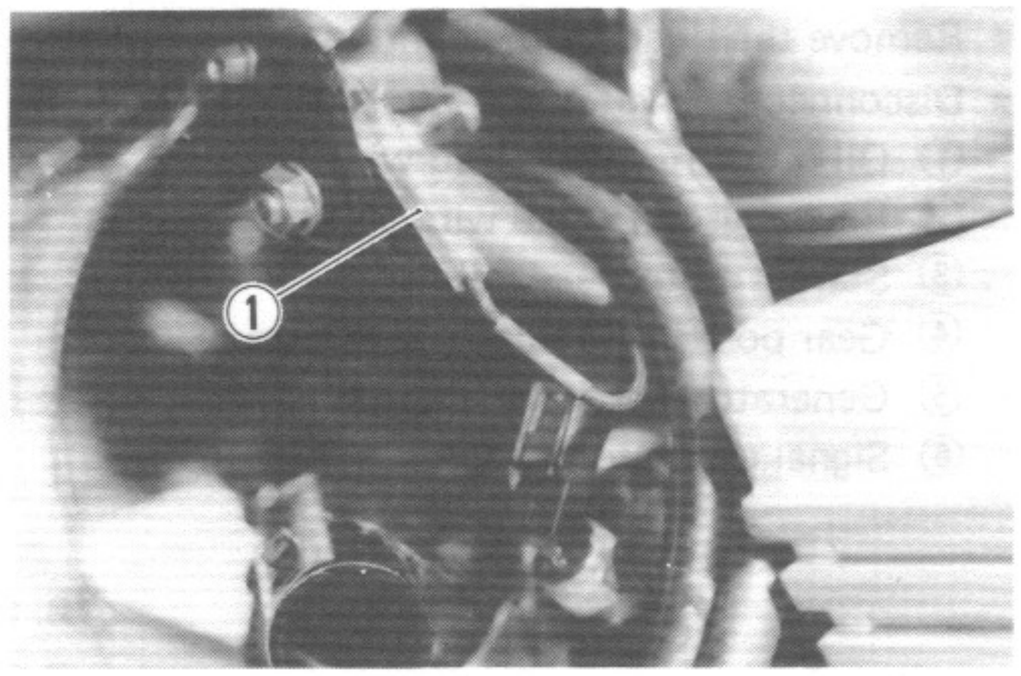




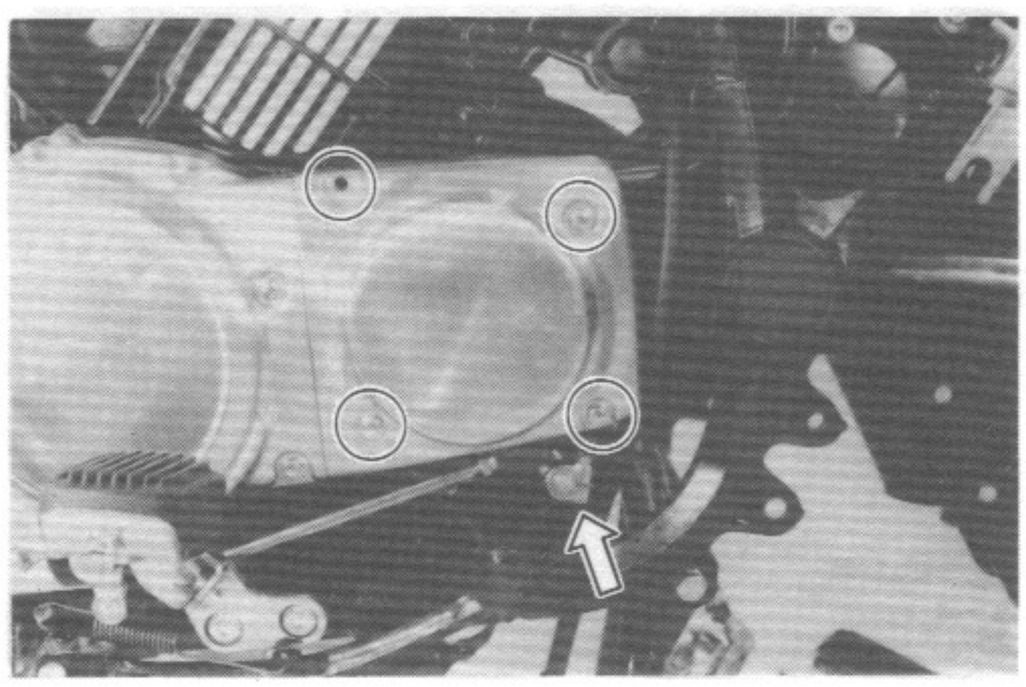




- Disconnect the water temperature sensor lead wire ①.

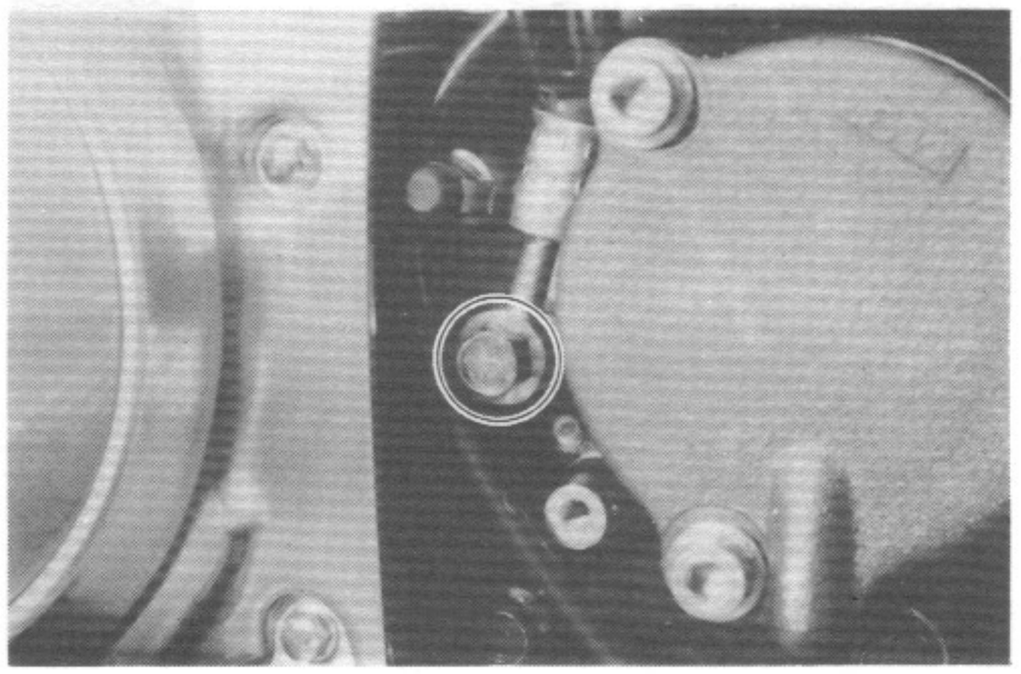


- Remove the secondary gearcase cover.
- Remove the gearshift lever link.

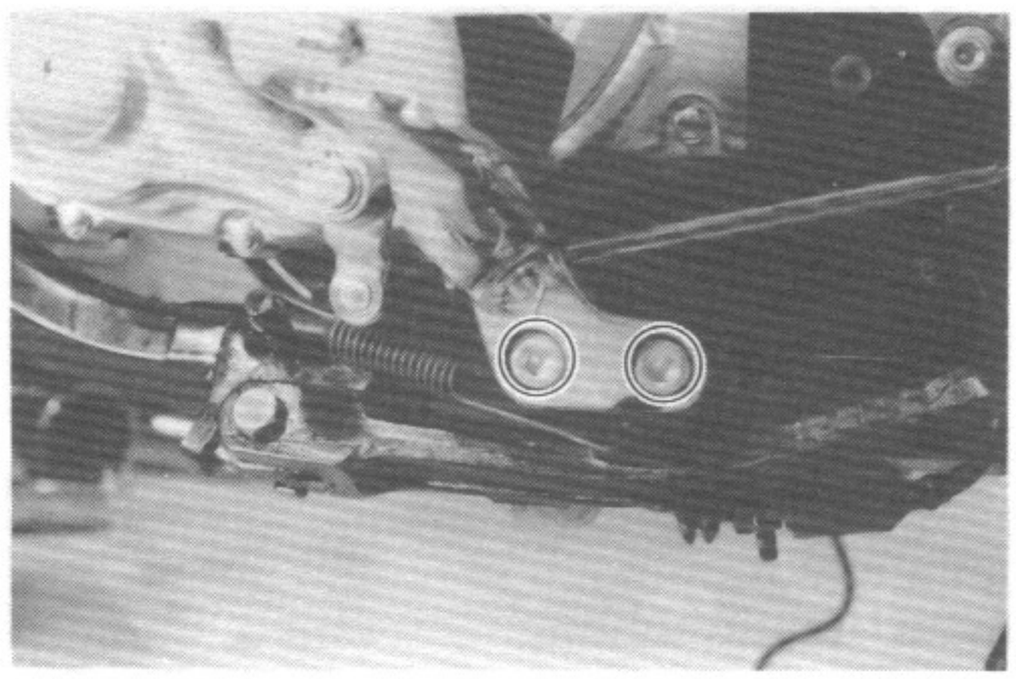


- Remove the union bolt and disconnect the clutch hydraulic line from the clutch cylinder.

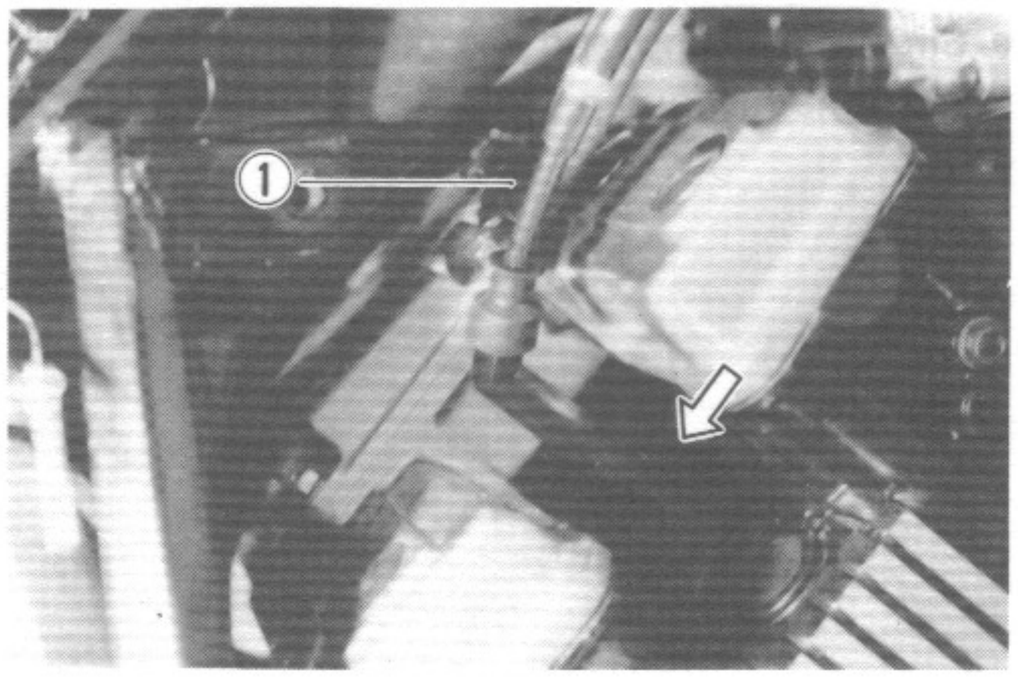
CAUTION:
Completely wipe off any clutch fluid adhering to any part of motorcycle. The fluid reacts chemically with paint, plastics, rubber materials, etc.



- Remove the gearshift lever with the left footrest by removing the bolts.

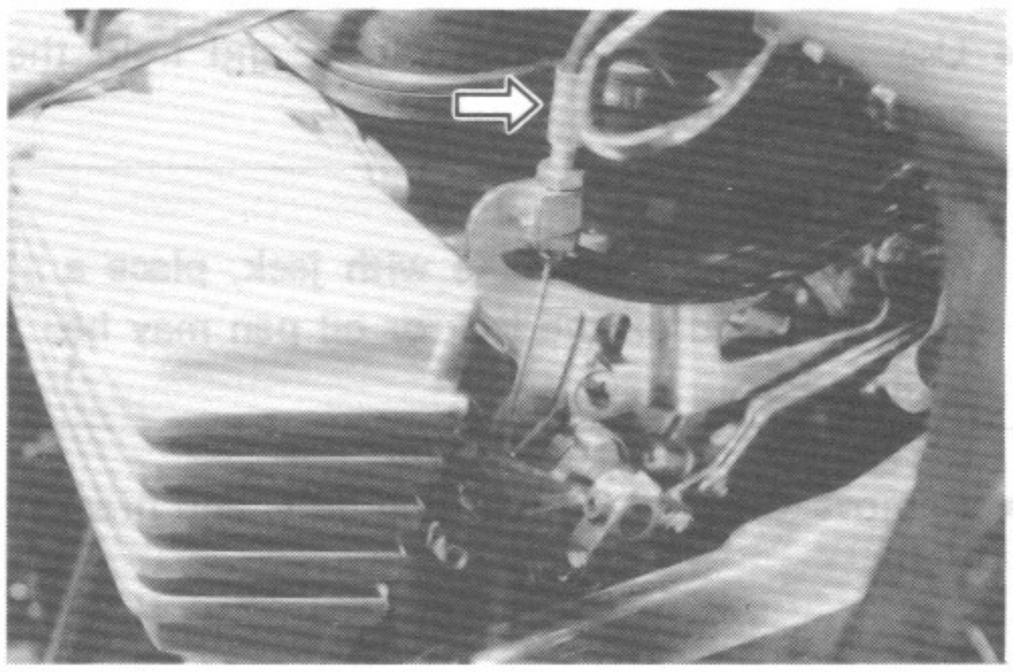


- Remove the breather hose ① from the cylinder head cover cap and disconnect the spark plug caps from the spark plugs.

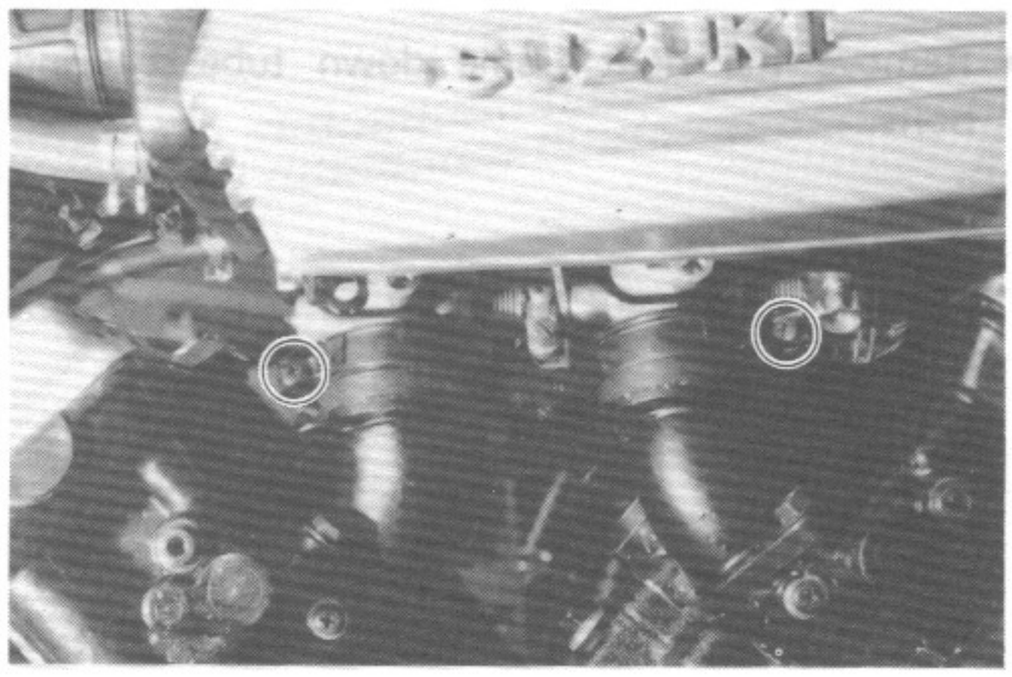


- Remove the choke cable holder screws and disconnect the two choke cables, right and left, from the carburetors.

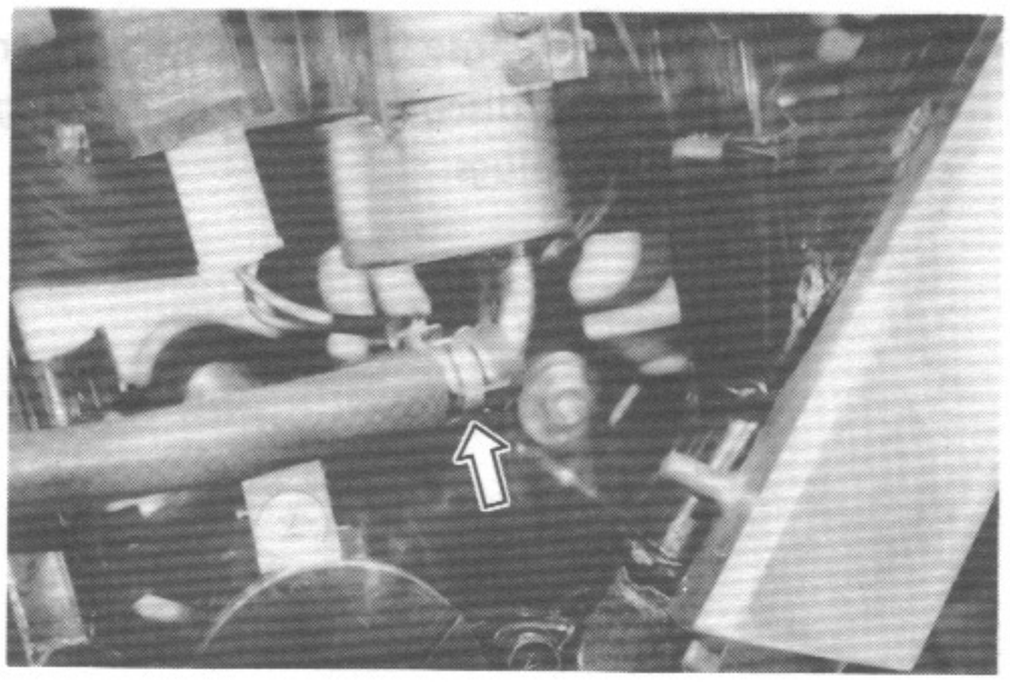
- Loosen the throttle cable holder nuts and disconnect the throttle cable from the throttle lever.



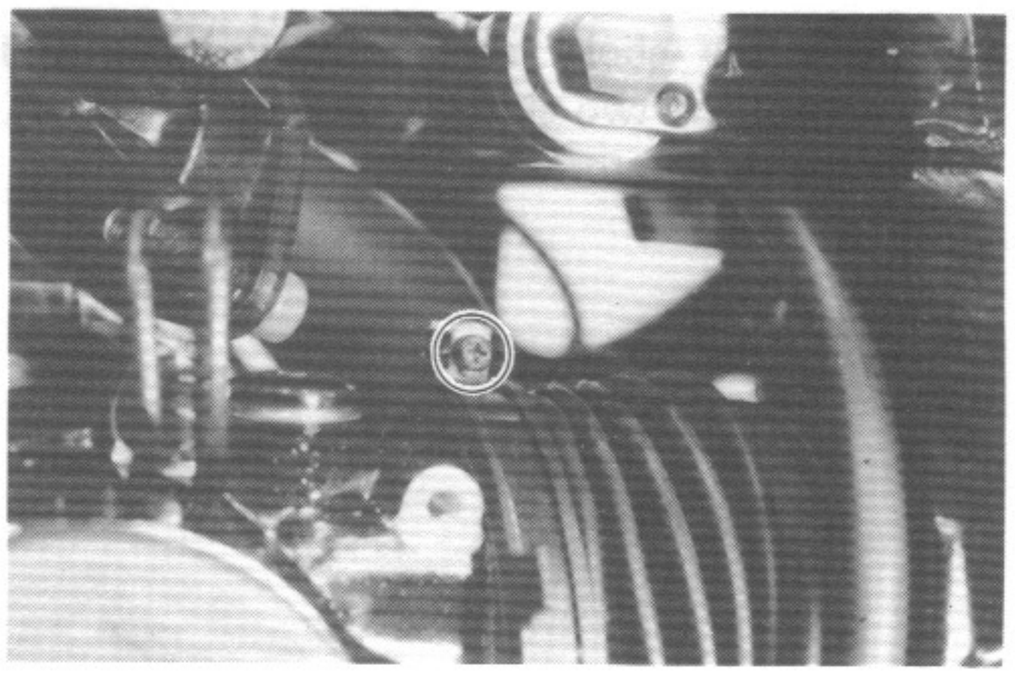
- Loosen the intake pipe clamp screws.



- Slide the clamp and disconnect the fuel hose from the fuel pump.

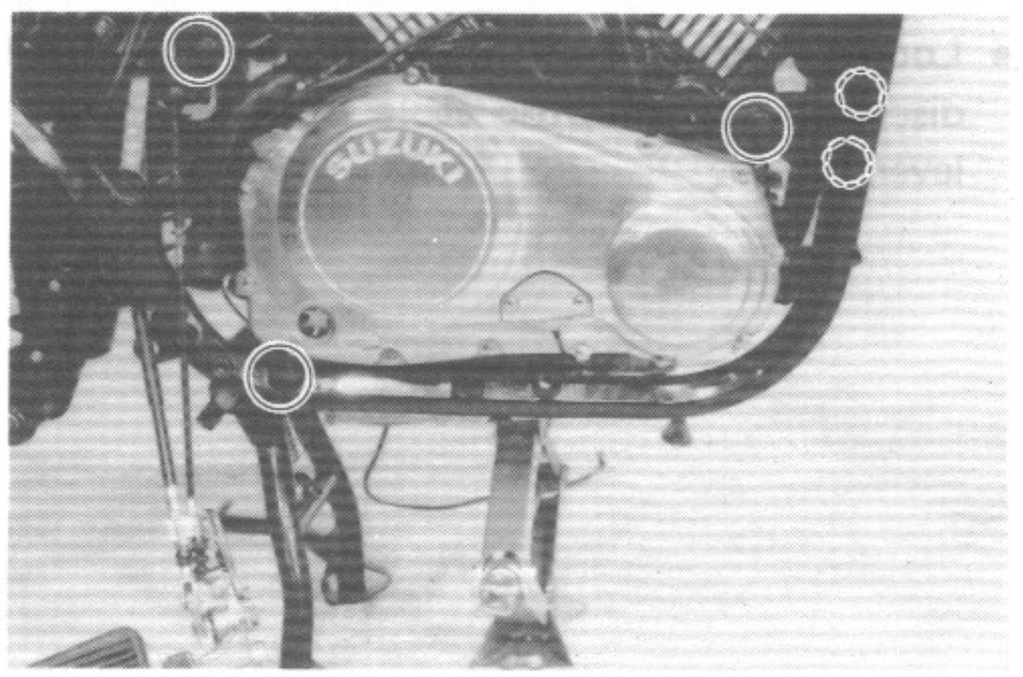


- Loosen the clamp screw and remove the boot from the secondary drive gearcase.



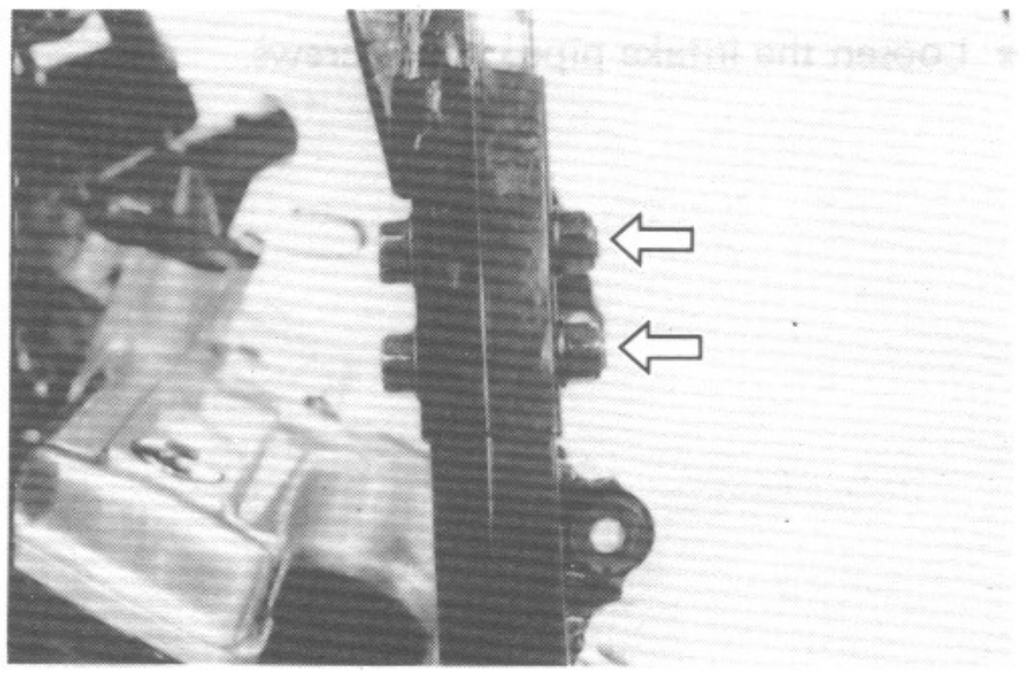
- Use a jack and wooden block, and hold the engine assembly.

CAUTION:
When holding the engine with jack, place a piece of wood on the jack or oil pan may be damaged.

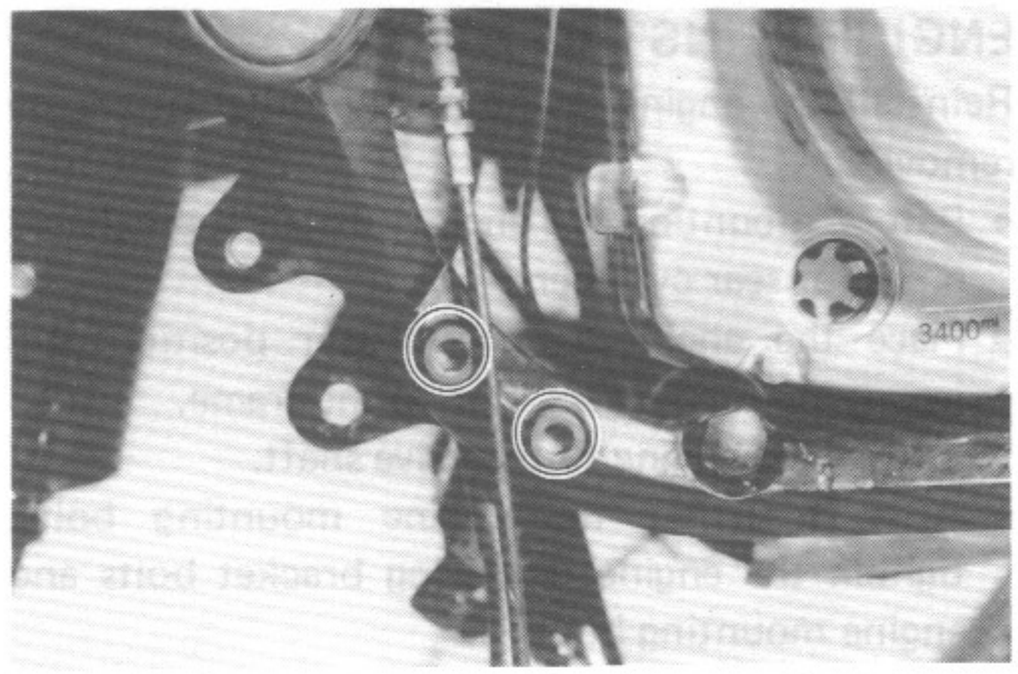


- Remove the engine mounting bolts and bracket bolts.

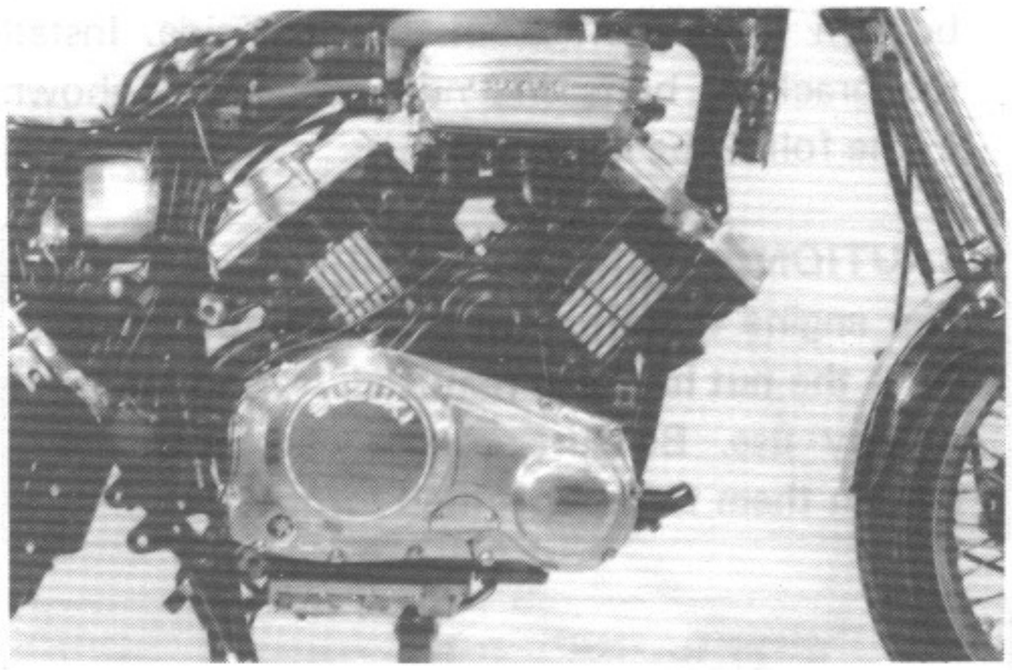
- Remove the right frame down tube securing bolts.



- Remove all the engine mounting bolts and remove the down tube bolts.

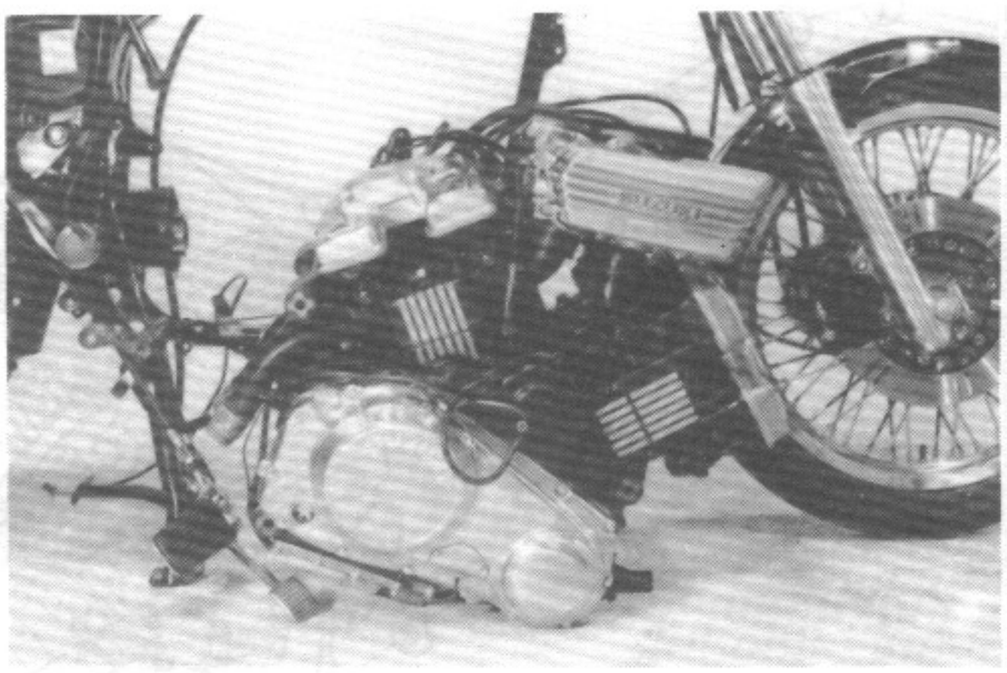


- Remove the down tube and slowly lower the engine assembly.

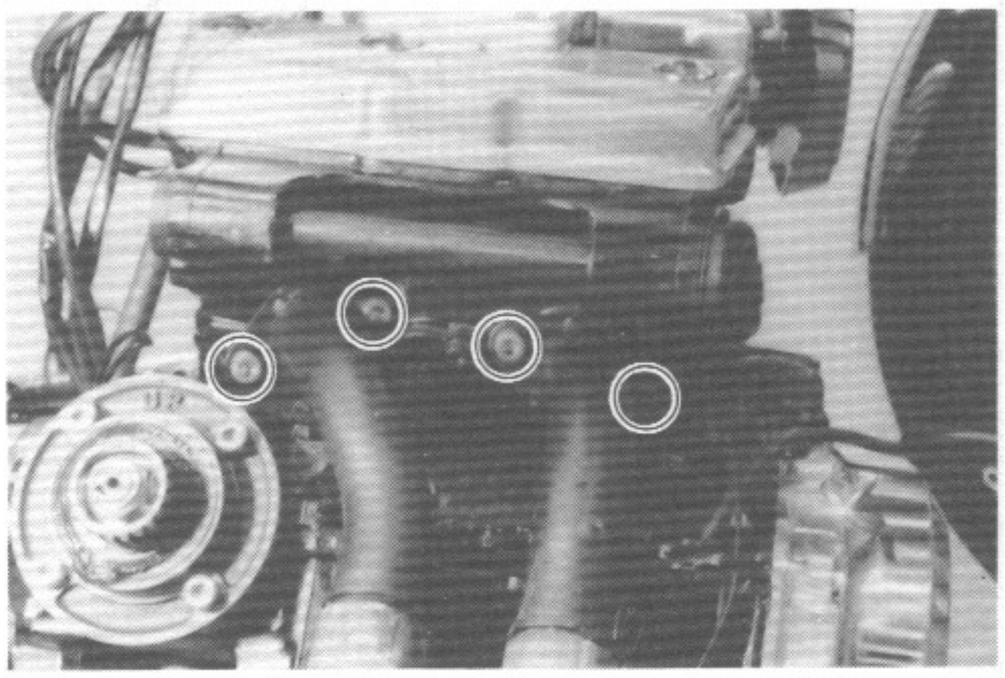


- Dismount the engine by pulling slightly forward and right side.

NOTE:
When removing the engine, hold the carburetor assembly in place or it may fall down.



- Remove the exhaust pipes for Nos. 1 and 3 cylinders.



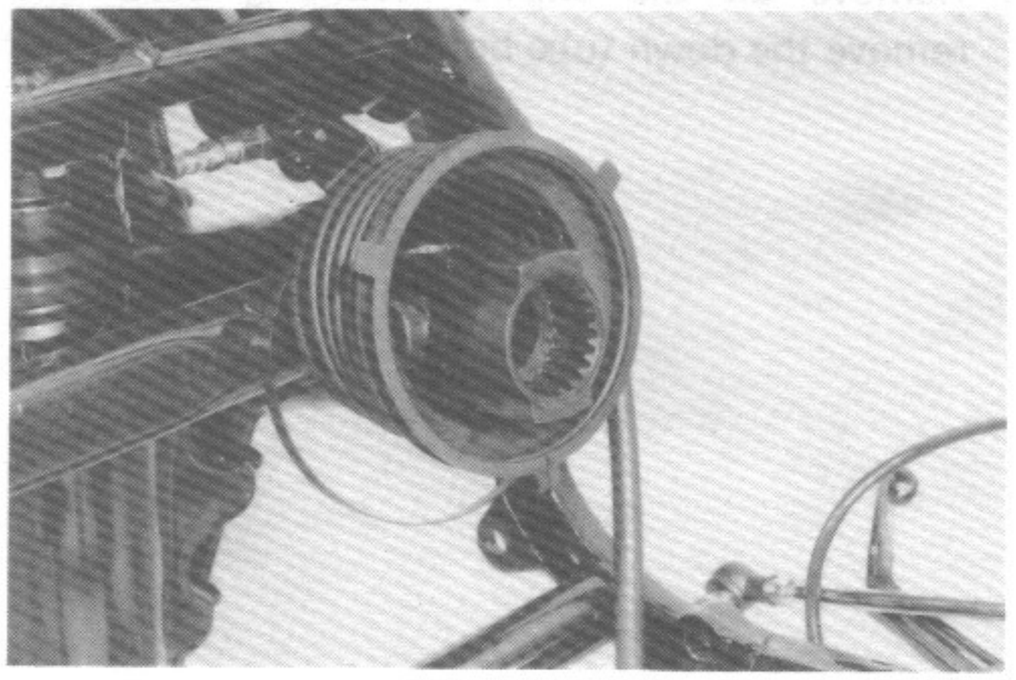
ENGINE REINSTALLATION

Reinstall the engine in the reverse order of engine removal.

- Before mounting the engine, install the exhaust pipes for rear cylinders.
- Place the engine in the proper position and install the right down tube to the frame.
- Engage the engine to the drive shaft.
- After inserting the engine mounting bolts, tighten the engine mounting bracket bolts and engine mounting bolts.

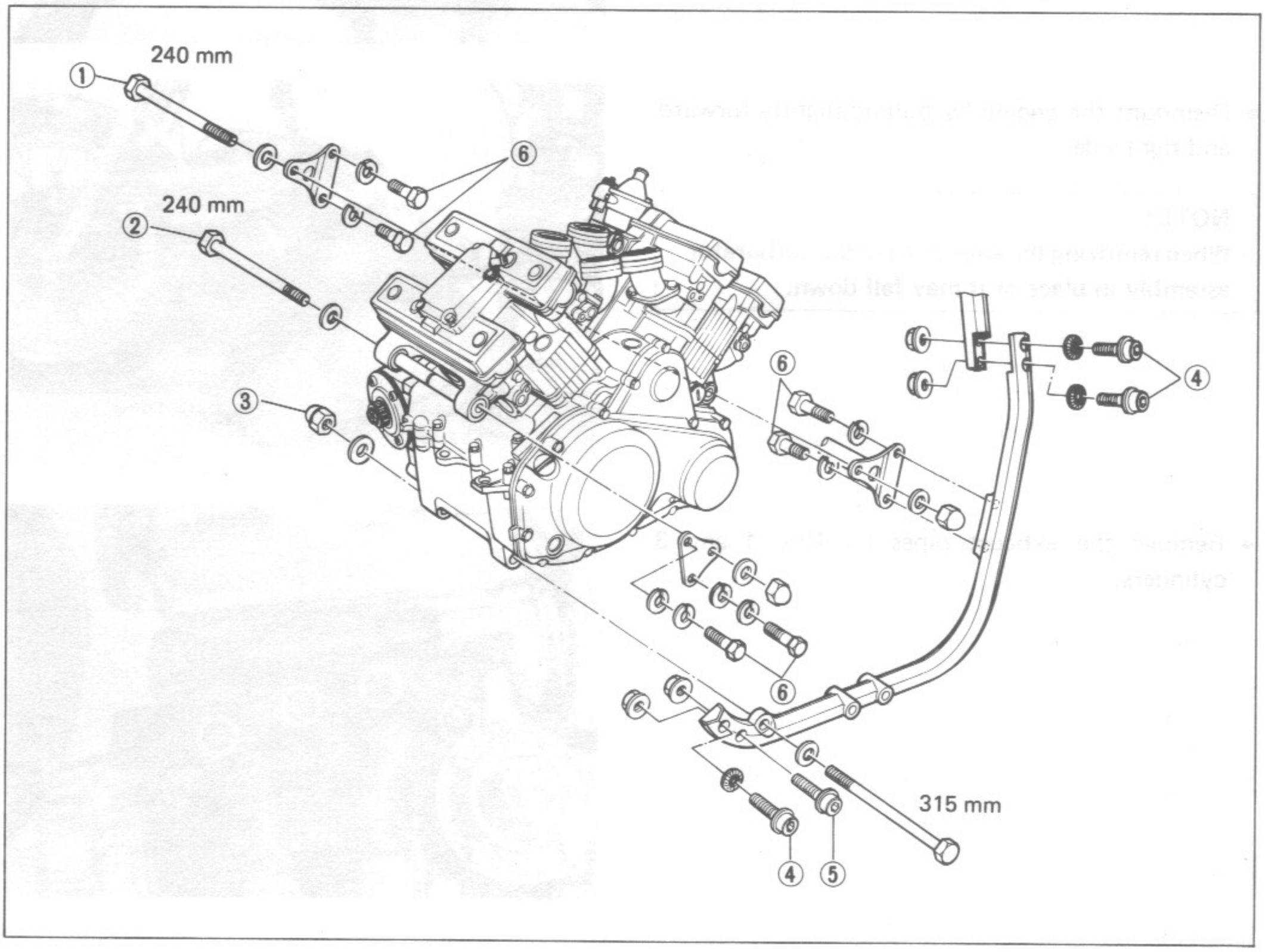
  Insert the all upper long bolts from left side and bottom lower bolt from the right side. Install the brackets, bolts and nuts properly as shown in the following illustration.

CAUTION:
The engine mounting nuts are self-lock nuts. 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.

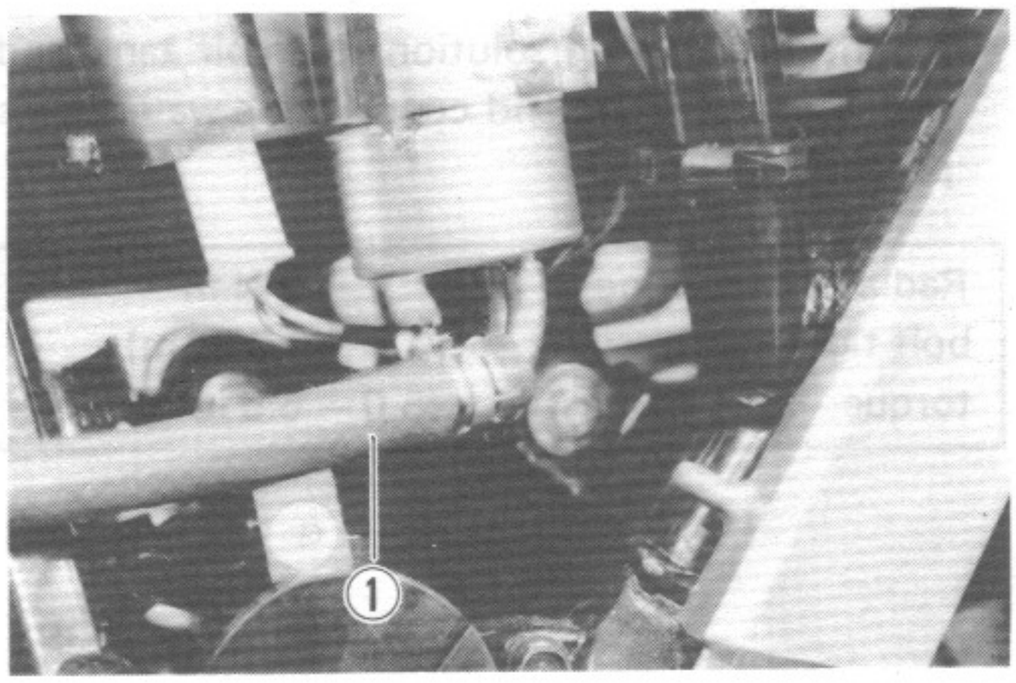


Tightening torque

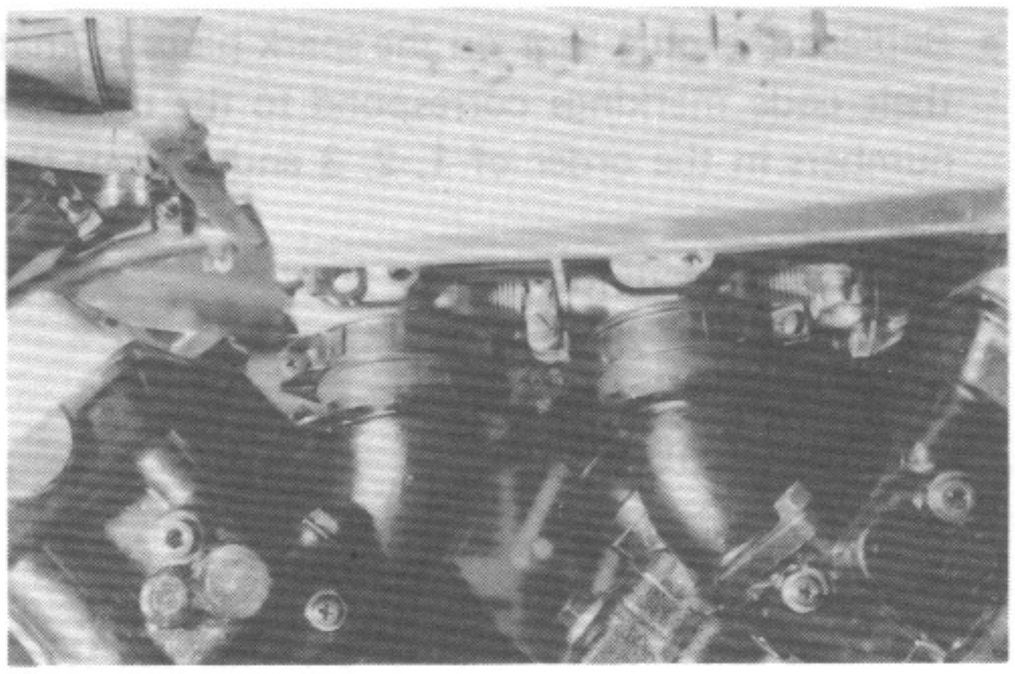
Item	N·m	kg-m	lb-ft
①, ② ③	60 – 72	6.0 – 7.2	43.5 – 52.0
④	60 – 65	6.0 – 6.5	43.5 – 47.0
⑤	30 – 35	3.0 – 3.5	21.5 – 25.5
⑥	18 – 28	1.8 – 2.8	13.0 – 20.0



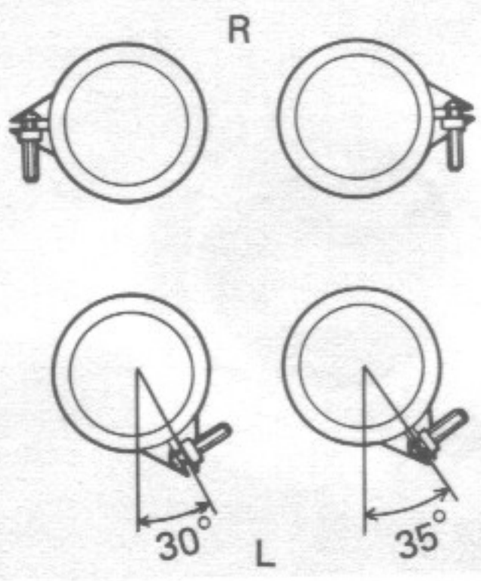
- Route the fuel hose properly and connect the fuel hose to the fuel pump.
  ① Hose to the carburetor



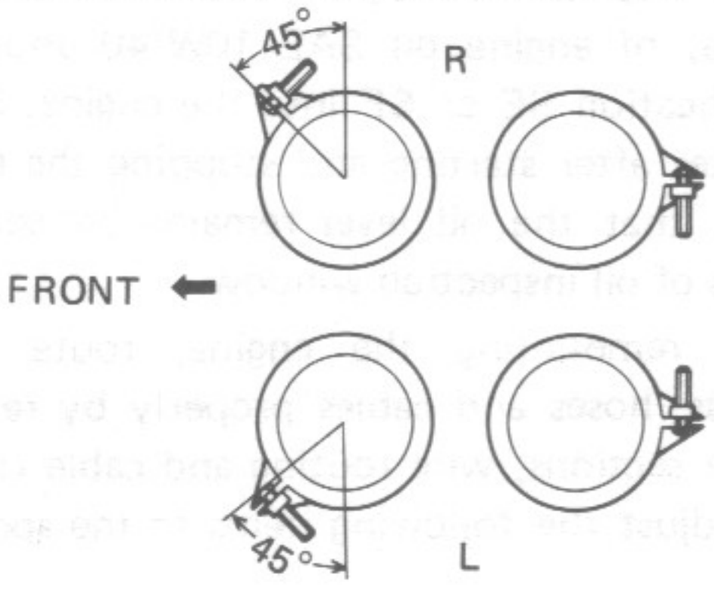
- Install the carburetor to the air chamber and tighten the intake pipe clamp screws securely.
- Firmly secure the carburetors with the clamps. If the carburetors are not firmly secured, gas leakage, incorrect air-fuel ratio and unsatisfactory engine operation may result.



CARBURETOR TO INTAKE PIPE CLAMPS



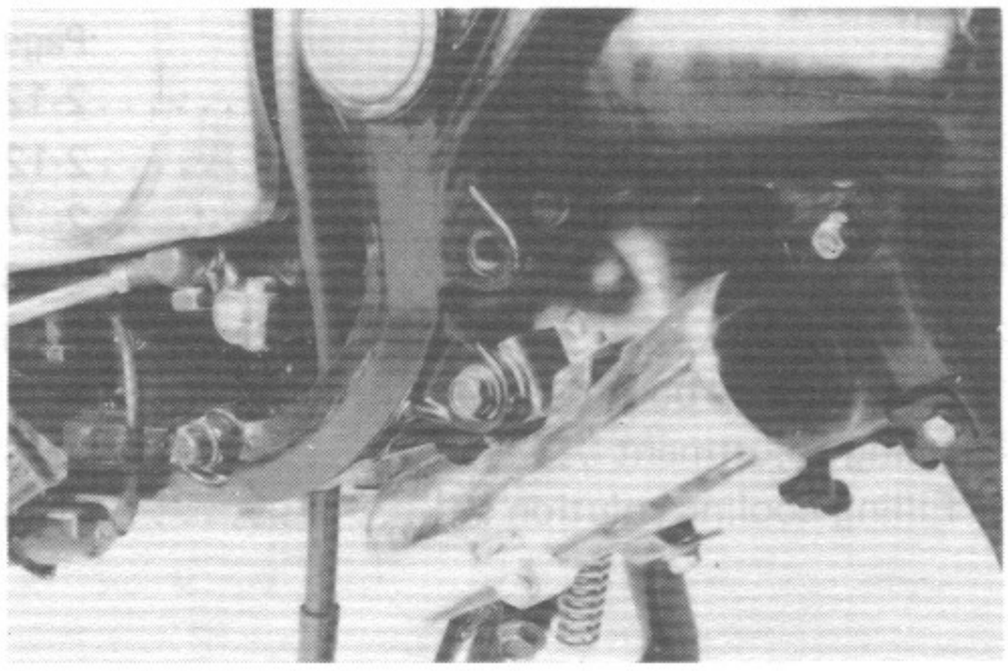
AIR CHAMBER TO CARBURETOR CLAMPS



- Install the exhaust pipes, pre-muffler and mufflers properly. When securing exhaust pipe clamp bolts, make sure that clamps are positioned properly.

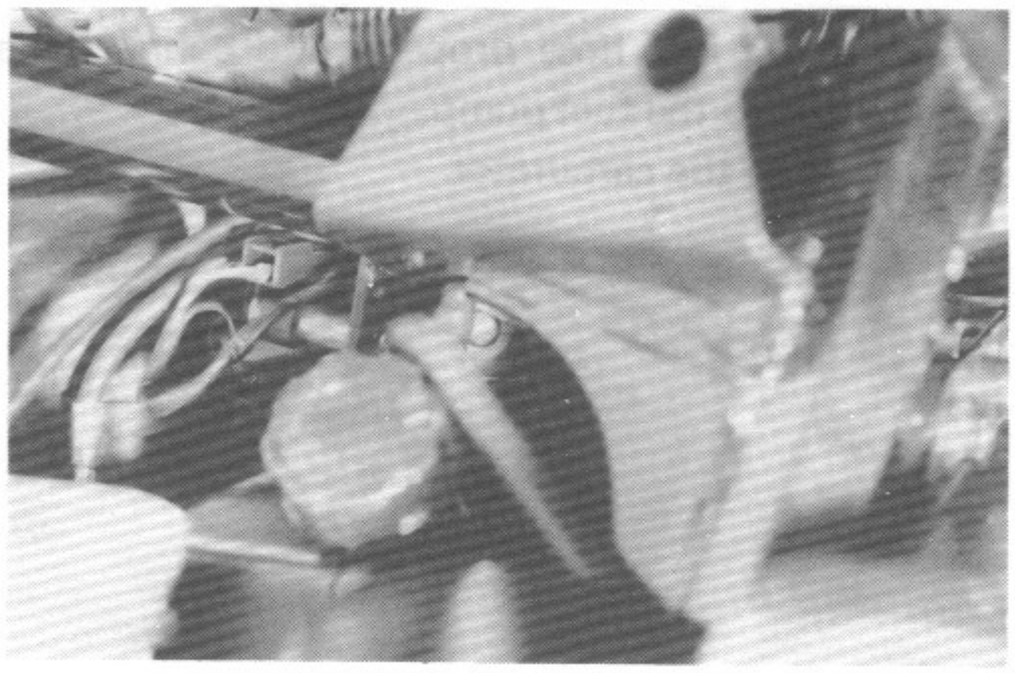
Tightening torque

Exhaust pipe clamp bolt	20 – 25 N·m (2.0 – 2.5 kg-m) (14.5 – 18.0 lb-ft)
Muffler mounting bolt	27 – 43 N·m (2.7 – 4.3 kg-m) (19.5 – 31.0 lb-ft)

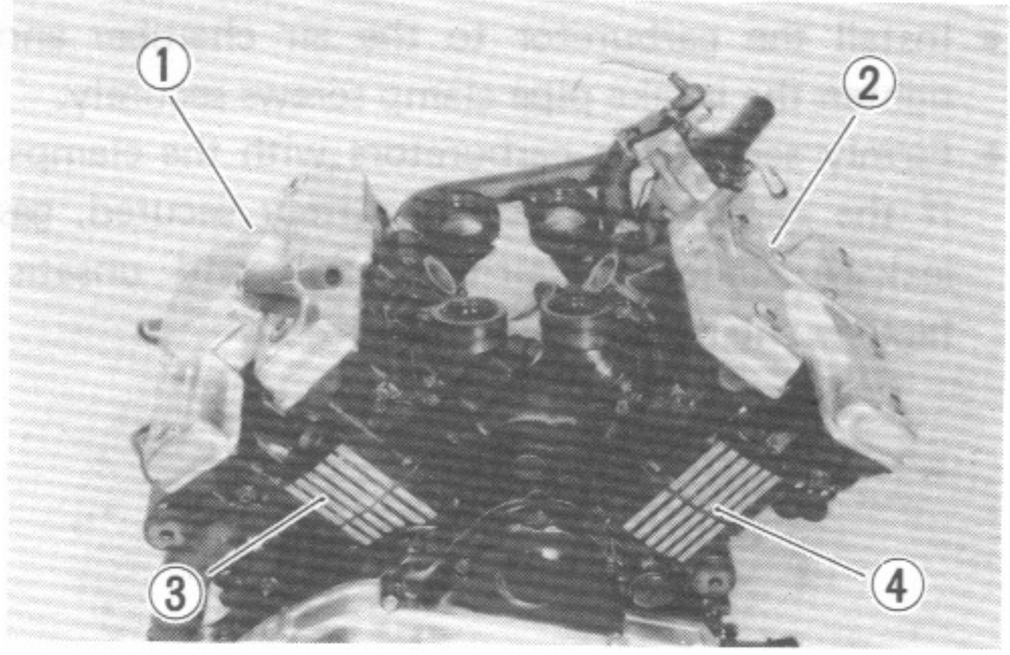


- Mount the cooling solution reservoir tank and radiator, and route and connect the water hoses properly.

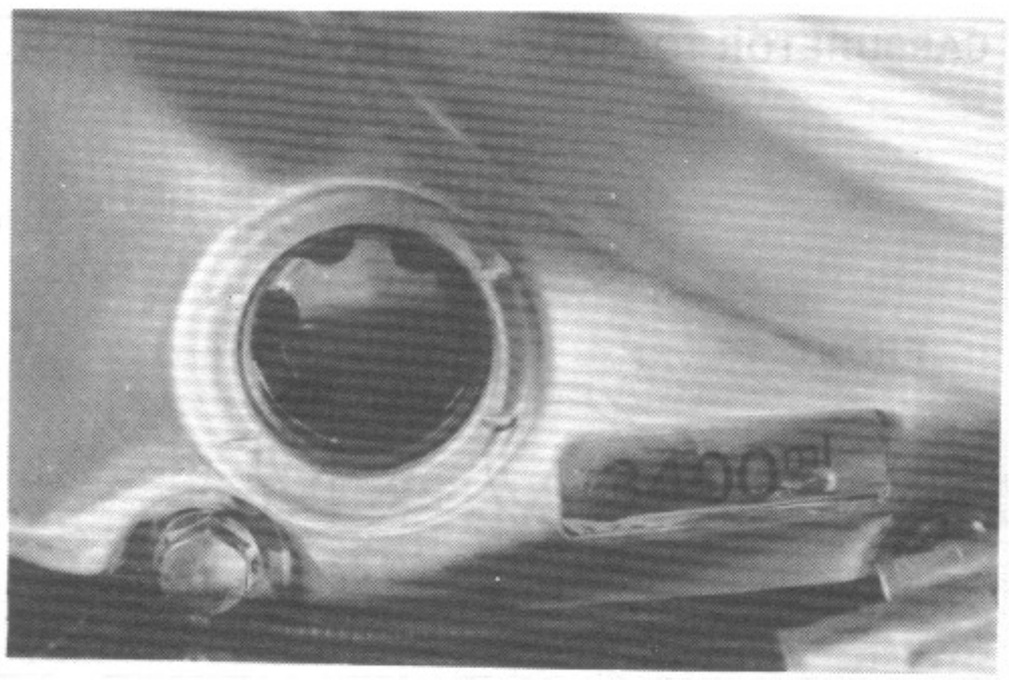
Radiator mounting bolt tightening torque	7 – 9 N·m (0.7 – 0.9 kg-m) (5.0 – 6.5 lb-ft)



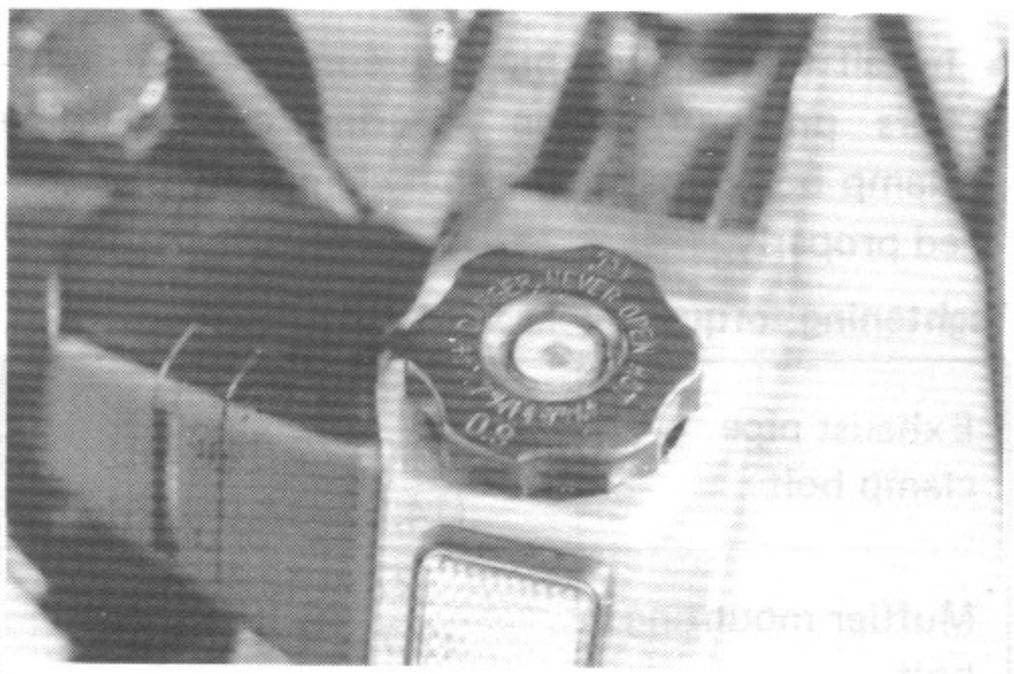
- Replace the plug caps on the spark plugs so that their code markings correspond to the cylinder numbers in the order of 1, 2, 3 and 4 from the rear left.
  ① Rear left cylinder
  ② Front left cylinder
  ③ Rear right cylinder
  ④ Front right cylinder



- Install 4.2 L (4.4 US qt) (when overhauling engine) of engine oil SAE 10W/40 under API classification SE or SF into the engine. Several minutes after starting and stopping the engine, check that the oil level remains between the marks of oil inspection window.
- After remounting the engine, route wiring harness, hoses and cables properly by referring to the sections, wire routing and cable routing, and adjust the following items to the specification.

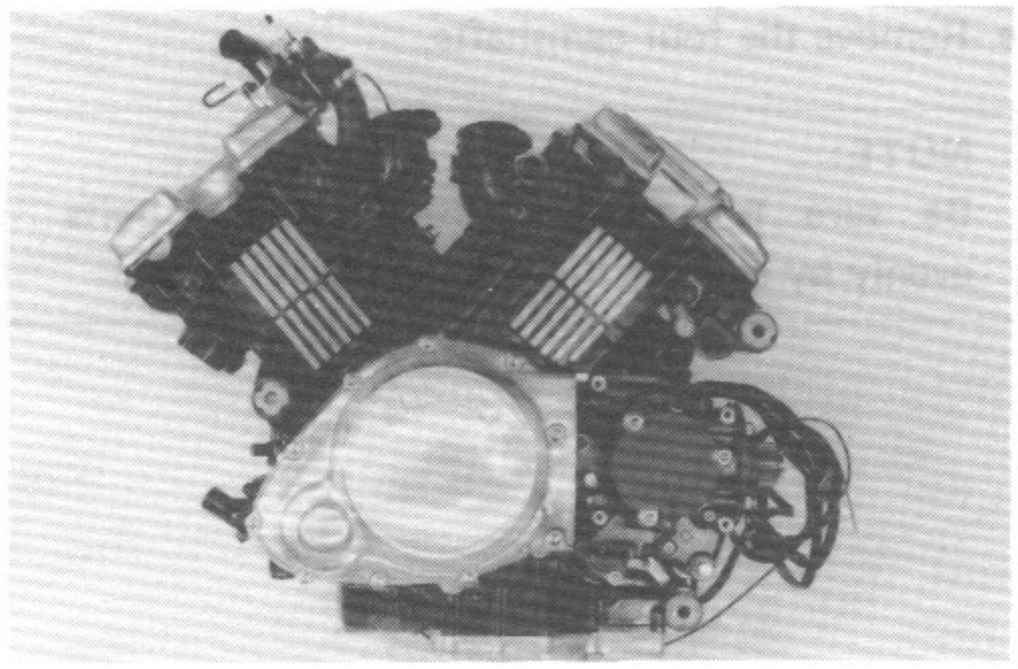


		Page
*	Rear brake pedal and cable	2-12
*	Brake light switch	2-12
*	Clutch air bleeding	2- 7
*	Throttle cable	2- 6
*	Choke cables	2- 6
*	Balancing carburetor	6-21
*	Idling adjustment	2- 6
*	Filling cooling solution	2- 8

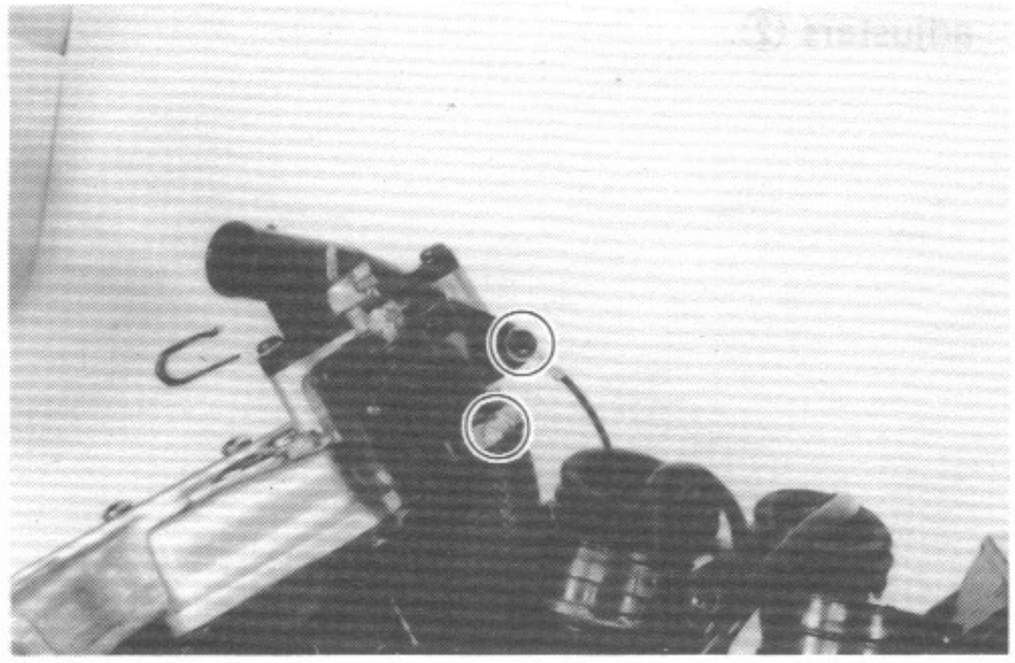


ENGINE DISASSEMBLY

CAUTION:
Be sure to identify each removed part such as intake pipe, camshaft, piston, conrod etc. as to its location and lay the parts out in groups so that each will be restored to the original location during assembly.

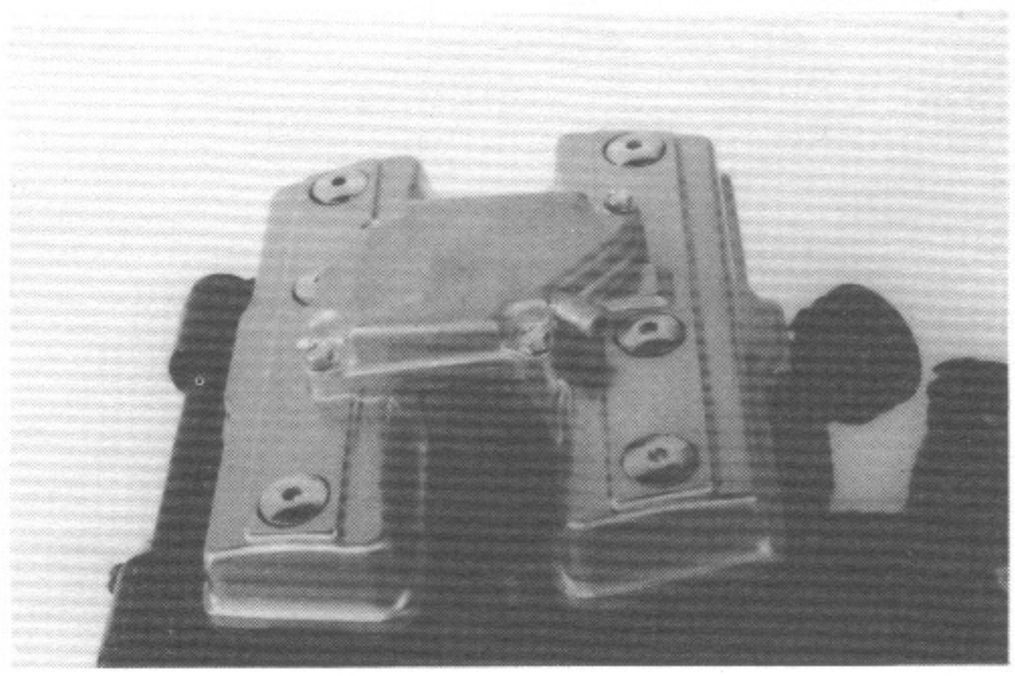


- Remove the water temperature gauge ground lead wire and disconnect the water hose from the union.

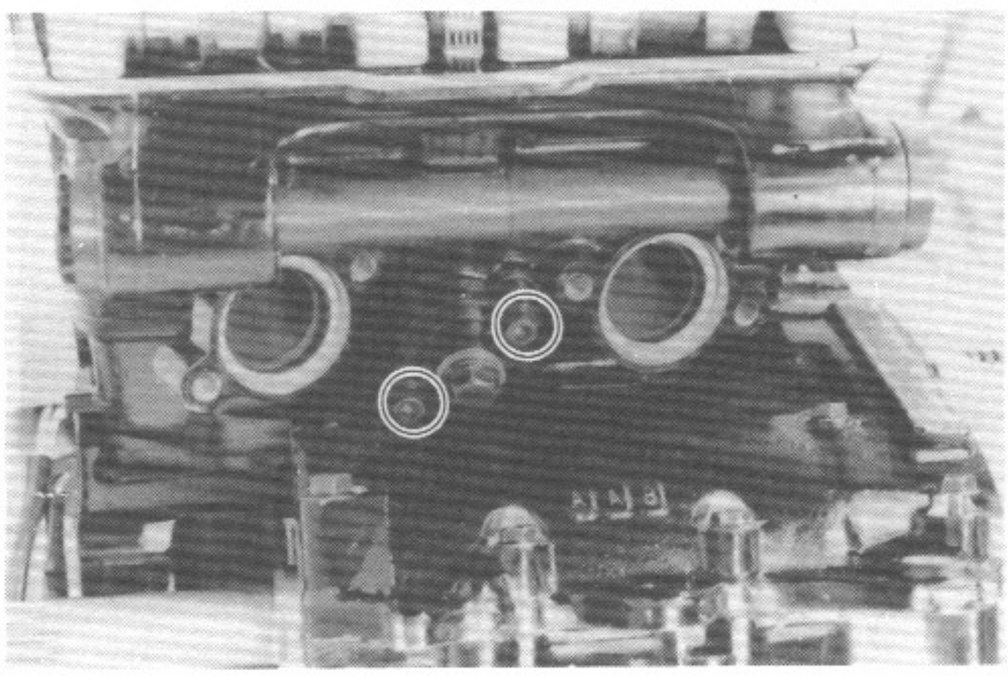


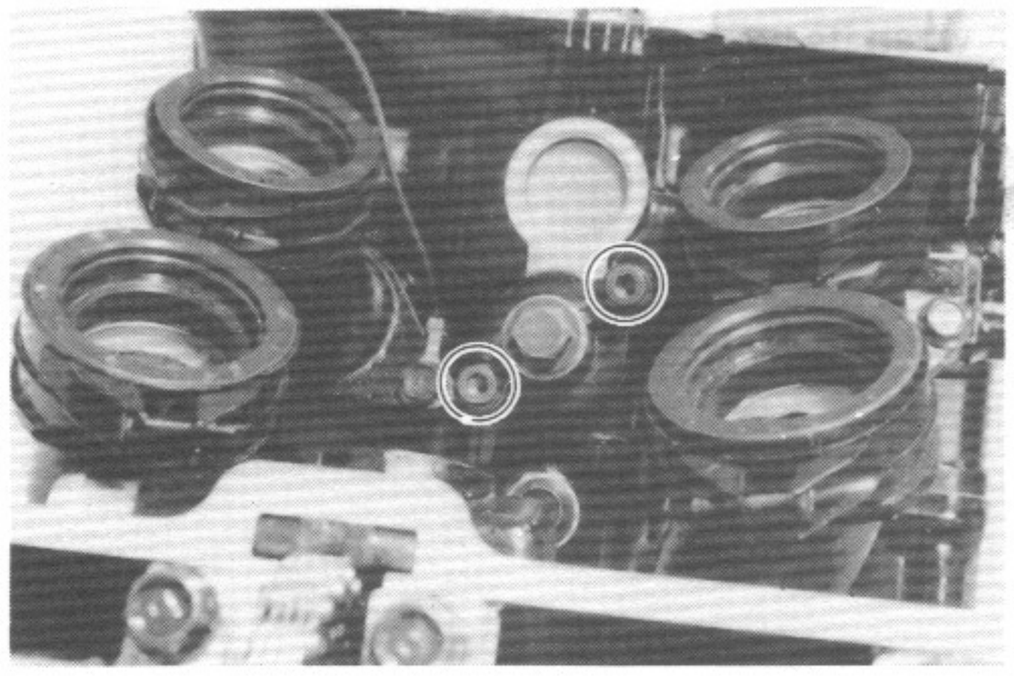
- Remove cylinder head covers and their gaskets.

NOTE:
Do not miss the gasket located with screws.



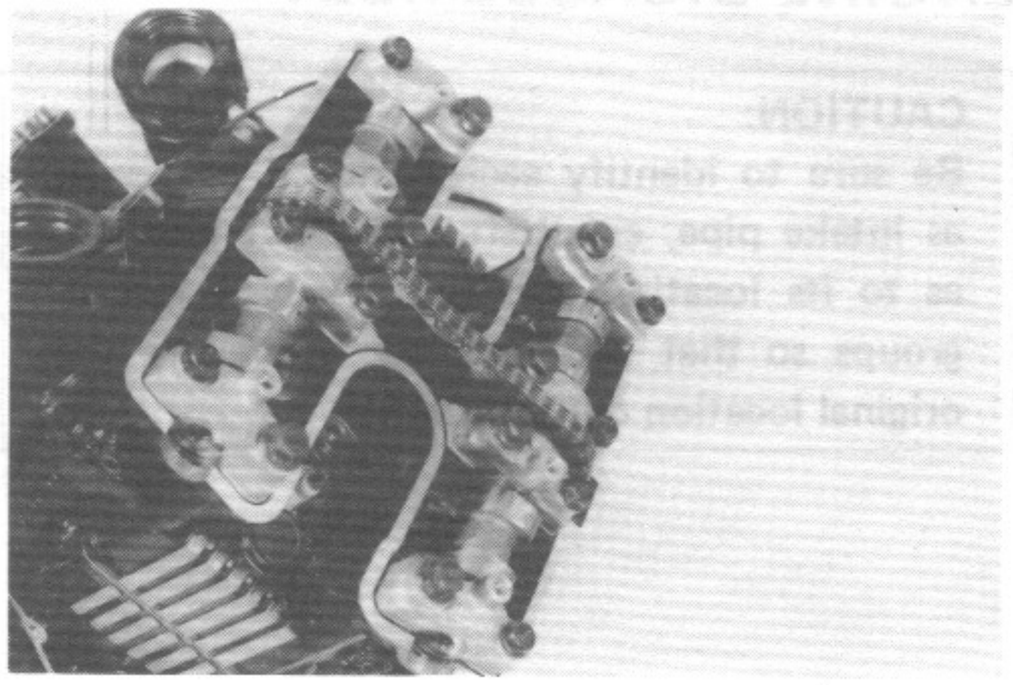
- Remove the cam drive chain tensioners by using 5-mm hexagon wrench.



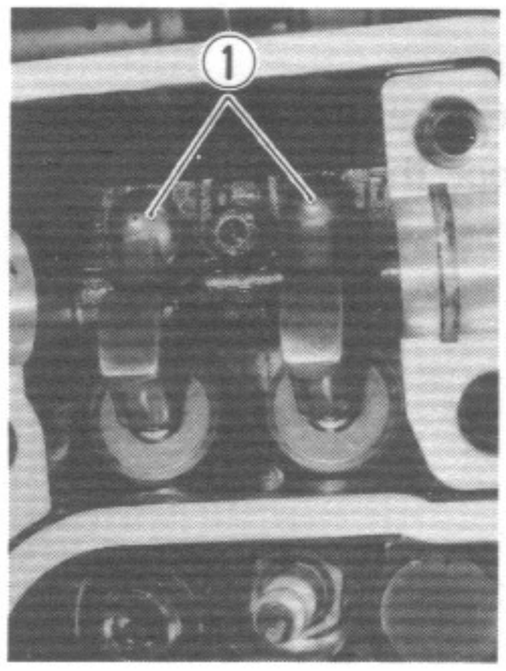


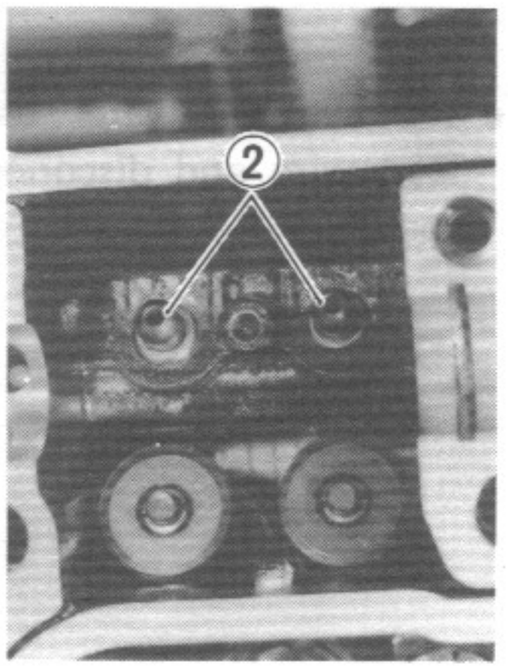
- Remove the sixteen camshaft holders.
- Remove the four camshafts.

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

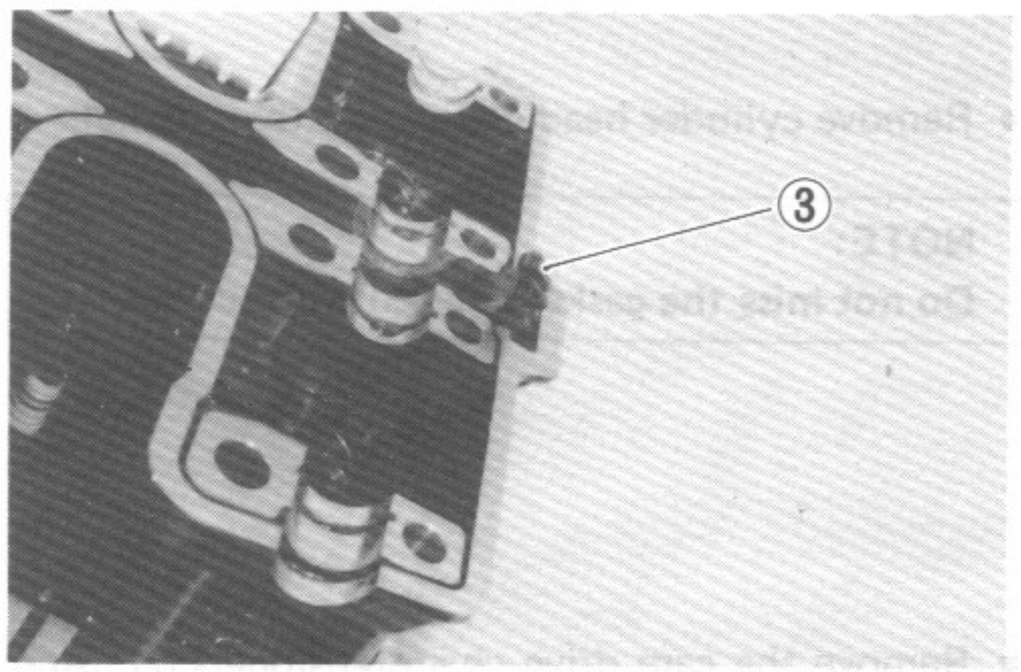


- Remove the cam follower pivots ① and lash-adjusters ②.

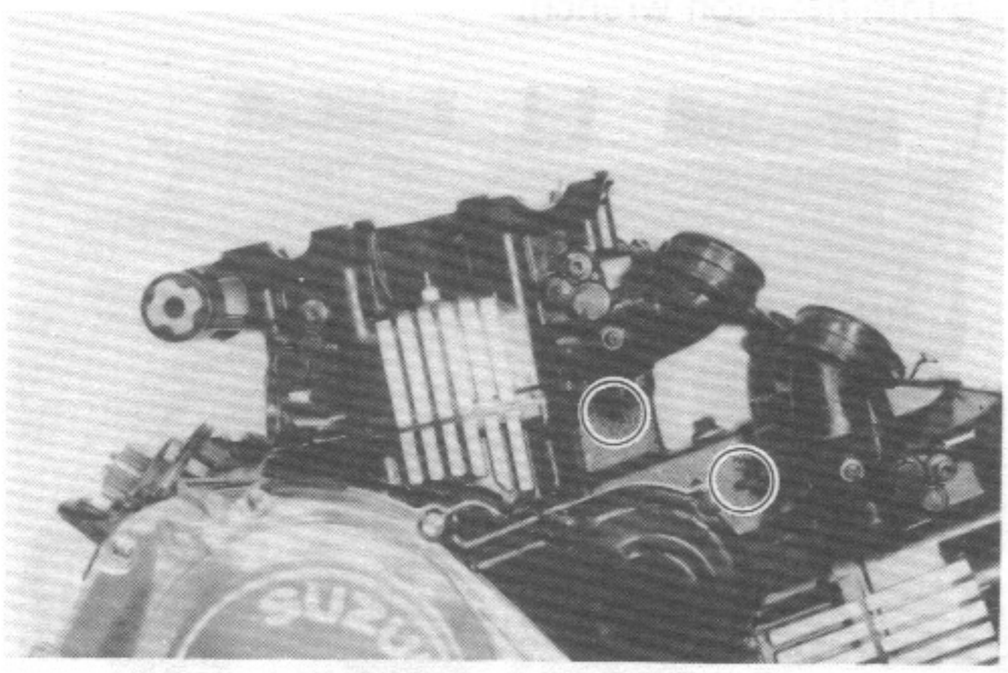




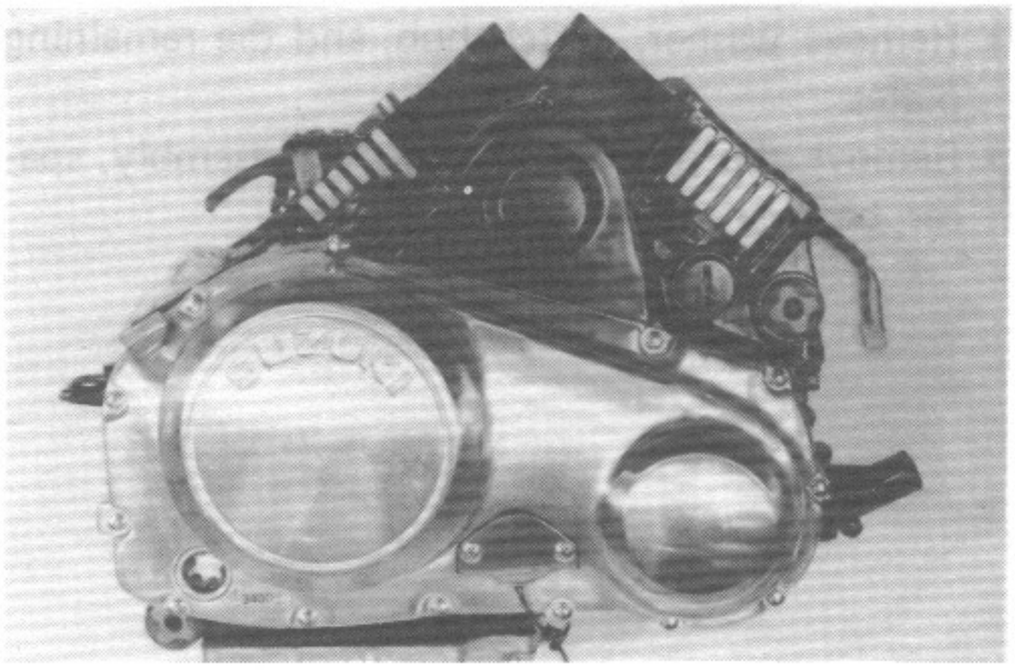
- Pull out cam chain guide ③.



- The cylinder head becomes free for removal when its two nuts are removed.

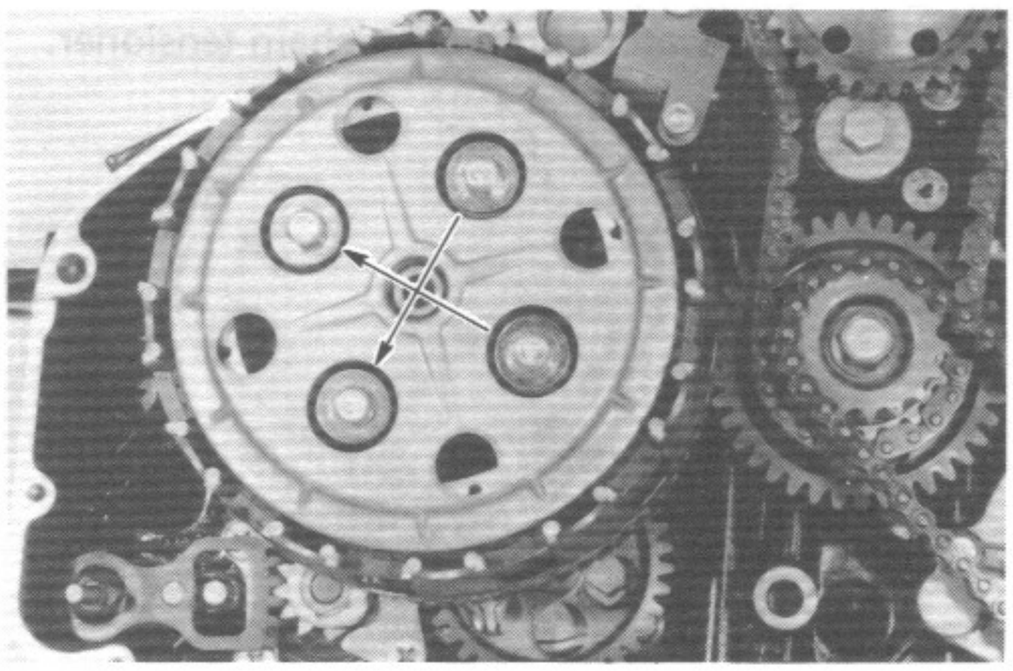


- Remove the clutch cover and gasket.

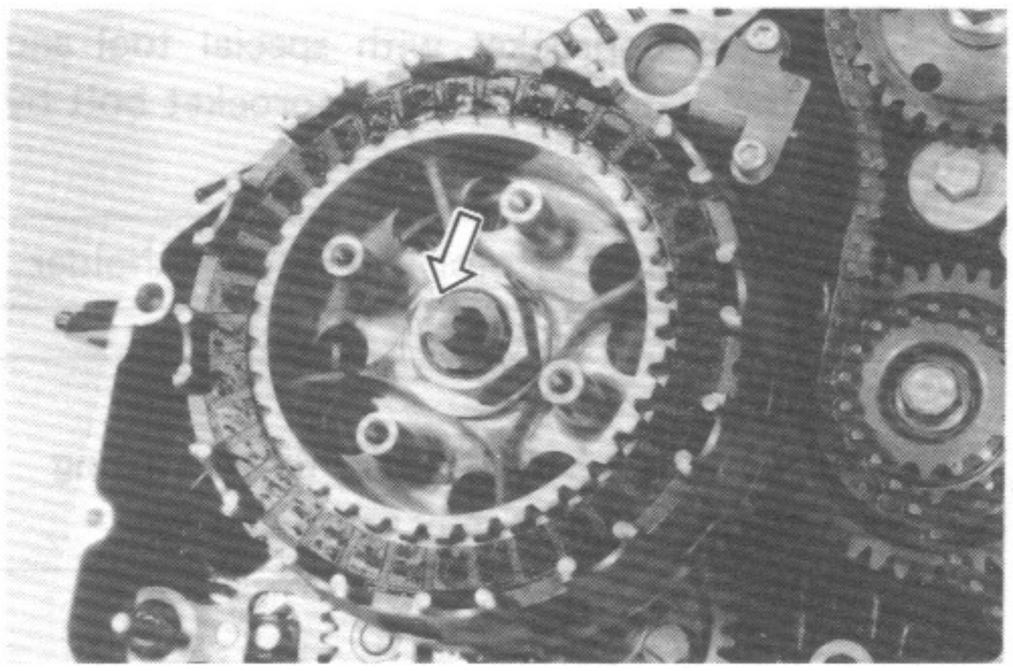


- By holding the idler shaft sprocket with special tool, remove the clutch spring mounting bolts in a criss-cross manner.
- Remove the clutch springs and pressure plate with clutch push piece.

09930 - 40113	Rotor and sprocket holder

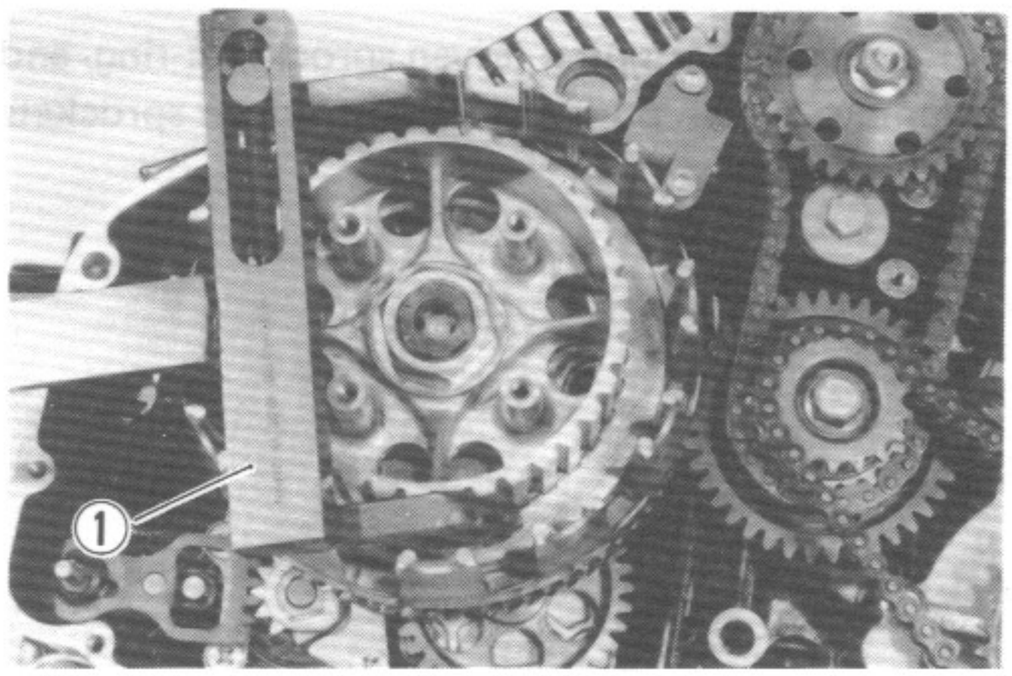


- Remove the clutch push rod.

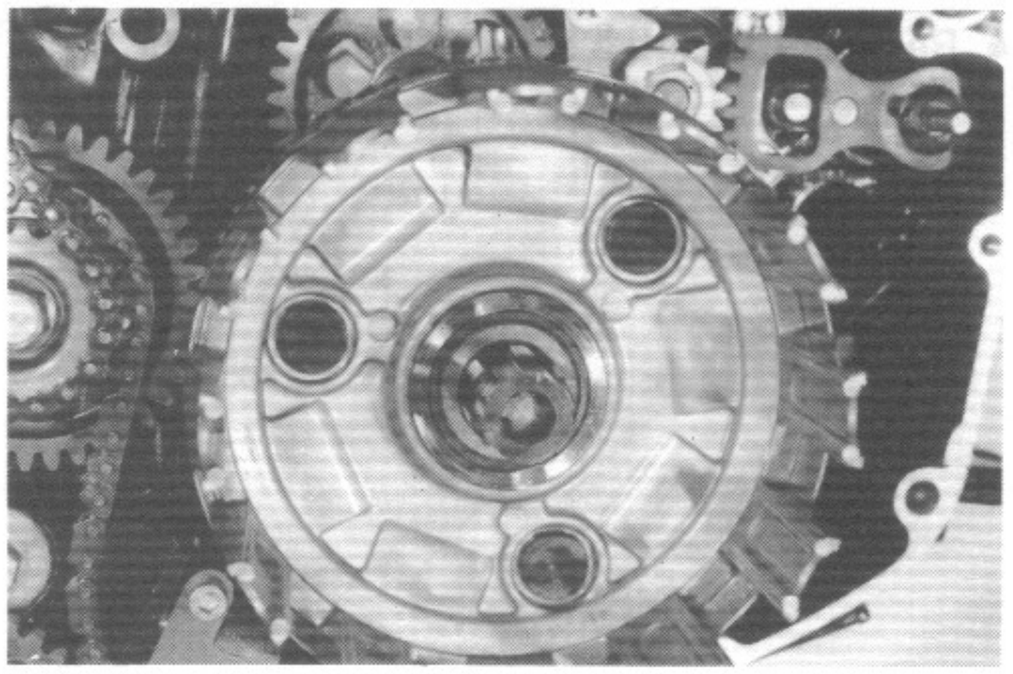


- After removal of several clutch driven and drive plates, flatten clutch sleeve hub nut lock washer by using chisel.
- Firmly secure clutch sleeve hub to remove mounting nut with clutch sleeve hub holder ①.

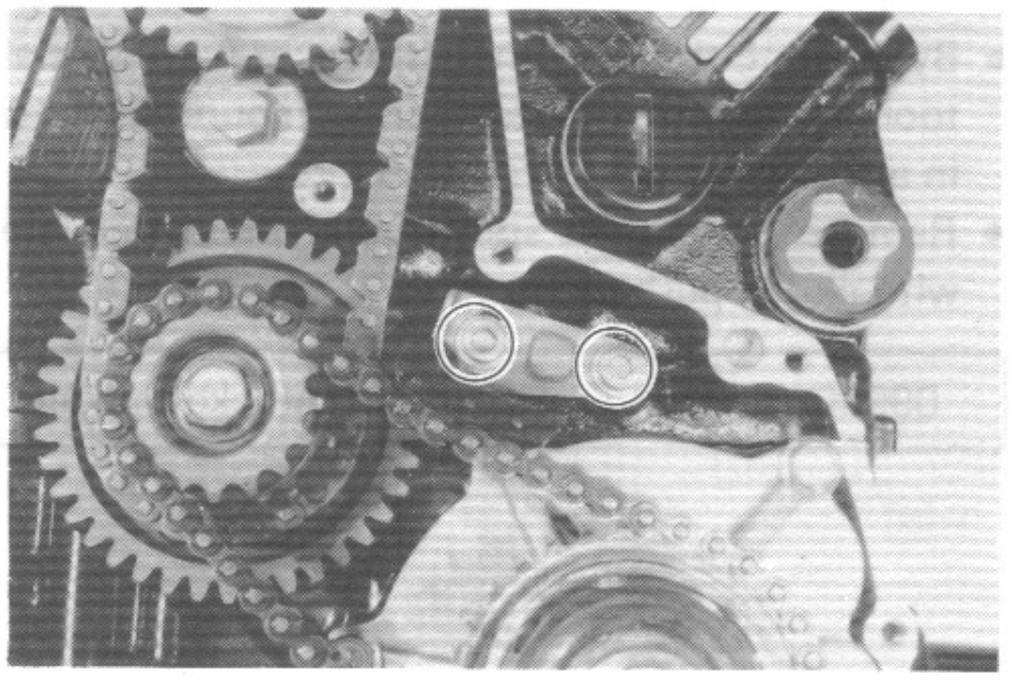
09920 - 53710	Clutch sleeve hub holder



- Remove washer, clutch hub, and the remaining plates.
- Remove the primary driven gear assembly, spacer, bearing and washer.



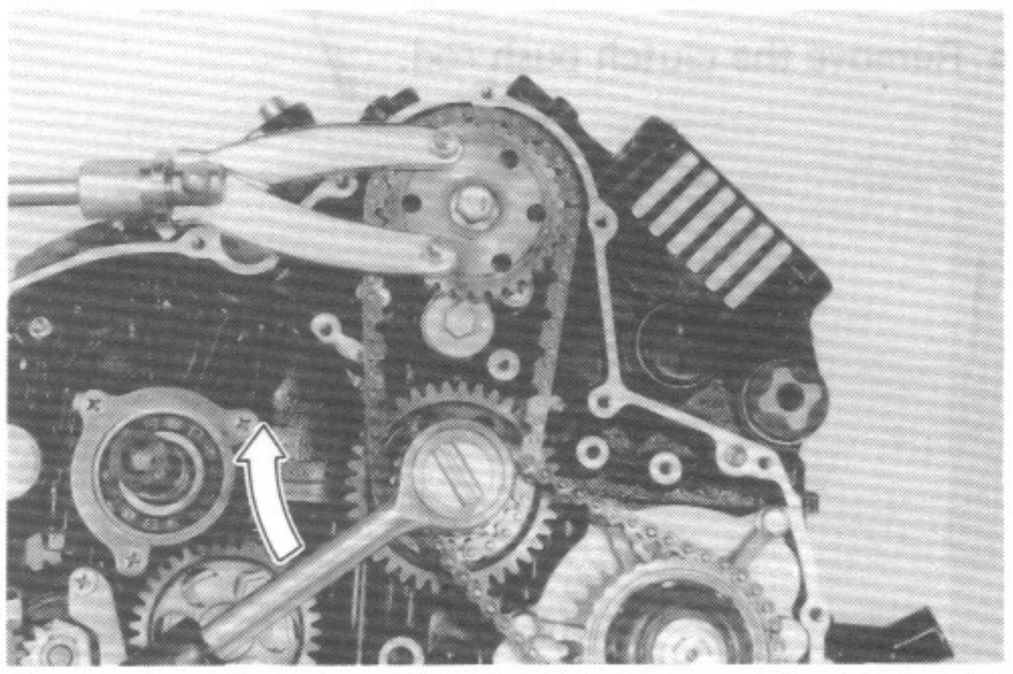
- Remove the water pump drive chain tensioner.



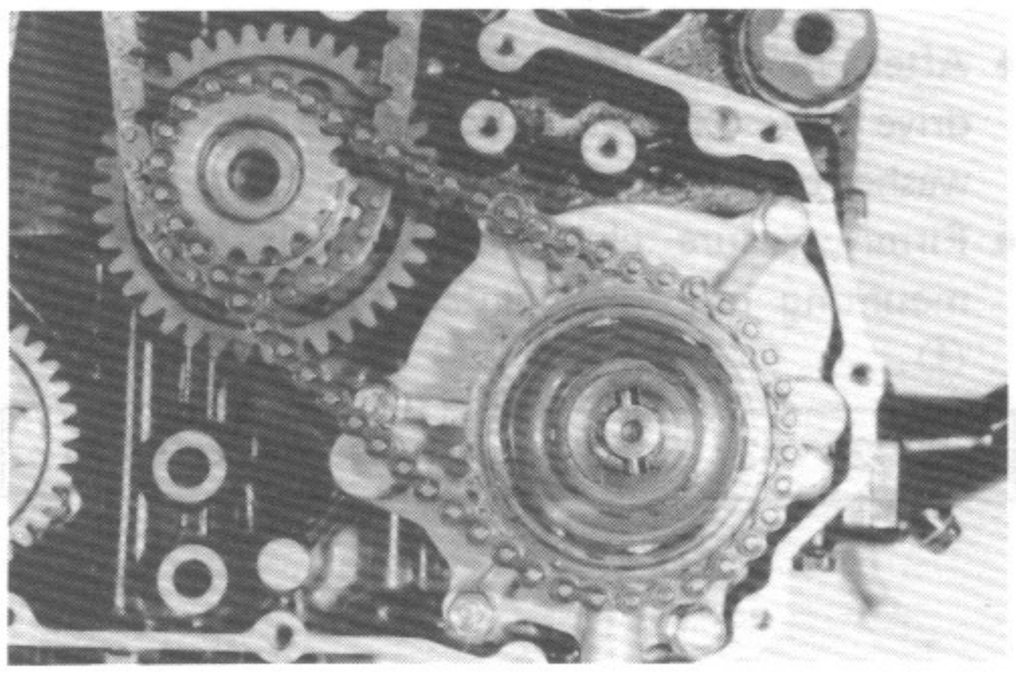
- Hold the idler sprocket with special tool and remove the water pump drive sprocket bolt by turning the bolt clockwise.

09930 - 40113	Rotor and sprocket holder

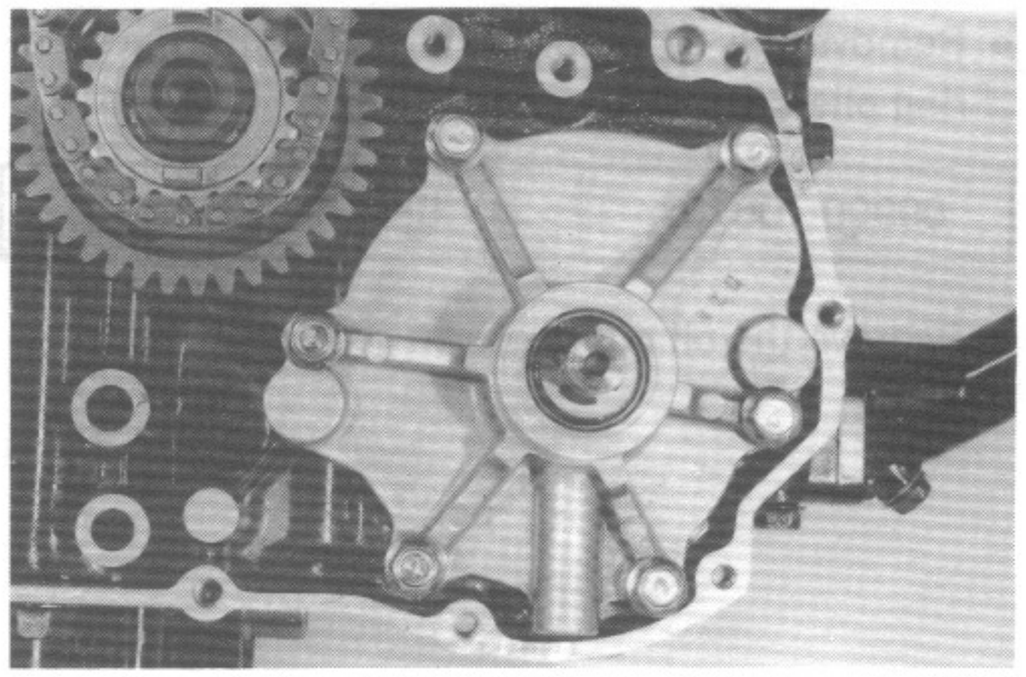
CAUTION:
This bolt has left-hand thread. When turning it counter-clockwise, it may cause damage.



- Remove water pump driven sprocket E-ring, and remove water pump drive and driven sprockets with drive chain.



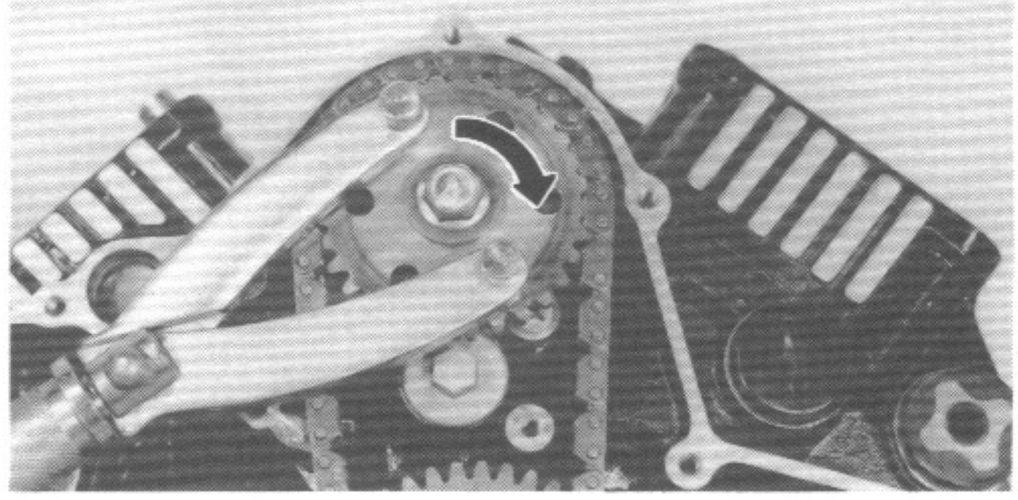
- Remove the water pump assembly.



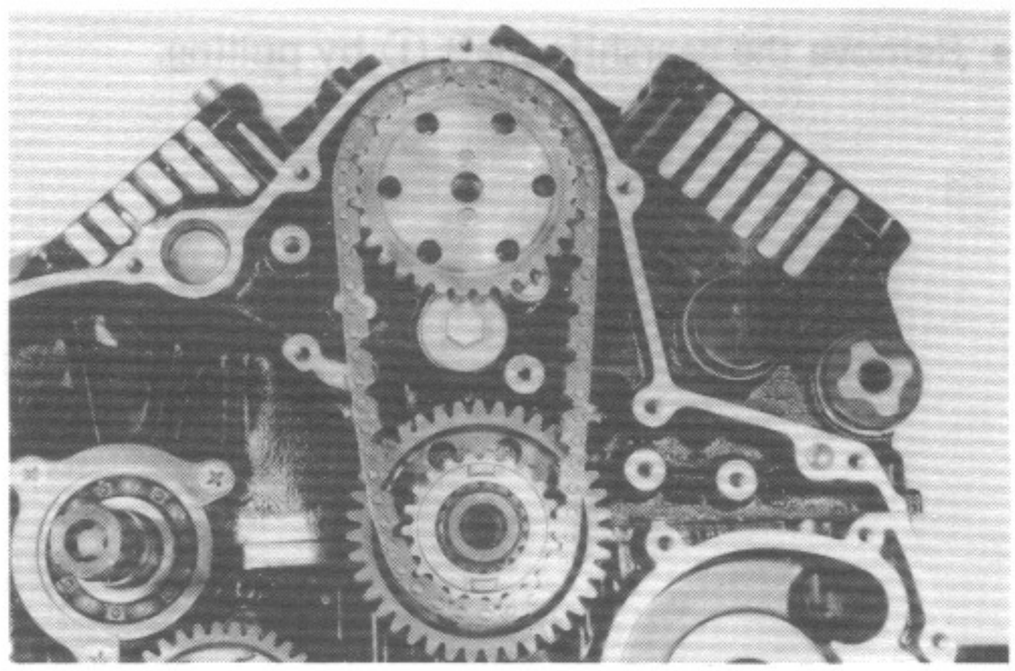
- Hold the idler shaft sprocket with the special tool and remove the sprocket bolt by turning it clockwise.

09930 - 40113	Rotor and sprocket holder

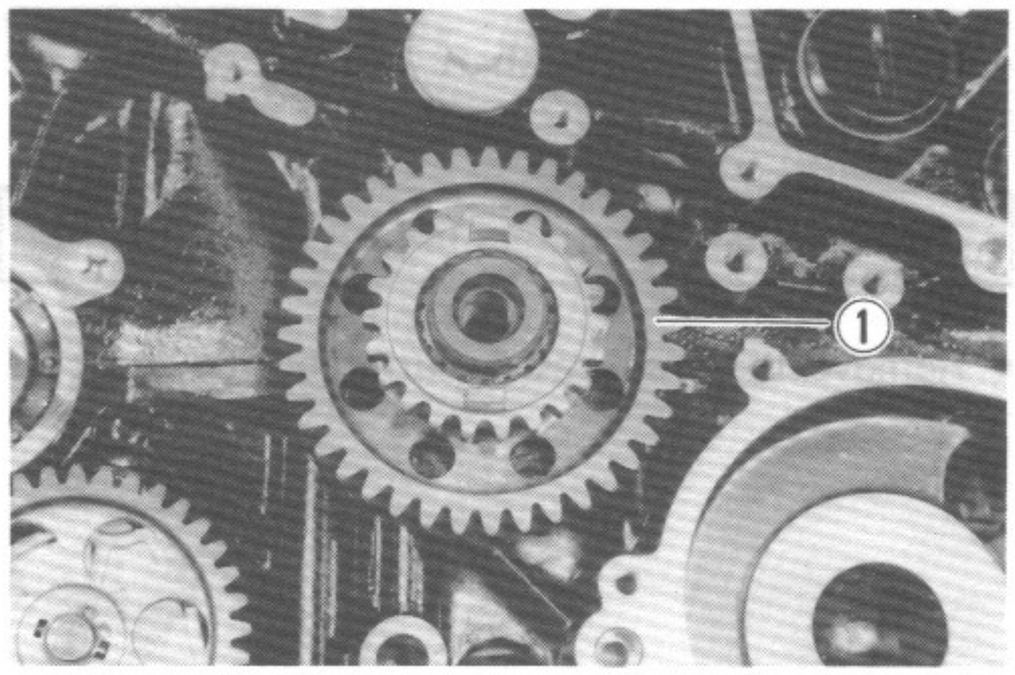
CAUTION:
This bolt has a left-hand thread. When loosening it, turn it clockwise.



- Remove the idler shaft drive chain tensioner.
- Remove the idler shaft drive and driven sprockets with drive chain.

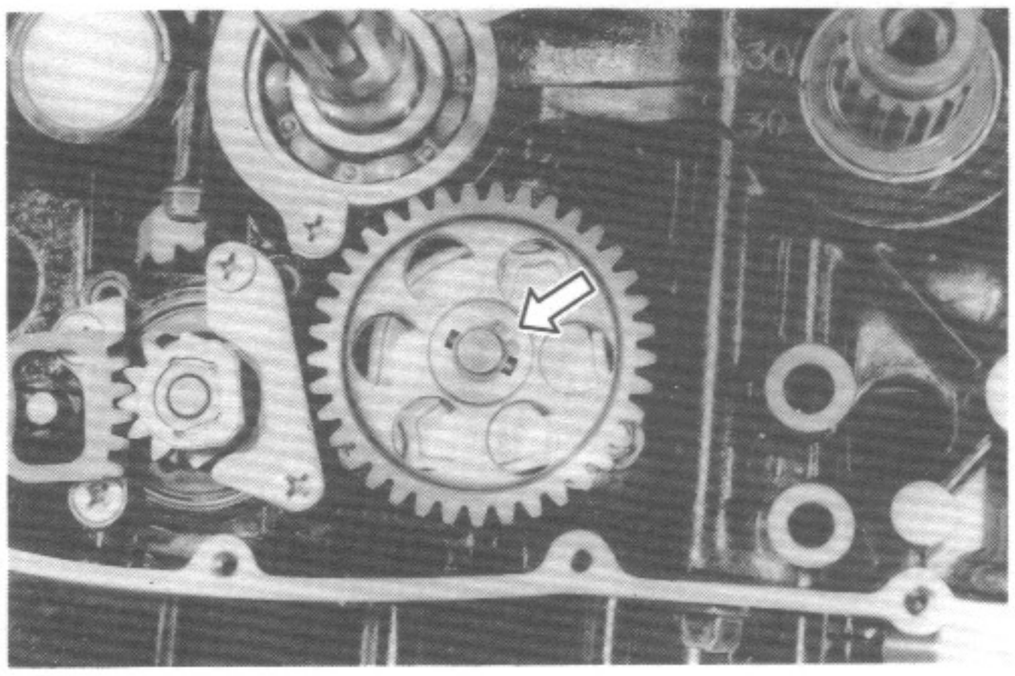


- Remove the primary drive gear ①.

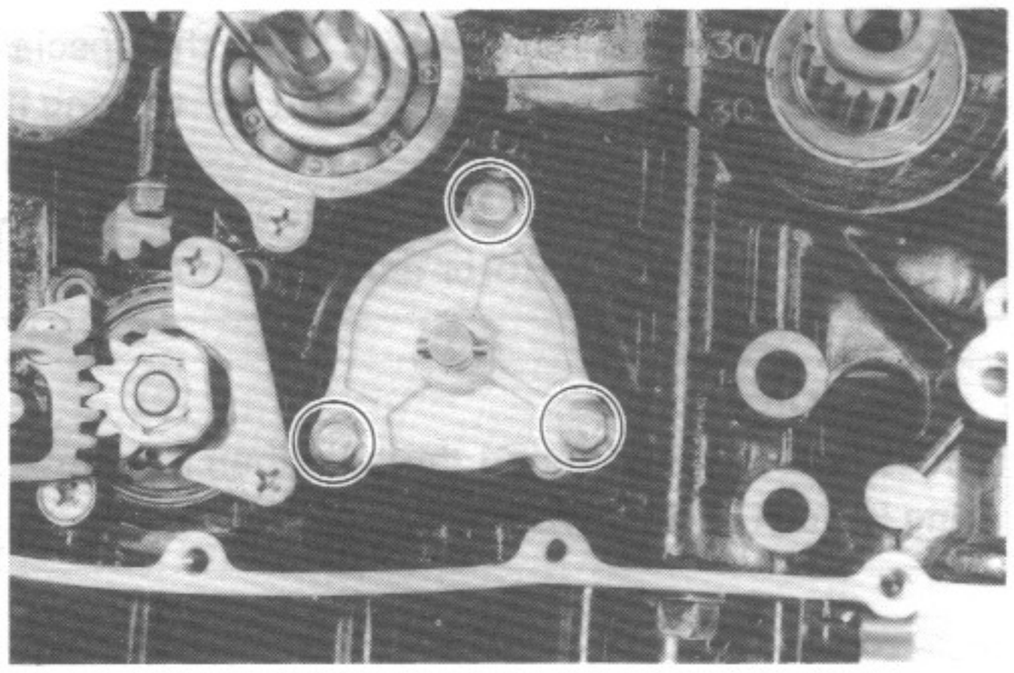


- Remove the oil pump driven gear with the snap-ring pliers.

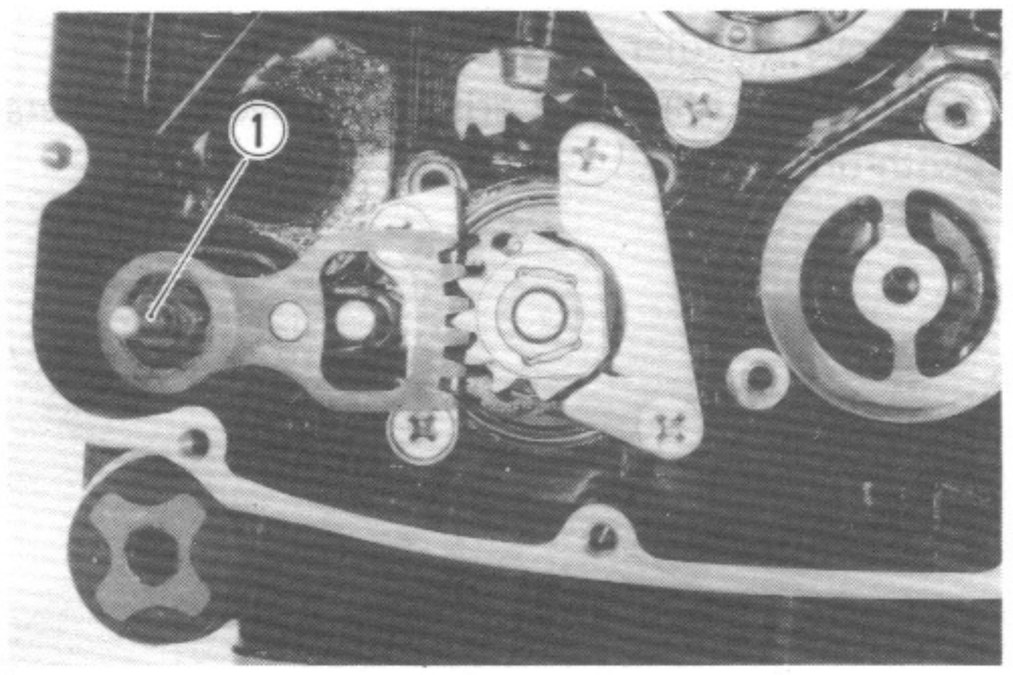
09900 - 06107	Snapring pliers



- Remove the oil pump driven gear.
- Remove the pin, washer and oil pump assembly.



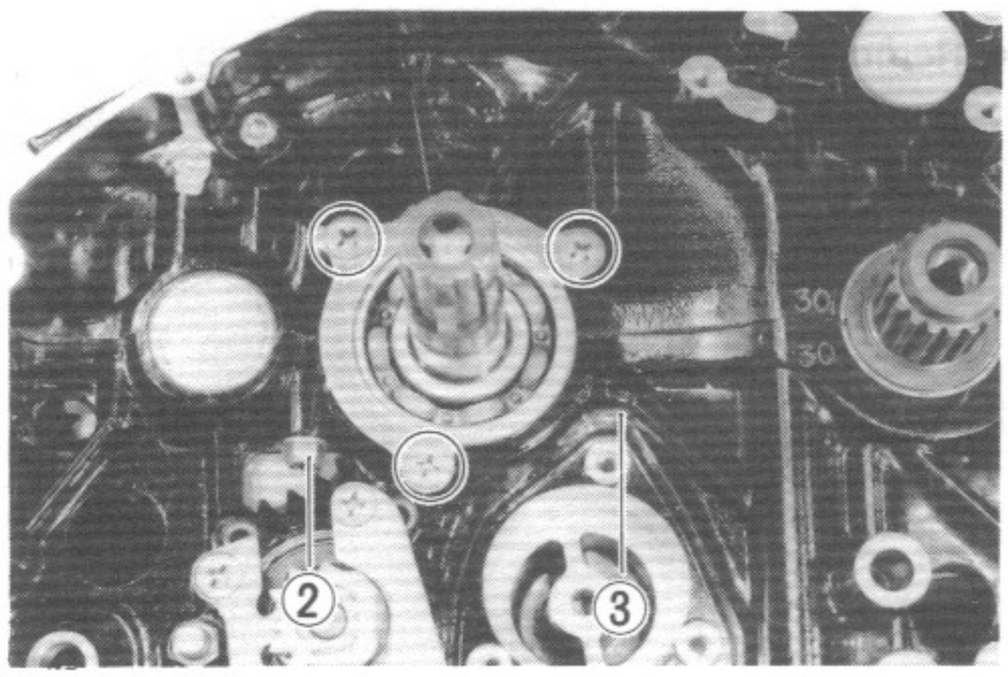
- Remove the gearshift shaft ① by pulling.



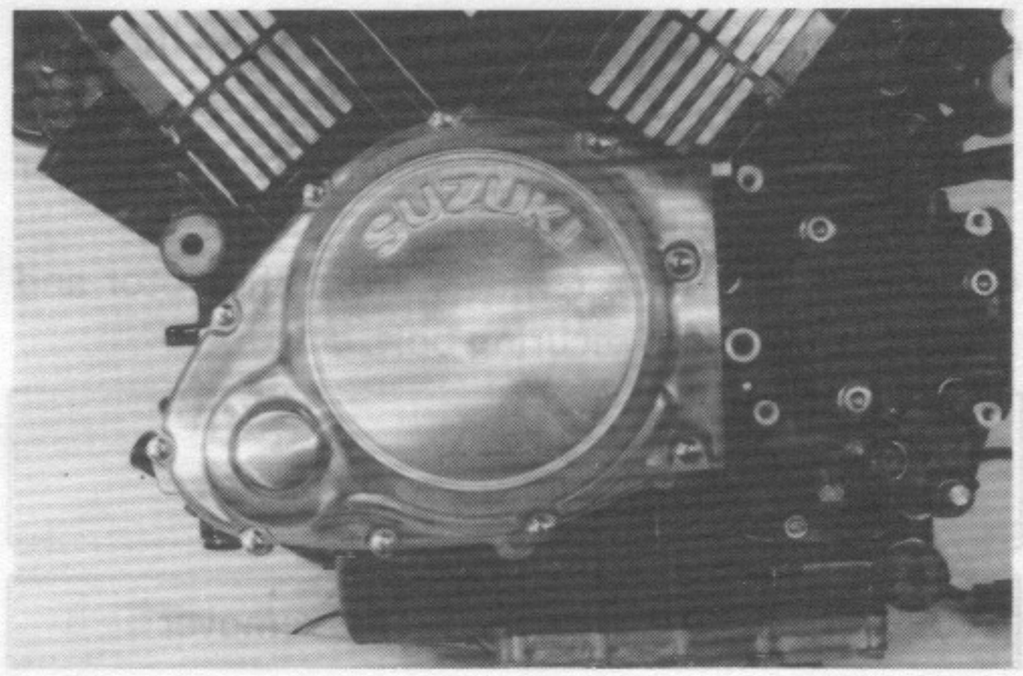
- Remove the countershaft bearing retainer by using impact driver.

09900 - 09003	Impact driver set

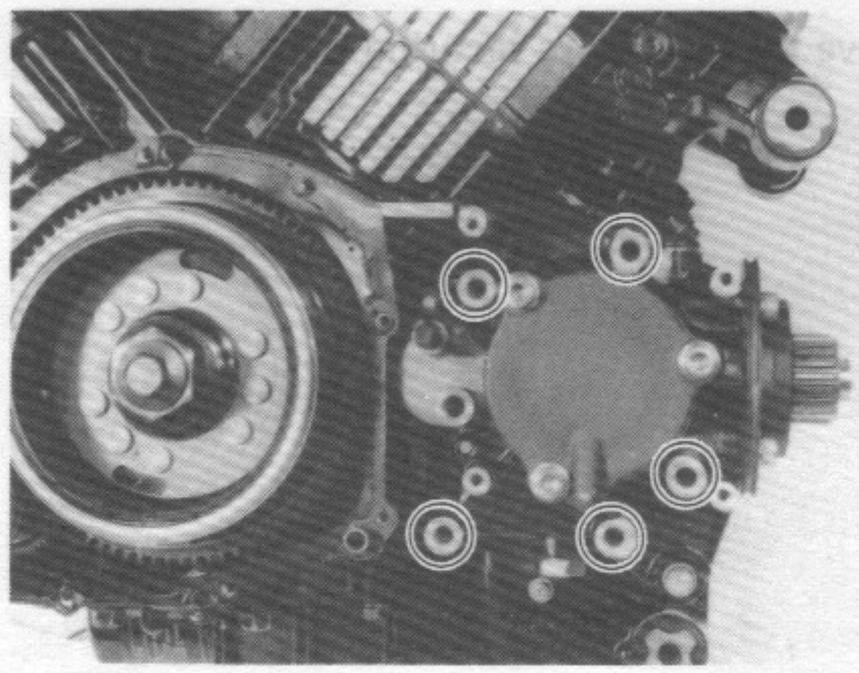
- Remove the crankcase securing nut ② and bolt ③.



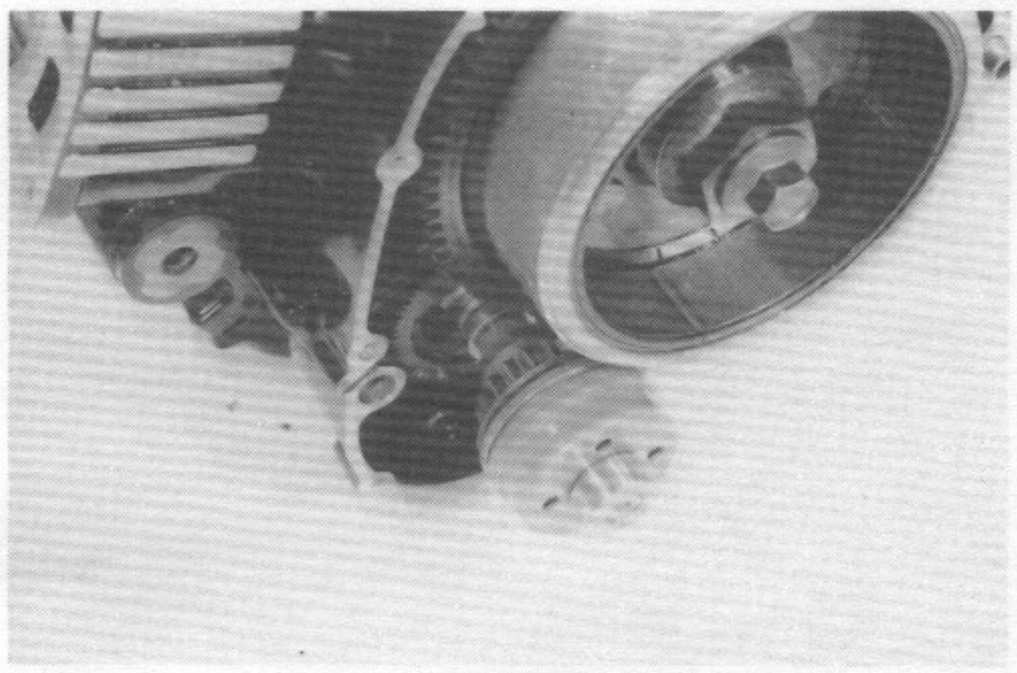
- Remove the generator cover and its gasket.



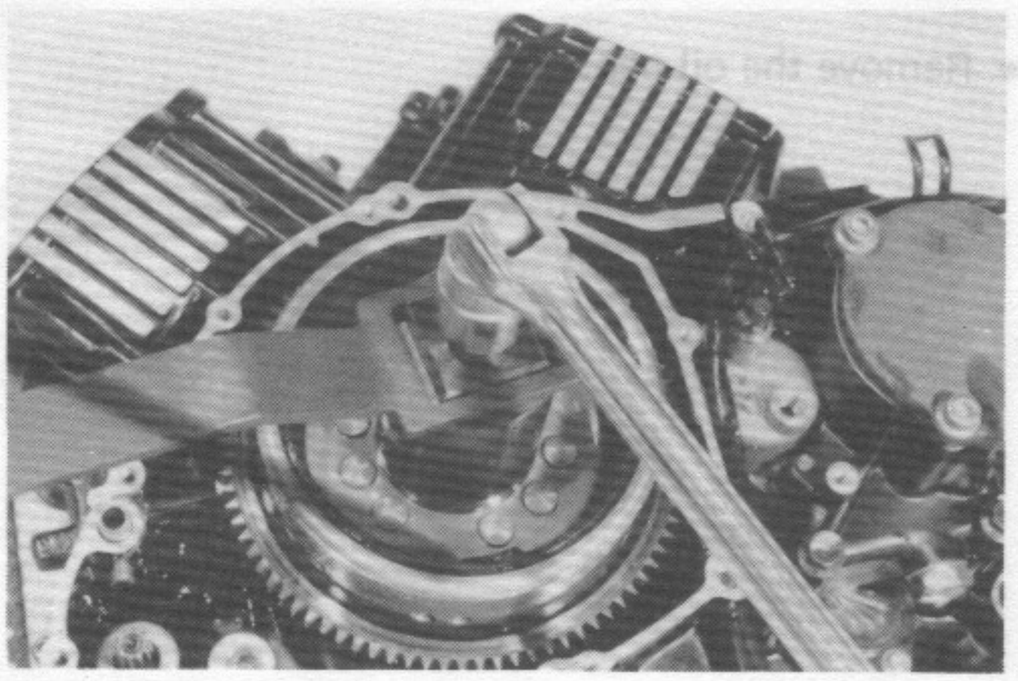
- Remove the secondary drive and driven bevel gear case and clutch cylinder.



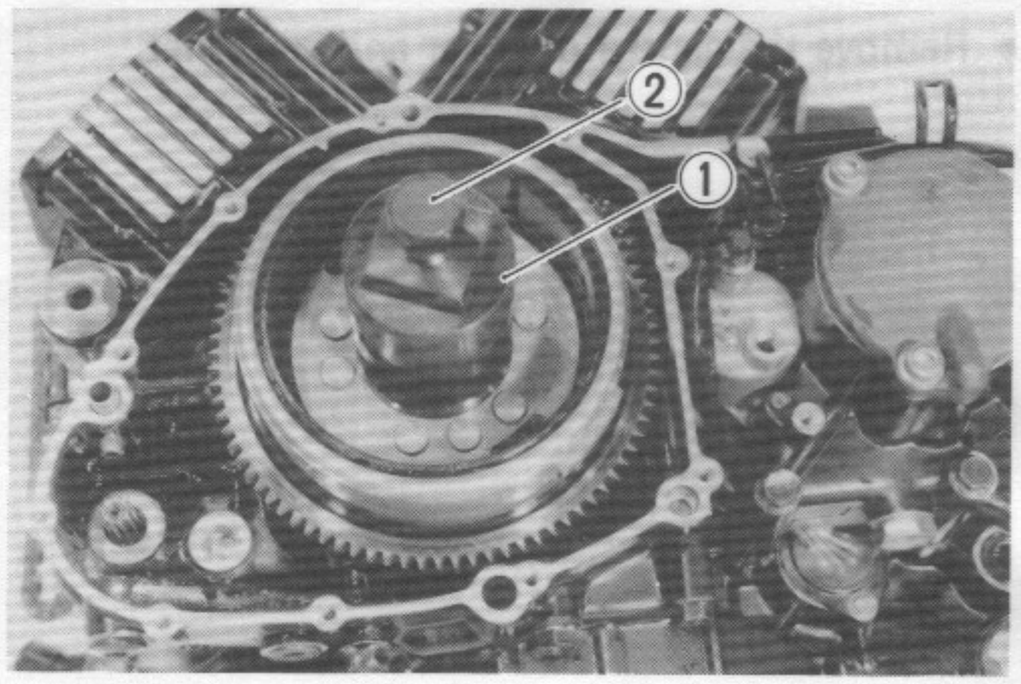
- Remove the starter pinion, starter drive gear and its thrust washer.



- Using 36-mm off-set wrench, loosen the rotor securing bolt by several turns. At this stage, do not remove the rotor securing bolt.



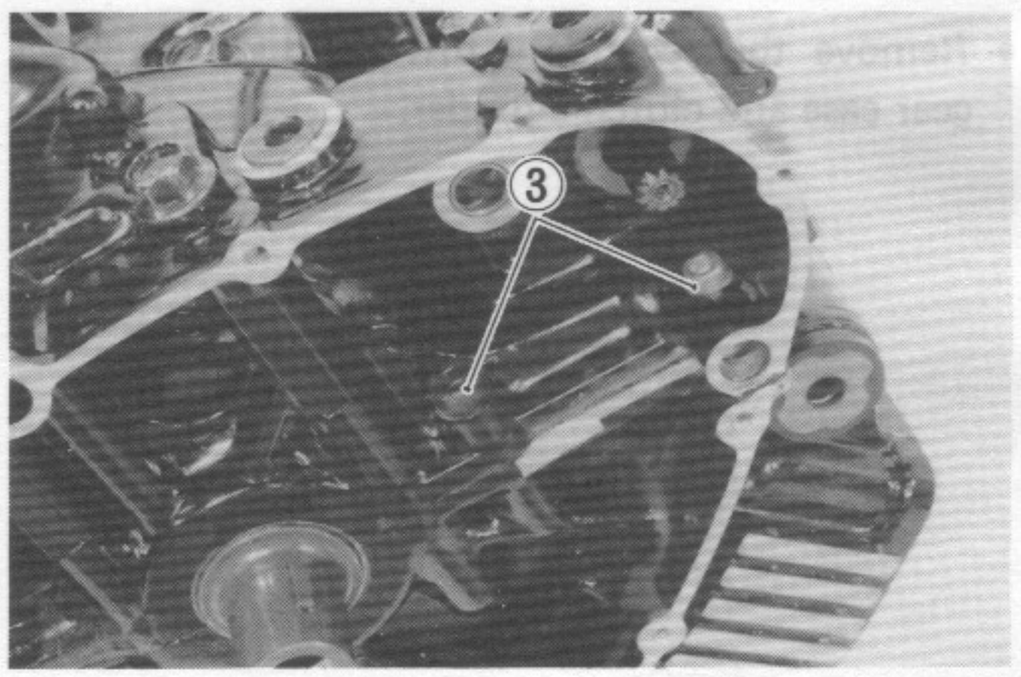
- Install the rotor remover ① into the boss of rotor and remove the rotor assembly by turning its center bolt ② while holding the remover with 36 mm off-set wrench.
- Remove the rotor remover from the rotor and remove the rotor securing bolt.



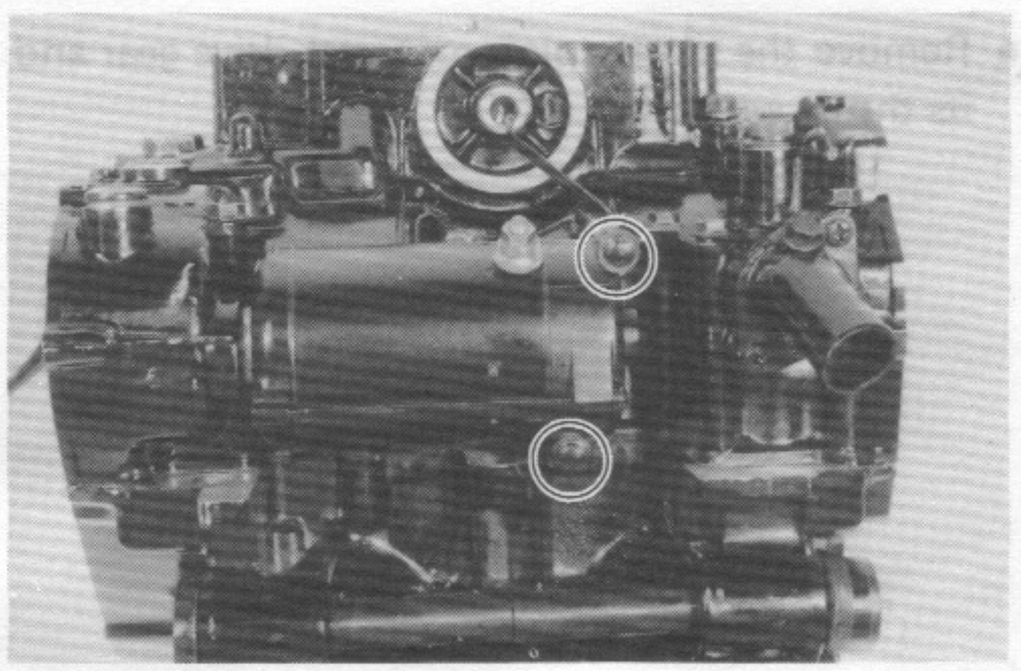
NOTE:
Do not hit the rotor with a hammer.

09930 - 30720	Rotor remover

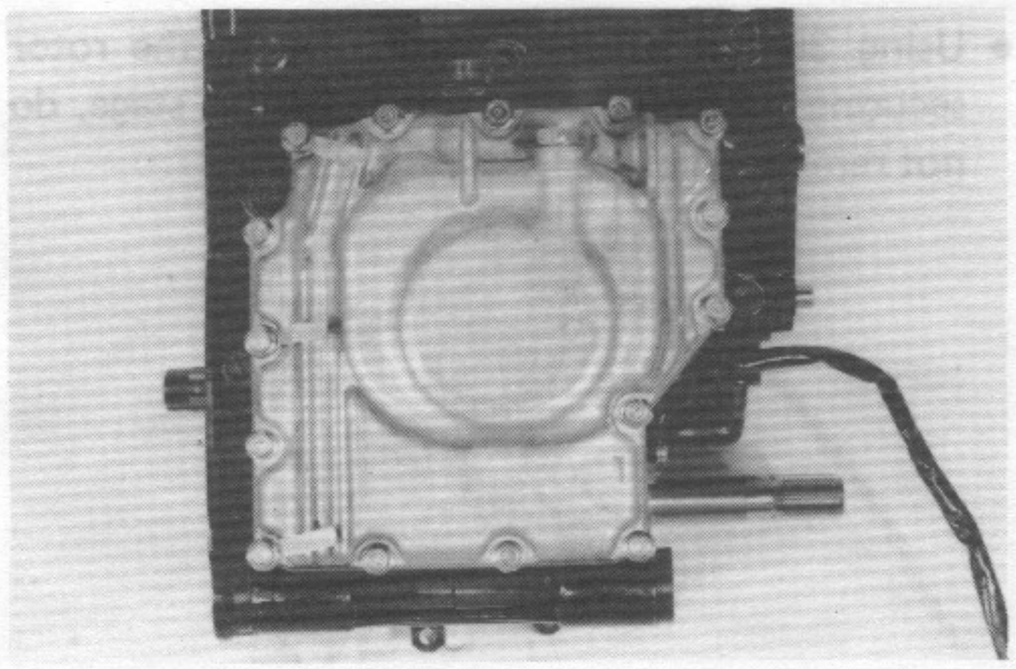
- Remove the crankcase securing bolts ③.



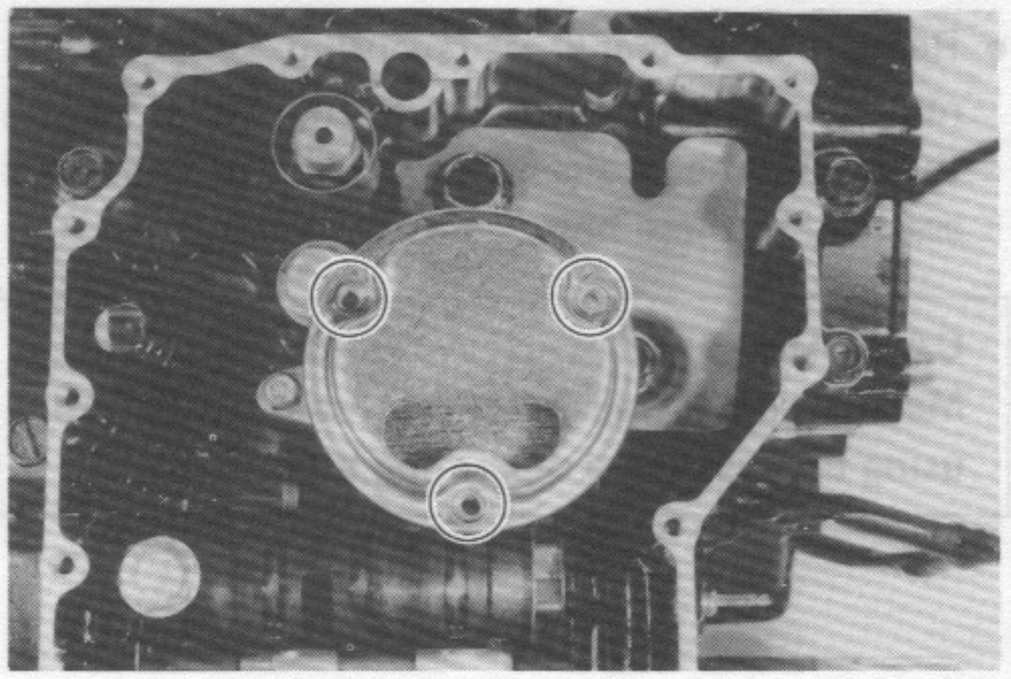
- Disconnect the starter motor lead wire and remove the starter motor.



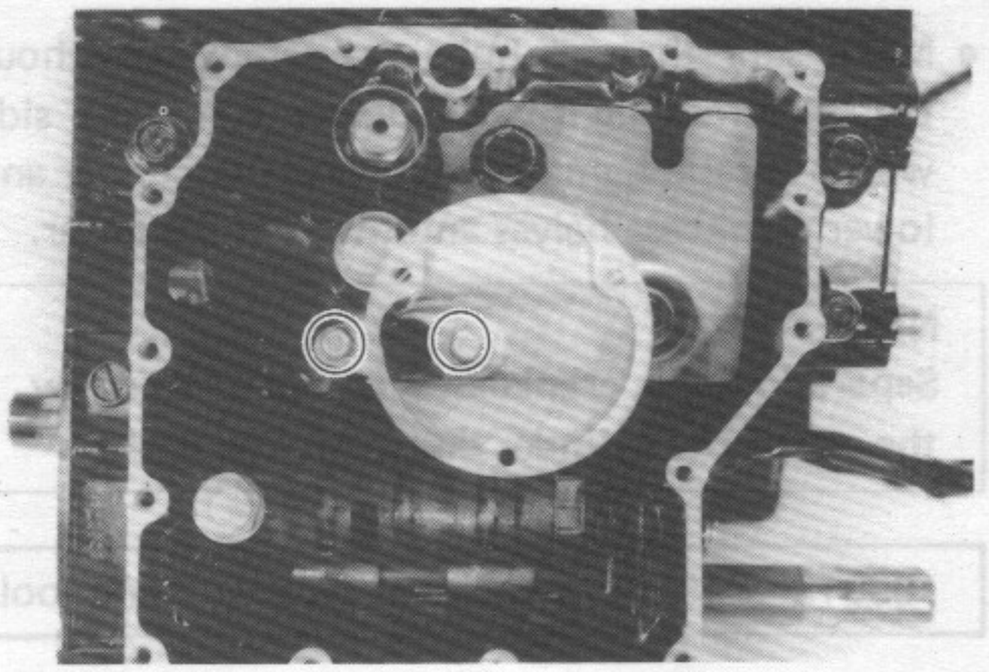
- Remove the oil pan.



- Remove the oil sump filter.

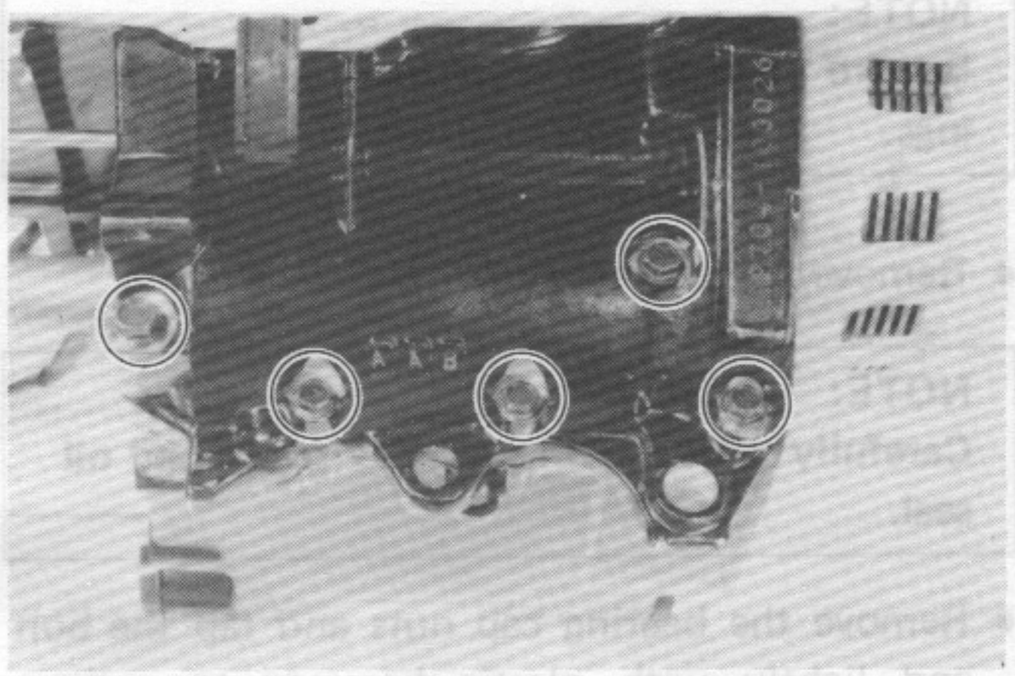


- Remove oil guide and O-ring.

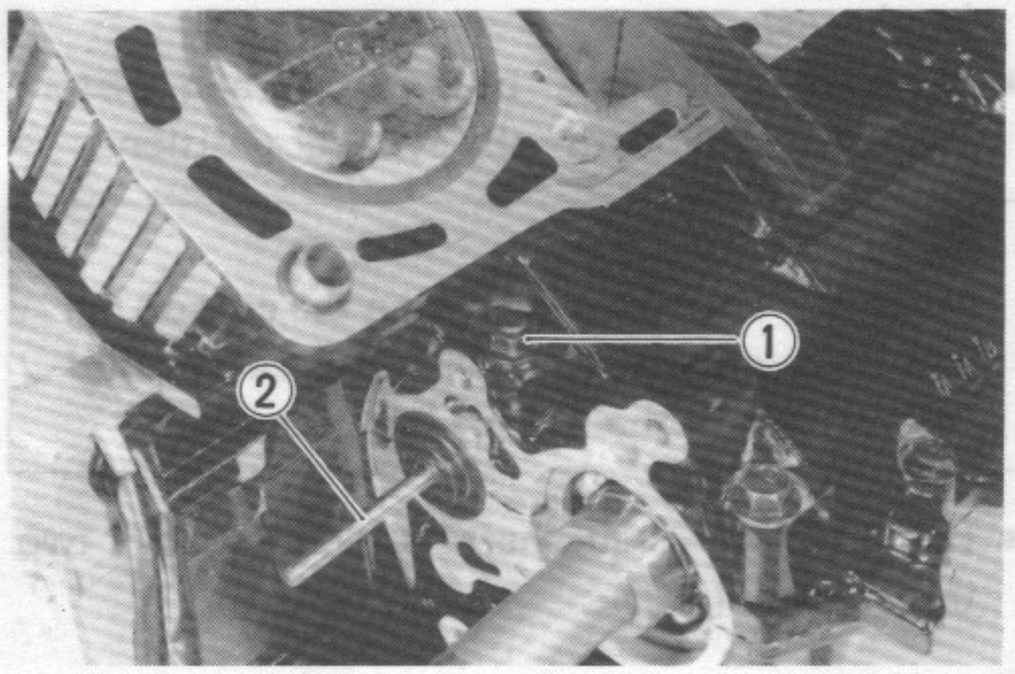


CAUTION:
Do not miss the O-ring located under the oil guide.

- Remove the crankcase securing bolts from the upper crankcase.

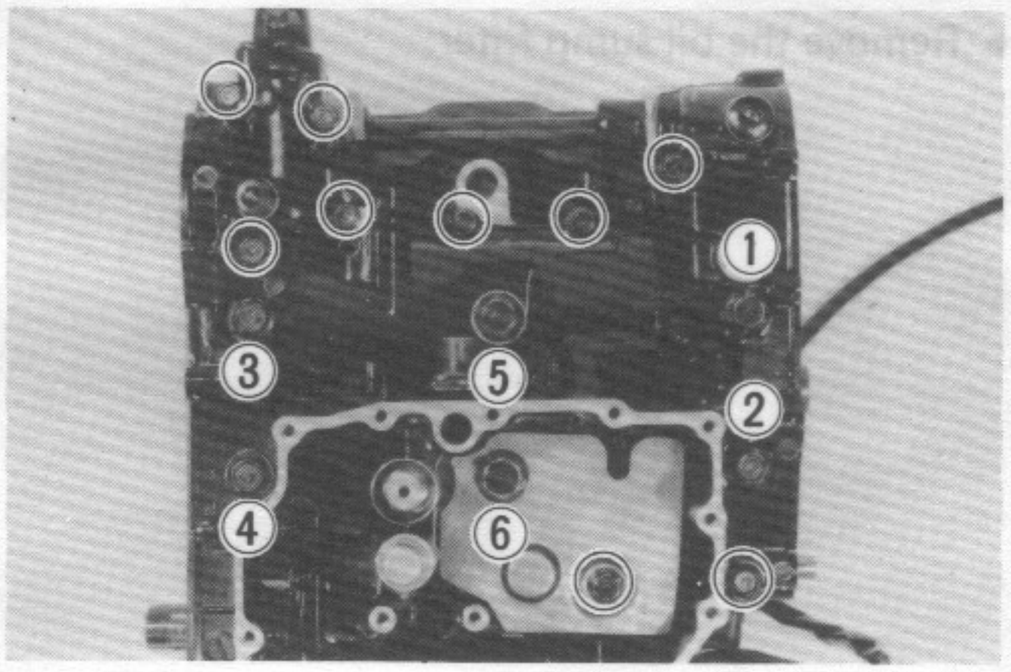


- Remove the crankcase securing nut ①.
- Extract the clutch pushrod ②.



- Remove the crankcase securing bolts. When removing the crankcase securing bolts, loosen them in the descending order of numbers assigned to these bolts.

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

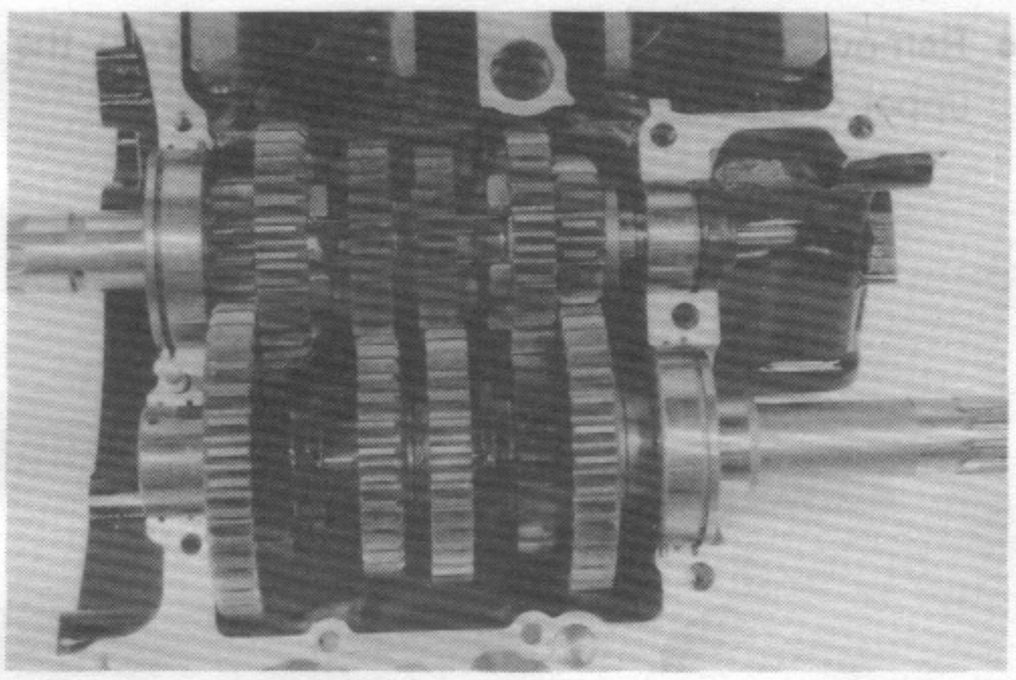


- Make sure that all bolts are removed without fail. Hammer lightly the lower crankcase side with a plastic hammer to separate the upper and lower crankcase halves and then lift the latter.

NOTE:
Separating the crankcases is made easier by the use of the cylinder disassembling tool.

09912 - 34510	Cylinder disassembling tool

NOTE:
Beware of dropping crankshaft journal bearings.

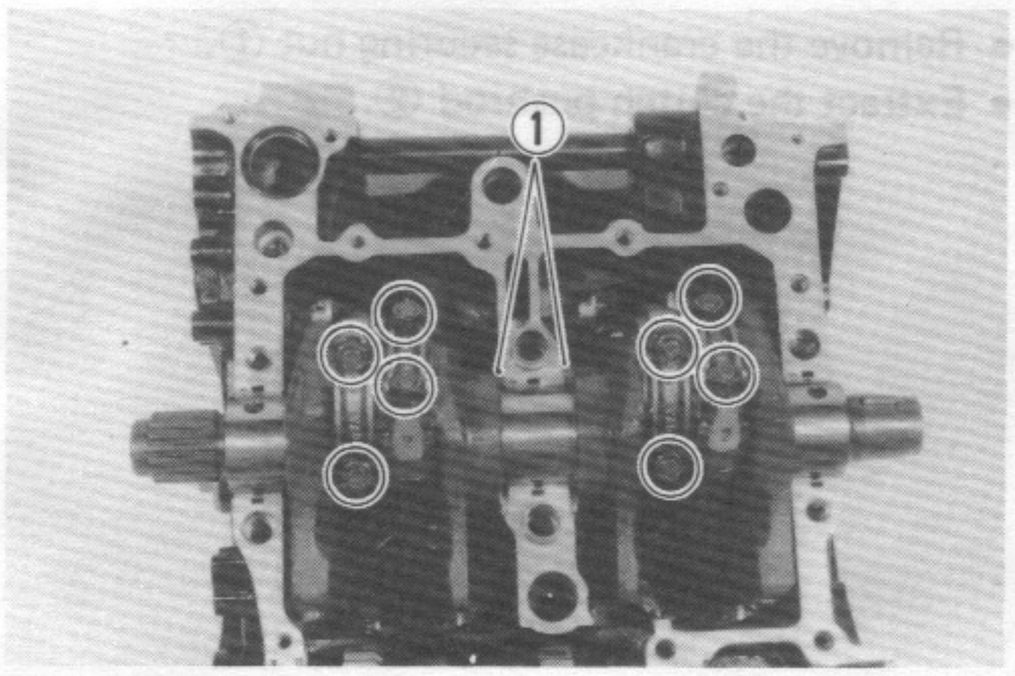


- Remove the countershaft and drive shaft.

NOTE:
Carefully set aside the two "C" rings and oil seal.

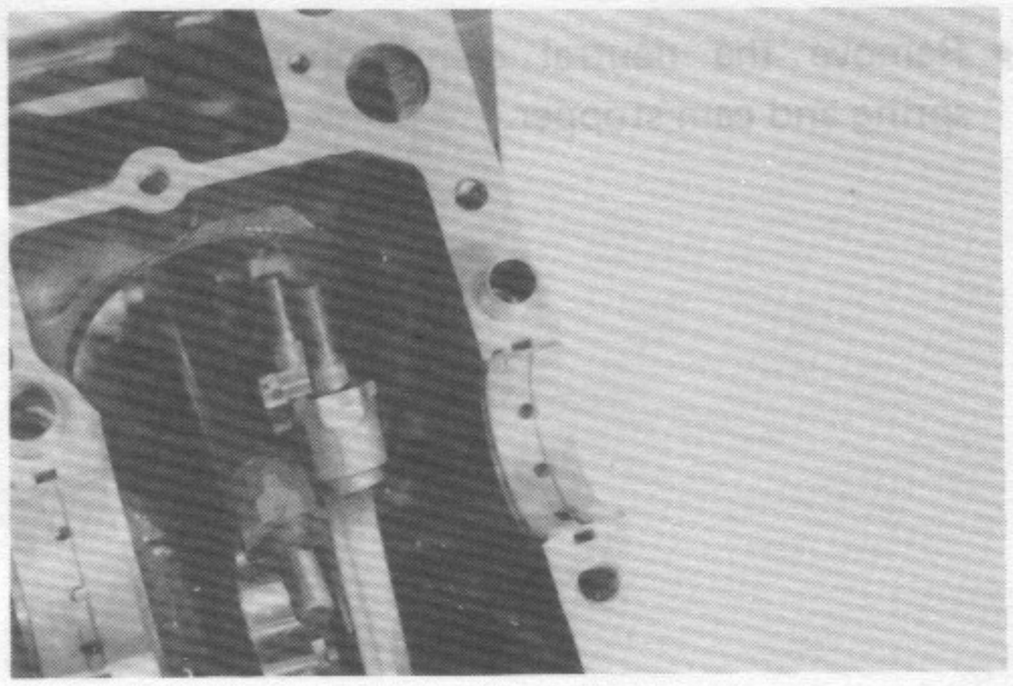
- Remove the bearing cap nuts and tap the bolt end lightly with plastic hammer to remove bearing cap.
- When removing the bearing cap and piston, mark them to identify the cylinder position.

NOTE:
Never try to remove or loosen the conrod big end stud, otherwise, it will displace the stud and will not fit the bearing cap properly.



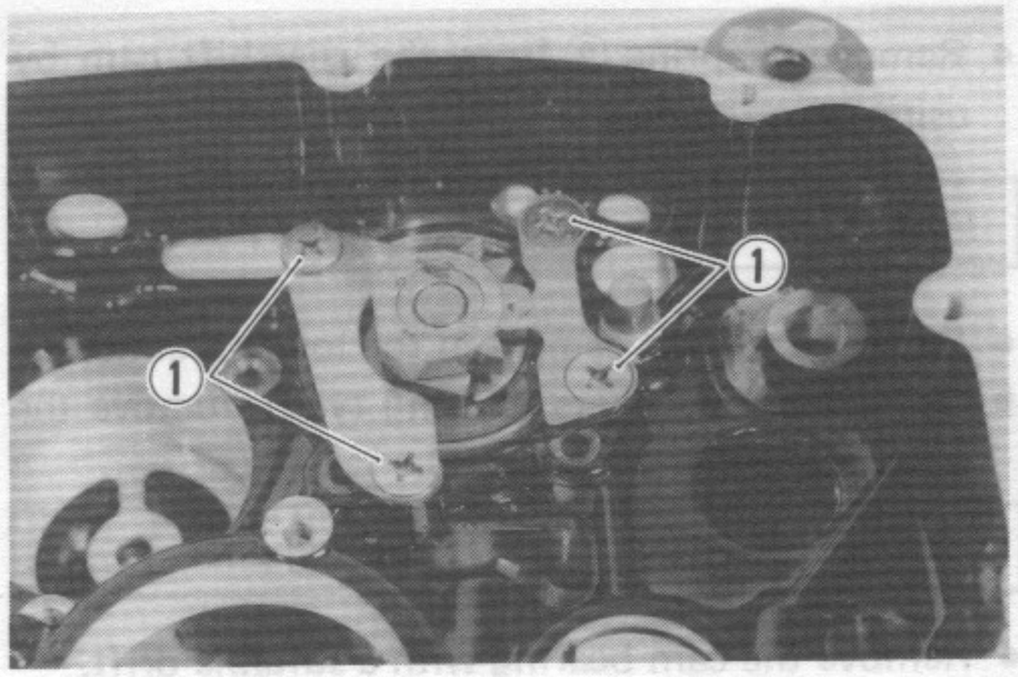
- Remove the crankshaft assembly and two thrust bearings ①.

- Remove the piston and conrod to the cylinder head side.



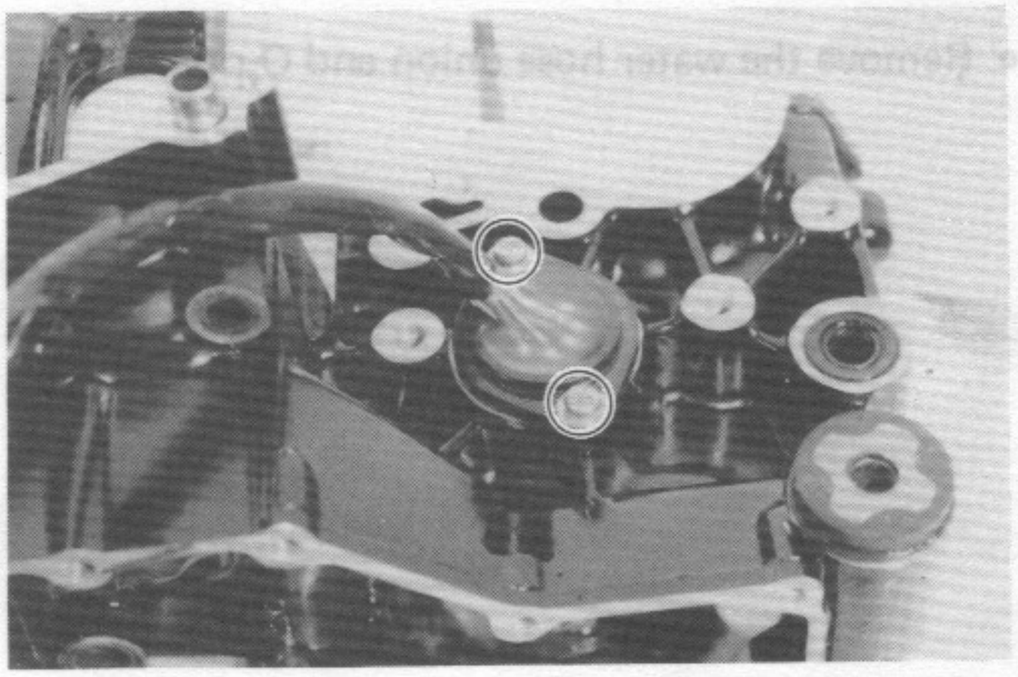
- Remove gearshift cam guide and pawl screws ①.

09900 - 09003	Impact driver set

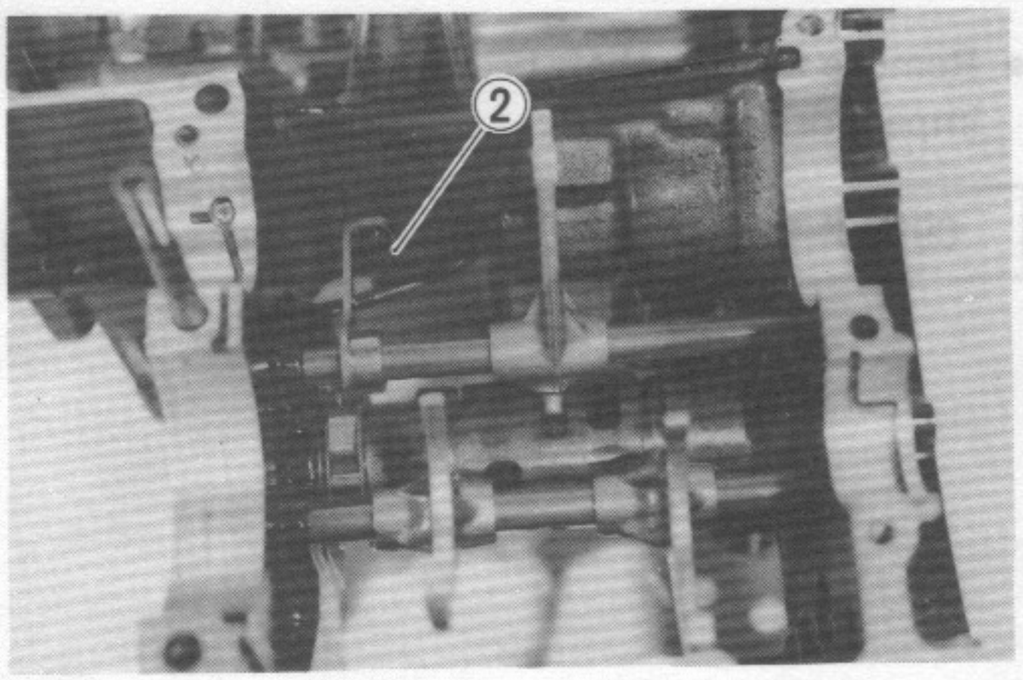


- Remove the gear position indicator switch body.

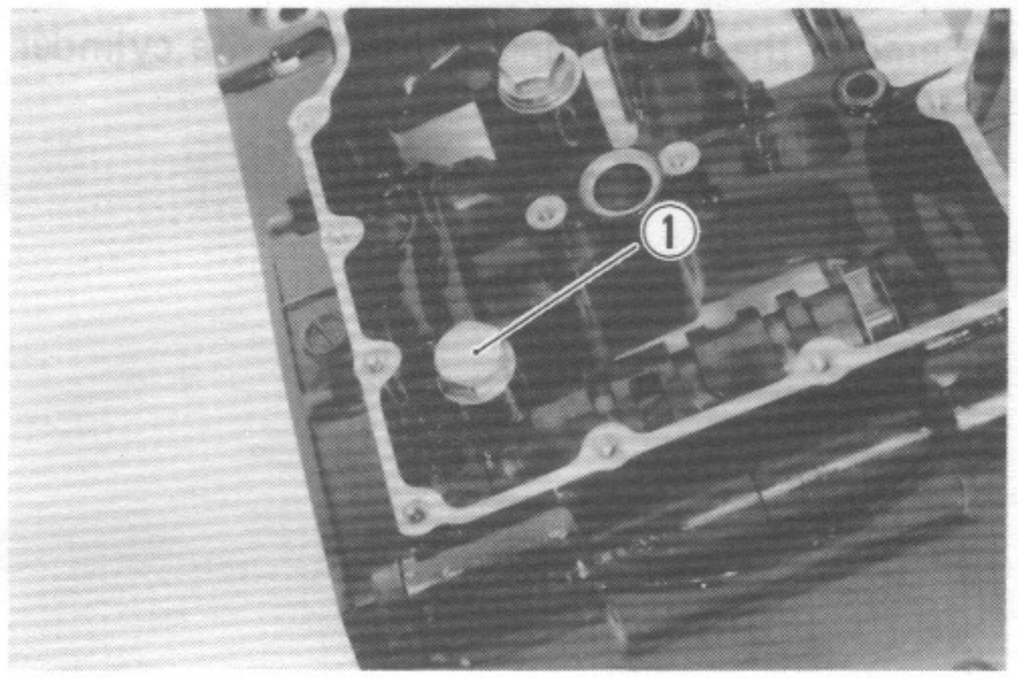
NOTE:
Do not miss the O-ring, switch contact and its spring.



- Unhook the gearshift cam stopper spring ② and remove the two gearshift fork shafts.



- Remove the neutral cam stopper holder ①, spring and cam stopper.

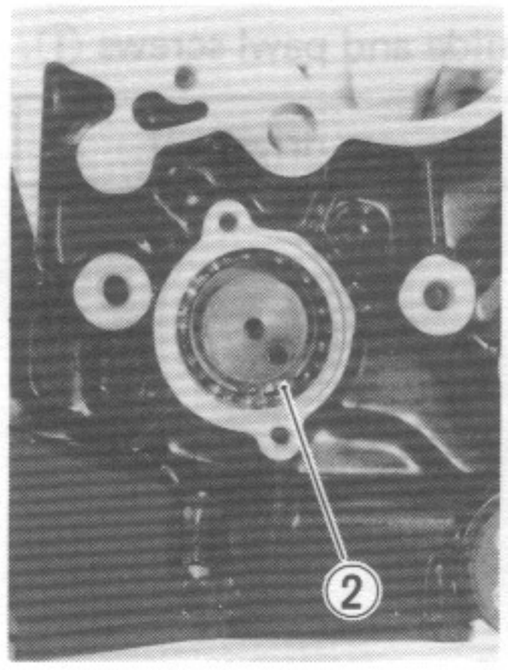


- Remove snapring ② from the gearshift cam by using snapring pliers.

09900 - 06107	Snapring pliers

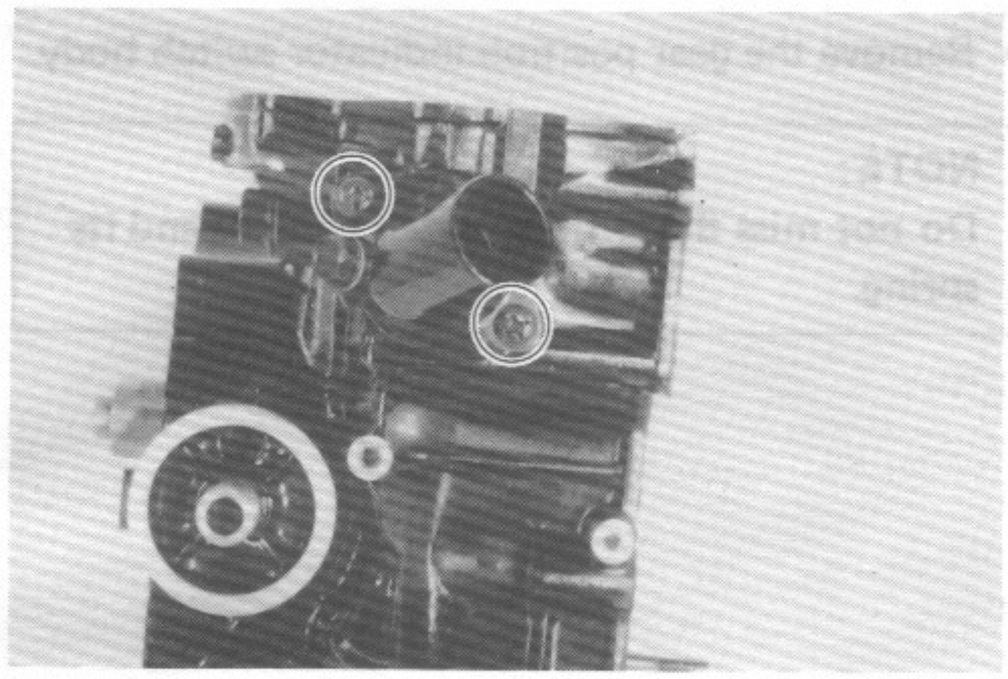
- Extract gearshift cam from the lower crankcase.
- Using snapring pliers (closing type), remove the bearing stopper snapring ③.

09900 - 06105	Snapring pliers



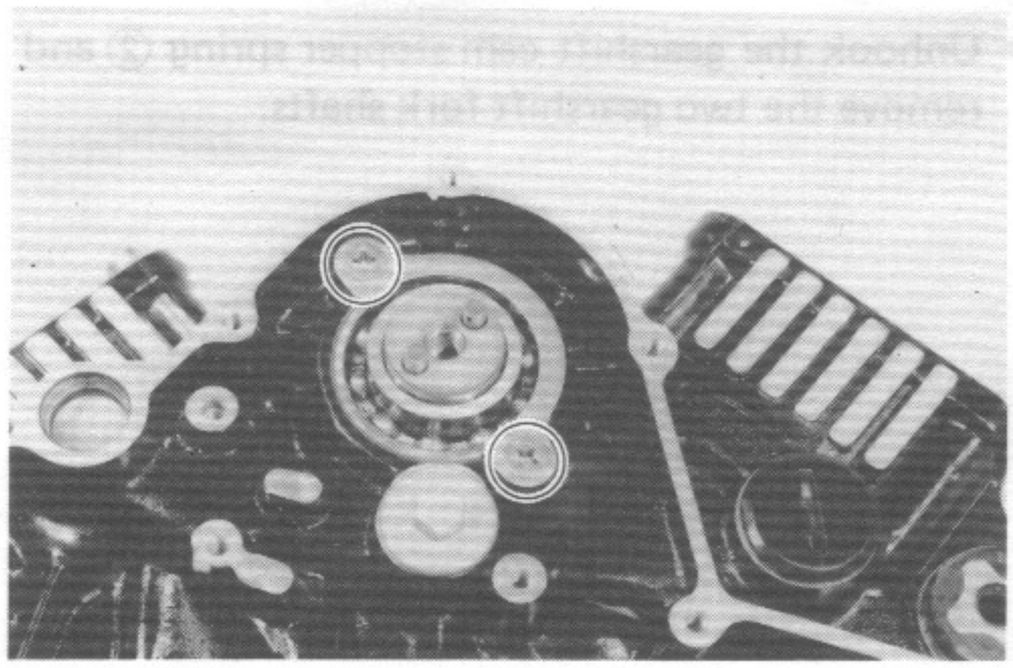
- Remove the cam bearing with a suitable drift.

- Remove the water hose union and O-ring.

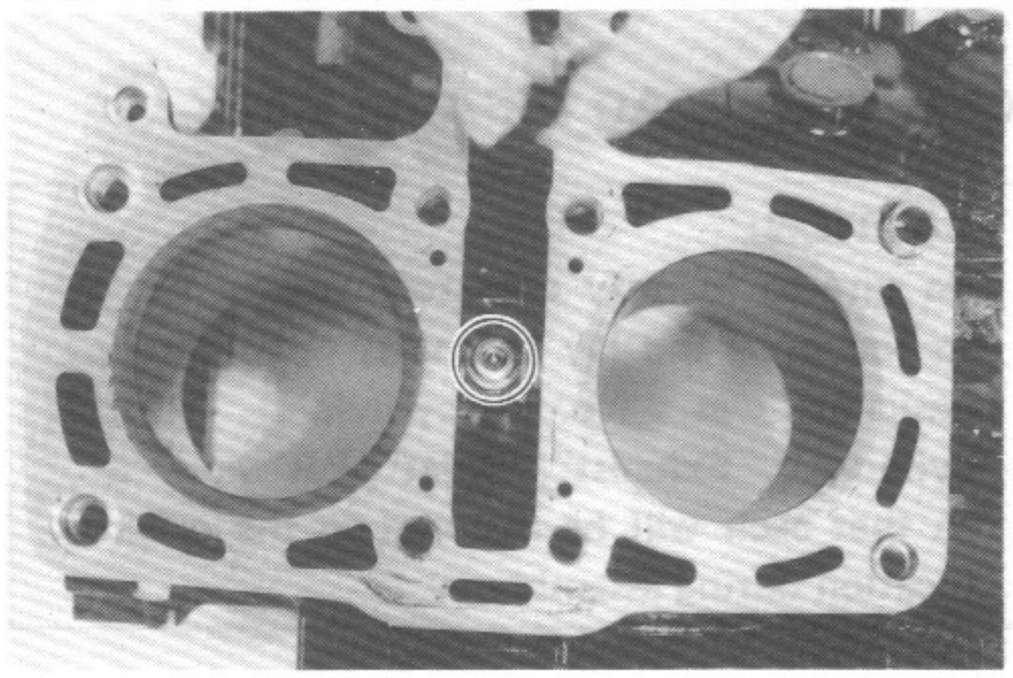


- Remove the idle shaft bearing retainer by using a impact driver.

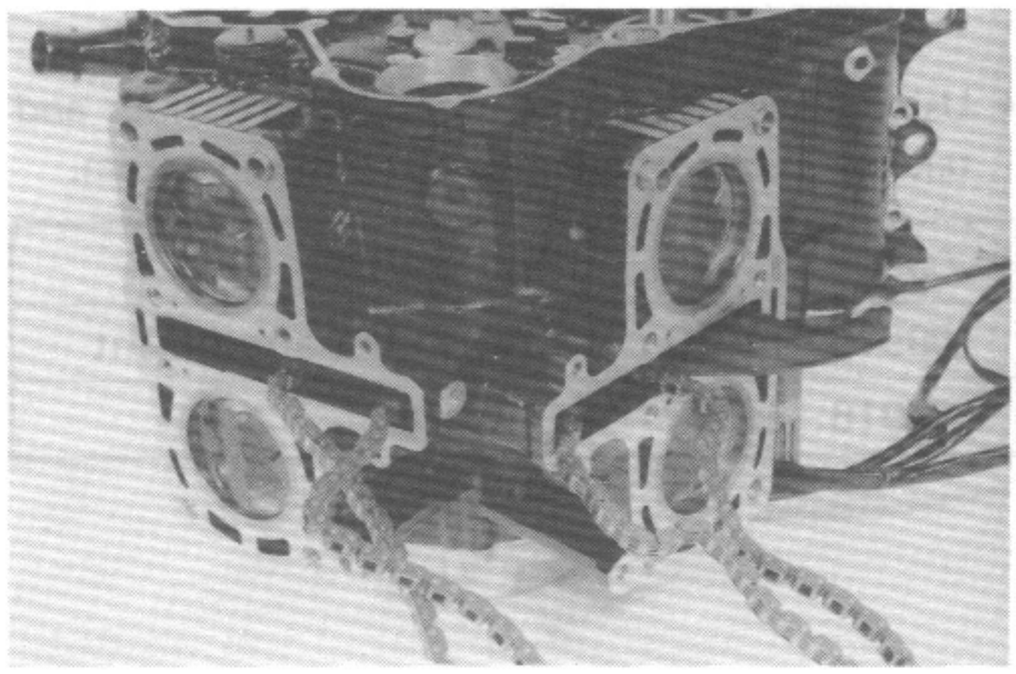
09900 - 09003	Impact driver set



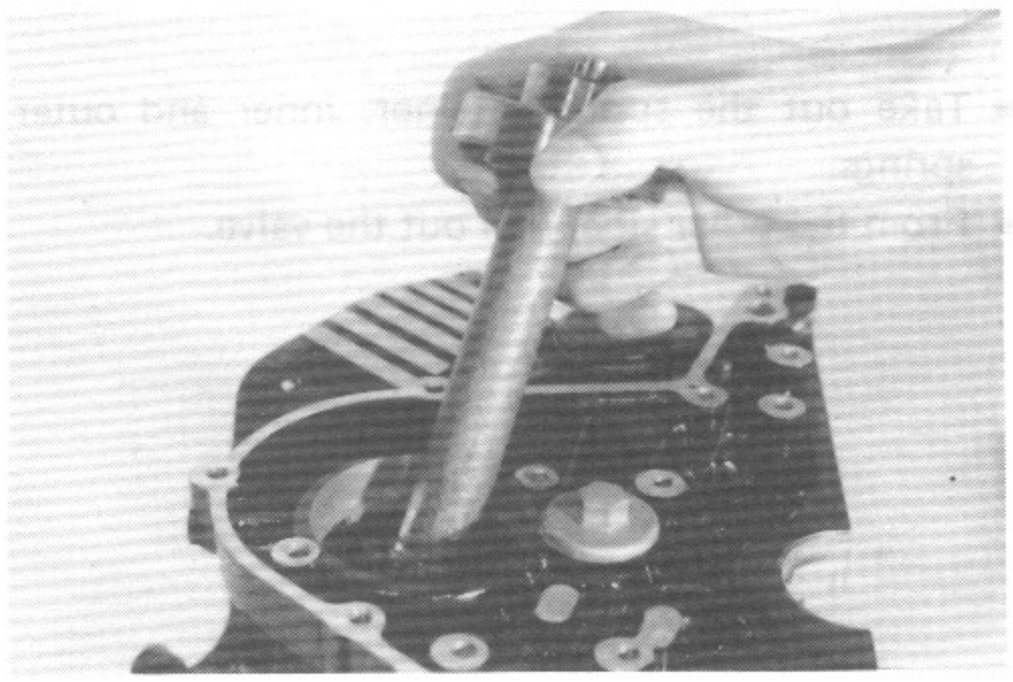
- Remove the cam drive chain tensioner.



- Disengage the two cam drive chains from the idle shaft sprockets.



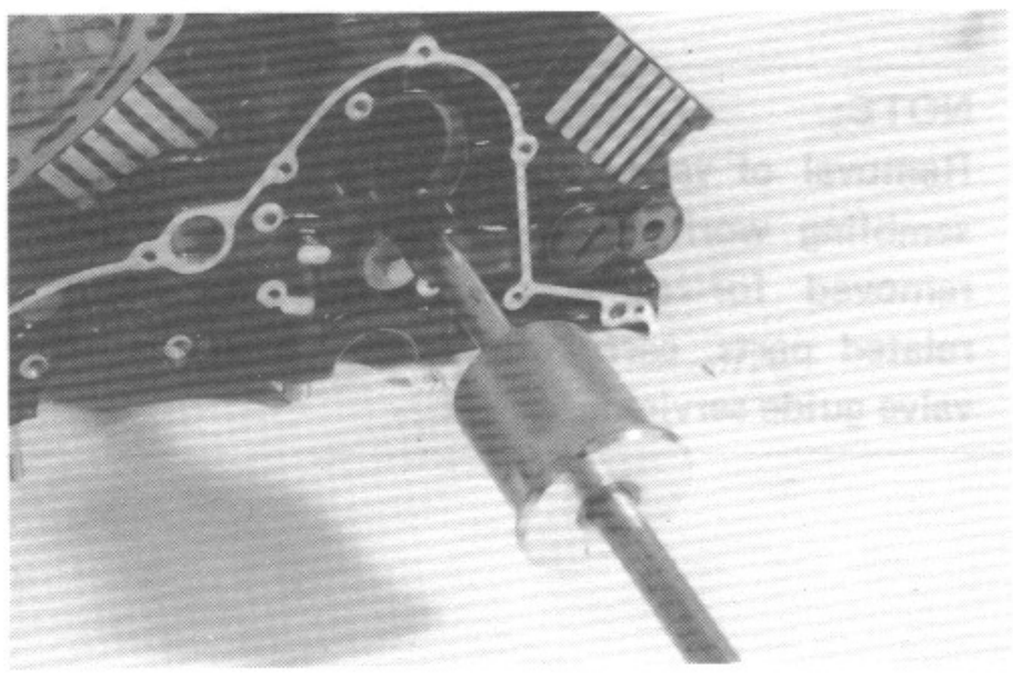
- Remove the idle shaft from the upper crankcase.



- Using the special tools and remove the idle shaft bearing.

09930 - 30102	Rotor remover slide shaft
09913 - 60710	Bearing remover (27 – 45 mm)

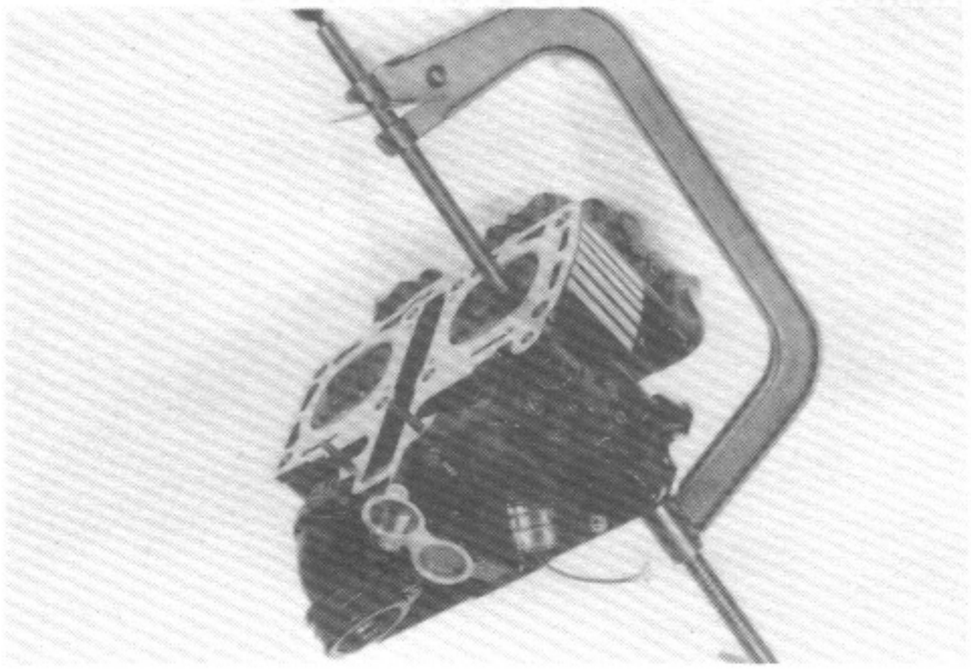
CAUTION:
The removed bearing should be replaced with a new one.



ENGINE COMPONENTS INSPECTION AND SERVICING

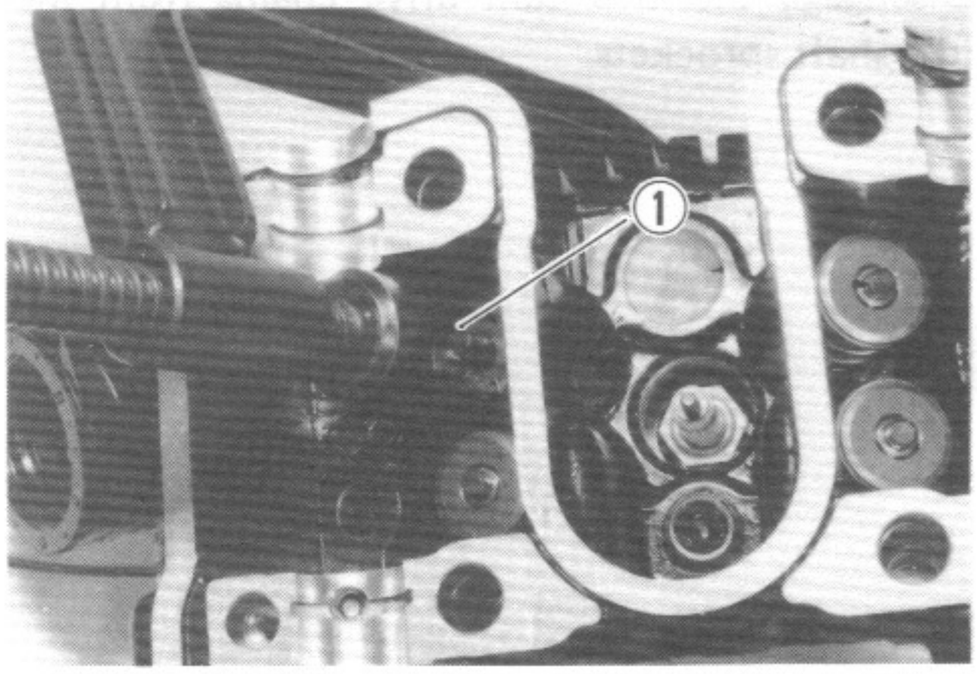
CYLINDER HEAD DISASSEMBLY

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

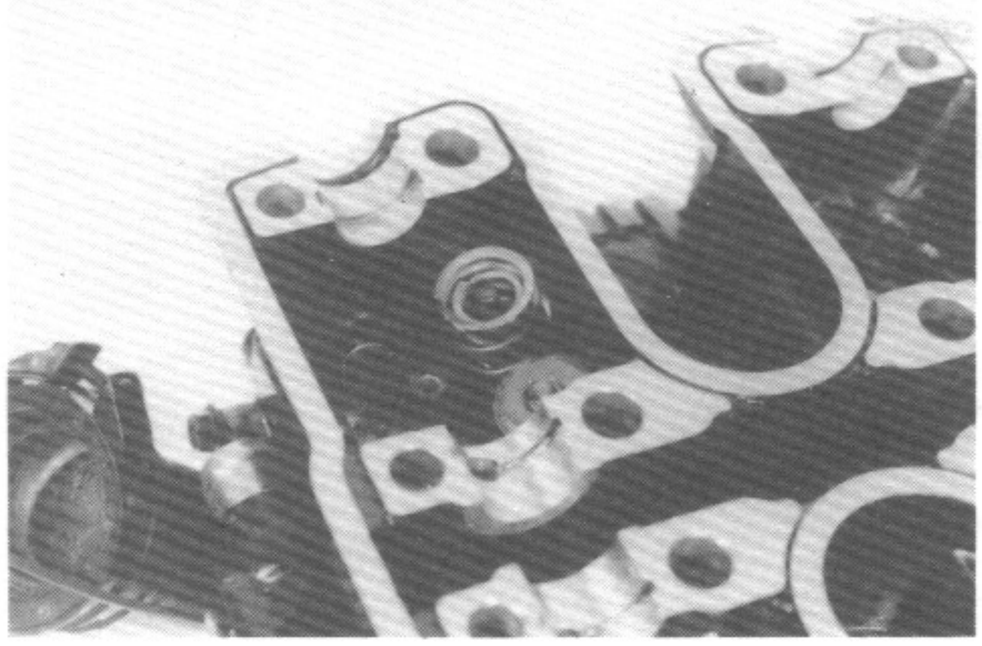


- Using special tools, compress valve springs and take off two cotter halves ① from valve stem.

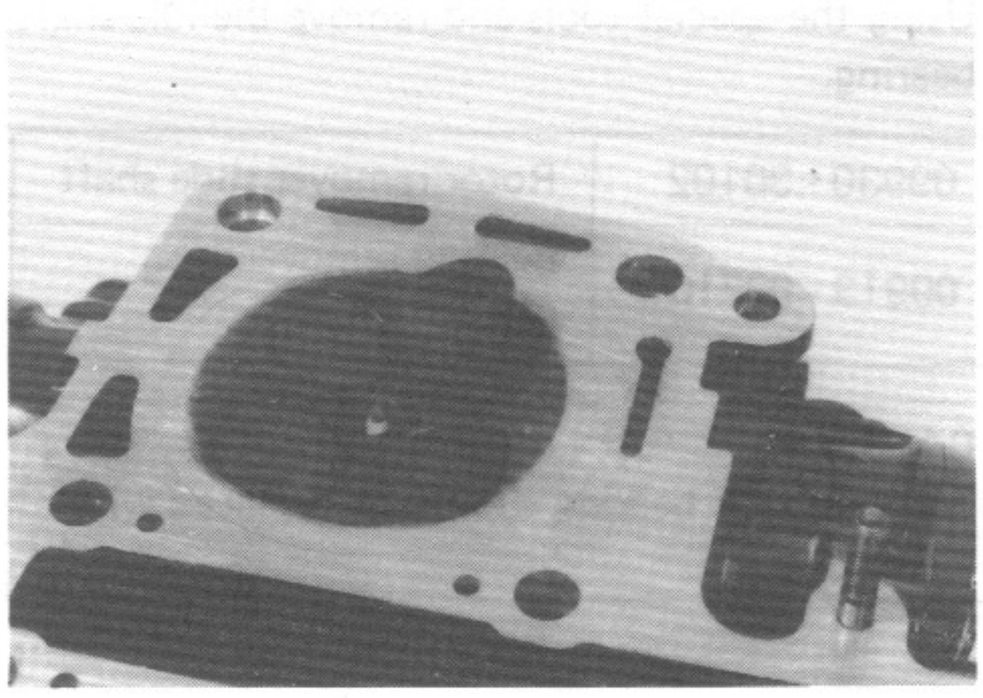
09916 - 14510	Valve lifter
09916 - 14910	Valve lifter attachment
09916 - 84510	Tweezers



- Take out the spring retainer, inner and outer springs.
- From the other side, pull out the valve.



NOTE:
Removal of 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.

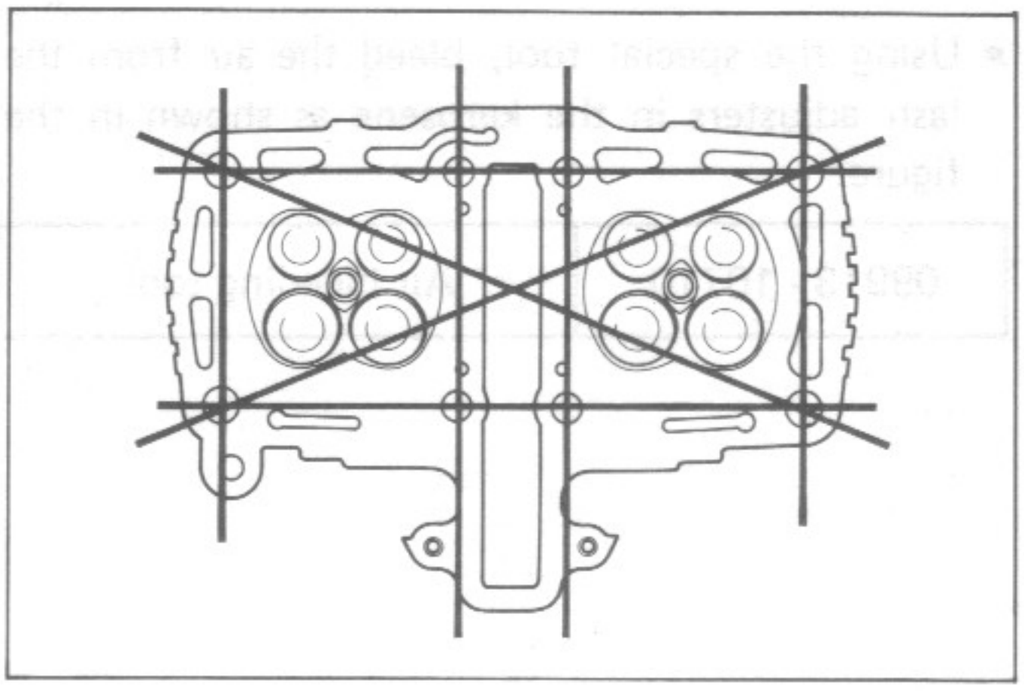


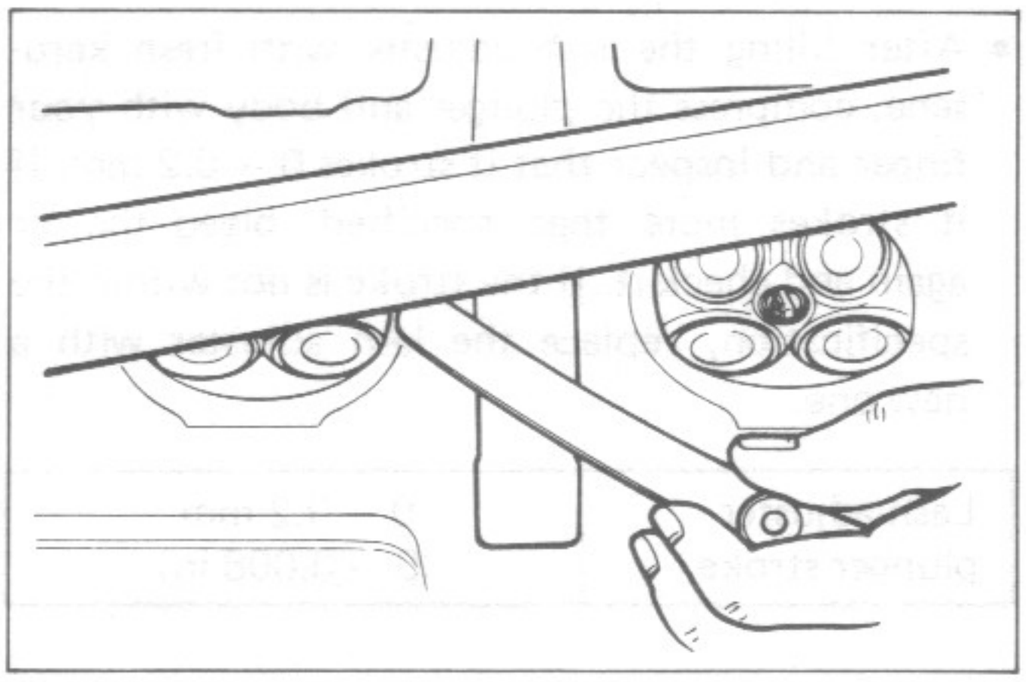
CYLINDER HEAD DISTORTION

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

09900 - 20803	Thickness gauge

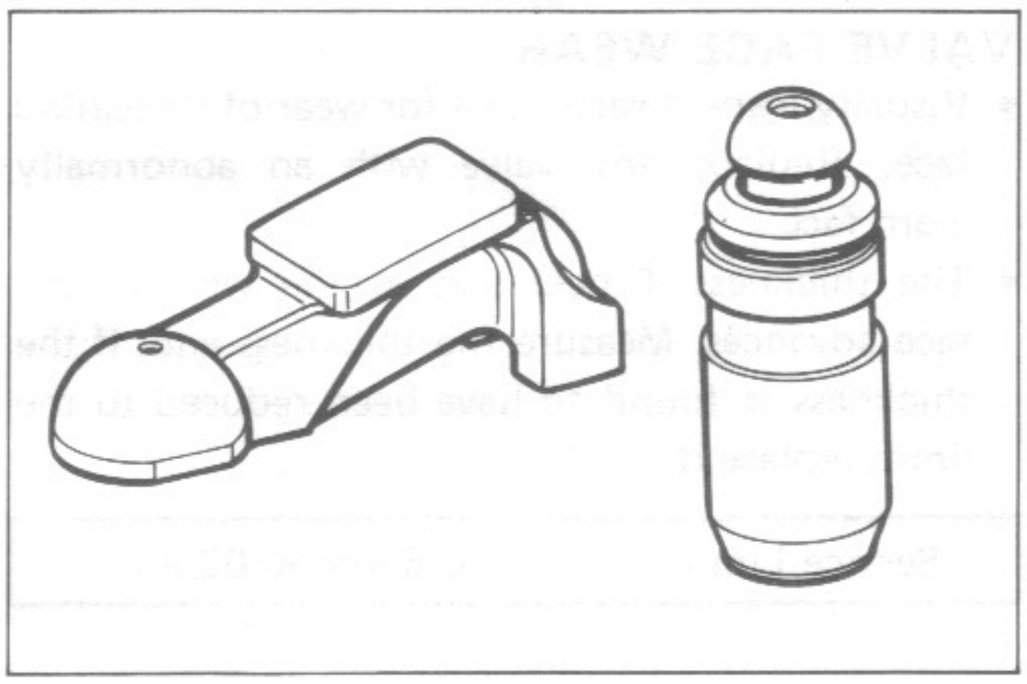
Service Limit	0.1 mm (0.004 in)



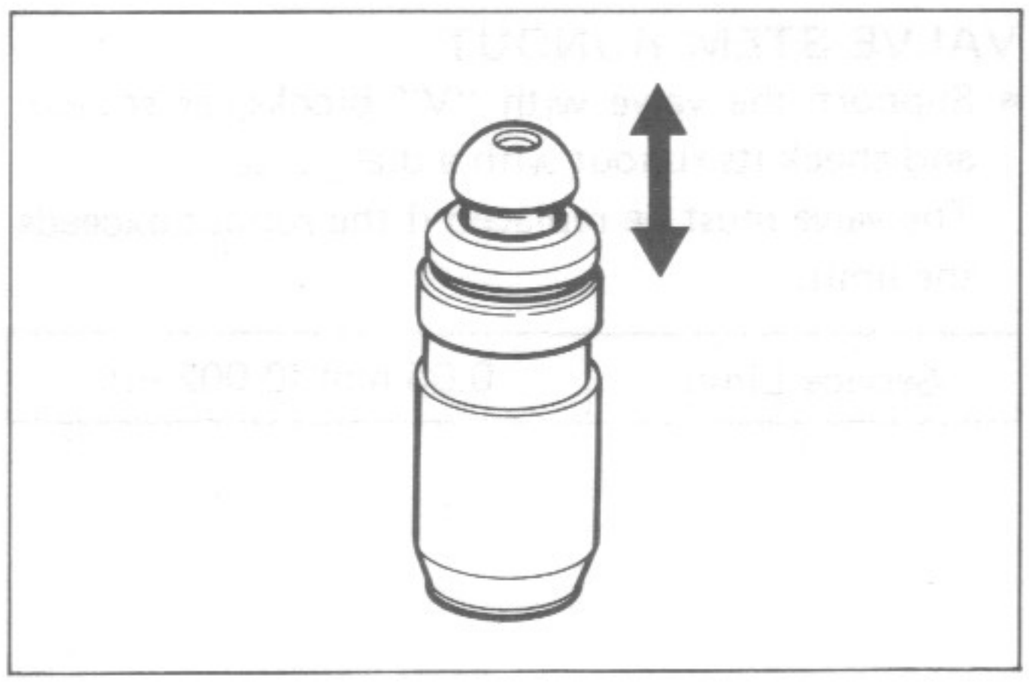


LASH ADJUSTER AND CAM FOLLOWER

- Inspect each cam follower and lash adjuster for wear, dent and/or damage. If any defect is found, replace it with a new one.
- Compress and stroke the plunger with your finger by using air bleeding tool and remove the oil completely from the lash adjuster body. Wash it with kerosene and inspect the lash adjuster whether it strokes smoothly. If any hitches or stickiness is noted, replace it with a new one.

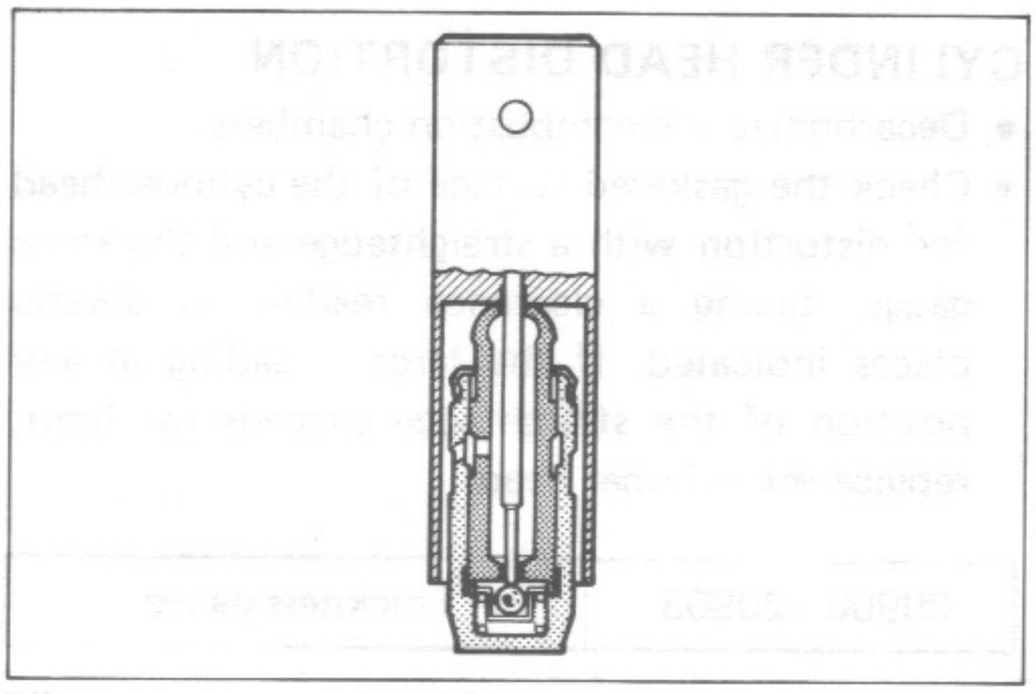


CAUTION:
When removing the camshaft holder, camshaft and/or cam follower from the cylinder head, always use kerosene to bleed the air from the lash adjuster before reinstalling. Never use any solvent, fluid or oil when bleeding the lash adjuster, or it may cause engine damage.



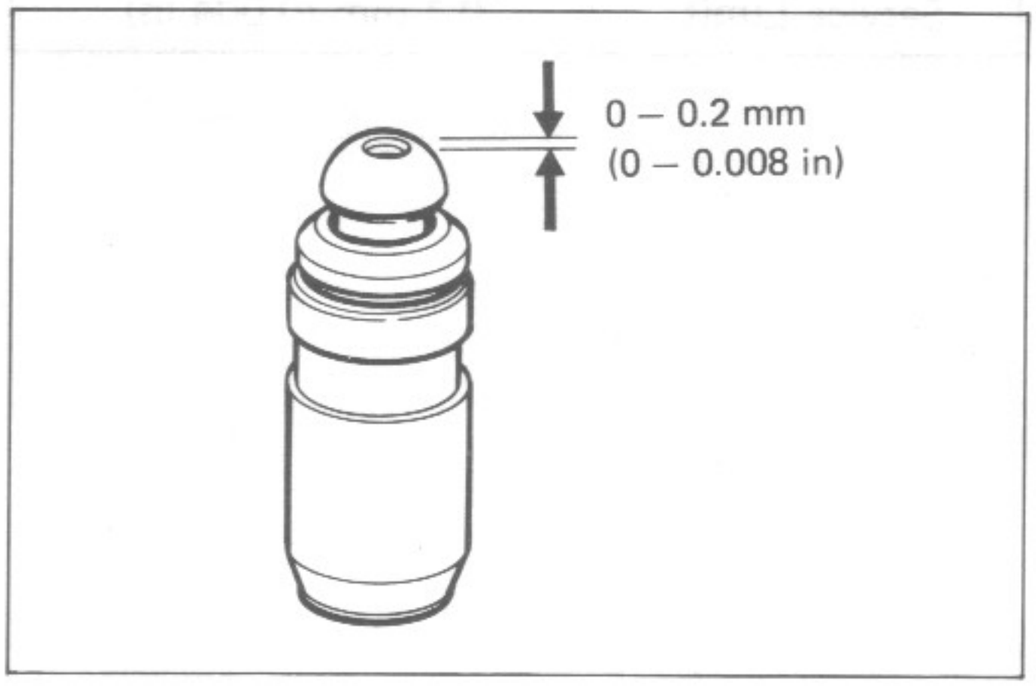
- Using the special tool, bleed the air from the lash adjusters in the kerosene as shown in the figure.

09913 - 10710	Air bleeding tool



- After filling the lash adjuster with fresh kerosene, compress the plunger and body with your finger and inspect that it strokes 0 – 0.2 mm. If it strokes more than specified, bleed the air again and check it. If the stroke is not within the specification, replace the lash adjuster with a new one.

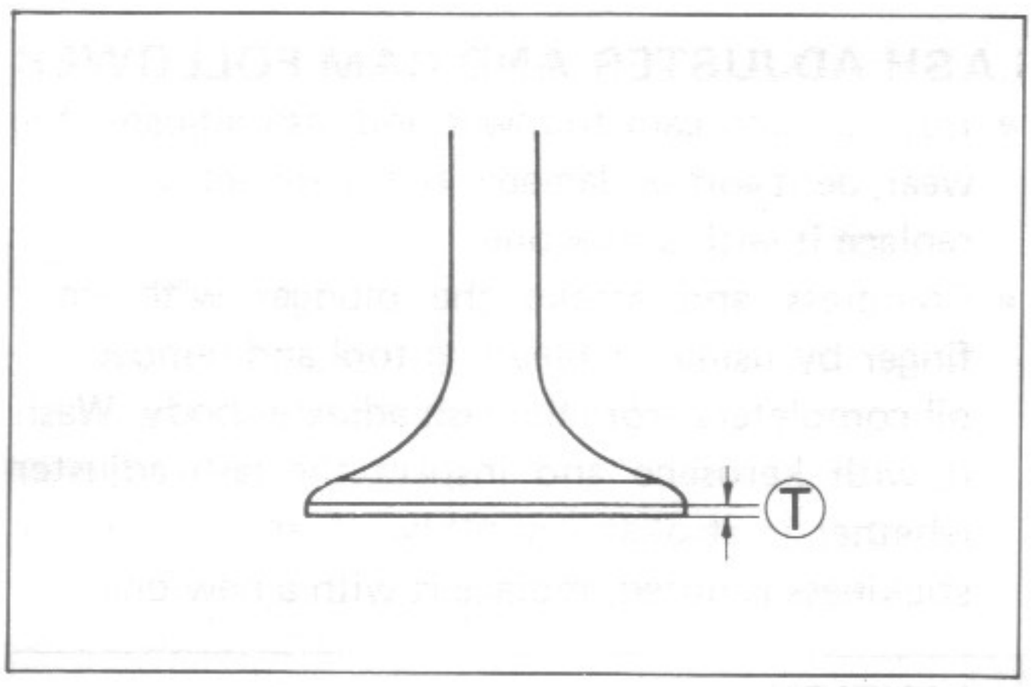
Lash-adjuster plunger stroke	0 – 0.2 mm (0 – 0.008 in)



VALVE FACE WEAR

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

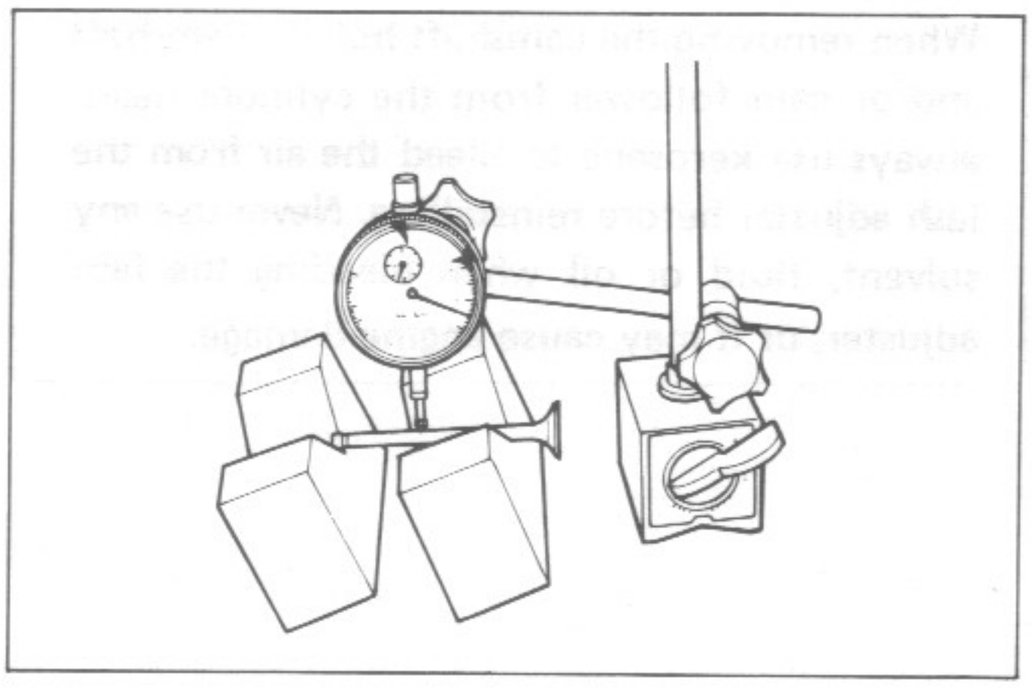
Service Limit	0.5 mm (0.02 in)



VALVE STEM RUNOUT

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

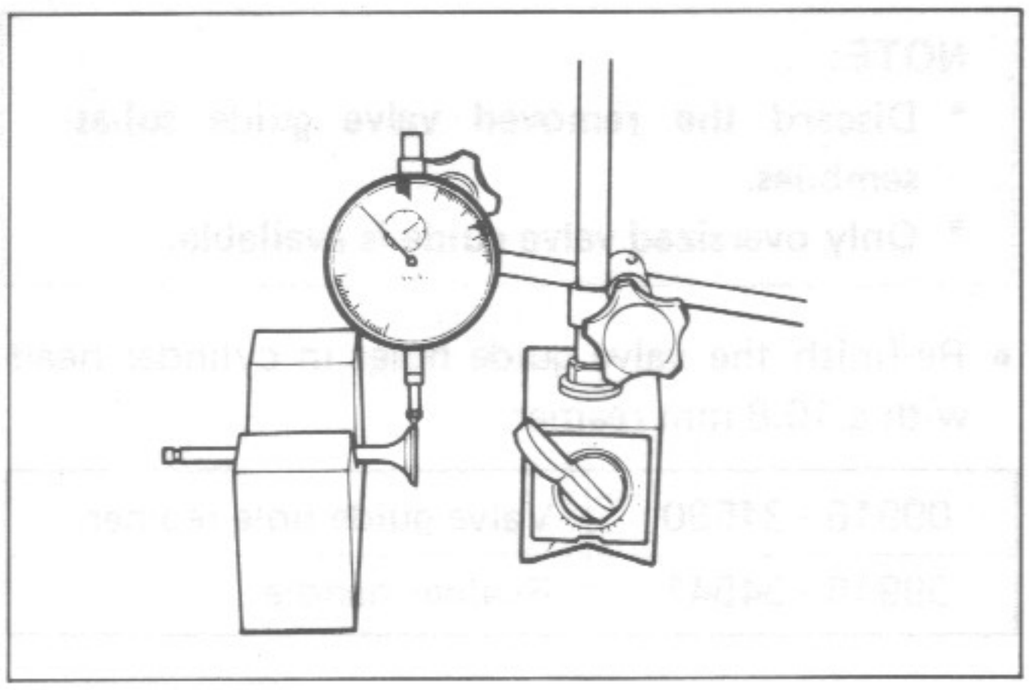
Service Limit	0.05 mm (0.002 in)



VALVE HEAD RADIAL RUNOUT

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

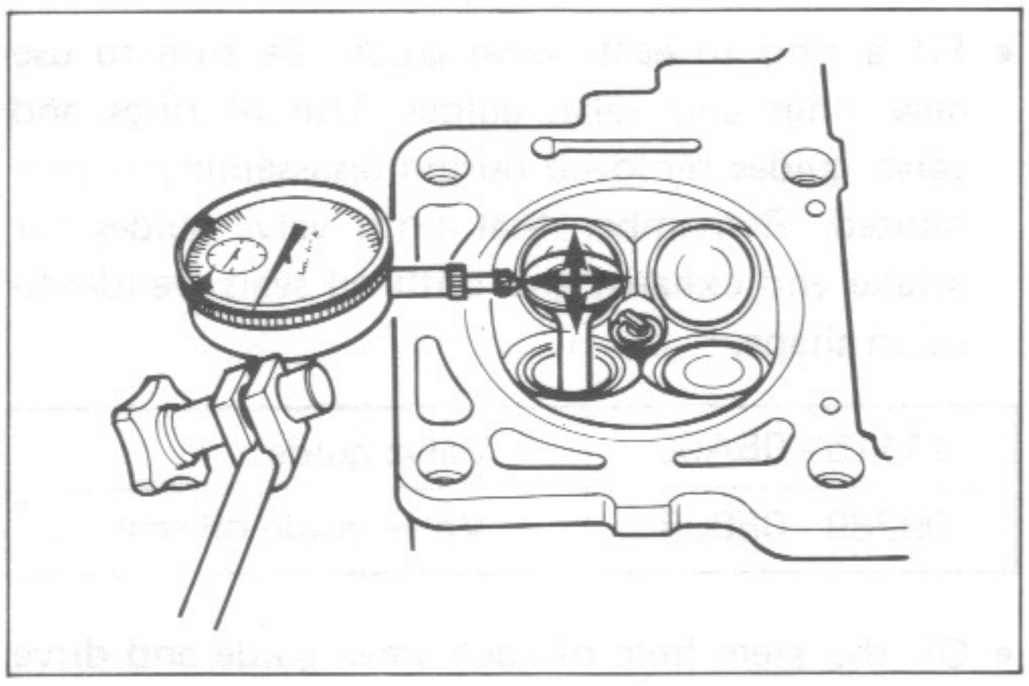
Service Limit	0.03 mm (0.001 in)



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 the standard range:

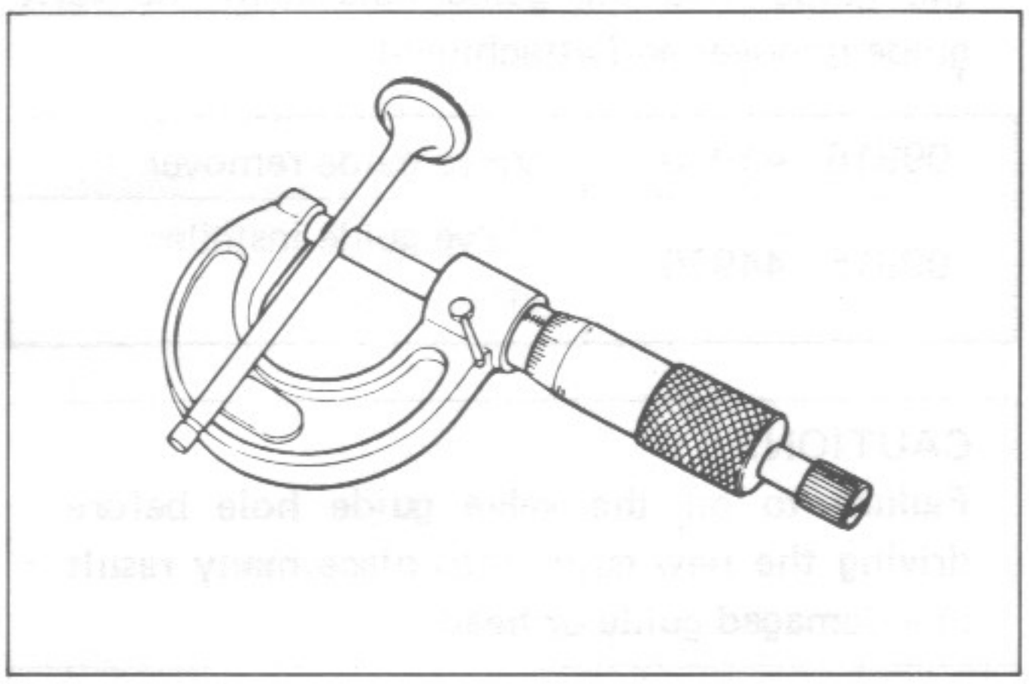
Valve	Service Limit
Intake valves	0.35 mm (0.014 in)
Exhaust valves	0.35 mm (0.014 in)



VALVE STEM WEAR

If the valve stem is worn down to the limit, as measured with a micrometer, where the clearance is found to be in excess of the limit indicated replace the valve, if the stem is within the limit, then replace the guide. After replacing valve or guide, be sure to recheck the clearance.

09900 - 20205	Micrometer (0 – 25 mm)

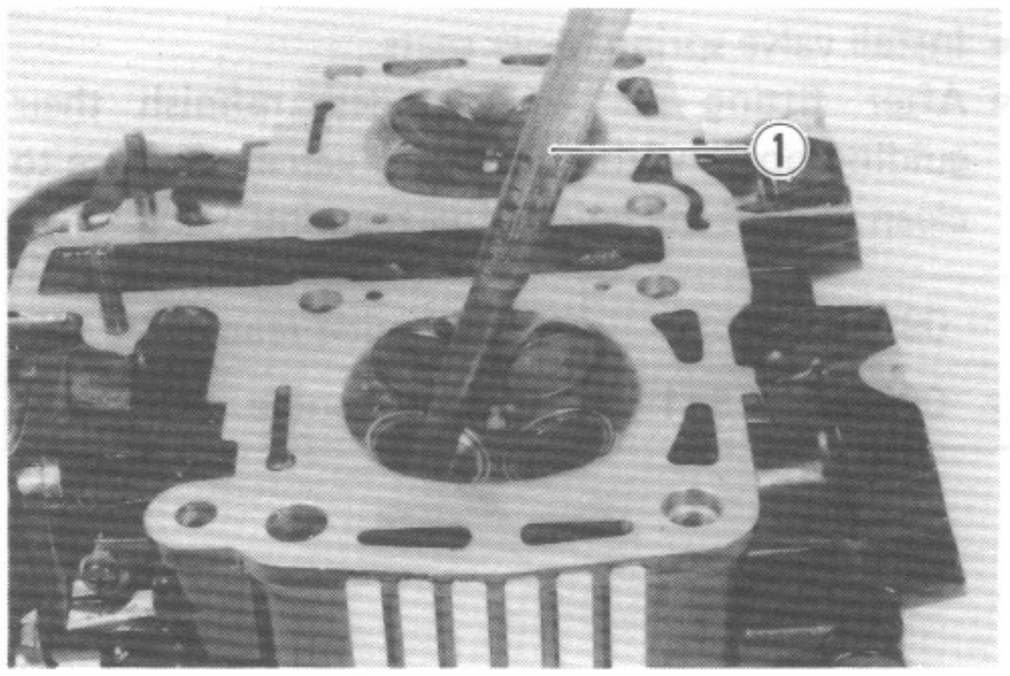


Valve	Standard
Intake valves	5.465 – 5.480 mm (0.2152 – 0.2157 in)
Exhaust valves	5.450 – 5.465 mm (0.2146 – 0.2152 in)

VALVE GUIDE SERVICING

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

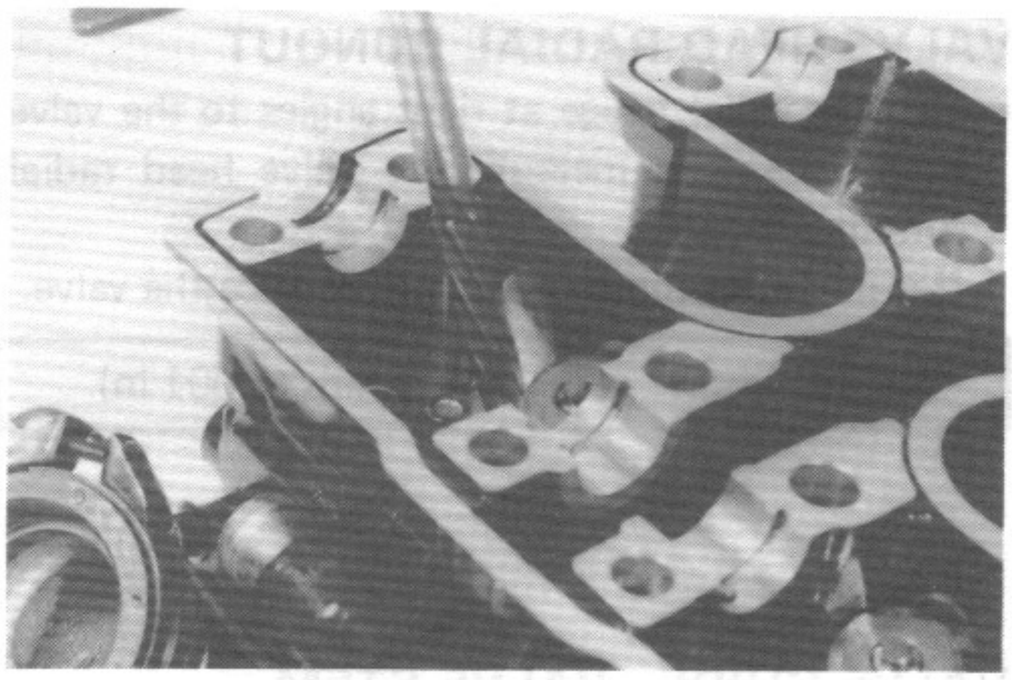
09916 - 44910	Valve guide remover



NOTE:
*** Discard the removed valve guide subassemblies.**
*** Only oversized valve guide is available.**

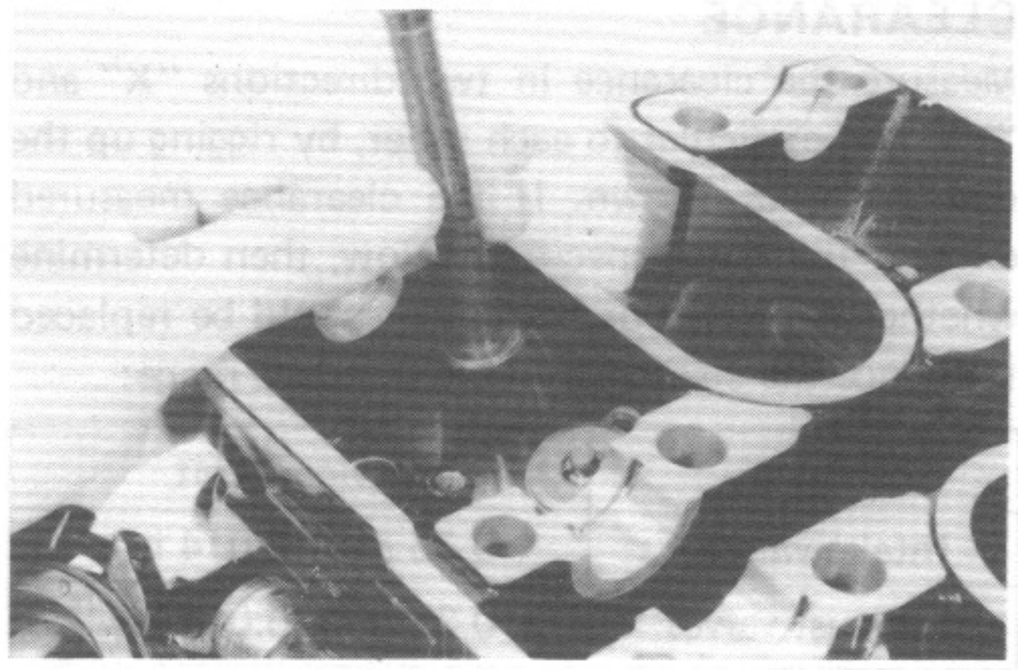
- Re-finish the valve guide holes in cylinder head with a 10.8 mm reamer.

09916 - 34580	Valve guide hole reamer
09916 - 34541	Reamer handle



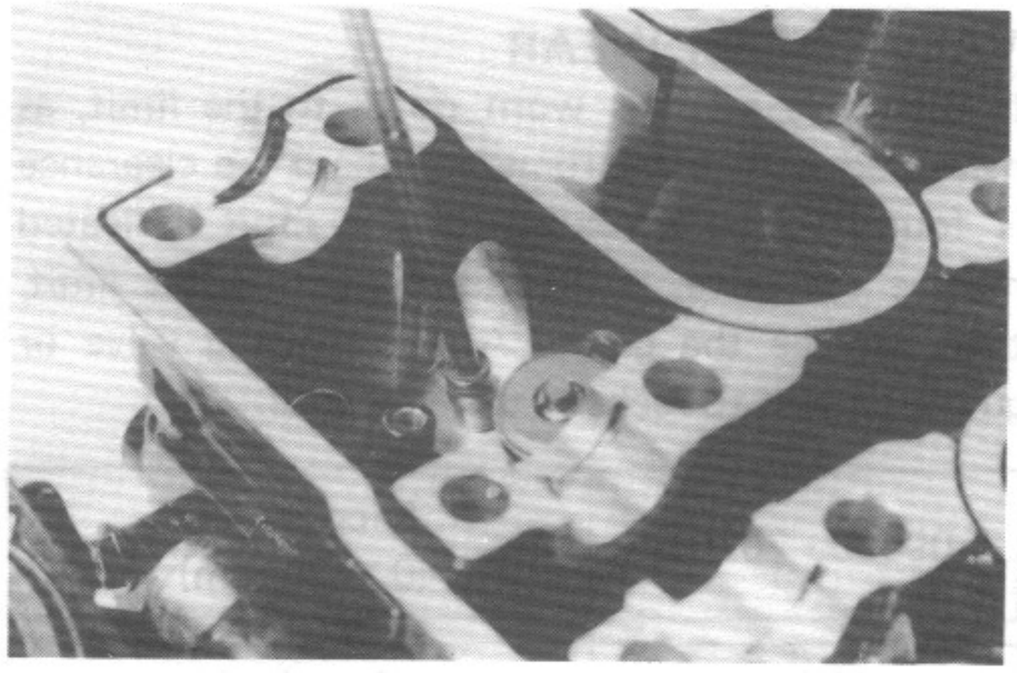
- Fit a ring to each valve guide. Be sure to use new rings and valve guides. Use of rings and valve guides removed during disassembly is prohibited. Remember that both valve guides for intake and exhaust and both oil seals are identical in shape.

11115 - 05A00	Valve guide
09289 - 05003	Valve guide oil seal



- Oil the stem hole of each valve guide and drive the guide into the guide hole with the valve guide remover and attachment.

09916 - 44910	Valve guide remover
09916 - 44920	Valve guide installer attachment



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

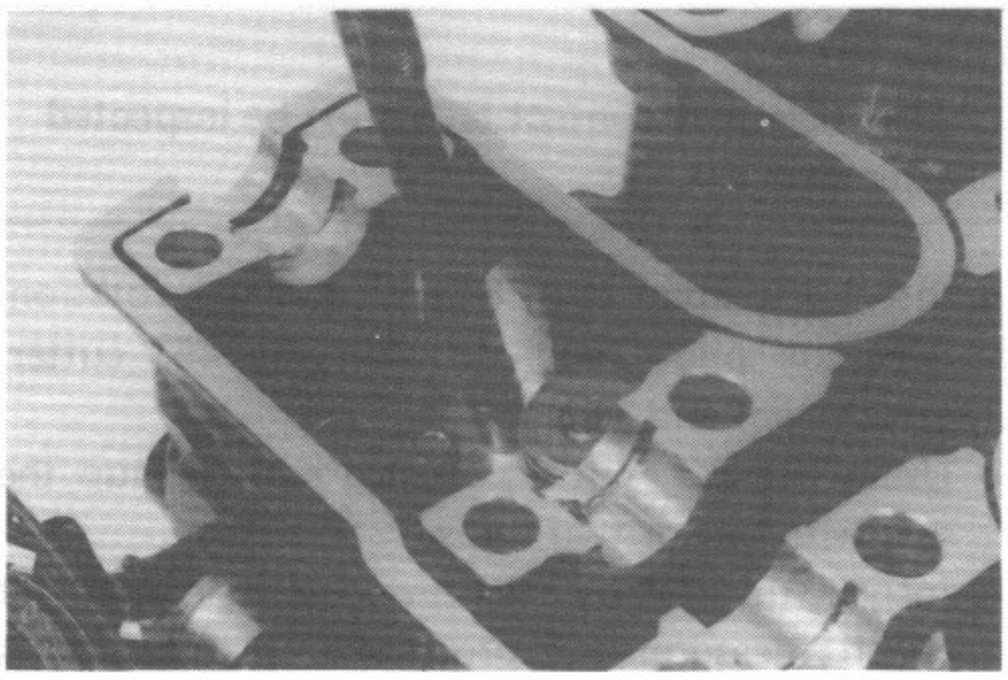
- Install valve spring lower seats.
- After fitting all valve guides, refinish their guiding bores with a 5.5 mm reamer. Be sure to clean and oil the guide after reaming.

09916 - 34550	Valve guide reamer
09916 - 34541	Reamer handle

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

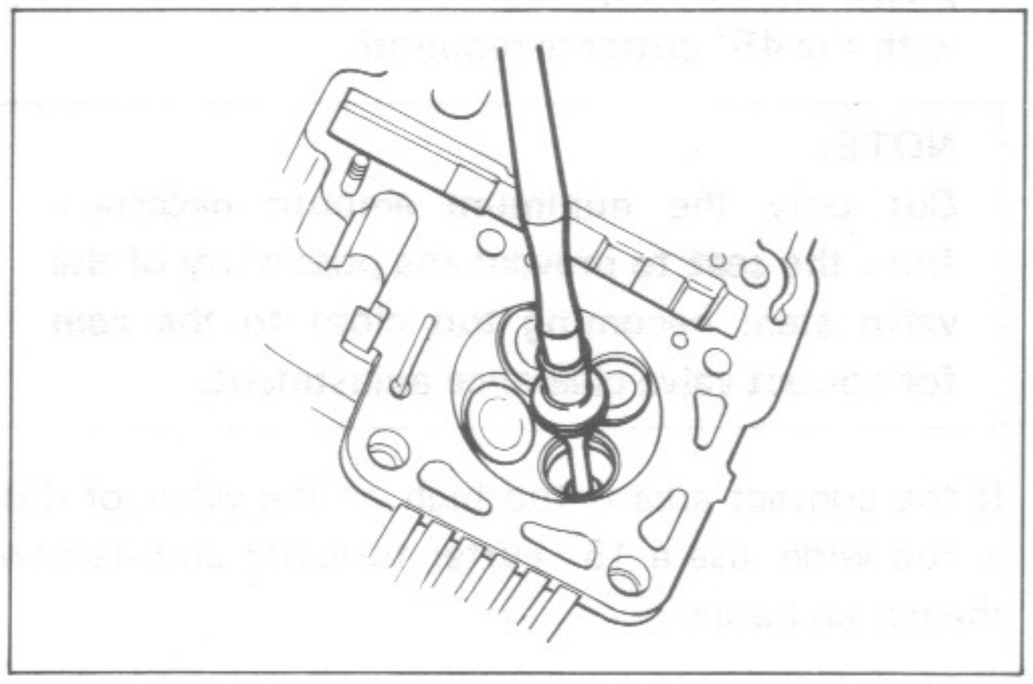
09916 - 44910	Valve guide remover

NOTE:
Do not use the oil seals removed in disassembly: use new seals.



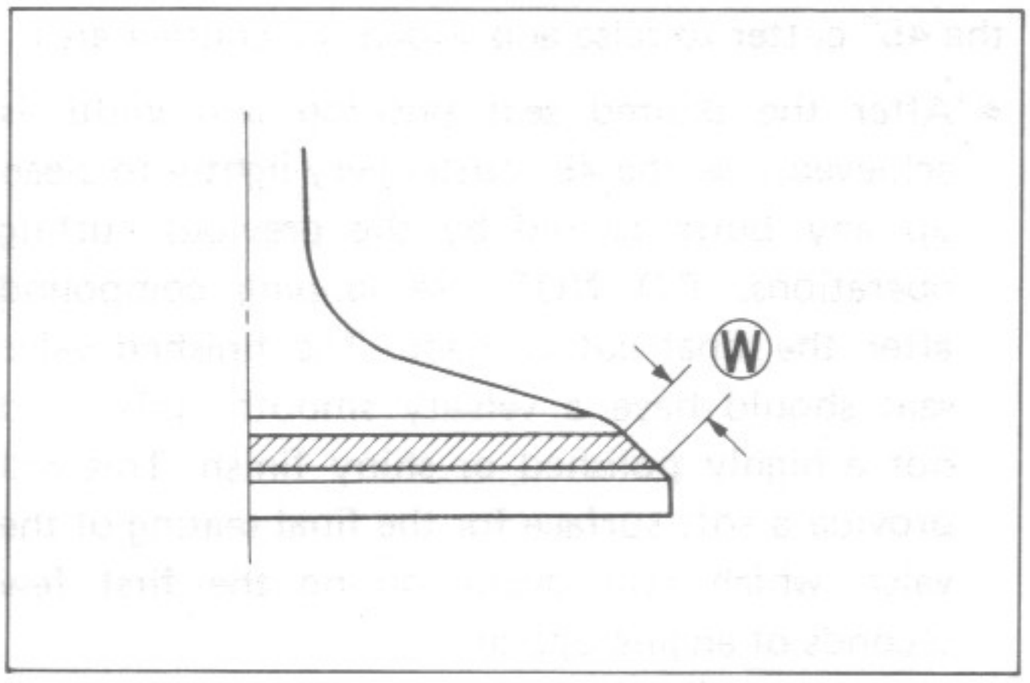
VALVE SEAT WIDTH

- 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 – and, in addition to this requirement, the width of the dye ring, which is the visualized seat "width", must be within the following specification:



Valve seat width

Seat width	Standard
Ⓦ	0.9 – 1.1 mm (0.035 – 0.043 in)



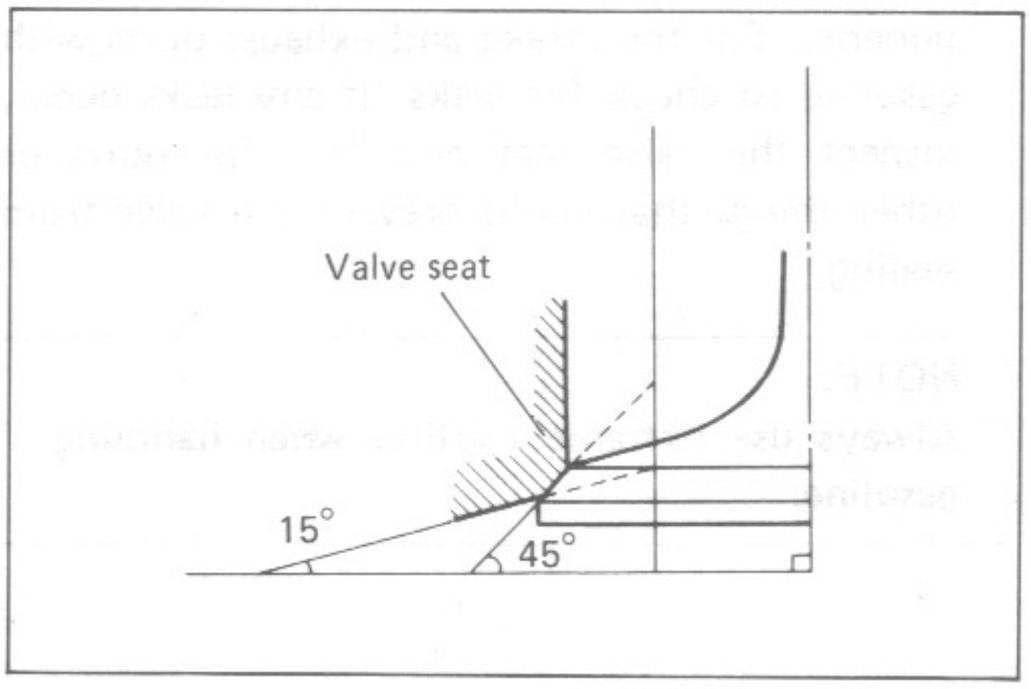
If either requirement is not met, correct the seat by servicing it as follows:

VALVE SEAT SERVICING

The valve seats for both the intake and exhaust valves are machined to two different angles. The seat contact surface is cut 45° and the area above the contact surface (closest to the combustion chamber) is cut to 15°.

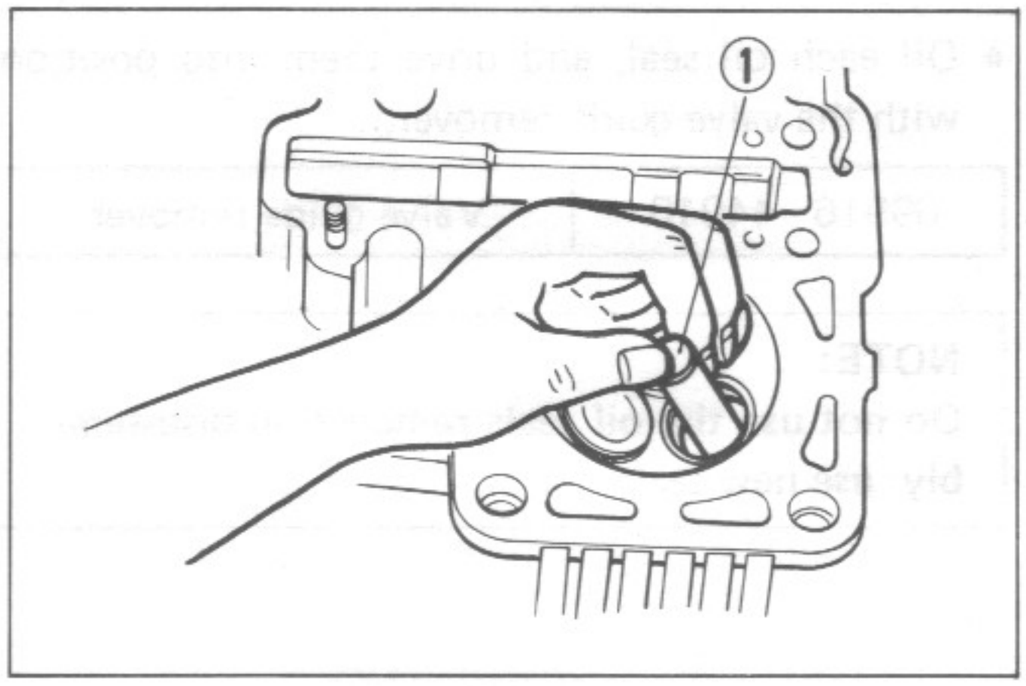
Parts list of valve seat servicing tools

Valve seat cutter head	N–116 (15° x 45° cutter) for both IN. and EX.
Solid pilot	N–100–10
Adapter	N–503–1
T-handle	N–503



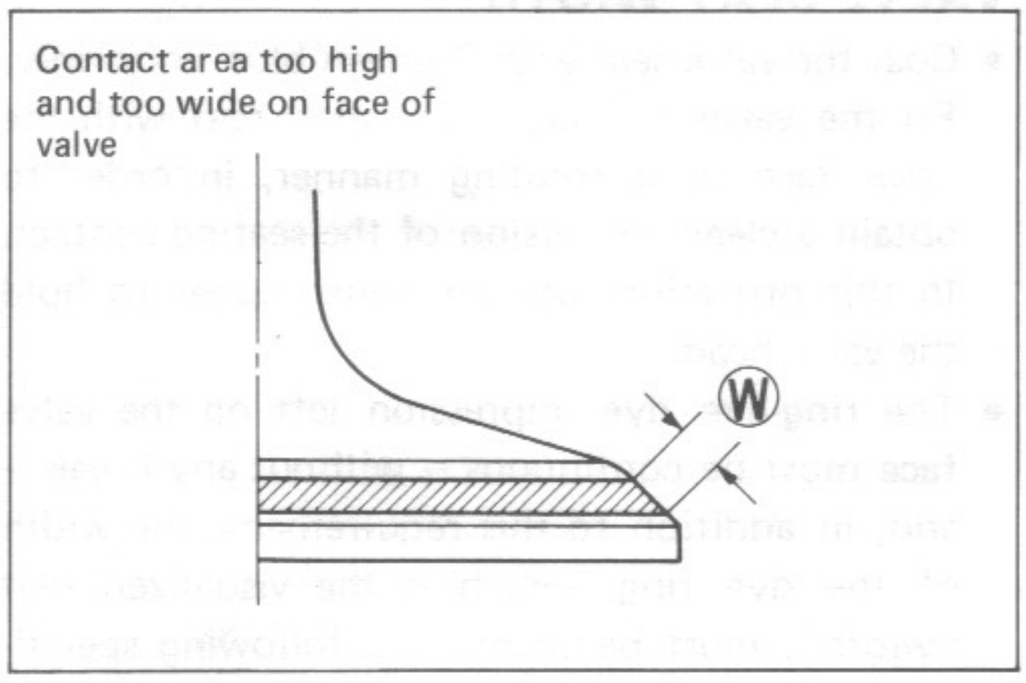
NOTE:
The valve seat contact area must be inspected after each cut.

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

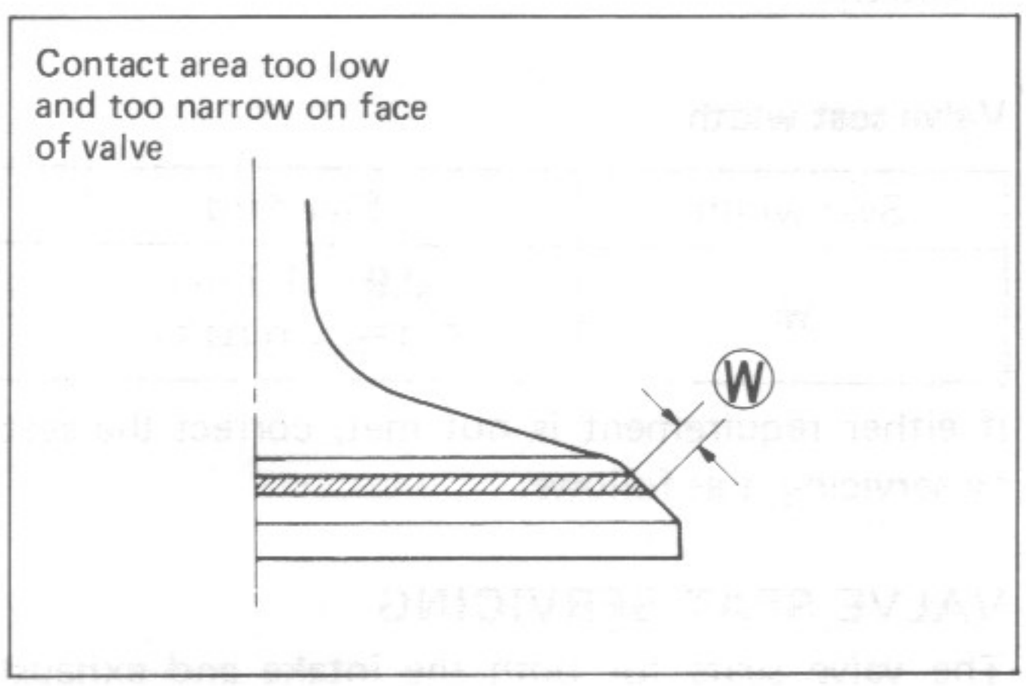


NOTE:
Cut only the minimum amount necessary from the seat to prevent the possibility of the valve stem becoming too close to the cam for correct valve clearance adjustment.

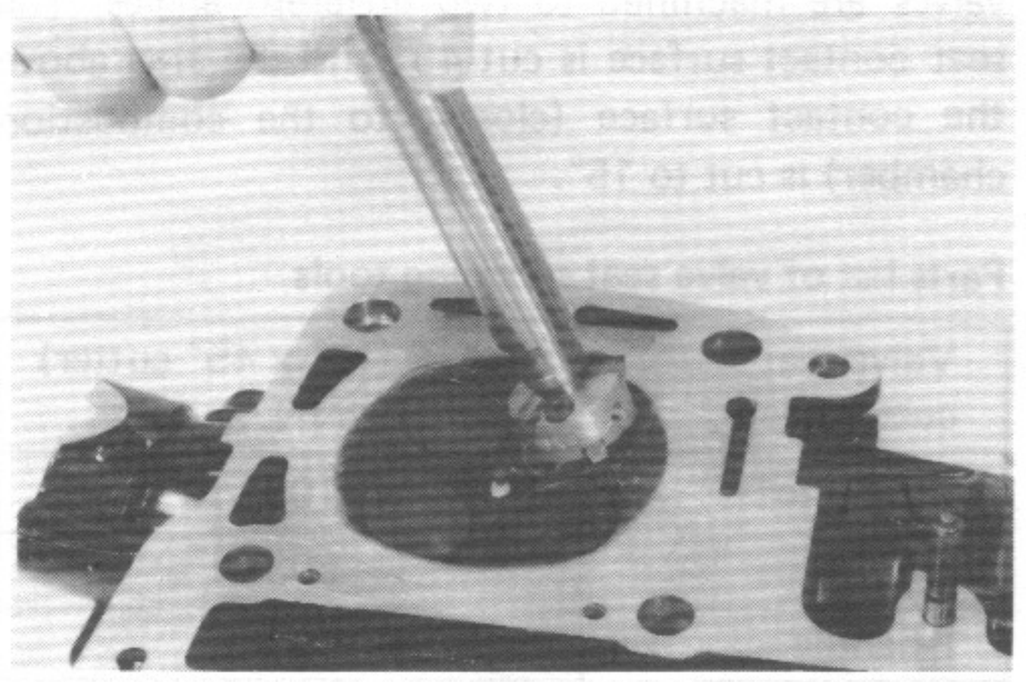
If the contact area is too high on the valve, or if it is too wide, use a 15° cutter to lower and narrow the contact area.



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



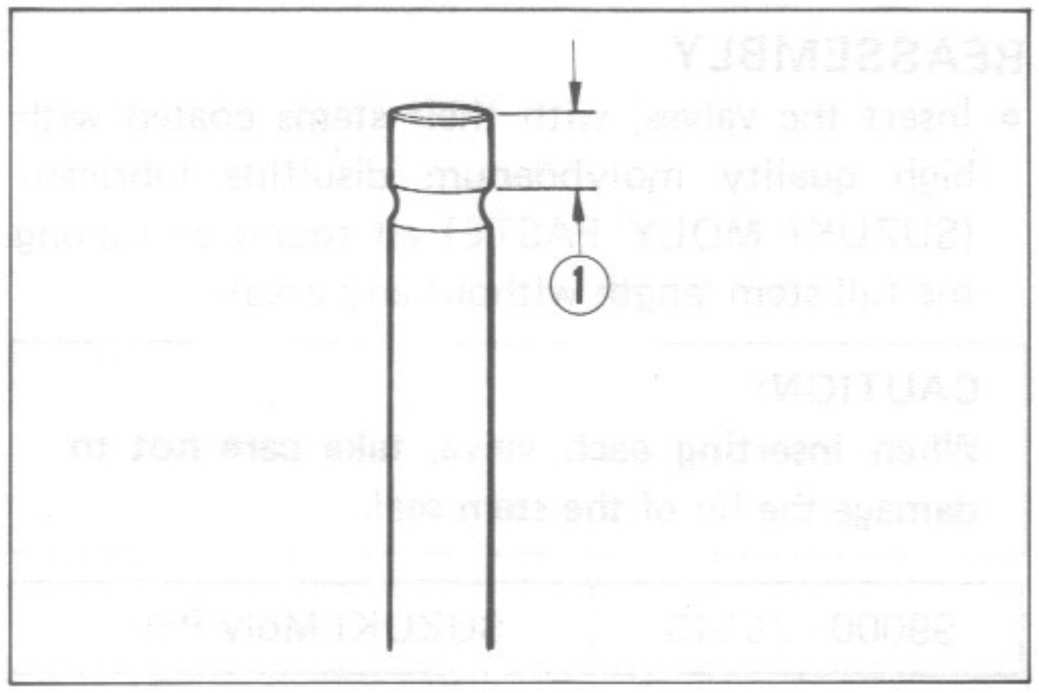
- After the desired seat position and width is achieved, use the 45° cutter very lightly to clean up any burrs caused by the previous cutting operations. DO NOT use lapping compound after the final cut is made. The finished valve seat should have a velvety smooth finish and not a highly polished or shiny 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.
- 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.



NOTE:
Always use extreme caution when handling gasoline.

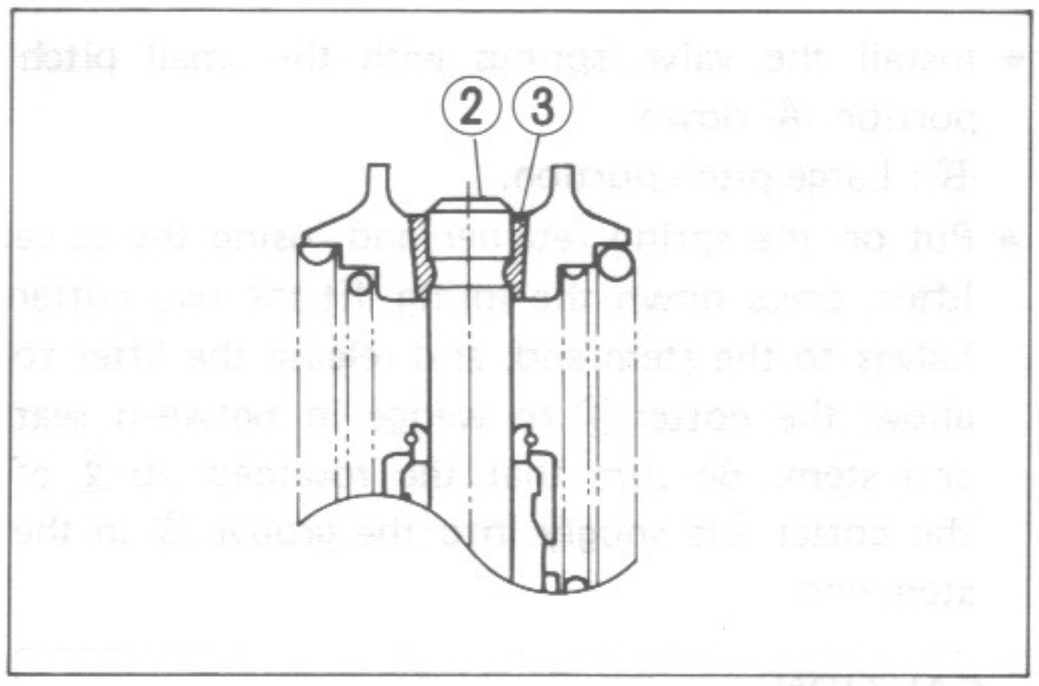
VALVE STEM END CONDITION

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 3.3 mm (0.13 in). If this length becomes less than 3.3 mm (0.13 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.

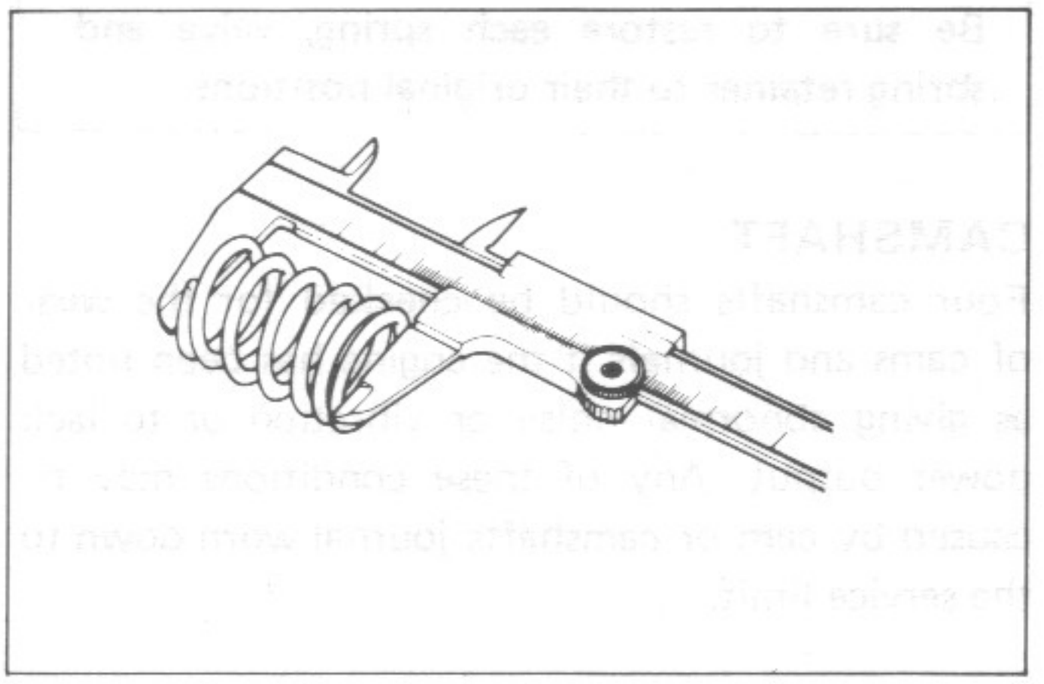


VALVE SPRINGS

- The force of the two coil springs keeps the valve seat tight. Weakened springs result in reduced engine power output, and often account for the chattering noise coming from the valve mechanism.
- Check the springs for strength by measuring their free lengths and also the force required to compress them. If the limit indicated is exceeded by the free length reading or if the measured force does not fall within the range specified, replace with a SUZUKI spring.



CAUTION:
Replace both of the valve springs, inner and outer, at a time, if any one of these is found to be beyond the limit.

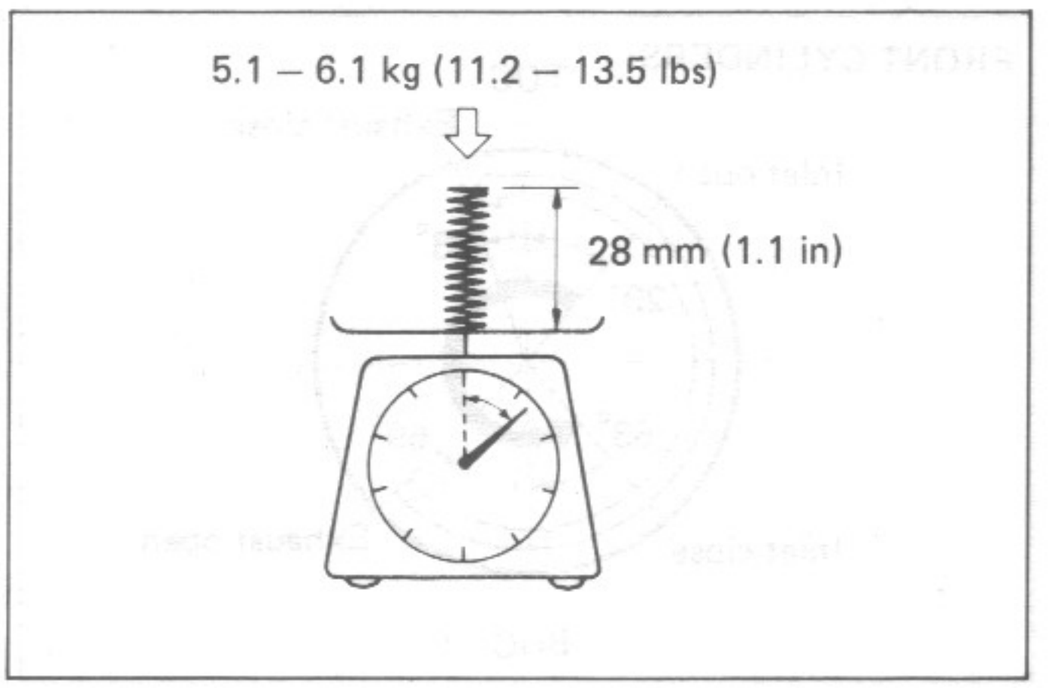


Valve spring free length

Spring	Service Limit
INNER	31.7 mm (1.25 in)
OUTER	35.5 mm (1.40 in)

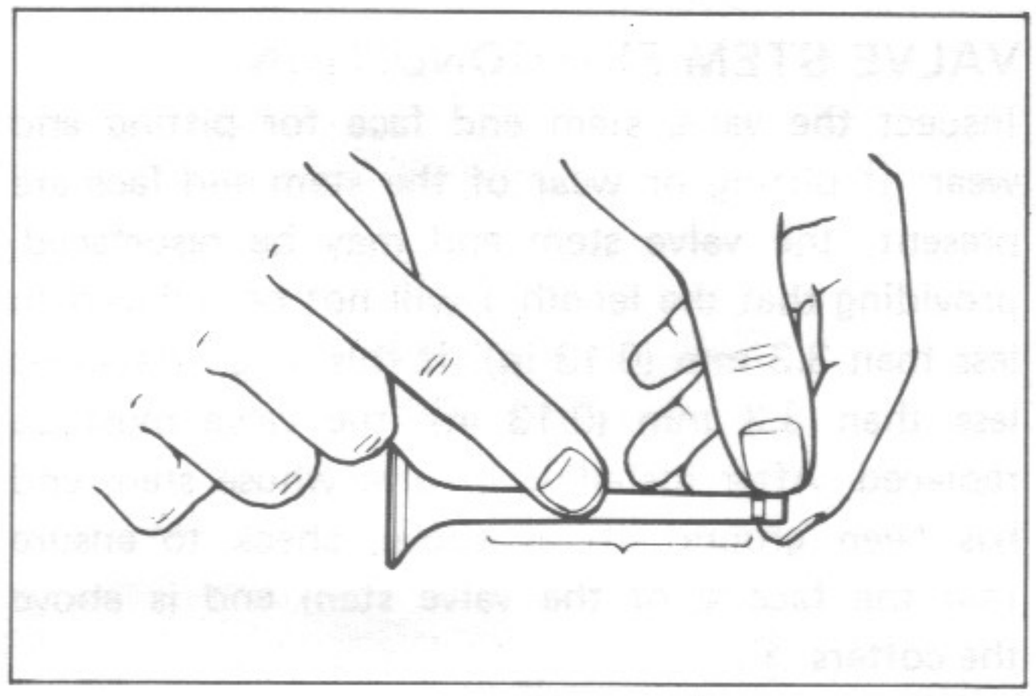
Valve spring tension

Spring	Standard
INNER	5.1 – 6.1 kg/28 mm (11.2 – 13.5 lbs/1.10 in)
OUTER	11.5 – 13.3 kg/31.5 mm (25.4 – 29.3 lbs/1.24 in)



REASSEMBLY

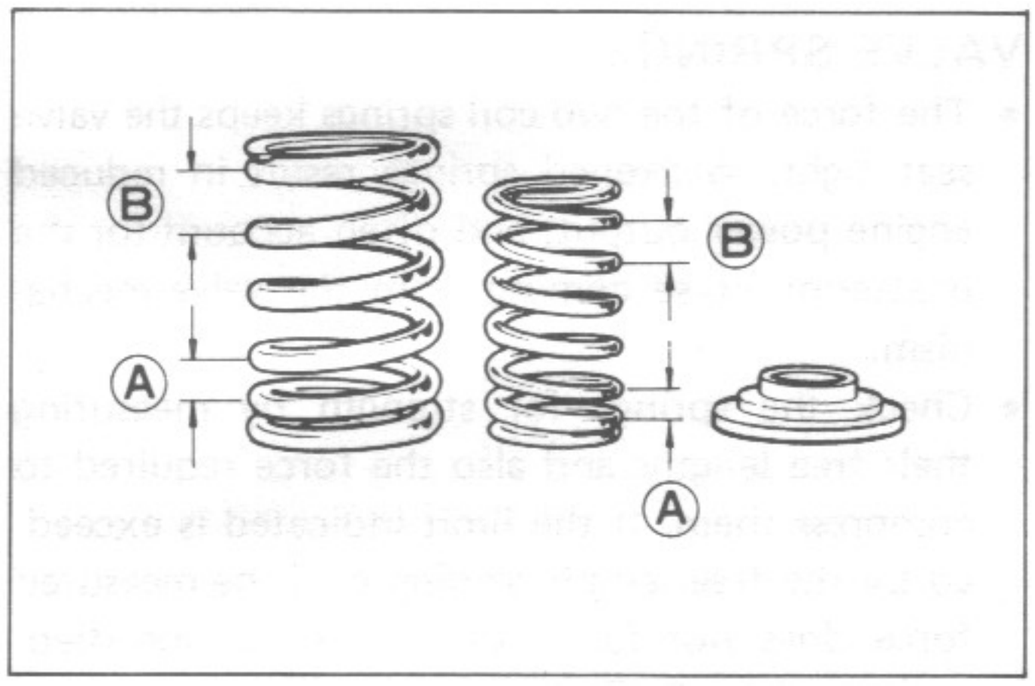
- Insert the valves, with their stems coated with high quality molybdenum disulfide lubricant (SUZUKI MOLY PASTE) all round and along the full stem length without any break.



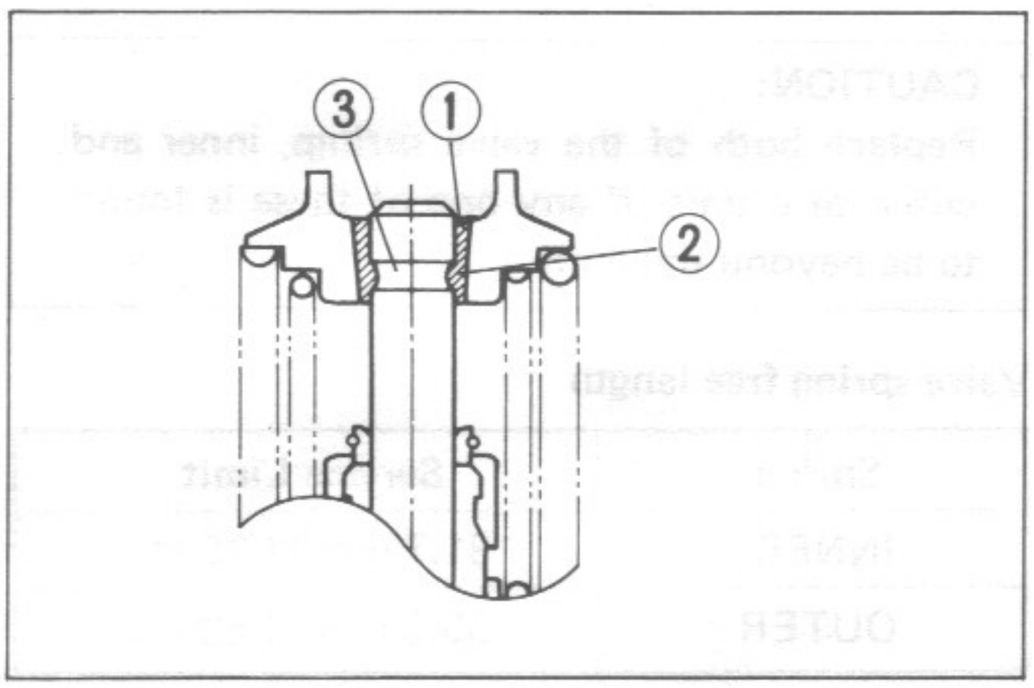
CAUTION:
When inserting each valve, take care not to damage the lip of the stem seal.

99000 - 25140	SUZUKI Moly Paste

- Install the valve springs with the small pitch portion Ⓐ down.
  Ⓑ : Large-pitch portion.
- Put on the spring retainer and, using the valve lifter, press down the spring, fit the two cotter halves to the stem end, and release the lifter to allow the cotter ① to wedge in between seat and stem. Be sure that the rounded lip ② of the cotter fits snugly into the groove ③ in the stem end.

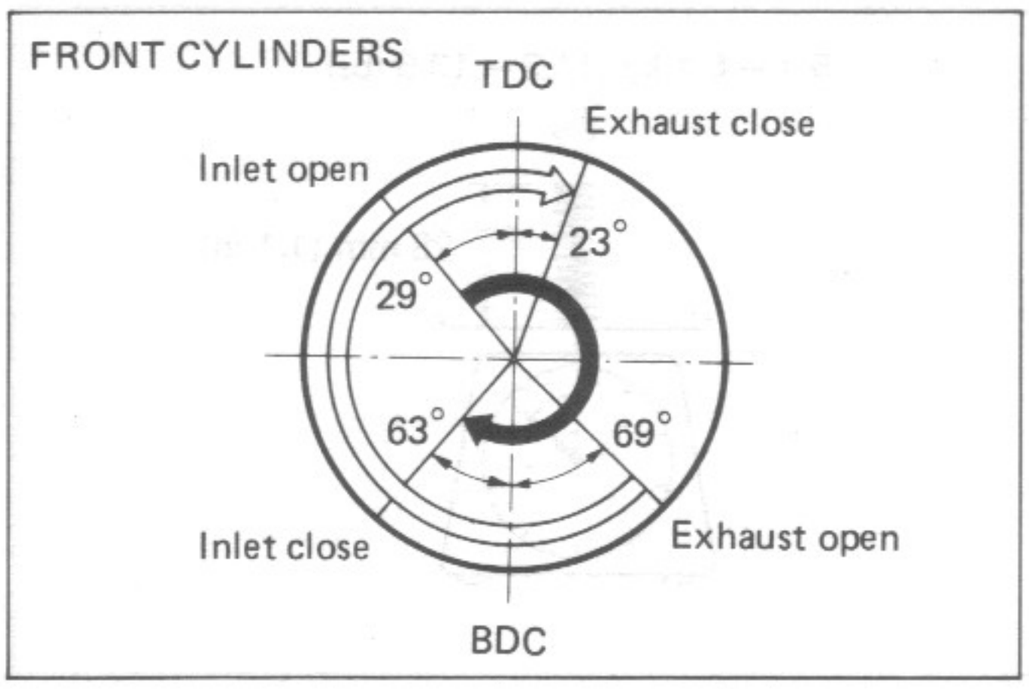


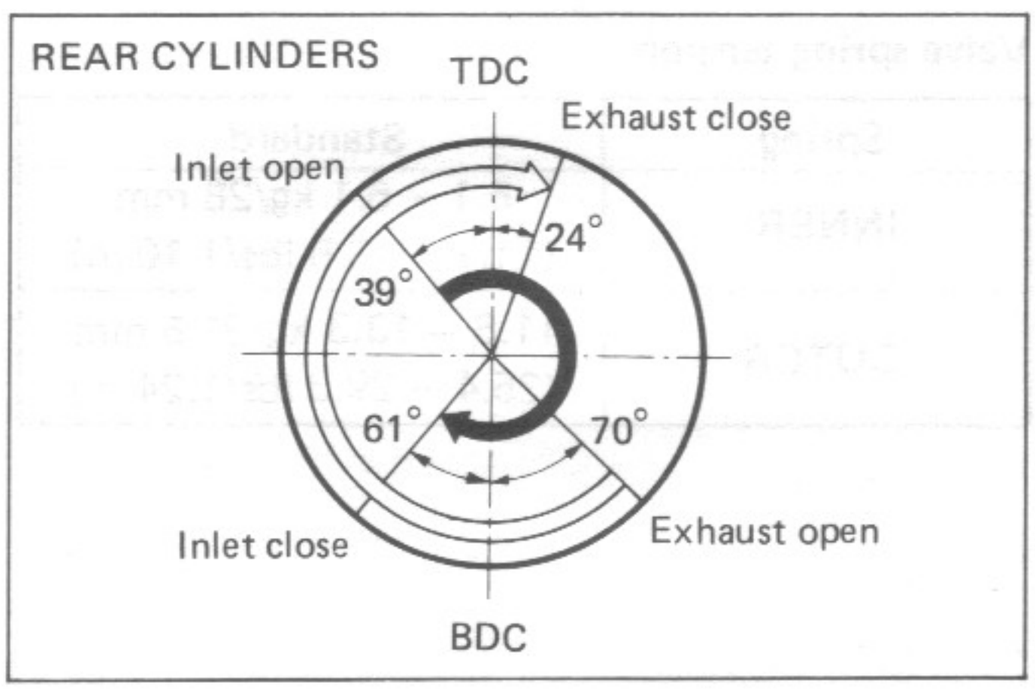
CAUTION:
Be sure to restore each spring, valve and spring retainer to their original positions.



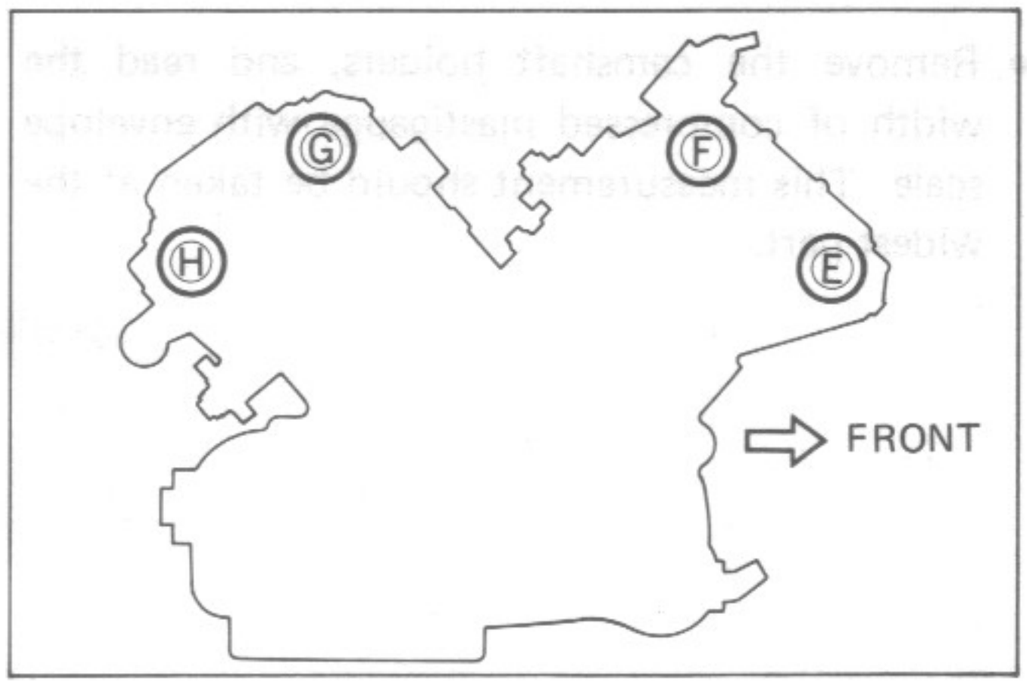
CAMSHAFT

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



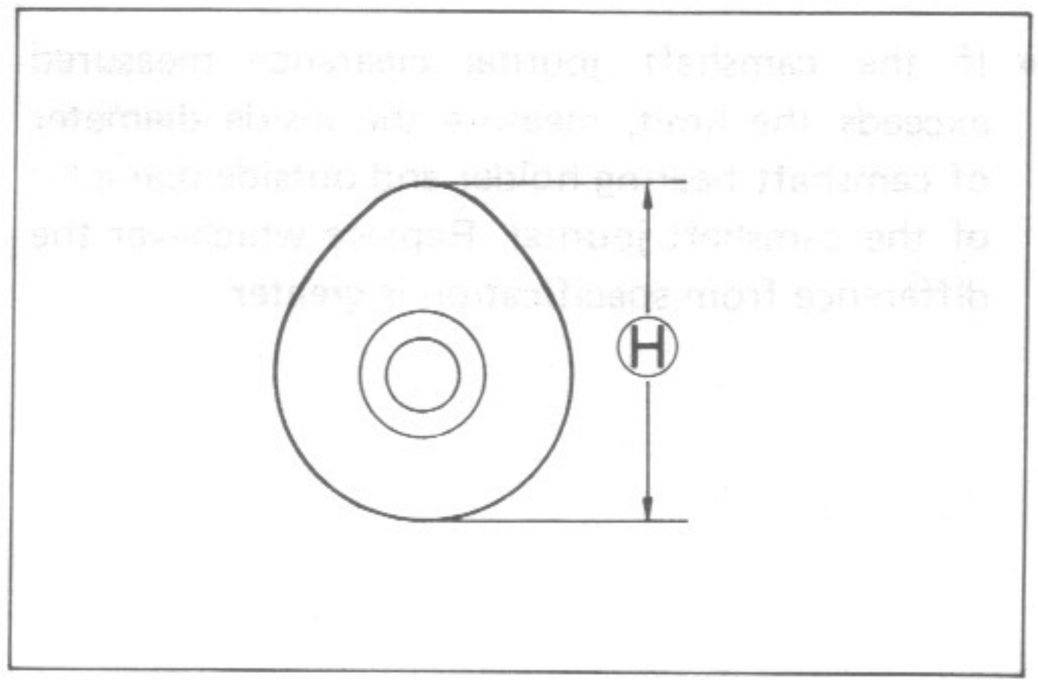


- The camshaft can be distinguished by the punched-letters, "E", "F", "G" and "H", on the camshaft right end. The right end can be distinguished by the notch from the left end.
  "E": Front exhaust camshaft
  "F": Front intake camshaft
  "G": Rear intake camshaft
  "H": Rear exhaust camshaft



CAM WEAR

- Worn-down cams are often the cause of mis-timing valve operation resulting in reduced power output. The limit of cam wear is specified for both intake and exhaust cams in terms of cam height Ⓗ, which is to be measured with a micrometer. Replace camshafts if found worn down to the limit.



Cam height

Height Ⓗ		Service Limit
Intake cams	Front	32.42 mm (1.276 in)
	Rear	32.75 mm (1.289 in)
Exhaust cams	Front & Rear	32.17 mm (1.267 in)

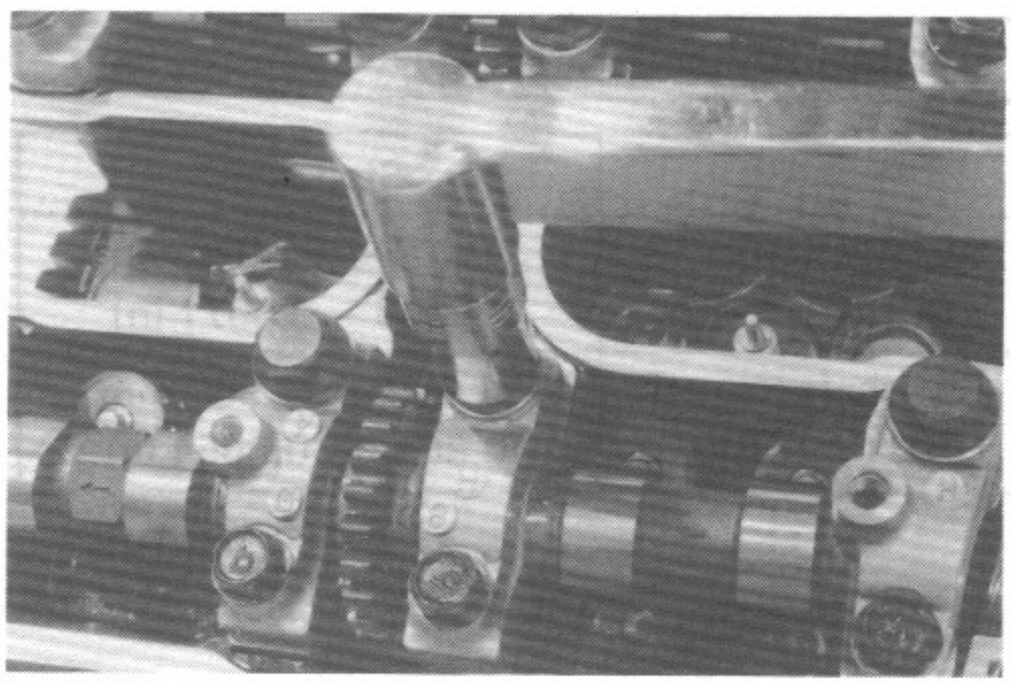
CAMSHAFT JOURNAL WEAR

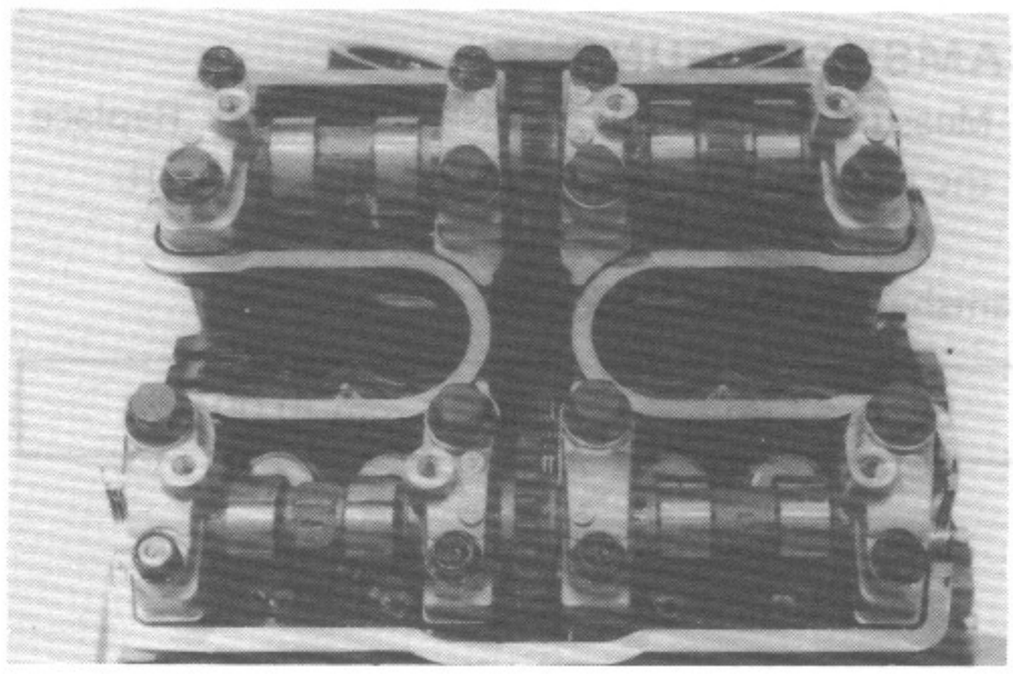
- Determine whether or not each journal is worn down to the limit by measuring the running clearance with the camshaft installed in place. Use plastigauge to read the clearance at the widest portion, which is specified as follows:

Camshaft journal oil clearance (IN & EX)

Service Limit	0.150 mm (0.0059 in)

NOTE:
Install each holder to their original positions.

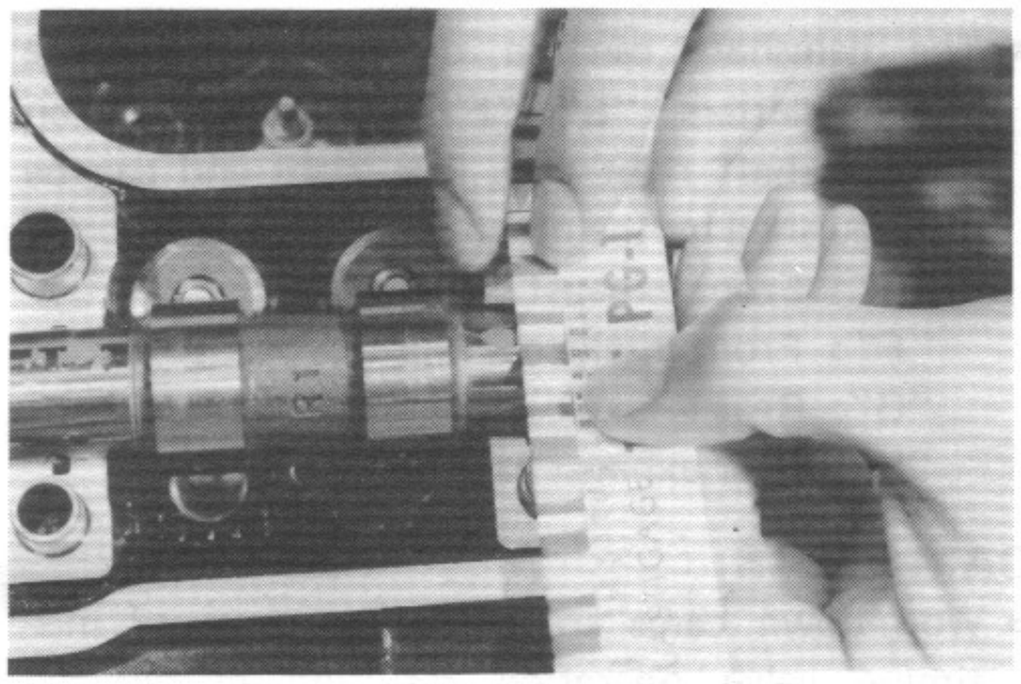




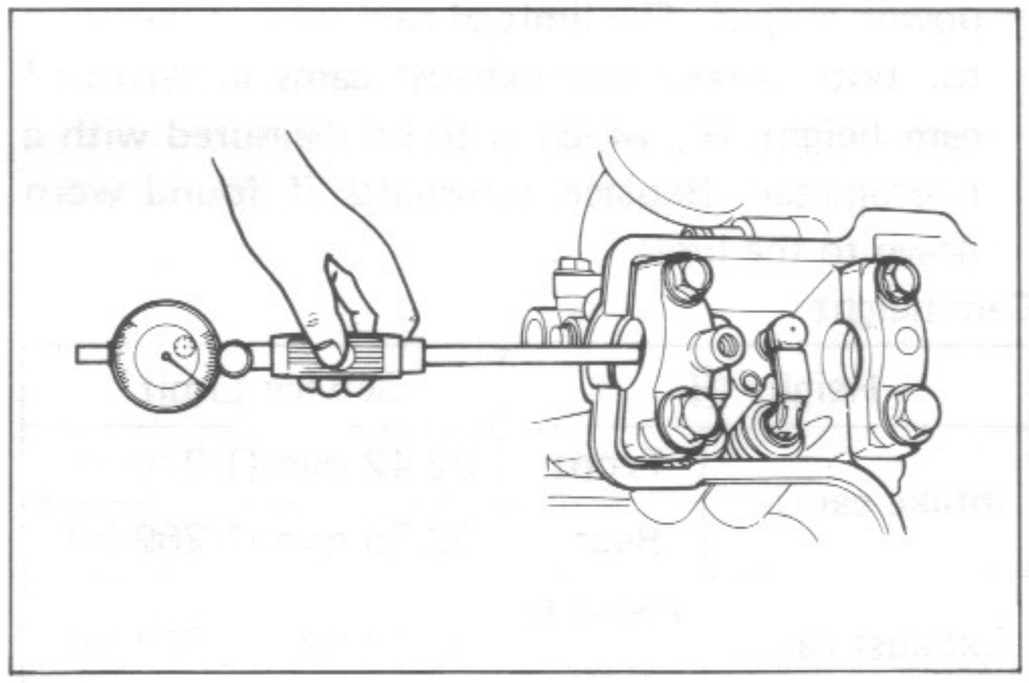
- Tighten the camshaft holder bolts evenly and diagonally to the specified torque.

	Initial	Final
Cam shaft journal holder bolt	15 N·m (1.5 kg-m) (11.0 lb-ft)	23 – 27 N·m (2.3 – 2.7 kg-m) (16.5 – 19.5 lb-ft)
Cylinder head bolt	35 N·m (3.5 kg-m) (25.5 lb-ft)	46 – 51 N·m (4.6 – 5.1 kg-m) (33.5 – 37.0 lb-ft)

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

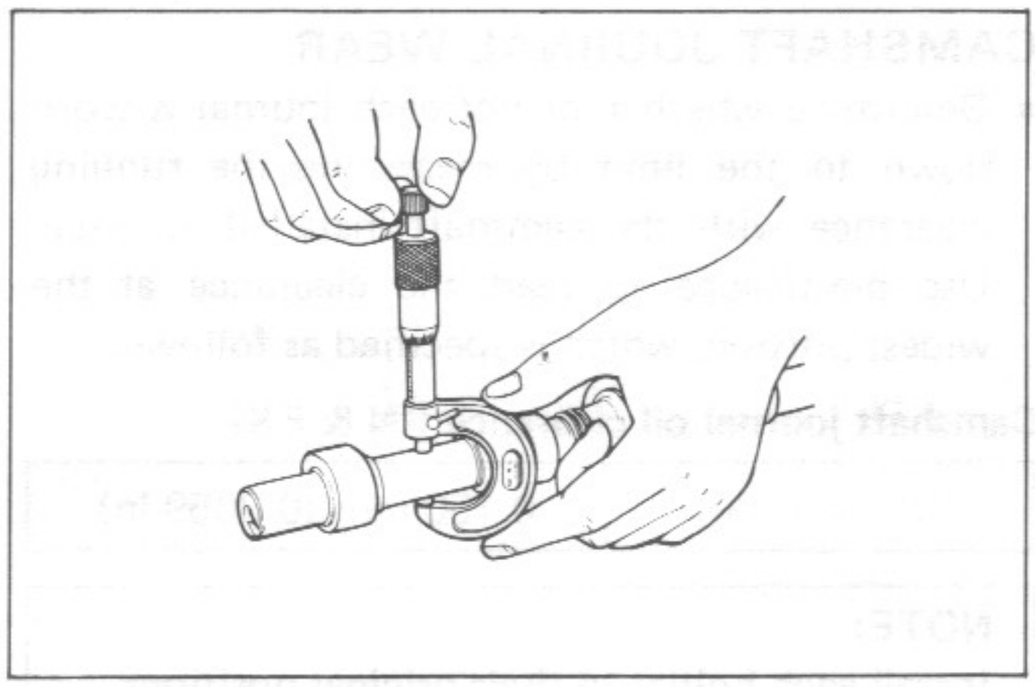


- If the camshaft journal clearance measured exceeds the limit, measure the inside diameter of camshaft bearing holder and outside diameter of the camshaft journal. Replace whichever the difference from specification is greater.



09900 - 20205	Micrometer (0 – 25 mm)

	Standard
Journal holder I.D. (In & Ex)	22.012 – 22.025 mm (0.8666 – 0.8671 in)
Camshaft journal O.D. (In & Ex)	21.959 – 21.980 mm (0.8645 – 0.8654 in)

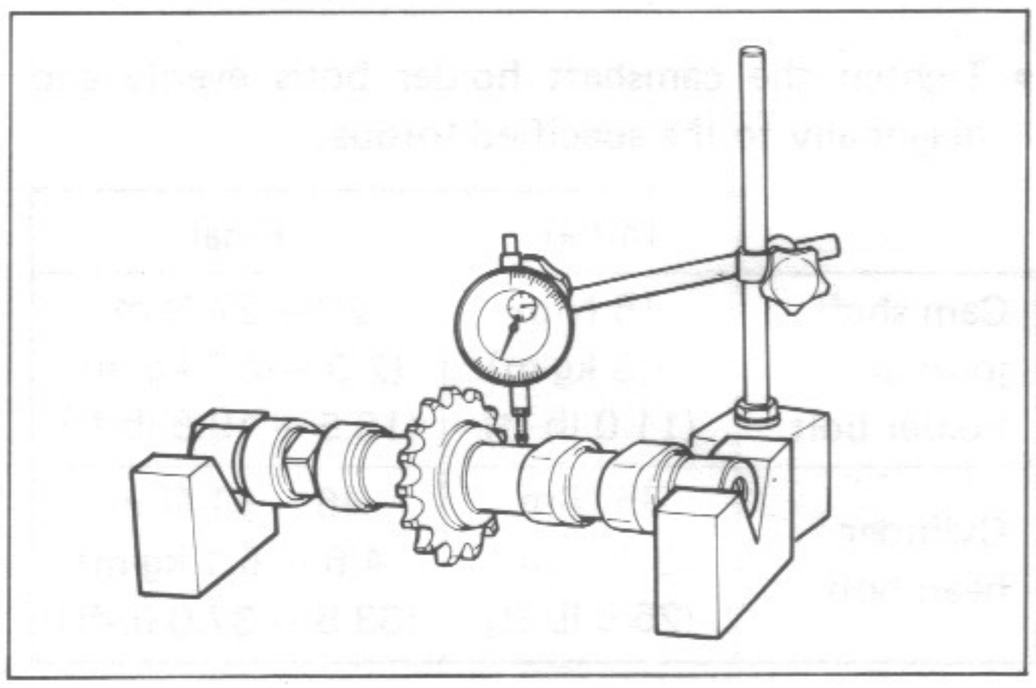


CAMSHAFT RUNOUT

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

Camshaft runout (IN & EX)

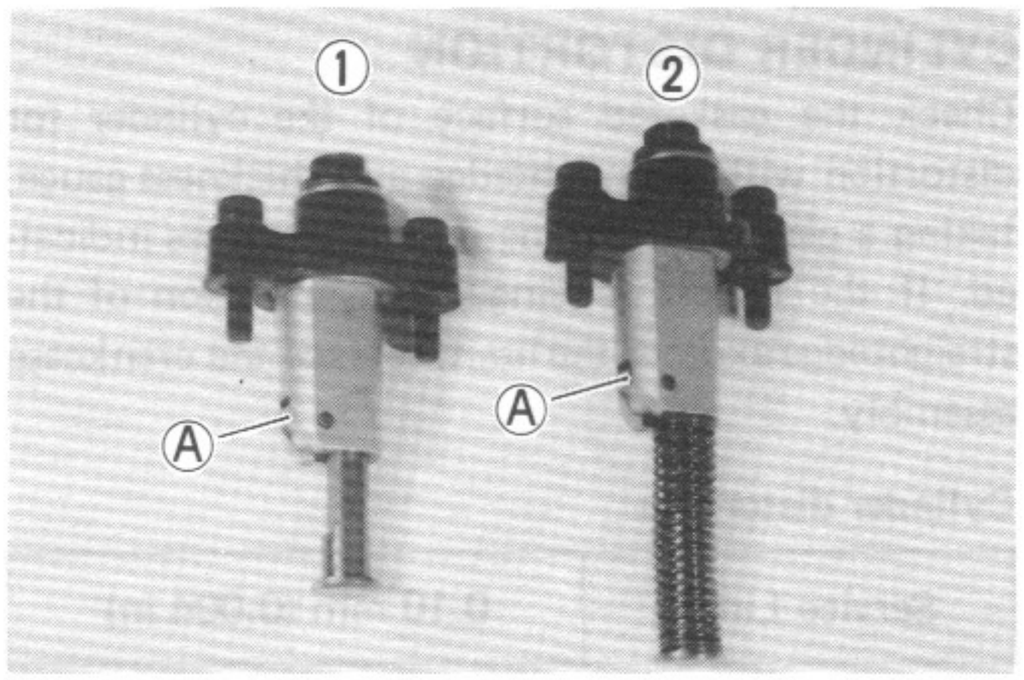
Service Limit	0.10 mm (0.004 in)

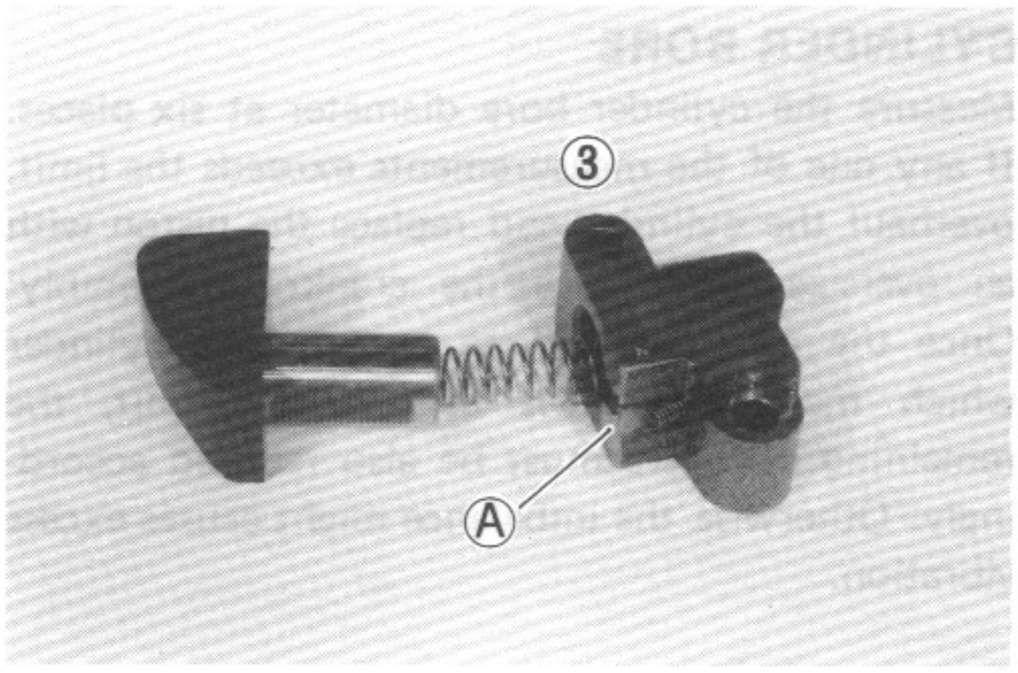


CAM CHAIN TENSIONER

For driving the four camshafts three cam chain tensioners are used on the respective cam drive chains. Unlock the rachet mechanism, and move the push rod in place to see if it slides smoothly. If any stickiness is noted or rachet mechanism is faulty, replace the chain tensioner assembly with a new one.

① Front cam chain tensioner
② Rear cam chain tensioner
③ Idle shaft drive chain tensioner
Ⓐ Rachet

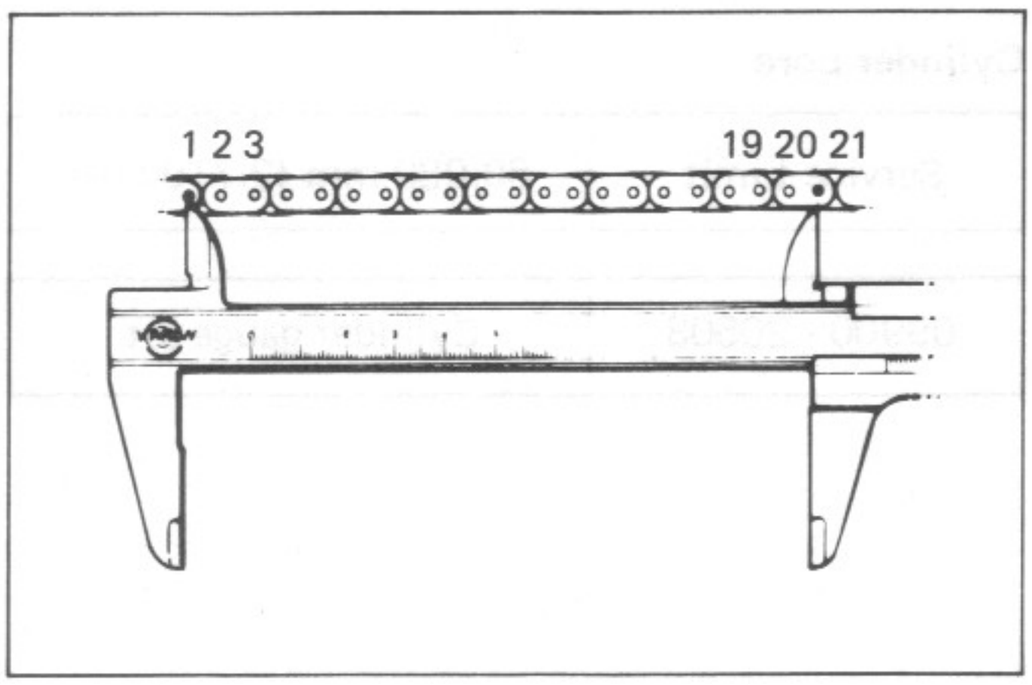




CAM CHAIN 20-PITCH LENGTH

Pull the chain tight to remove any slack, then using vernier calipers, measure the 20-pitch length of cam chain. If it measures more than limit, replace the cam chain/idle shaft chain.

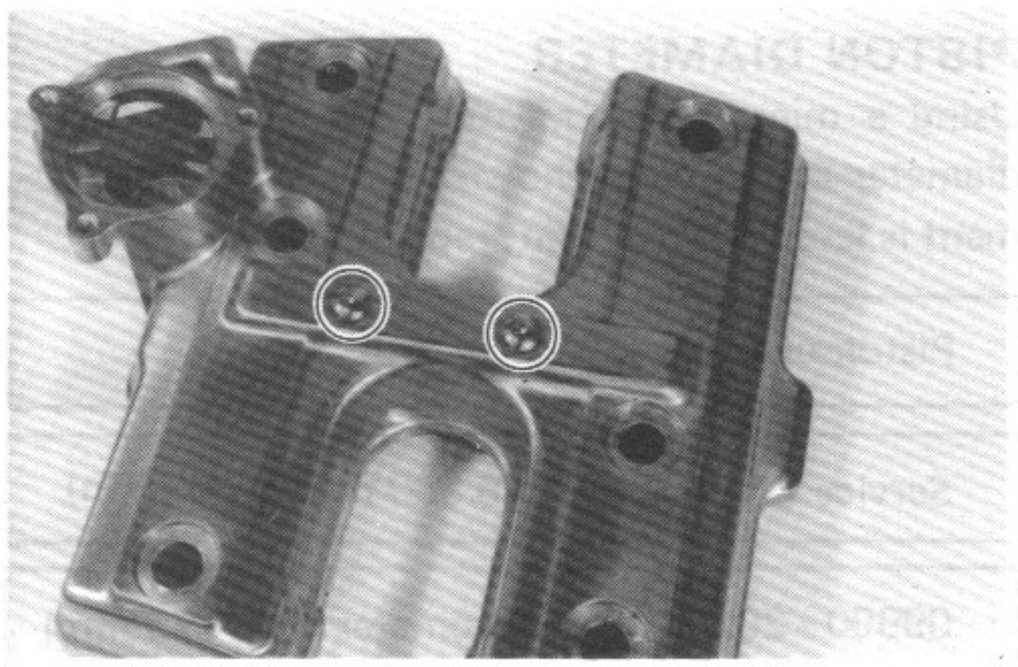
Service Limit	161.0 mm (6.34 in)



CAM CHAIN GUIDE

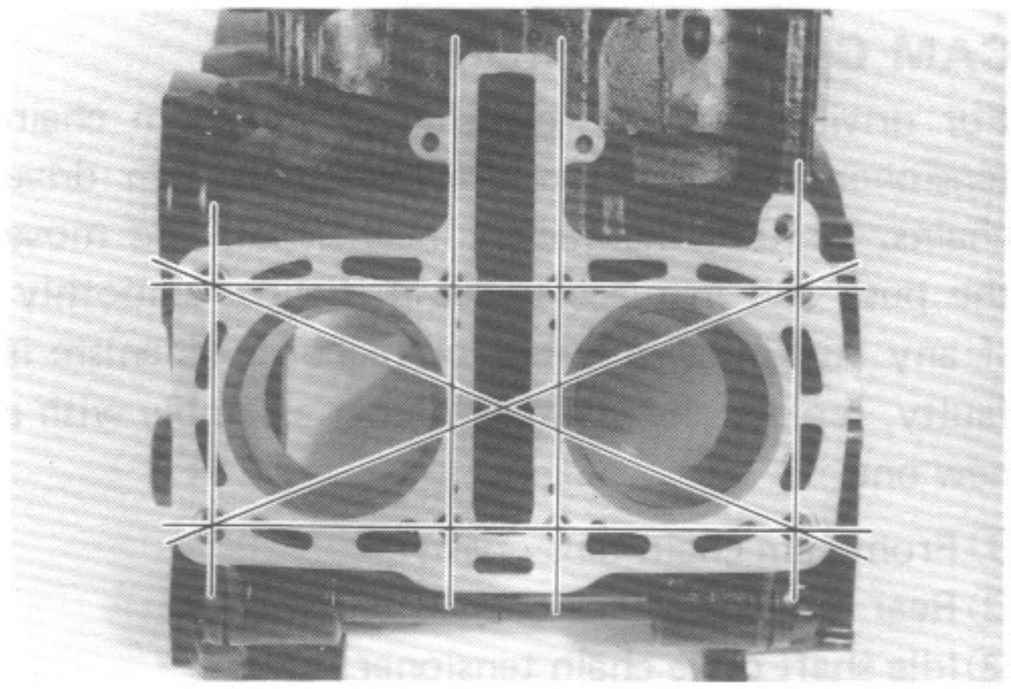
NOTE:
When replacing following chain guides, apply SUZUKI Thread lock cement "1361A" to screws thread.

99104 - 32020	Thread lock super "1361A"



CYLINDER DISTORTION

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

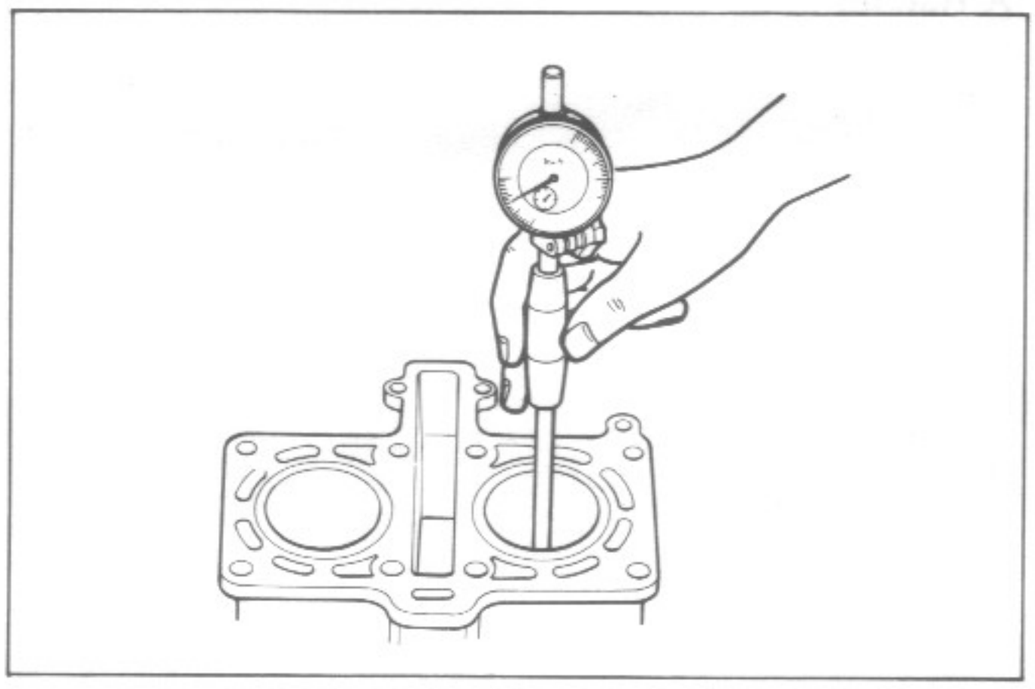


Cylinder distortion

Service Limit	0.10 mm (0.004 in)

CYLINDER BORE

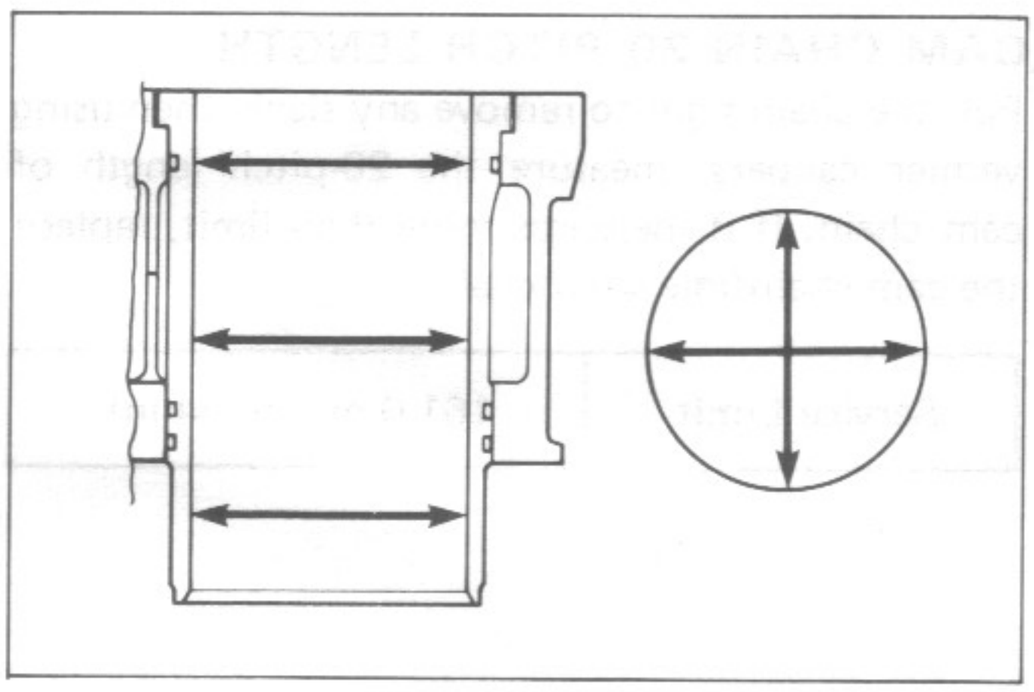
Measure the cylinder bore diameter at six places. If any one of the measurements exceeds the limit, overhaul the cylinder and replace the piston with an oversize, or replace the crankcase assembly. Once the reboring is done on any one cylinder which measurements is beyond the limit, the remaining cylinders must be also rebored accordingly. Otherwise the imbalance might causes excess vibration.



Cylinder bore

Service Limit	69.080 mm (2.7197 in)

09900 - 20508	Cylinder gauge set



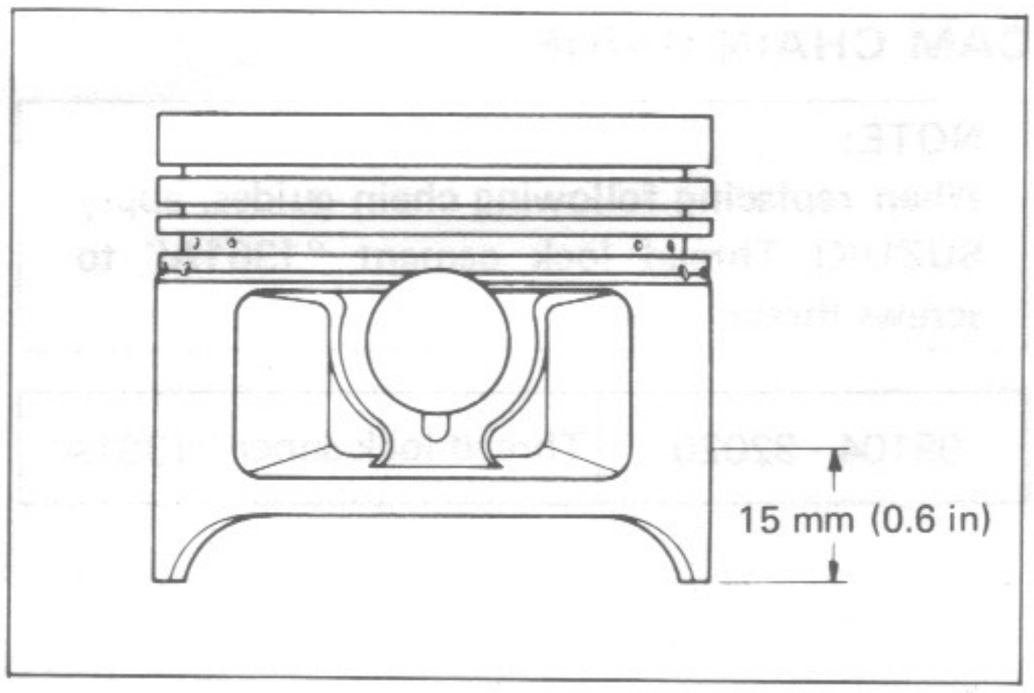
PISTON DIAMETER

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

Piston oversize	0.5, 1.0 mm

Service Limit	68.880 mm (2.7118 in)

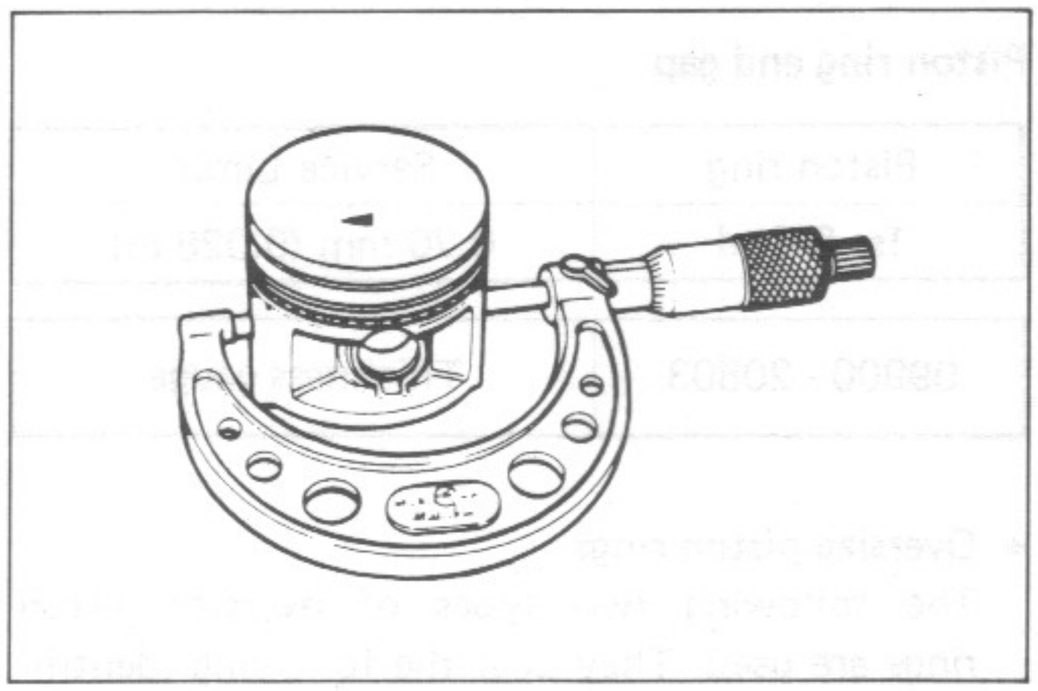
09900 - 20203	Micrometer (50 – 75 mm)



PISTON-CYLINDER CLEARANCE

As a result of the above measurement, if the piston clearance exceeds the following limit, overhaul the cylinder and use an oversize piston, or replace both crankcase assembly and piston.

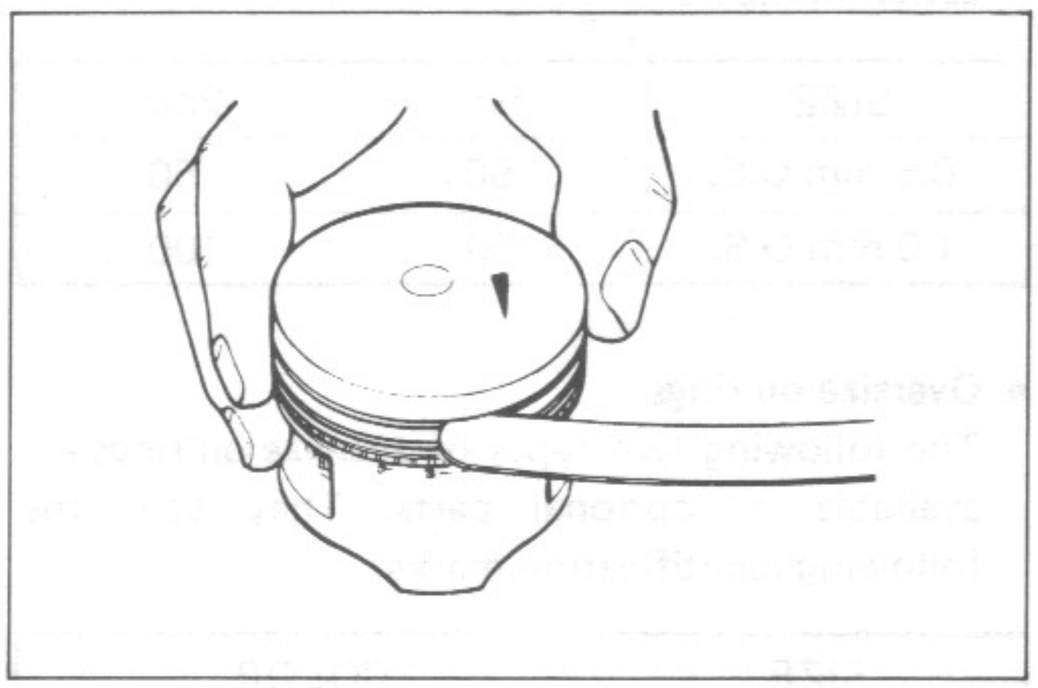
Service Limit	0.120 mm (0.0047 in)



PISTON RING-GROOVE CLEARANCE

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

09900 - 20803	Thickness gauge

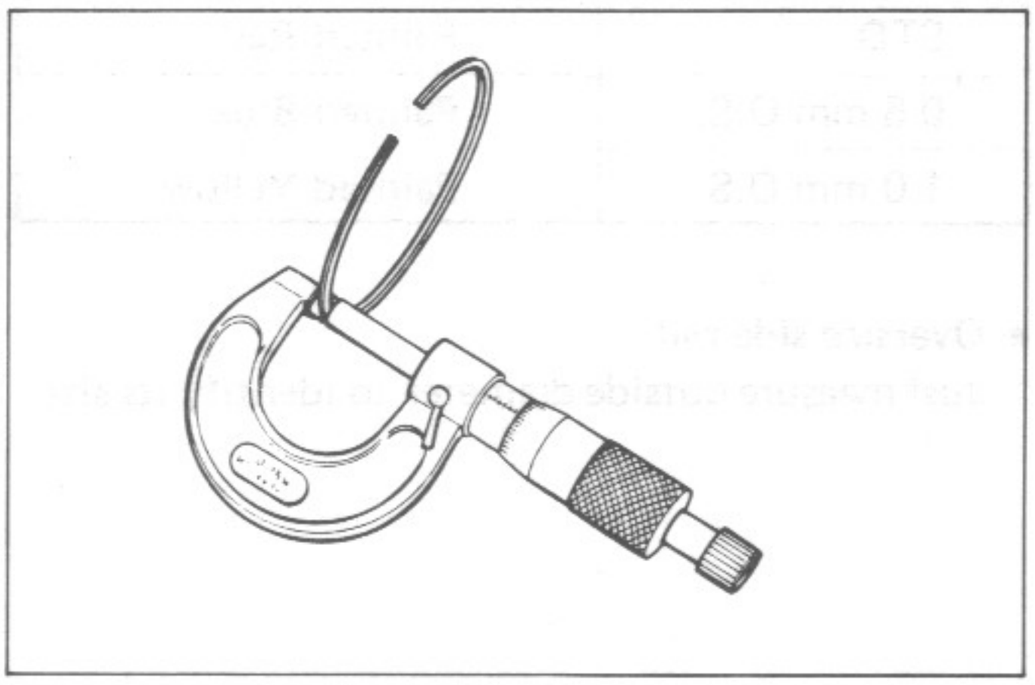


Piston ring—groove clearance

Piston ring	Service Limit
1st	0.18 mm (0.007 in)
2nd	0.15 mm (0.006 in)

Piston ring groove width

Piston ring	Standard
1st	1.01 – 1.03 mm (0.0398 – 0.0406 in)
2nd	1.21 – 1.23 mm (0.0476 – 0.0484 in)
Oil	2.51 – 2.53 mm (0.0988 – 0.0996 in)



Piston ring thickness

Piston ring	Standard
1st	0.975 – 0.990 mm (0.0384 – 0.0390 in)
2nd	1.170 – 1.190 mm (0.0461 – 0.0469 in)

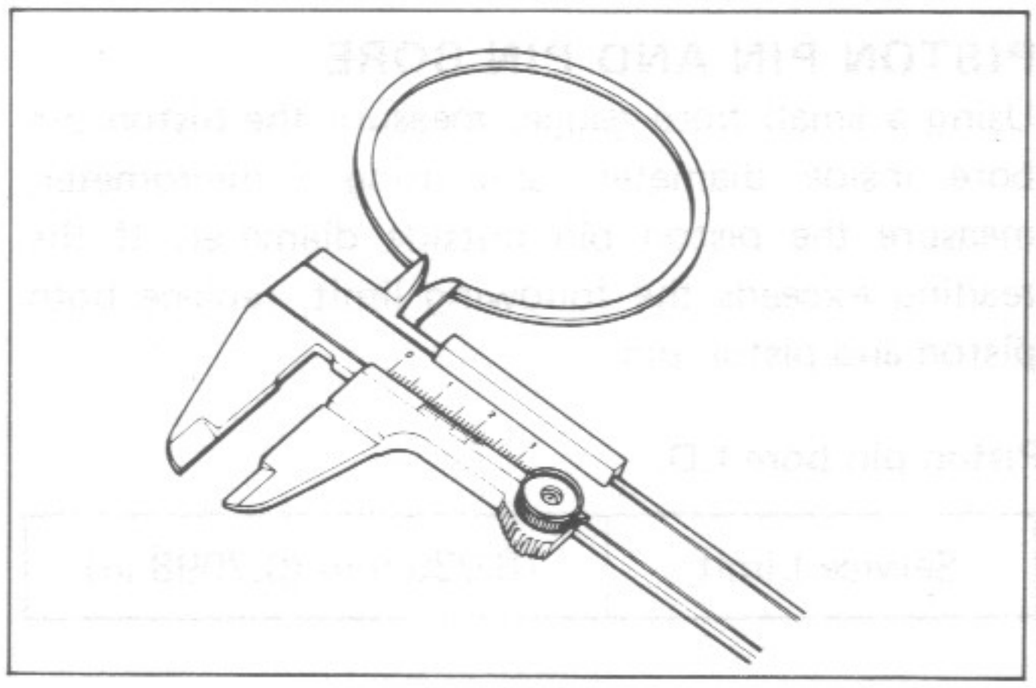
PISTON RING FREE END GAP AND PISTON RING END GAP

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

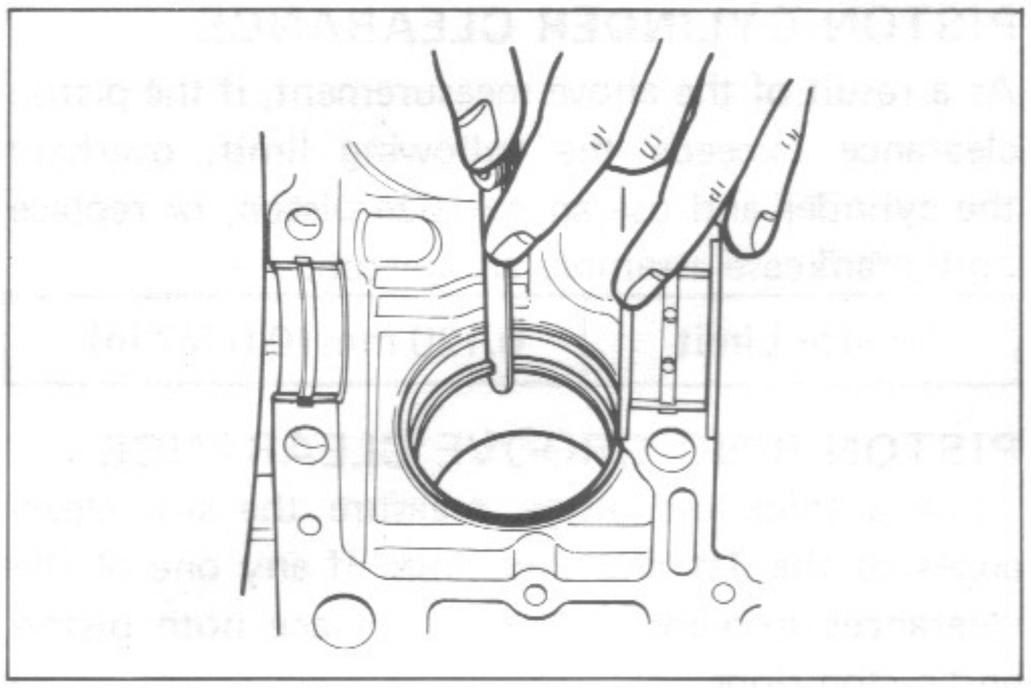
Piston ring		Service Limit
1st	N	6.8 mm (0.27 in)
2nd	N	8.4 mm (0.33 in)



Piston ring end gap

Piston ring	Service Limit
1st & 2nd	0.70 mm (0.028 in)

09900 - 20803	Thickness gauge



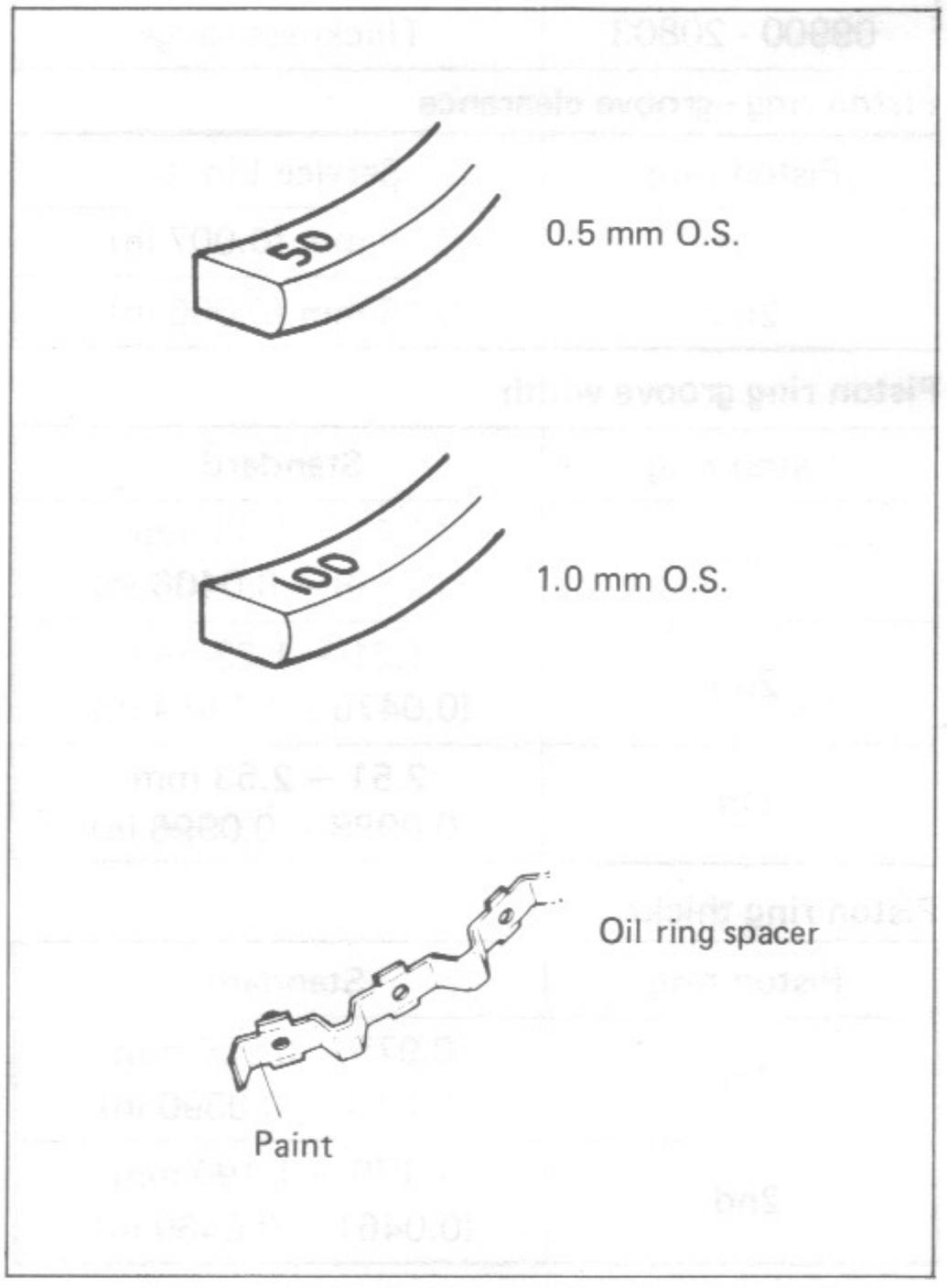
- **Oversize piston rings**
  The following two types of oversize piston rings are used. They bear the following identification numbers.

SIZE	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 available as optional parts. They bear the following identification marks.

SIZE	COLOR
STD	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 its size.

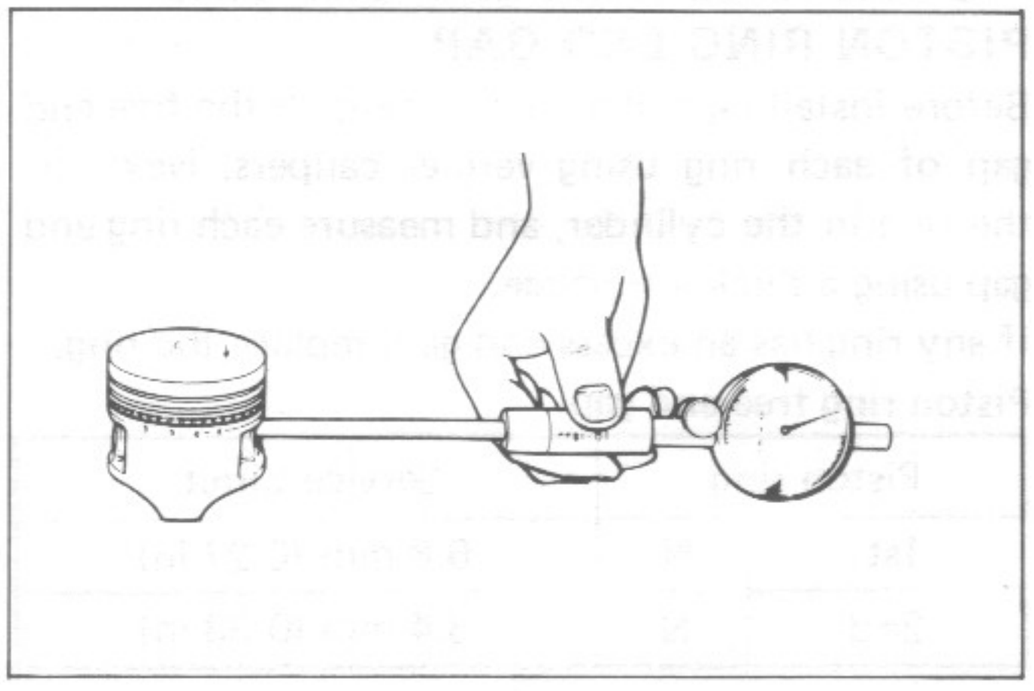


PISTON PIN AND PIN BORE

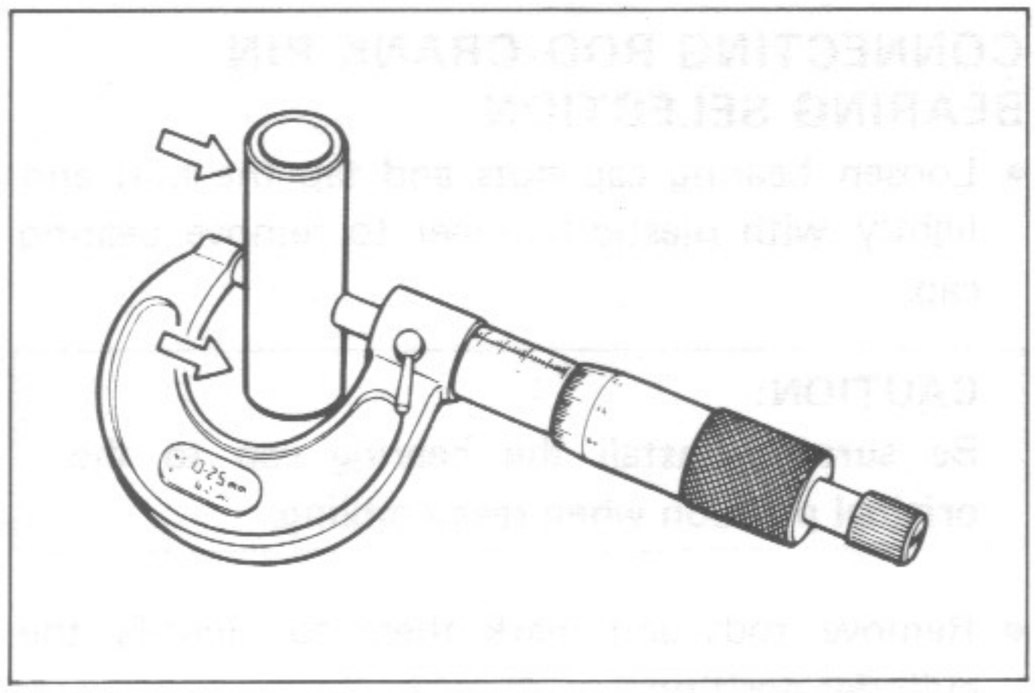
Using a small bore gauge, measure the piston pin bore inside diameter, and using a micrometer, measure the piston pin outside diameter. If the reading exceeds the following limit, replace both piston and piston pin.

Piston pin bore I.D.

Service Limit	18.030 mm (0.7098 in)



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



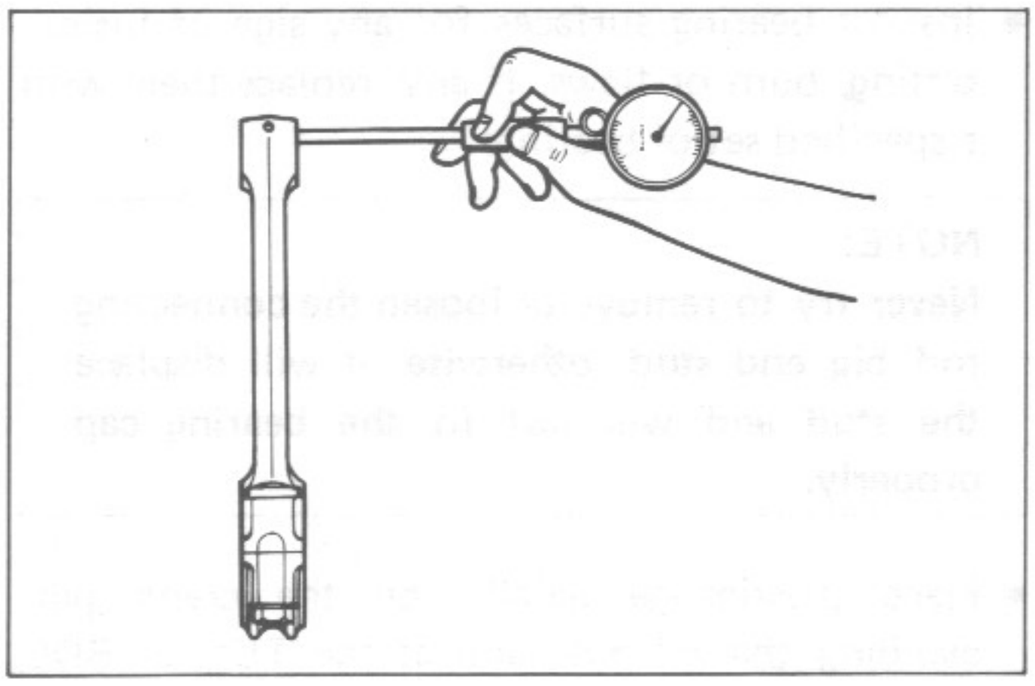
Piston pin O.D.

Service Limit	17.980 mm (0.7079 in)

09900 - 20205	Micrometer (0 – 25 mm)

CONNECTING ROD SMALL END BORE I.D.

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



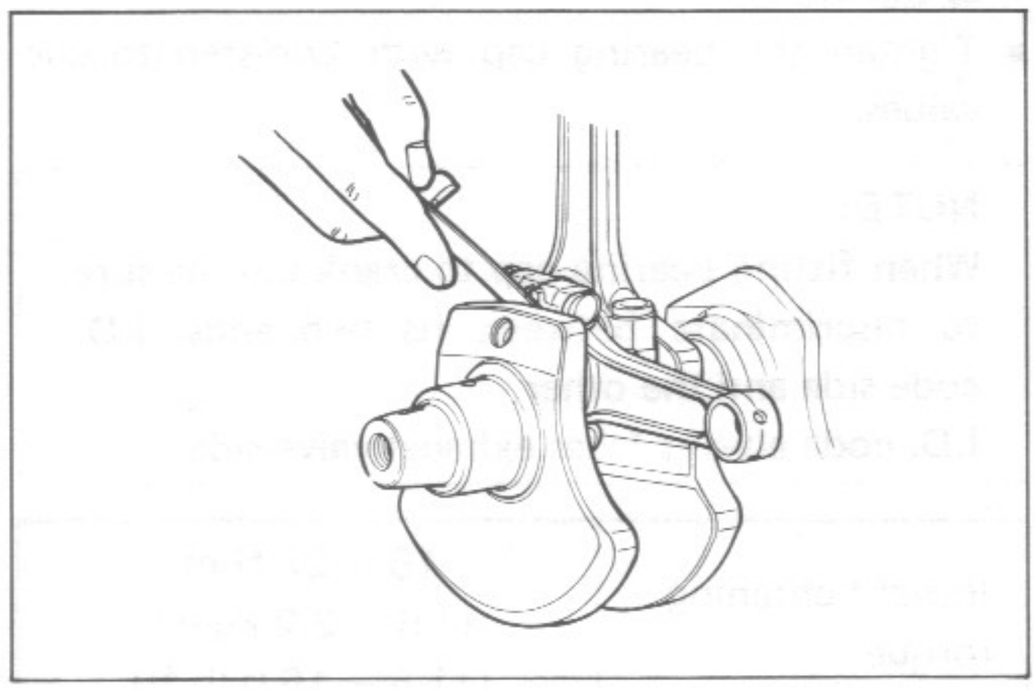
Connecting rod small end bore I.D.

Service Limit	18.040 mm (0.7102 in)

- If the connecting rod small end bore inside diameter exceeds the above mentioned limit, replace connecting rod.

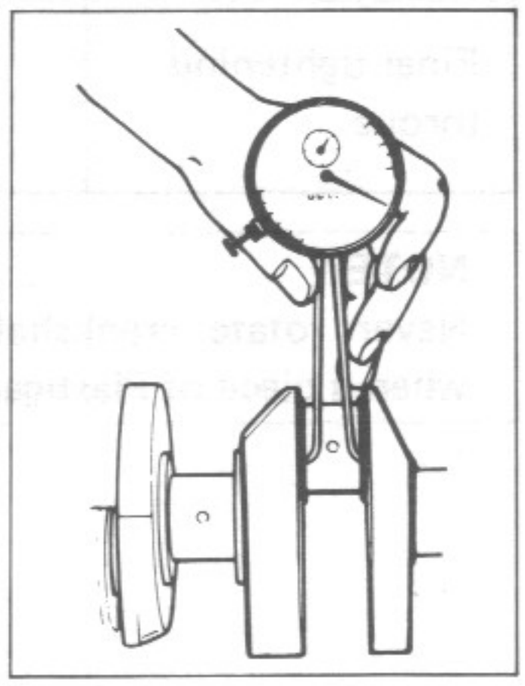
CONNECTING ROD BIG END THRUST CLEARANCE

Check the connecting rod thrust clearance by using thickness gauge. If the clearance exceeds the limit, replace connecting rod or crankshaft.



Service Limit	0.30 mm (0.012 in)

	Standard
Big end width	19.95 – 20.00 mm (0.785 – 0.787 in)
Crank pin width	40.10 – 40.15 mm (1.579 – 1.581 in)



CONNECTING ROD-CRANK PIN BEARING SELECTION

- Loosen bearing cap nuts and tap the bolt end lightly with plastic hammer to remove bearing cap.

> CAUTION:
> **Be sure to install the bearing cap to the original position when reassembling.**

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

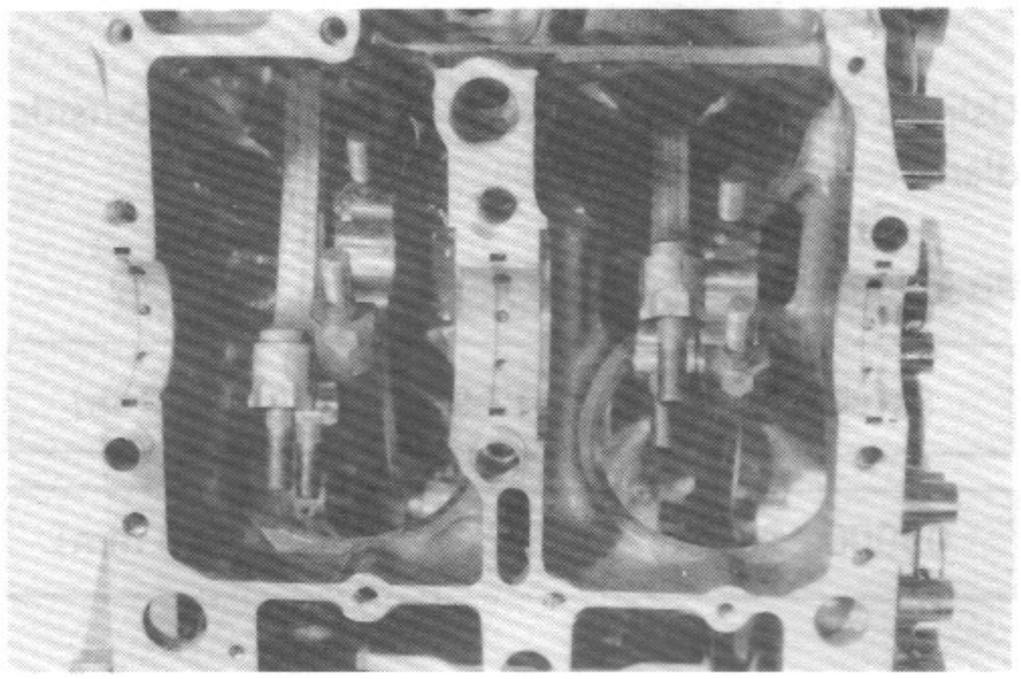
> NOTE:
> **Never try to remove or loosen the connecting rod big end stud, otherwise, it will displace the stud and will not fit the bearing cap properly.**

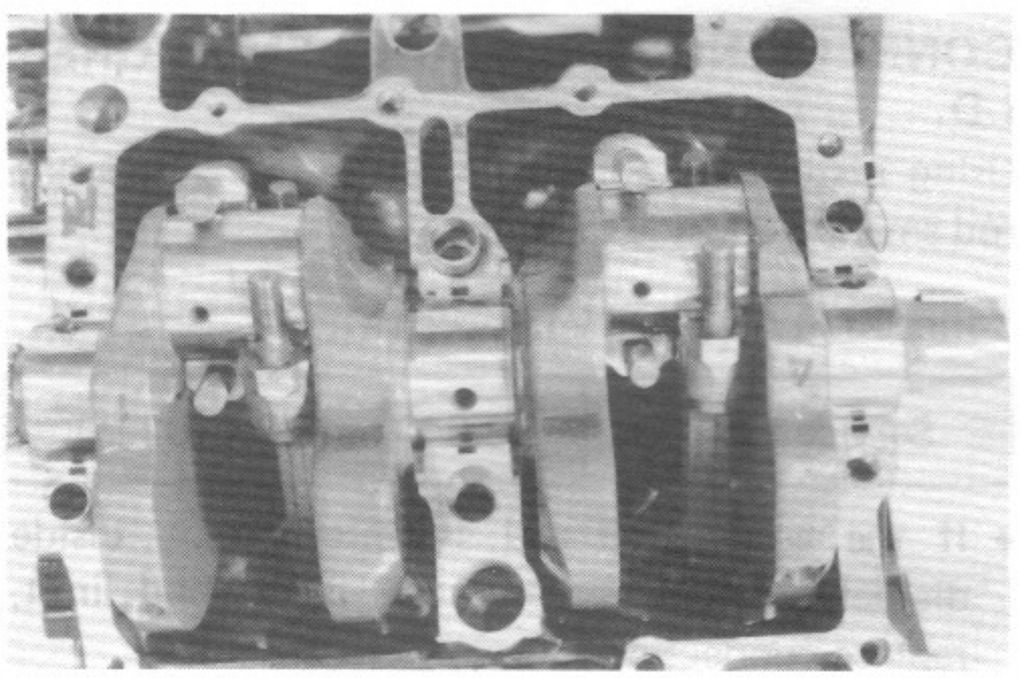
- Place plastigauge axially on the crank pin, avoiding the oil hole and at the TDC or BDC as shown.
- Tighten the bearing cap with two-step torque values.

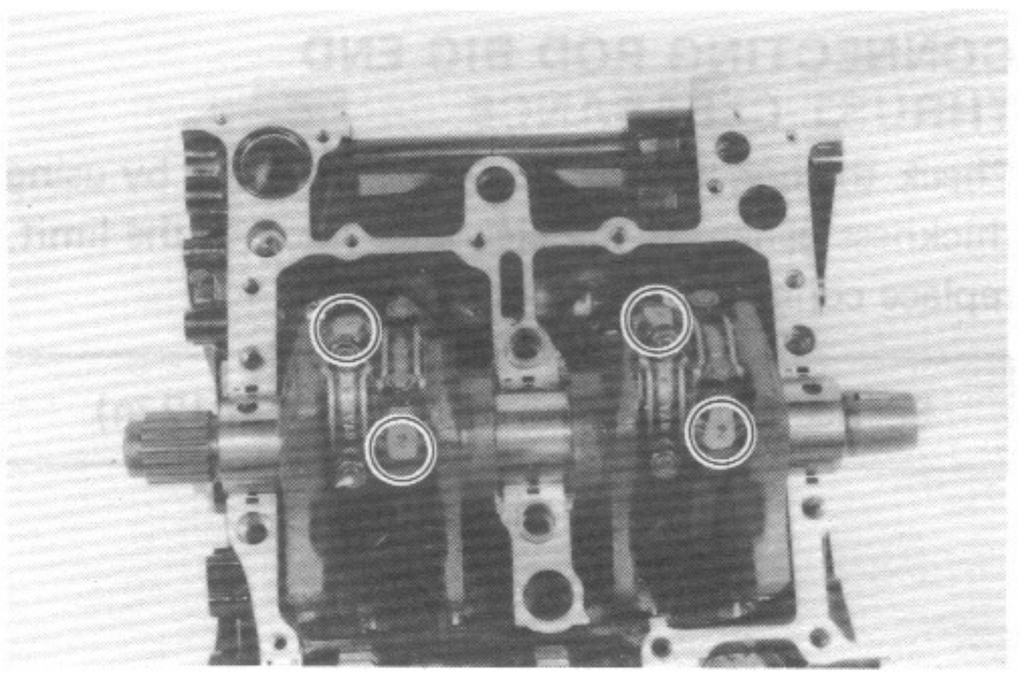
> NOTE:
> **When fitting bearing cap to crank pin, be sure to discriminate between its two ends, I.D. code side and the other.**
> **I.D. code always faces exhaust valve side.**

Initial tightening torque	16 – 22 N·m (1.6 – 2.2 kg-m) (11.5 – 16.0 lb-ft)
Final tightening torque	33 – 37 N·m (3.3 – 3.7 kg-m) (24.0 – 27.0 lb-ft)

> NOTE:
> **Never rotate crankshaft or connecting rod when a piece of Plastigauge is in the clearance.**



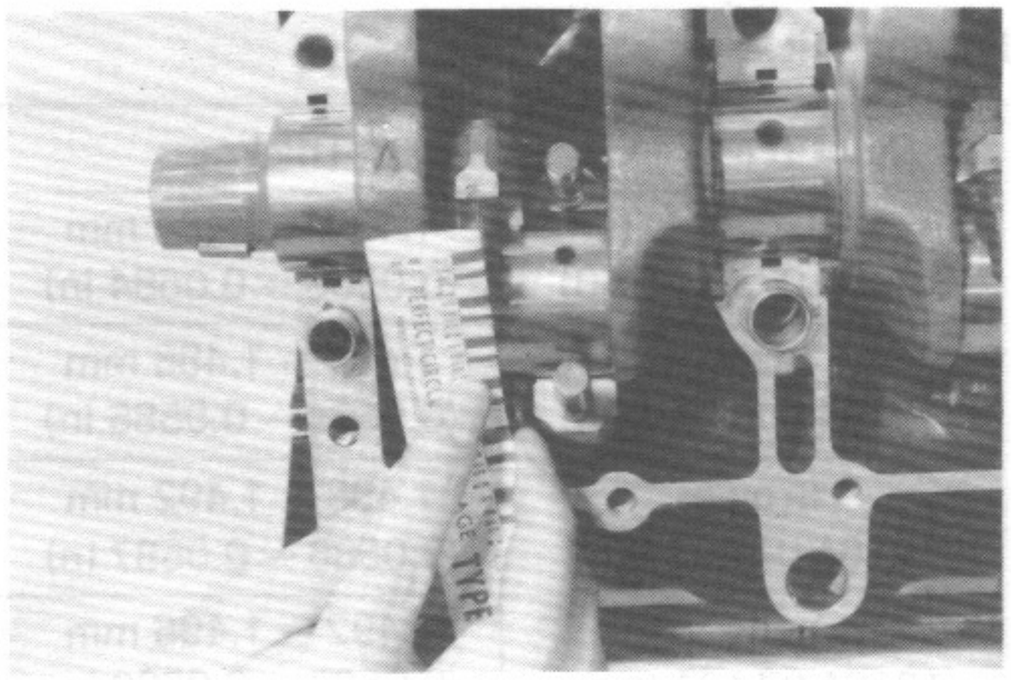


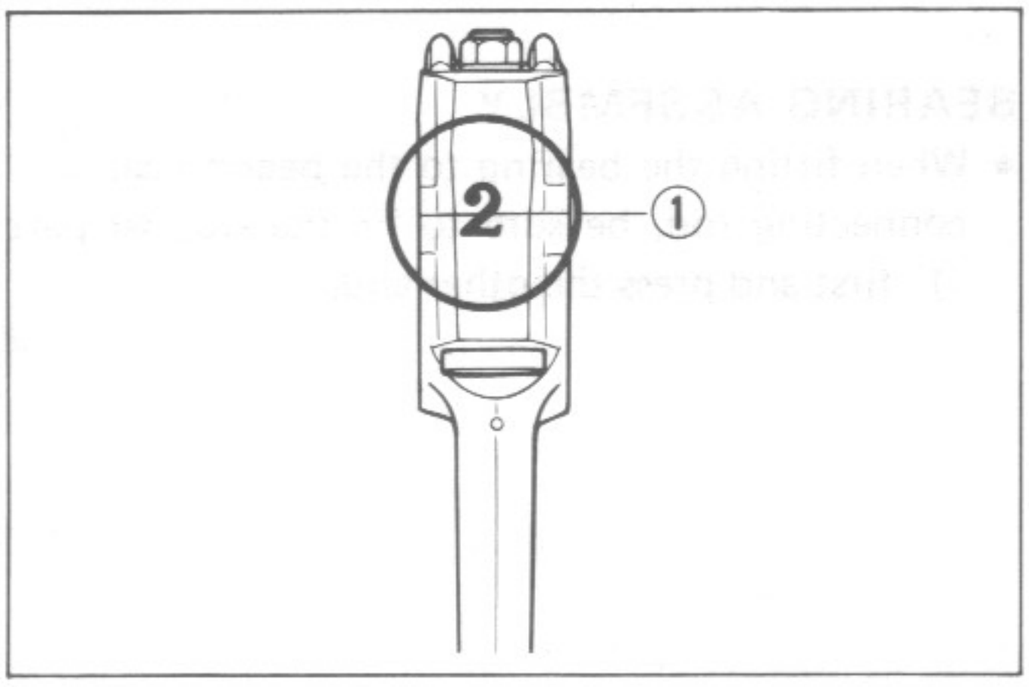


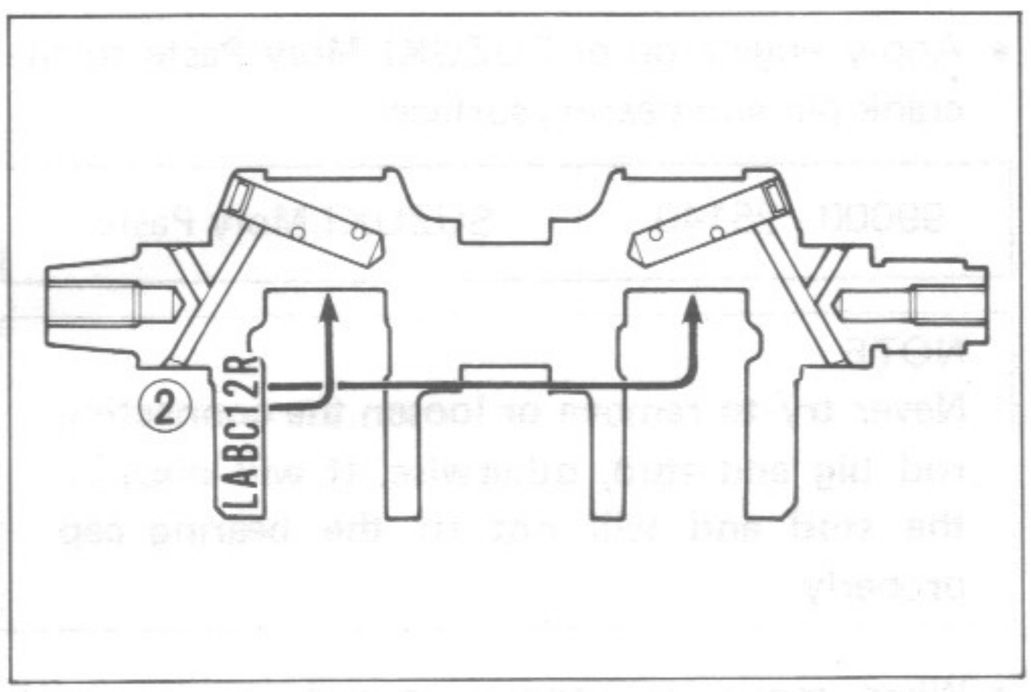
- Remove the caps and measure the width of compressed plastigauge with envelope scale. This measurement should be taken at the widest part.

Service Limit	0.090 mm (0.0035 in)

- If oil clearance exceeds the service limit, select the specified bearings from the following table.
- Check the corresponding conrod I.D. code number ①, "1" or "2".
- Check the corresponding crank pin O.D. code number ②, "1", "2" or "3".
- The crank pin O.D. code number is on the left crank web.







Bearing selection table

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

Oil clearance

Standard	0.032 – 0.056 mm (0.0013 – 0.0022 in)

Connecting rod I.D. specification

Code	I.D. Specification
1	39.000 – 39.008 mm (1.5354 – 1.5357 in)
2	39.008 – 39.016 mm (1.5357 – 1.5361 in)

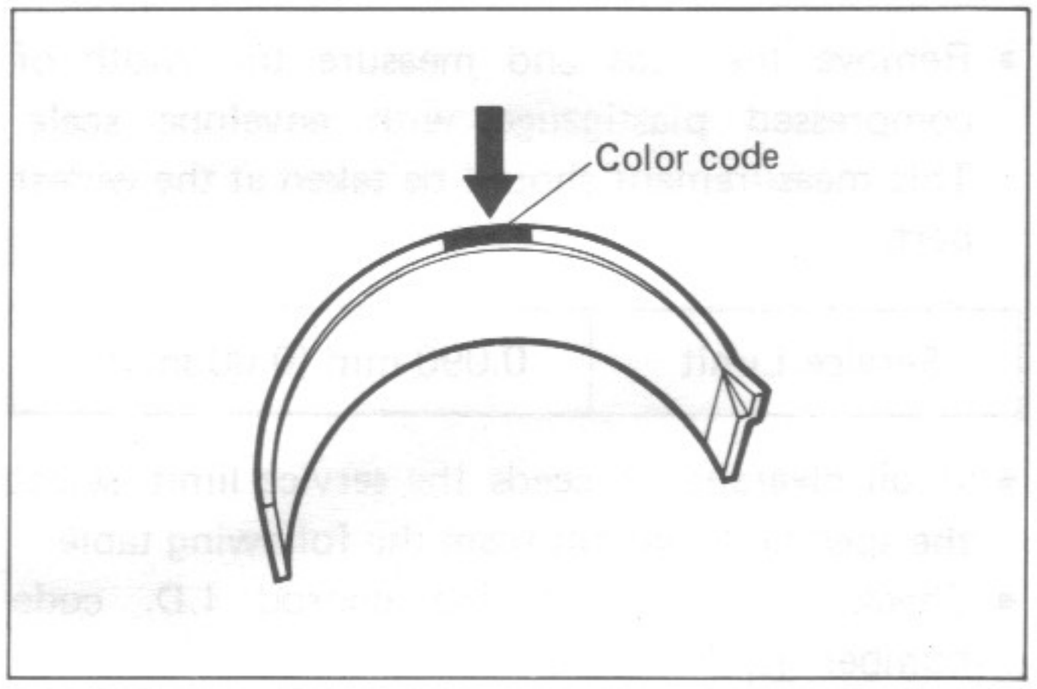
Crank pin O.D. specification

Code	O.D. Specification
1	35.992 – 36.000 mm (1.4170 – 1.4173 in)
2	35.984 – 35.992 mm (1.4167 – 1.4170 in)
3	35.976 – 35.984 mm (1.4164 – 1.4167 in)

CAUTION:
Bearing should always be replaced as a set.

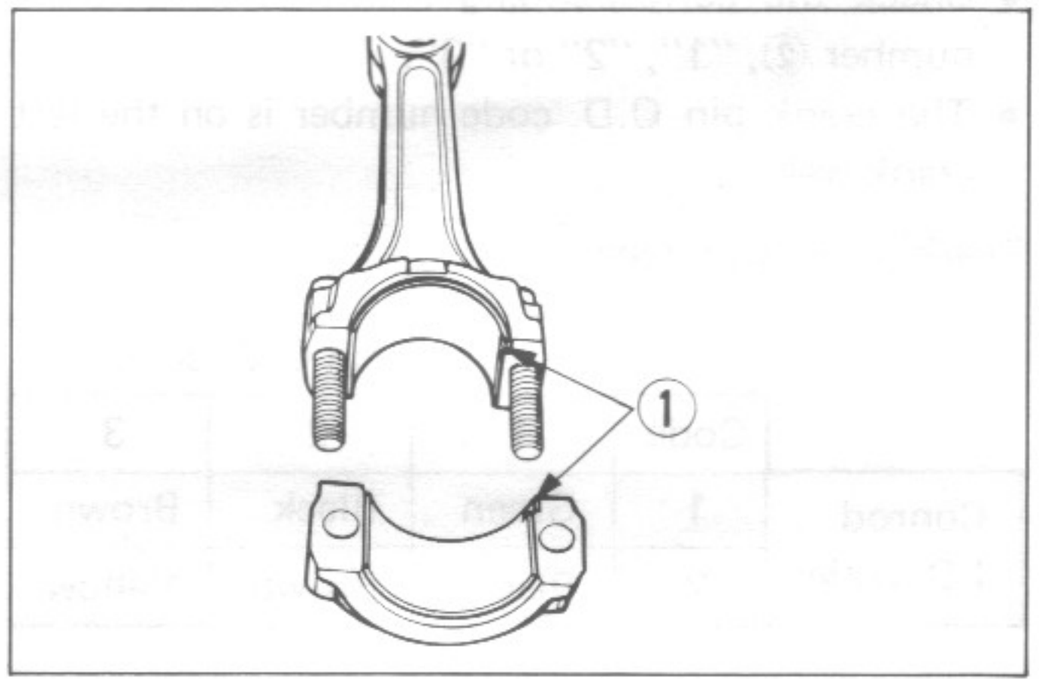
Bearing thickness

Color (Part No.)	Thickness
Green (12164-07A01-0A0)	1.480 – 1.484 mm (0.0583 – 0.0584 in)
Black (12164-07A01-0B0)	1.484 – 1.488 mm (0.0584 – 0.0586 in)
Brown (12164-07A01-0C0)	1.488 – 1.492 mm (0.0586 – 0.0587 in)
Yellow (12164-07A01-0D0)	1.492 – 1.496 mm (0.0587 – 0.0589 in)



BEARING ASSEMBLY

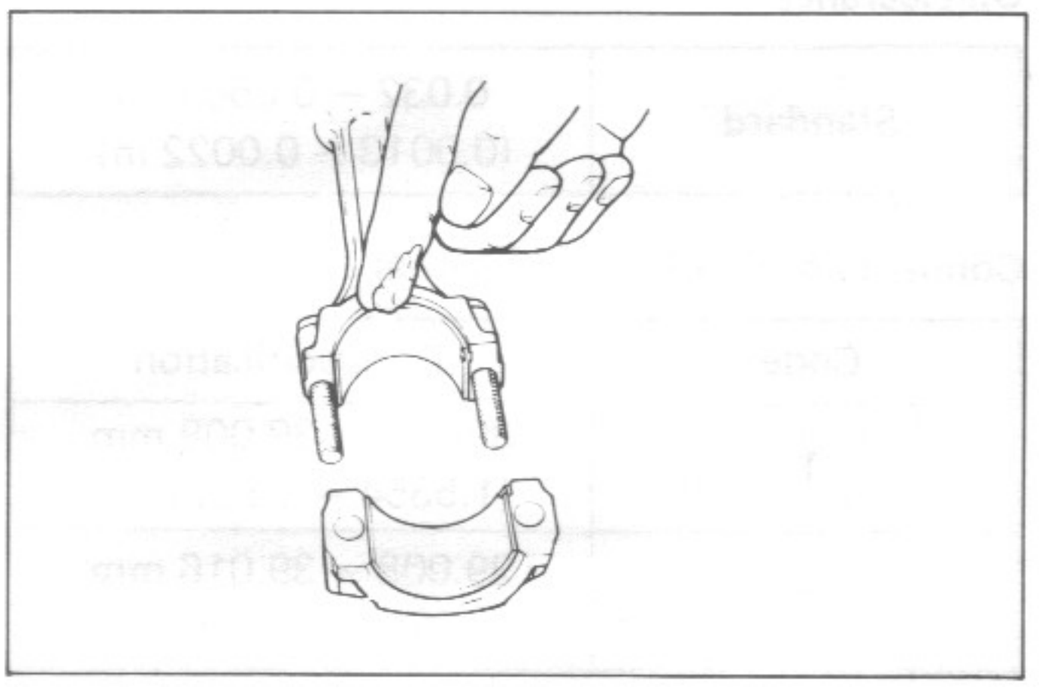
- When fitting the bearing to the bearing cap and connecting rod, be sure to fix the stopper part ① first and press the other end.



- Apply engine oil or SUZUKI Moly Paste to the crank pin and bearing surface.

99000 - 25140	SUZUKI Moly Paste

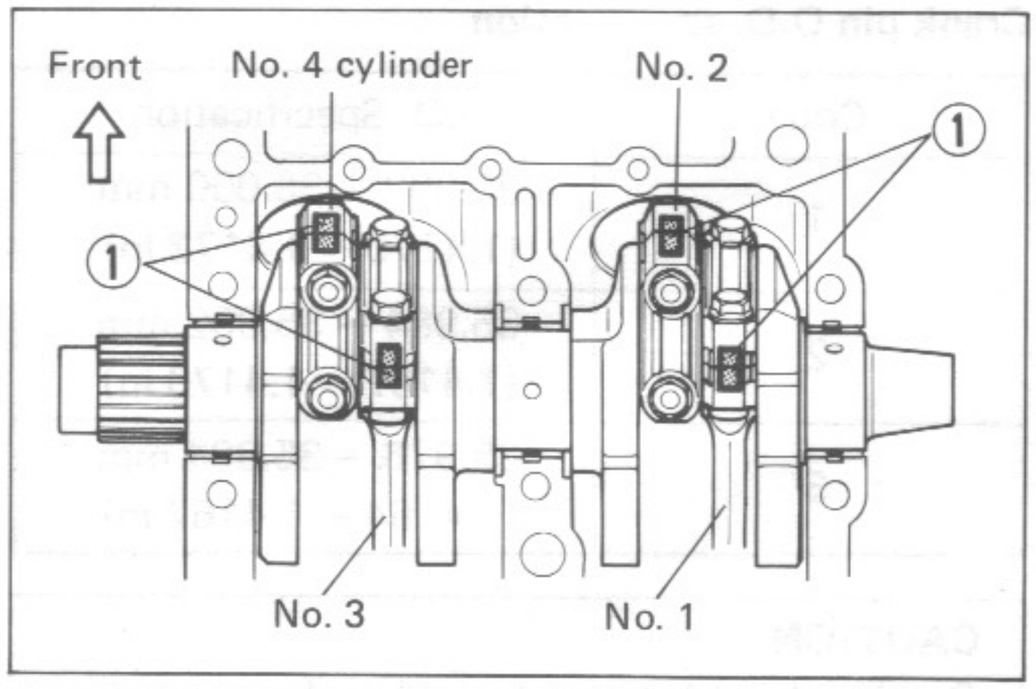
NOTE:
Never try to remove or loosen the connecting rod big end stud, otherwise, it will displace the stud and will not fit the bearing cap properly.



- When mounting connecting rod on the crank shaft, make sure that I.D. code ② of the connecting rod faces as shown in the figure.

- Tighten the connecting rod fitting nuts with specified torque.

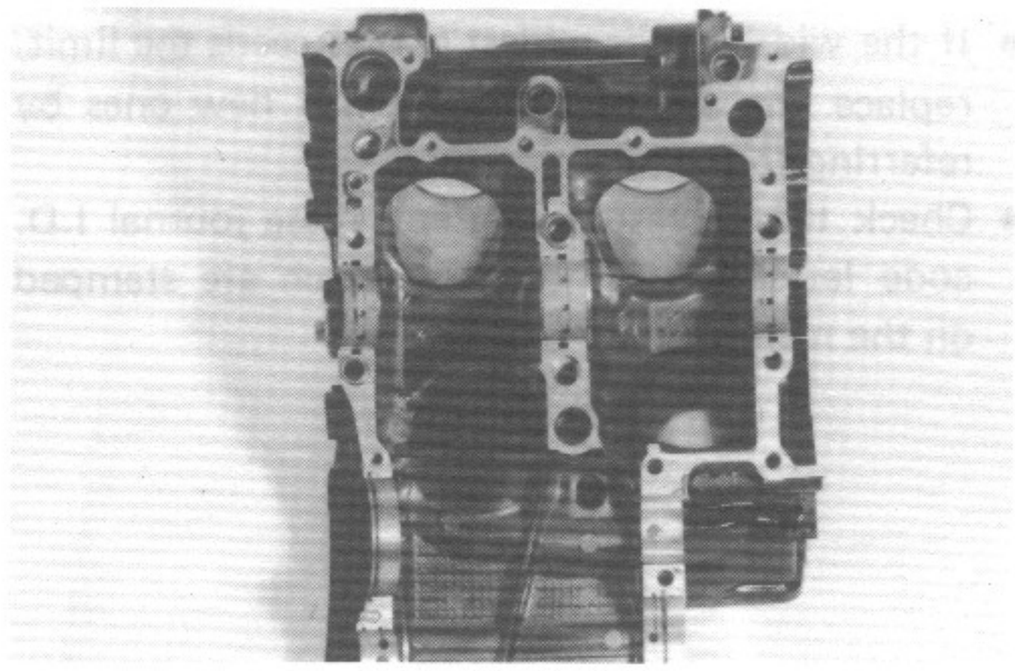
	Initial	Final
Tightening torque	16 – 22 N·m (1.6 – 2.2 kg-m) (11.5 – 16.0 lb-ft)	33 – 37 N·m (3.3 – 3.7 kg-m) (24.0 – 27.0 lb-ft)



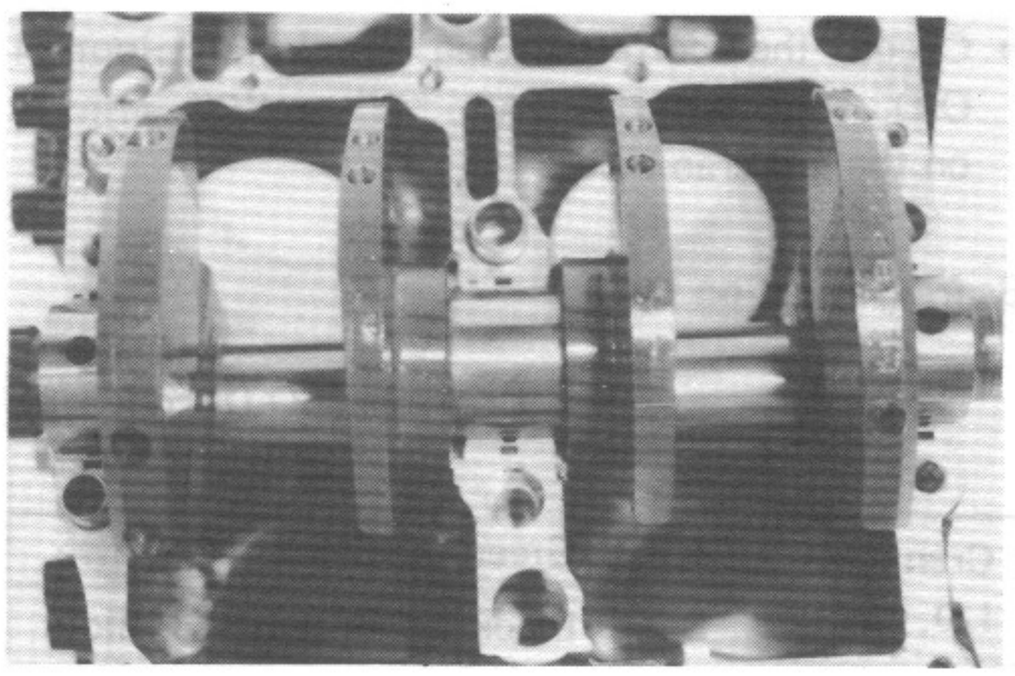
- Check the connecting rod for smooth turning.

CRANKCASE-CRANKSHAFT BEARING SELECTION

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

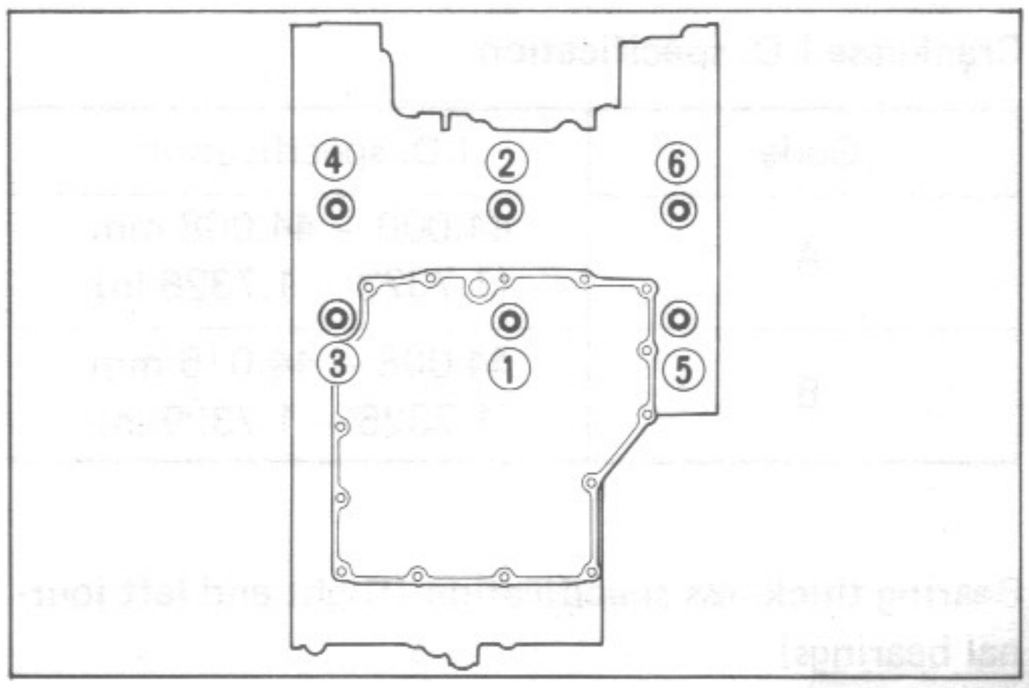


- Place plastigauge on each crankshaft journal in the usual manner.



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

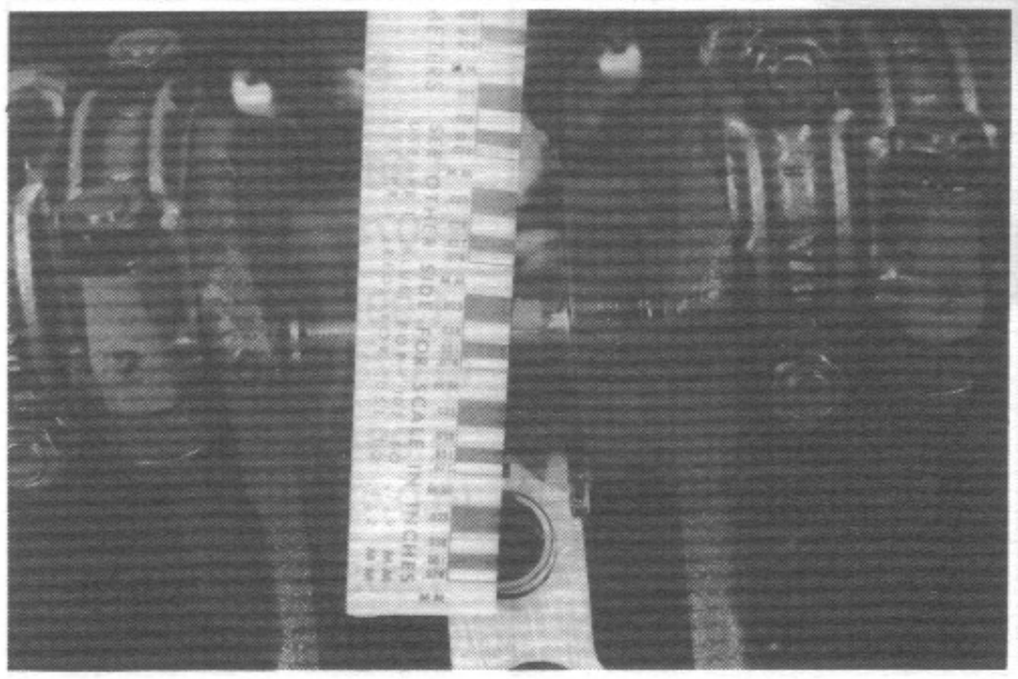
- Mate the lower crankcase with the upper crankcase, and tighten the crankcase securing bolts with specified torque value in the indicated order.



Tightening torque

	Initial	Final
12-mm bolt	40 – 50 N·m (4.0 – 5.0 kg-m) (29.0 – 36.0 lb-ft)	60 – 70 N·m (6.0 – 7.0 kg-m) (43.5 – 50.5 lb-ft)
10-mm bolt	25 – 35 N·m (2.5 – 3.5 kg-m) (18.0 – 25.5 lb-ft)	45 – 55 N·m (4.5 – 5.5 kg-m) (32.5 – 40.0 lb-ft)

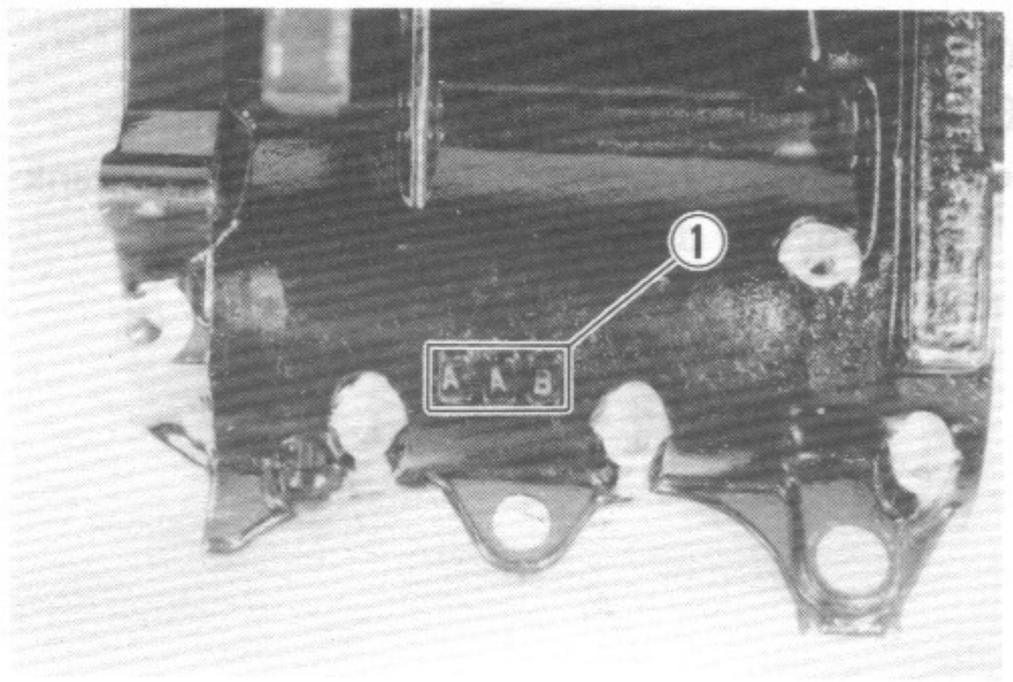
- Remove the lower crankcase, and measure the width of compressed plastigauge in the usual manner.



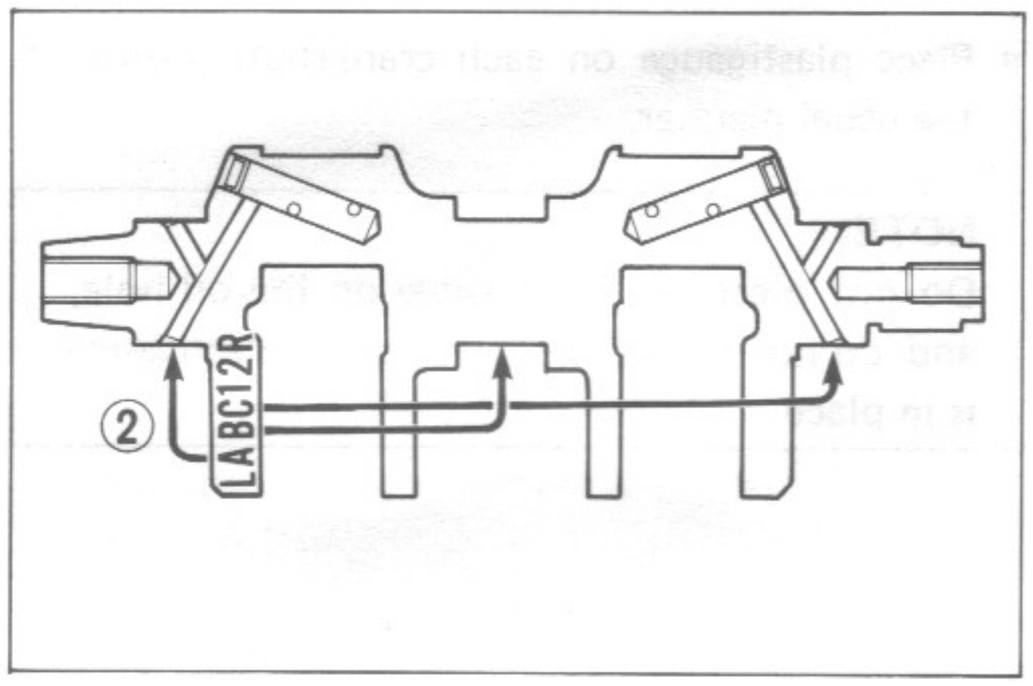
Crankshaft journal oil clearance	0.020 – 0.044 mm (0.0008 – 0.0017 in)

Service Limit	0.080 mm (0.0031 in)

- If the width at the widest part exceeds the limit, replace the set of bearings with new ones by referring to the selection table.
- Check the corresponding crankcase journal I.D. code letter ① "A" or "B" which are stamped on the rear of upper crankcase.



- Check the corresponding crankshaft journal O.D. code letter ② "A", "B" or "C", printed on the left crank web.



Bearing selection table

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

Crankcase I.D. specification

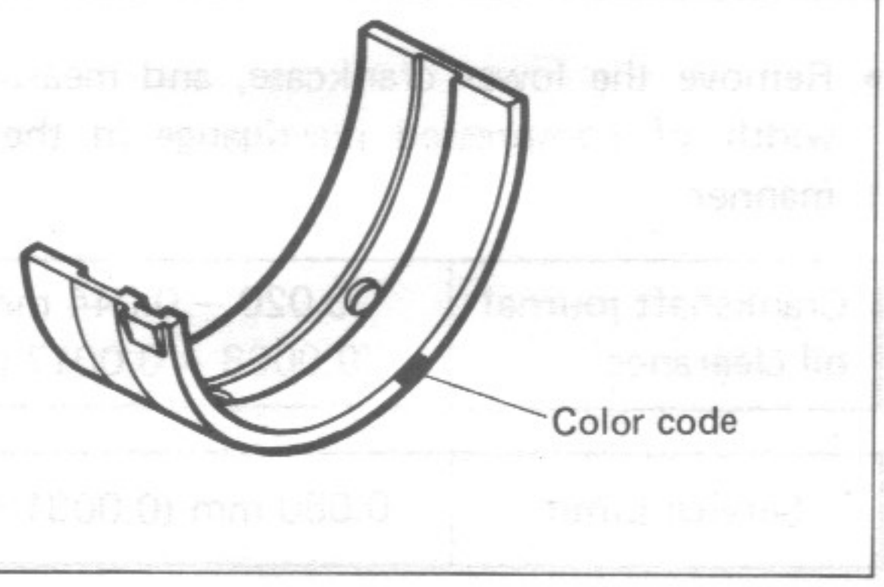
Code	I.D. specification
A	44.000 – 44.008 mm (1.7323 – 1.7326 in)
B	44.008 – 44.016 mm (1.7326 – 1.7329 in)

Crankshaft journal O.D. specification

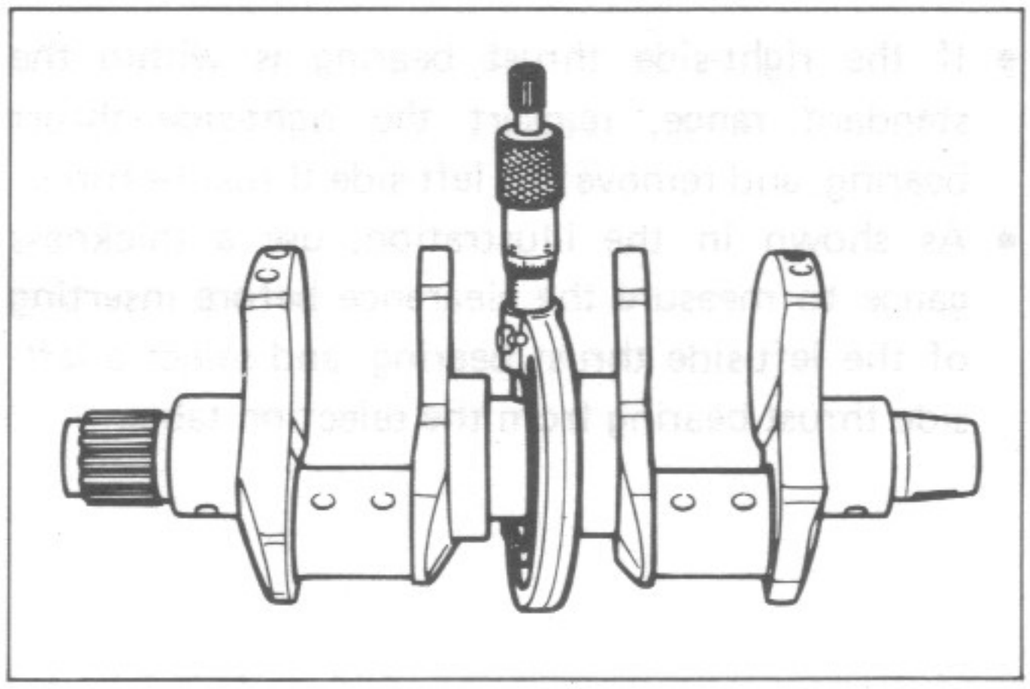
Code	O.D. specification
A	39.992 – 40.000 mm (1.5745 – 1.5748 in)
B	39.984 – 39.992 mm (1.5742 – 1.5745 in)
C	39.976 – 39.984 mm (1.5739 – 1.5742 in)

Bearing thickness specification (Right and left journal bearings)

Color (Part number)	Specification
Green (12229-05A00-0A0)	1.986 – 1.990 mm (0.0782 – 0.0783 in)
Black (12229-05A00-0B0)	1.990 – 1.994 mm (0.0783 – 0.0785 in)
Brown (12229-05A00-0C0)	1.994 – 1.998 mm (0.0785 – 0.0787 in)
Yellow (12229-05A00-0D0)	1.998 – 2.002 mm (0.0787 – 0.0788 in)

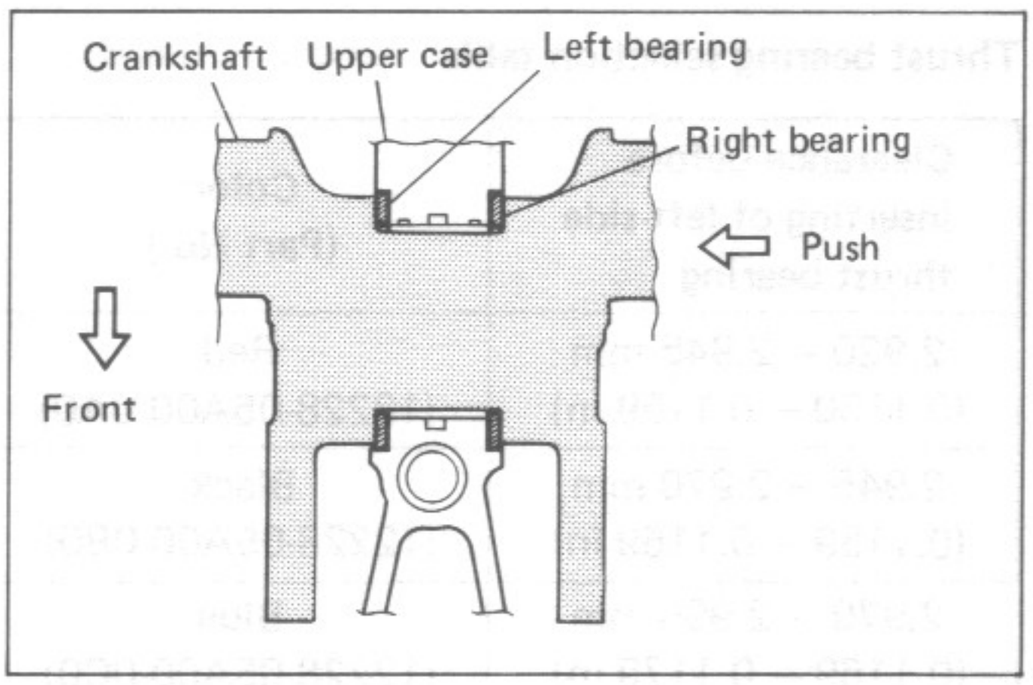


NOTE:
Center journal bearing is wider than R and L journal bearings, and their parts number are shown as follows. 12229-05A10-XXX



CRANKSHAFT THRUST CLEARANCE

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

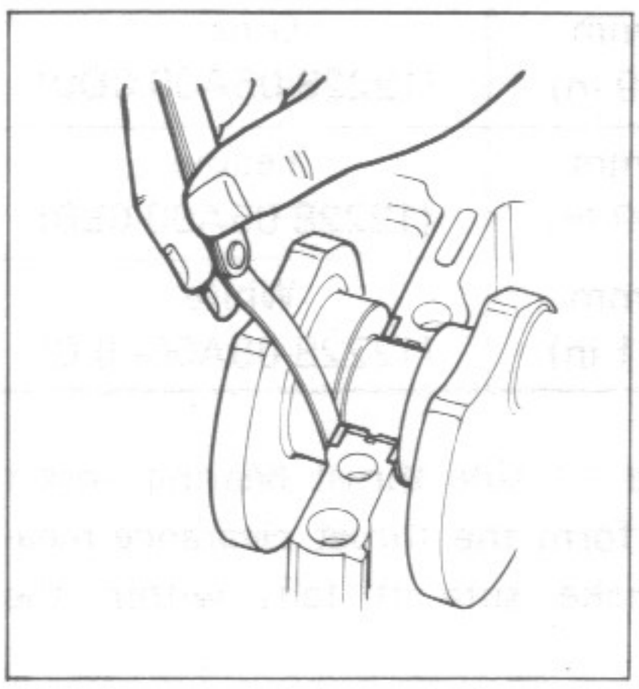


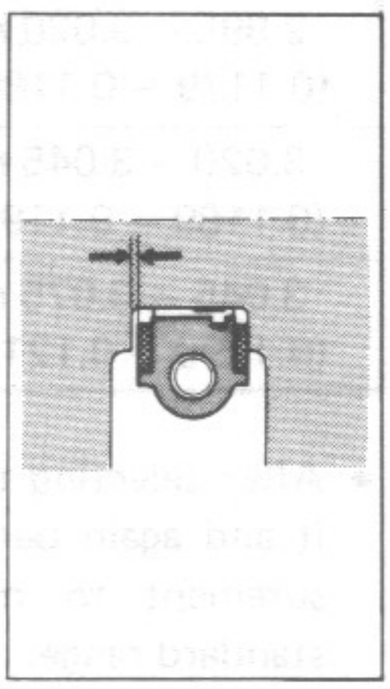
NOTE:
Push the crankshaft to the generator side, so that there is no clearance on the right-side thrust bearing.

Thrust clearance

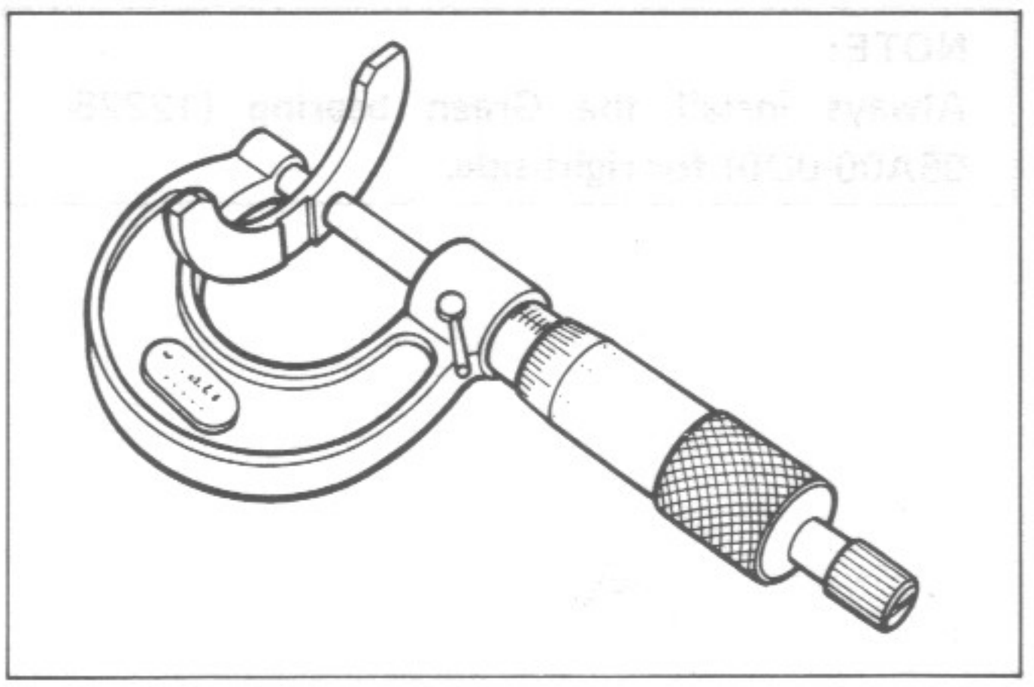
Standard	0.045 – 0.100 mm (0.0018 – 0.0039 in)

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





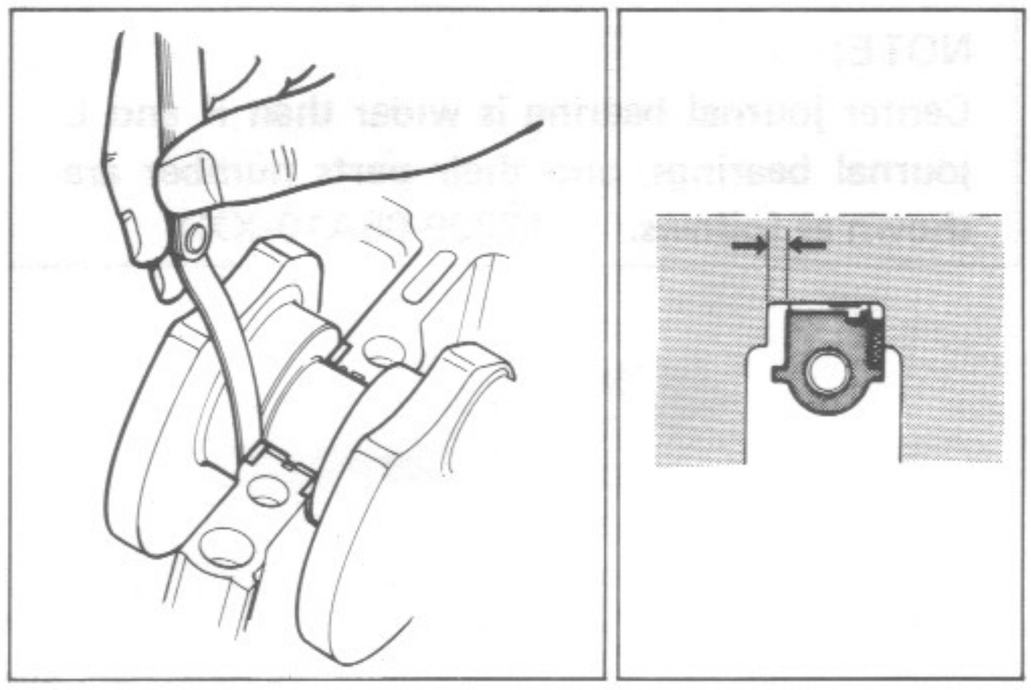
- Remove the right-side thrust bearing, and measure its thickness with a micrometer. If the thickness of the right-side thrust bearing is below standard, replace with a new bearing and once again perform the thrust clearance measurement listed above, checking to make sure it is within standards.



Right-side thrust bearing thickness

Standard	2.925 – 2.950 mm (0.1152 – 0.1161 in)

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



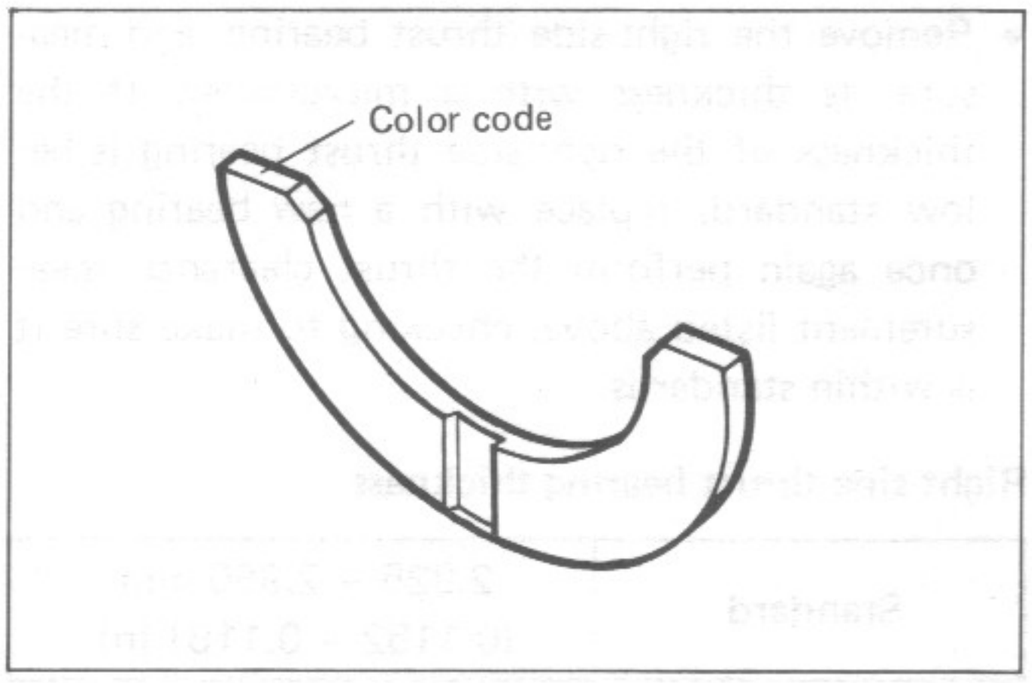
Thrust bearing selection table

Clearance before inserting of left-side thrust bearing	Color (Part No.)	Thrust bearing thickness	Standard thrust clearance
2.920 – 2.945 mm (0.1150 – 0.1159 in)	Red (12228-05A00-0A0)	2.850 – 2.875 mm (0.1122 – 0.1132 in)	0.045 – 0.095 mm (0.0018 – 0.0037 in)
2.945 – 2.970 mm (0.1159 – 0.1169 in)	Black (12228-05A00-0B0)	2.875 – 2.900 mm (0.1132 – 0.1142 in)	
2.970 – 2.995 mm (0.1169 – 0.1179 in)	Blue (12228-05A00-0C0)	2.900 – 2.925 mm (0.1142 – 0.1152 in)	
2.995 – 3.020 mm (0.1179 – 0.1189 in)	Green (12228-05A00-0D0)	2.925 – 2.950 mm (0.1152 – 0.1161 in)	
3.020 – 3.045 mm (0.1189 – 0.1199 in)	Yellow (12228-05A00-0E0)	2.950 – 2.975 mm (0.1161 – 0.1171 in)	
3.045 – 3.075 mm (0.1199 – 0.1211 in)	White (12228-05A00-0F0)	2.975 – 3.000 mm (0.1171 – 0.1181 in)	0.045 – 0.100 mm (0.0018 – 0.0039 in)

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

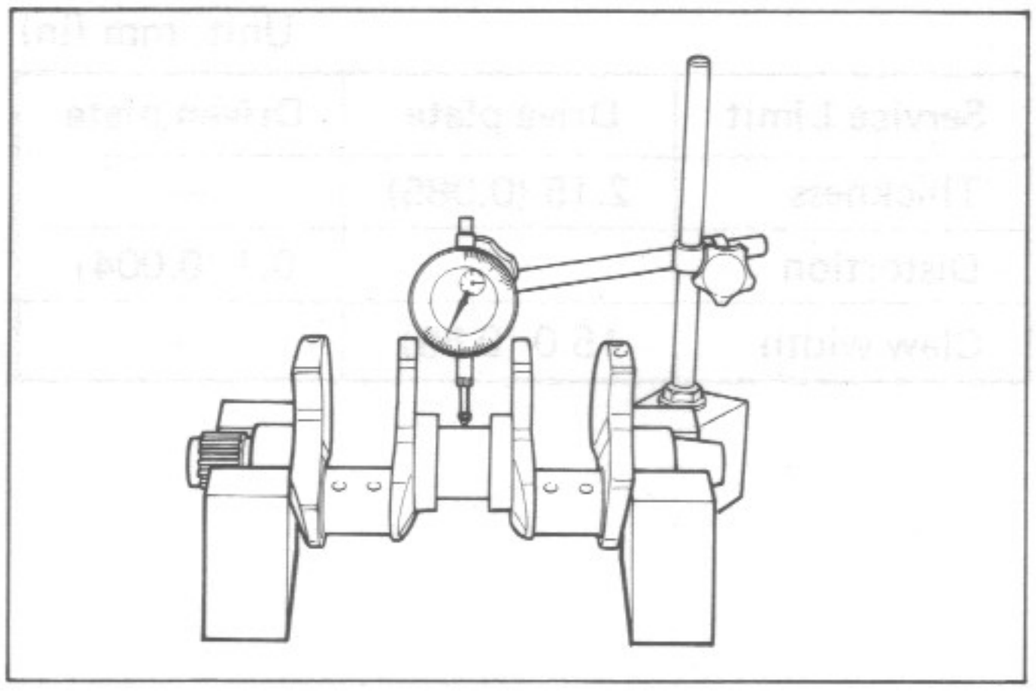
NOTE:
Always install the Green bearing (12228-05A00-0D0) for right-side.

NOTE:
Right-side thrust bearing has the same specification as the Green of left-side thrust bearing.



CRANKSHAFT RUNOUT

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

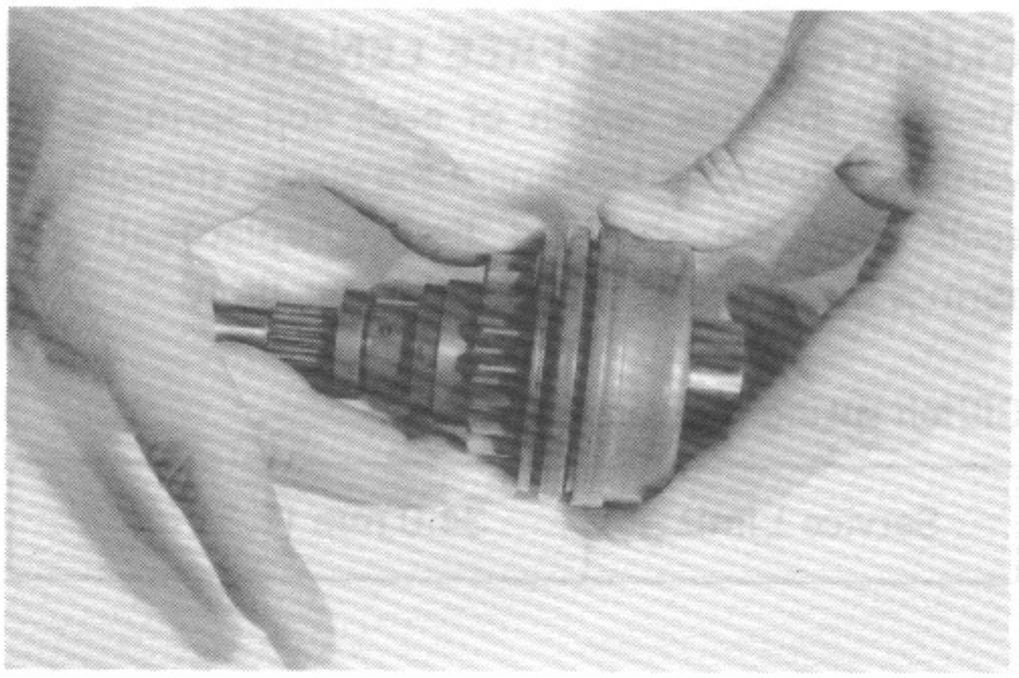


Crankshaft runout

Service Limit	0.05 mm (0.002 in)

STARTER PINION

- Inspect the pinion gear for smooth operation.
- While holding idle gear, turn freely the pinion gear to one direction and never turn to the opposite direction. If the pinion gear turns both directions or is locked on the shaft, replace the starter pinion assembly with a new one.

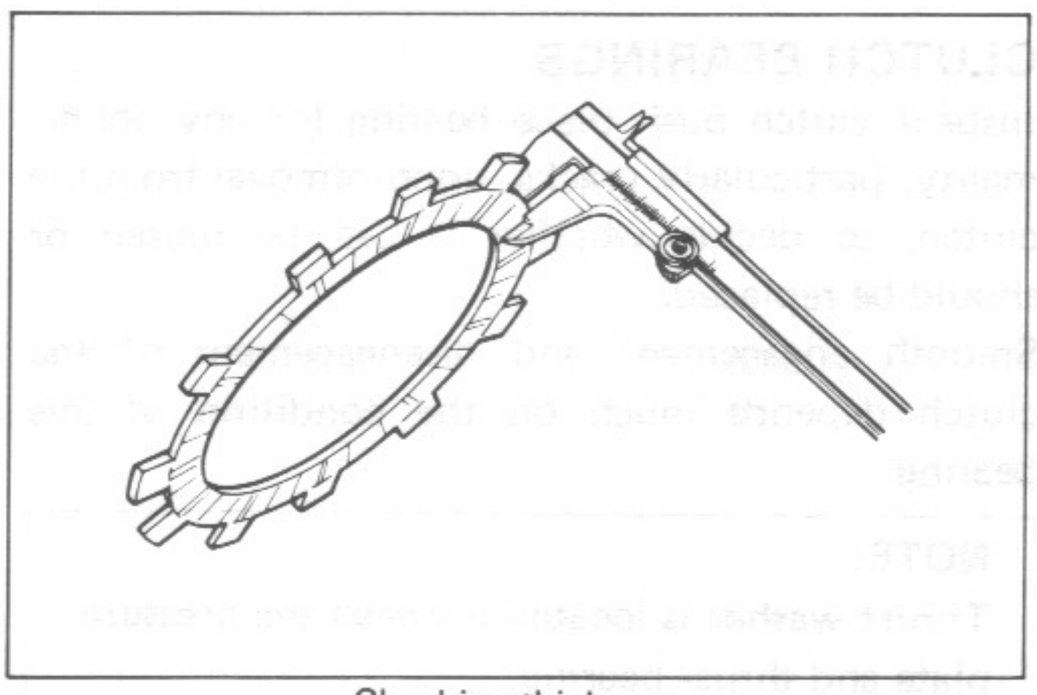


CLUTCH DRIVE PLATES AND DRIVEN PLATES

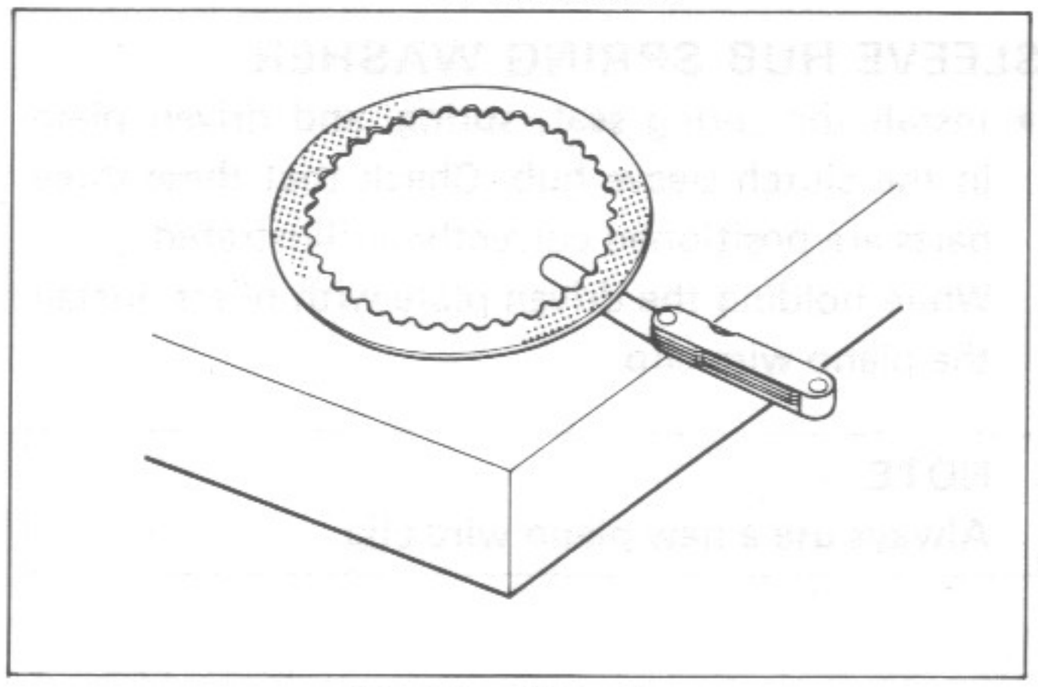
Clutch plates in service remain in oily condition as they were lubricated with oil. Because of this condition, both drive and driven plates are subject to little wearing action and therefore last much longer. Their life depends largely on the quality of oil used in the clutch and also on the way the clutch is operated.

These plates are expendable: they are meant to be replaced when found worn down or distorted to the respective limit: use a caliper to check thickness and a thickness gauge and surface plate to check distortion.

09900 - 20101	Vernier calipers
09900 - 20803	Thickness gauge



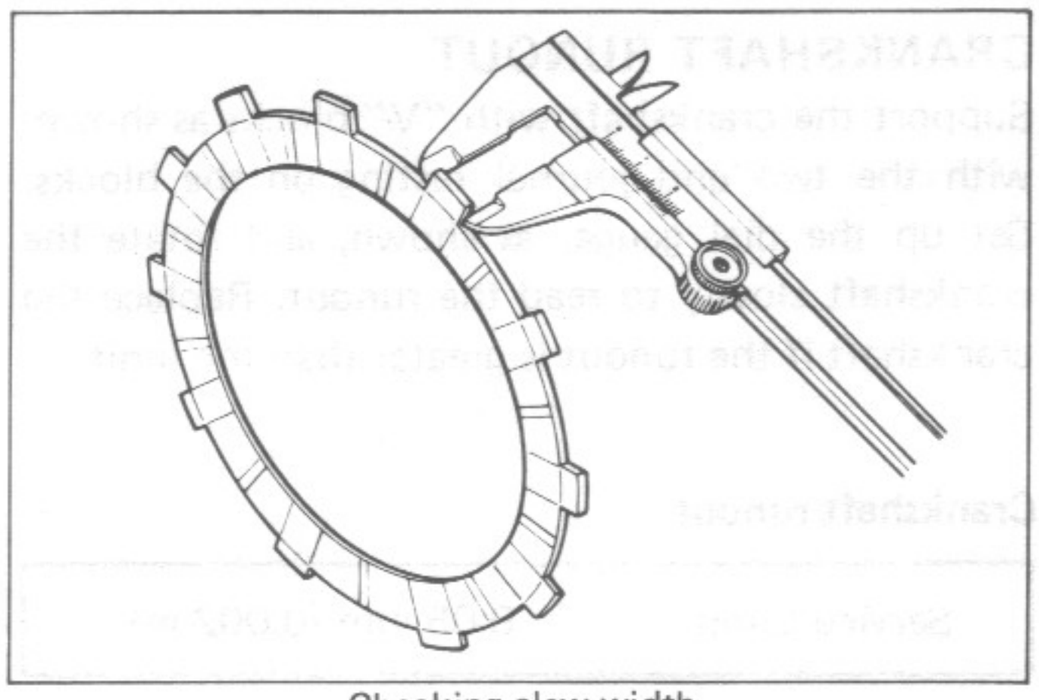
Checking thickness



Checking distortion

Unit: mm (in)

Service Limit	Drive plate	Driven plate
Thickness	2.15 (0.085)	–
Distortion	–	0.1 (0.004)
Claw width	15.0 (0.59)	–



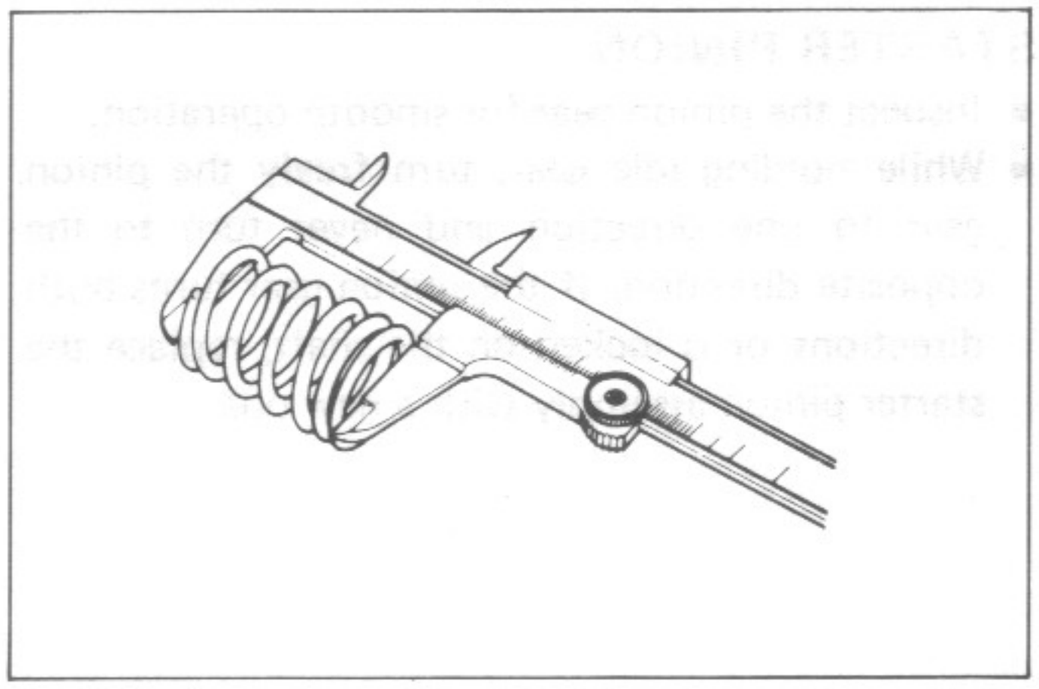
Checking claw width

CLUTCH SPRING FREE LENGTH

Measure the free length of each coil spring with vernier calipers, and compare the elastic strength of each with the specified limit. Replace all the springs if any spring is not within the limit.

Clutch spring free length

Service Limit	34.0 mm (1.34 in)

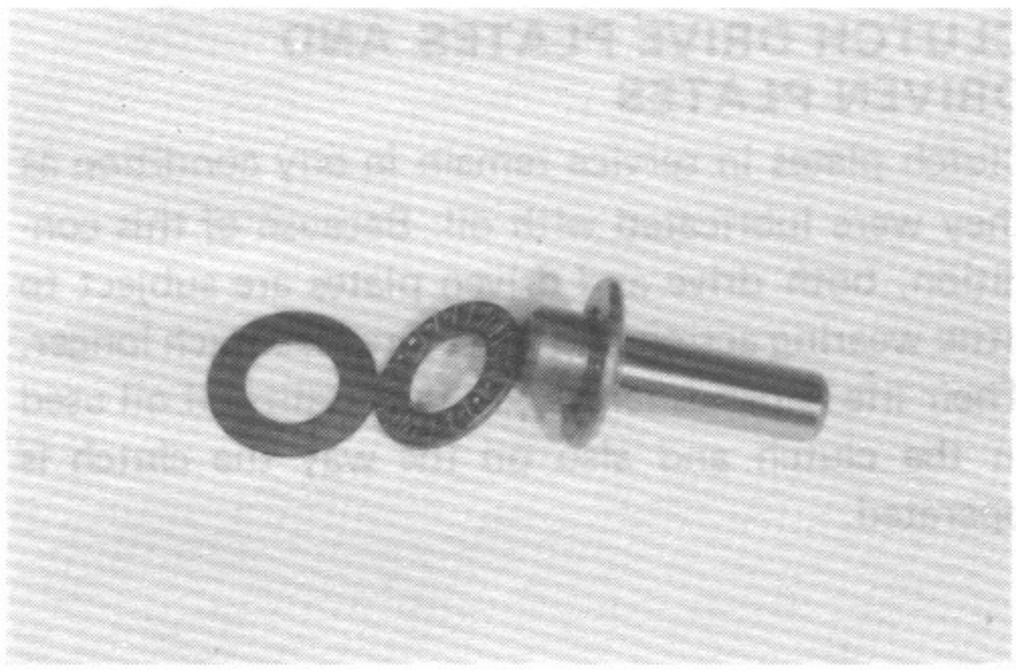


CLUTCH BEARINGS

Inspect clutch push piece bearing for any abnormality, particularly cracks, upon removal from the clutch, 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.

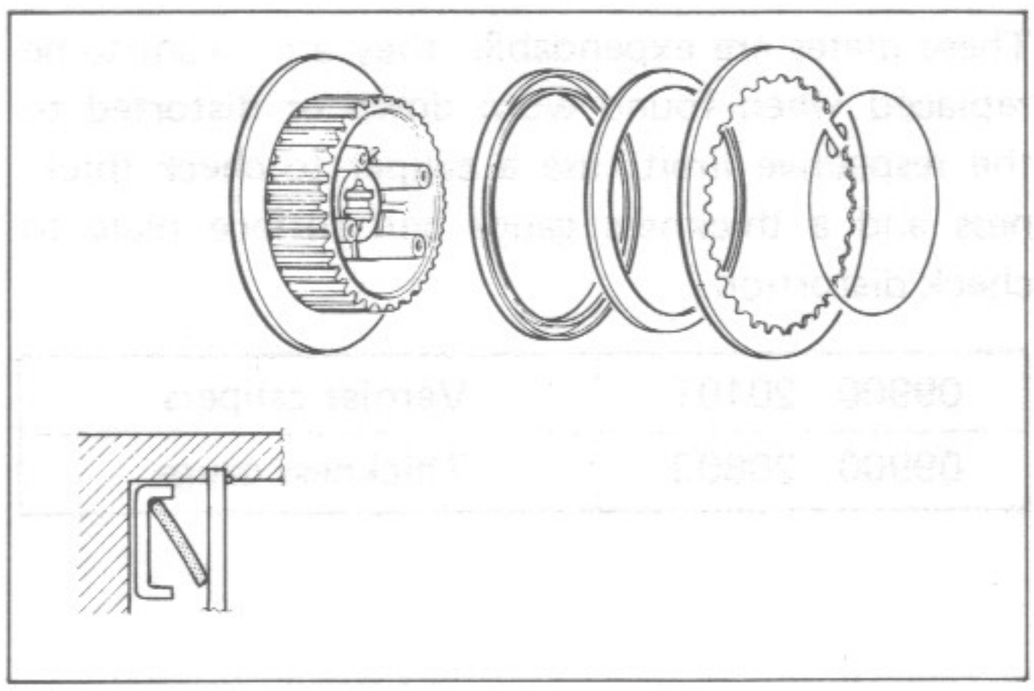
NOTE:
Thrust washer is located between the pressure plate and thrust bearing.



SLEEVE HUB SPRING WASHER

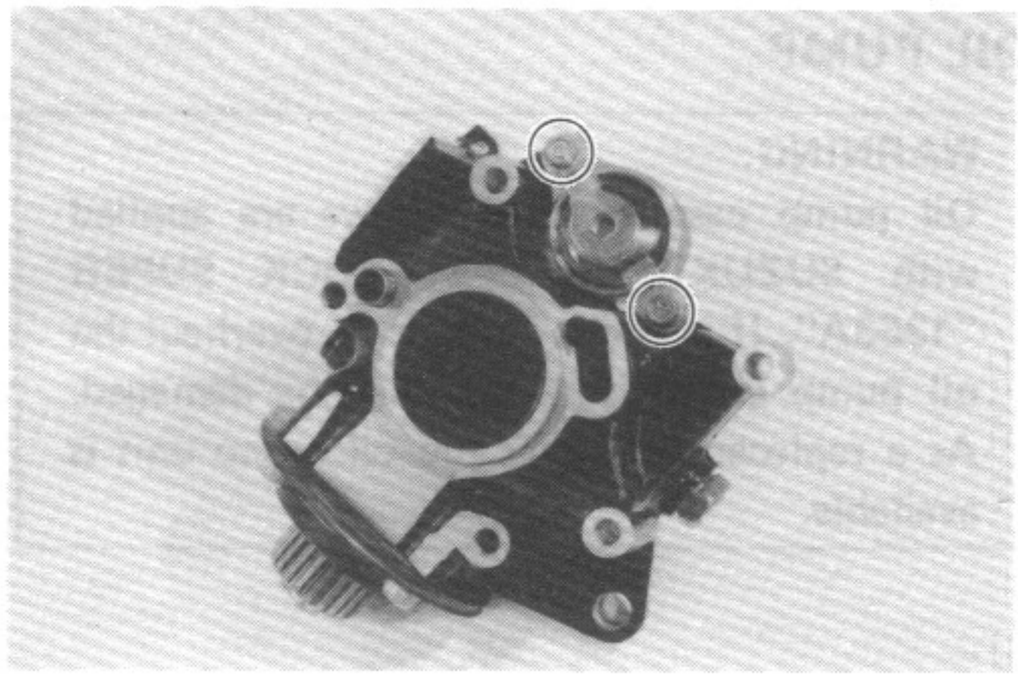
- Install the spring seat, spring, and driven plate in the clutch sleeve hub. Check that these three parts are positioned correctly as illustrated.
  While holding the driven plate with pliers, install the piano wire clip.

NOTE:
Always use a new piano wire clip.

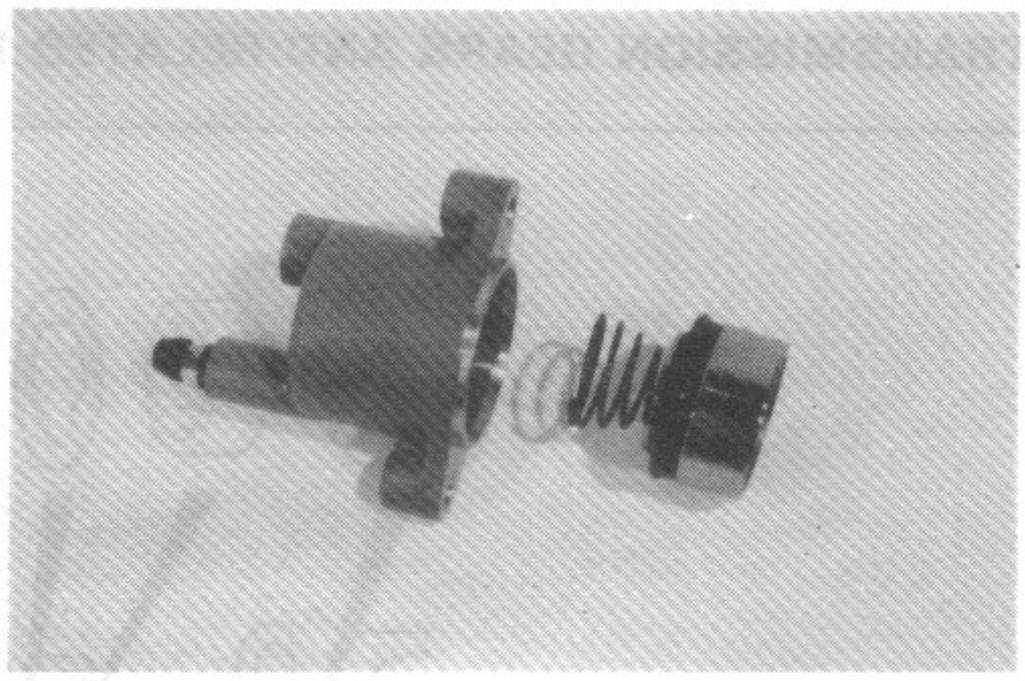


CLUTCH CYLINDER

- Flatten the locking tab and remove the clutch cylinder from the secondary drive gearbox assembly.



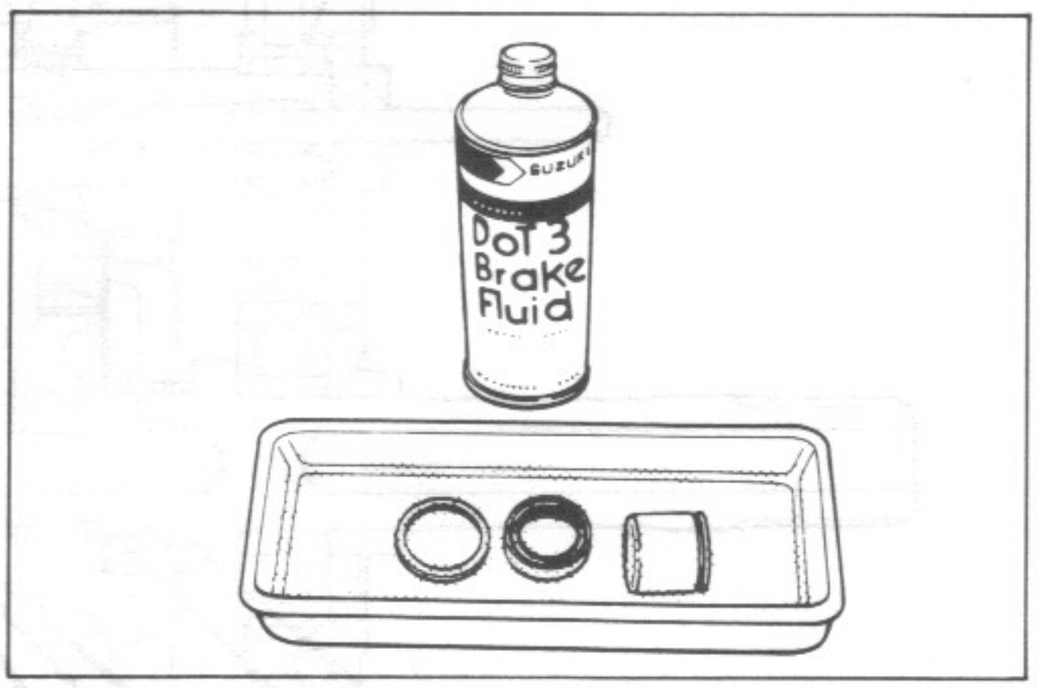
- Remove the piston, oil seal and spring.
- Inspect the clutch cylinder bore wall for nicks, scratches or other damage.
- Inspect the each rubber parts for damage and wear.
- Inspect the piston surface for any scratches or other damage.



REASSEMBLY

Reassemble the clutch cylinder in the reverse order of disassembly and by taking the following steps:

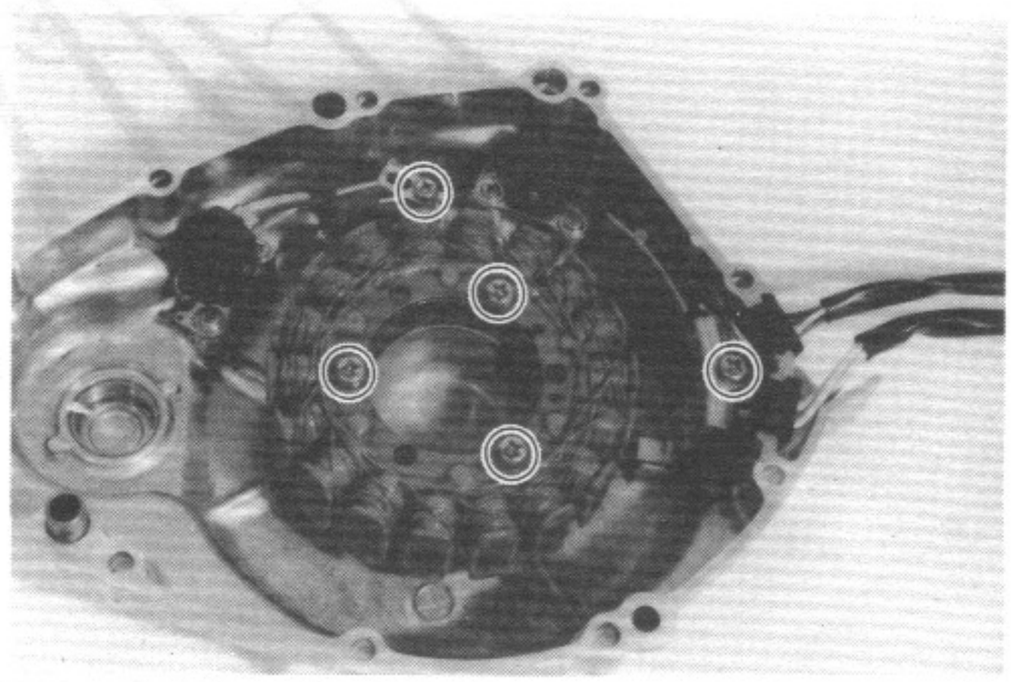
CAUTION:
Wash the clutch cylinder components with fresh brake fluid before reassembly.
Never use cleaning solvent or gasoline to wash them.
Apply brake fluid to the cylinder bore and piston to be inserted into the bore.



GENERATOR AND SIGNAL GENERATOR

- Apply THREAD LOCK "1363C" (99104-32050) to the stator set screws and its lead wire guide screws.

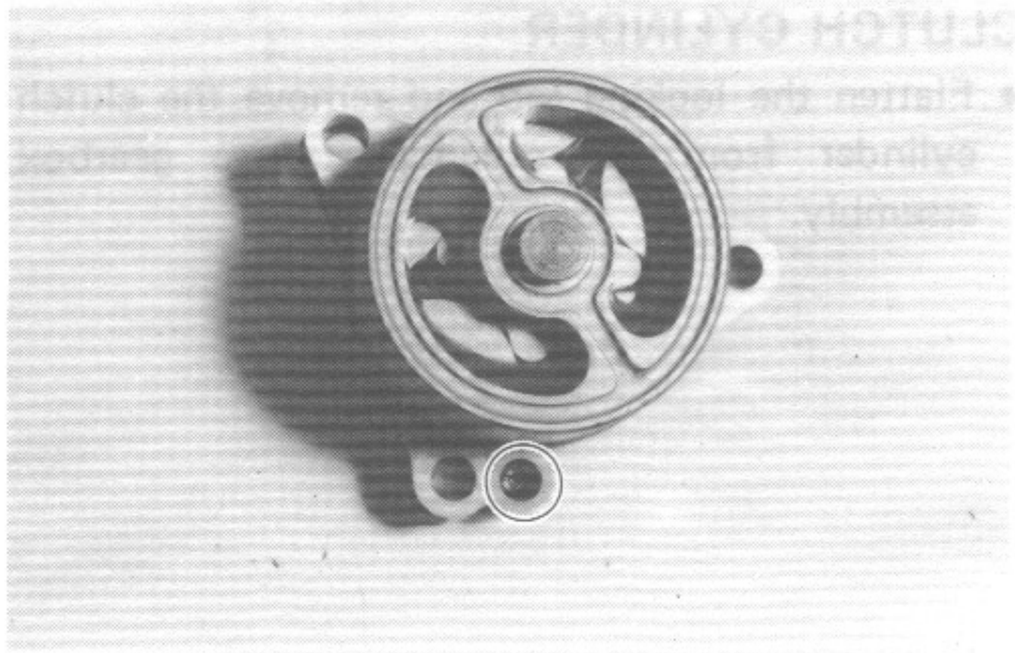
NOTE:
Wipe off oil and grease on screw completely, and then apply the screw lock.



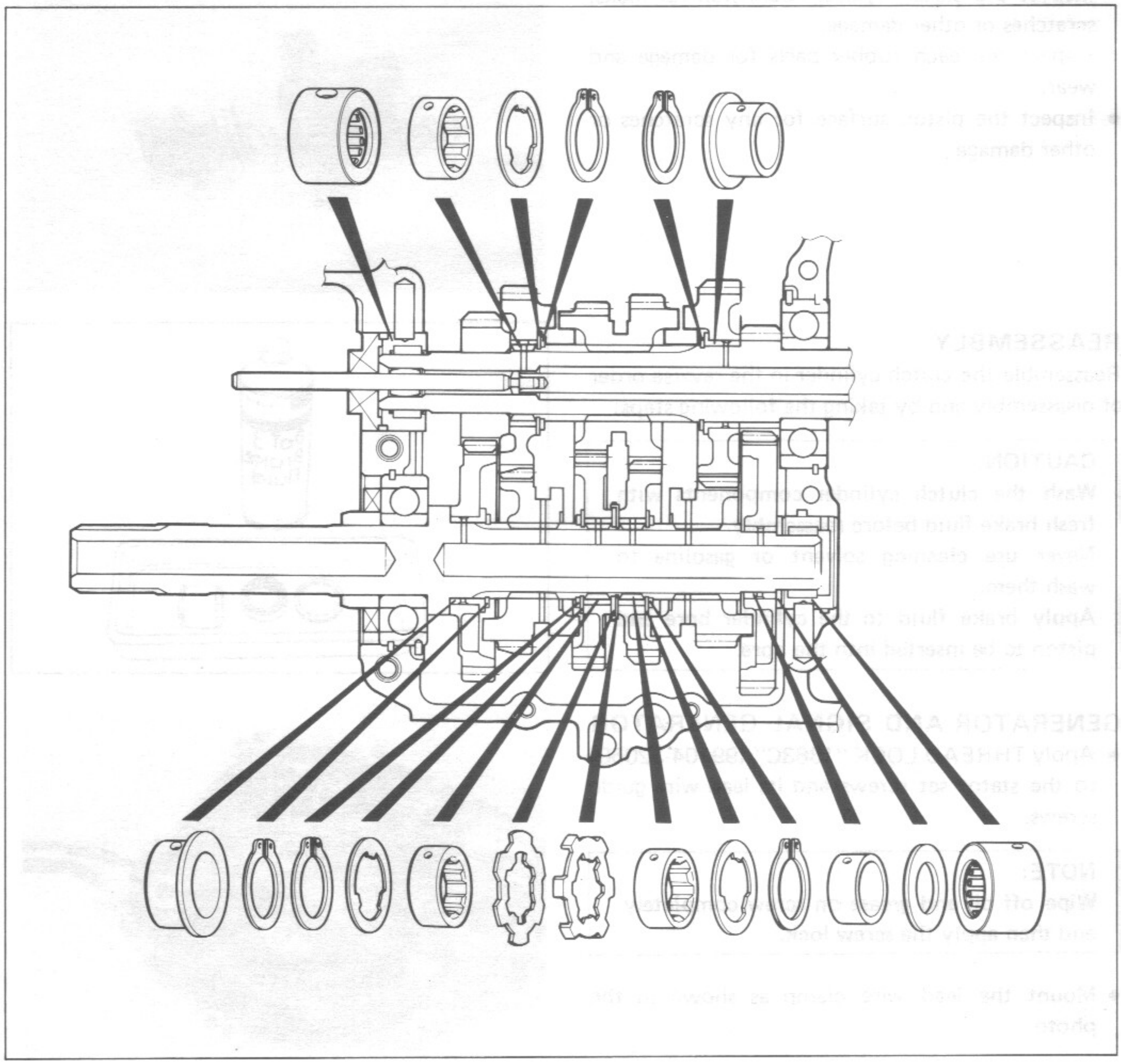
- Mount the lead wire clamp as shown in the photo.

OIL PUMP

WARNING:
Oil pump case securing screws are applied with SUZUKI THREAD LOCK SUPER "1363A". If attempt is made to overhaul the oil pump assembly, screw may be damaged. As a replacement, only the oil pump unit is available.



TRANSMISSION GEARS AND RELATED PARTS



MOUNTING 2ND DRIVE GEAR

Press 2nd drive gear to a position so that the stepped surface Ⓐ of the shaft is aligned with the end surface Ⓑ of the second drive gear as indicated.

99104 - 32030	Thread lock super "1363A"

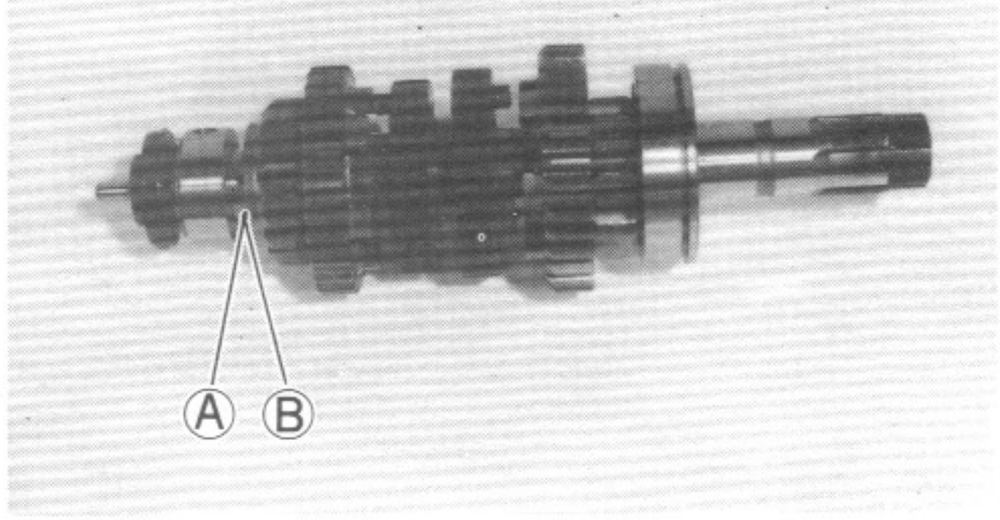
NOTE:

- **Before mounting 2nd drive gear, apply THREAD LOCK SUPER "1363A" to its bore, taking care not to smear 5th drive gear with "SUPER "1363A".**
- **After mounting the 2nd drive gear, check that 5th drive gear spins smoothly, by moving it with your fingers.**
- **2nd drive gear may be replaced twice before it becomes necessary to also replace the countershaft.**

GEAR-SHIFTING FORK CLEARANCE

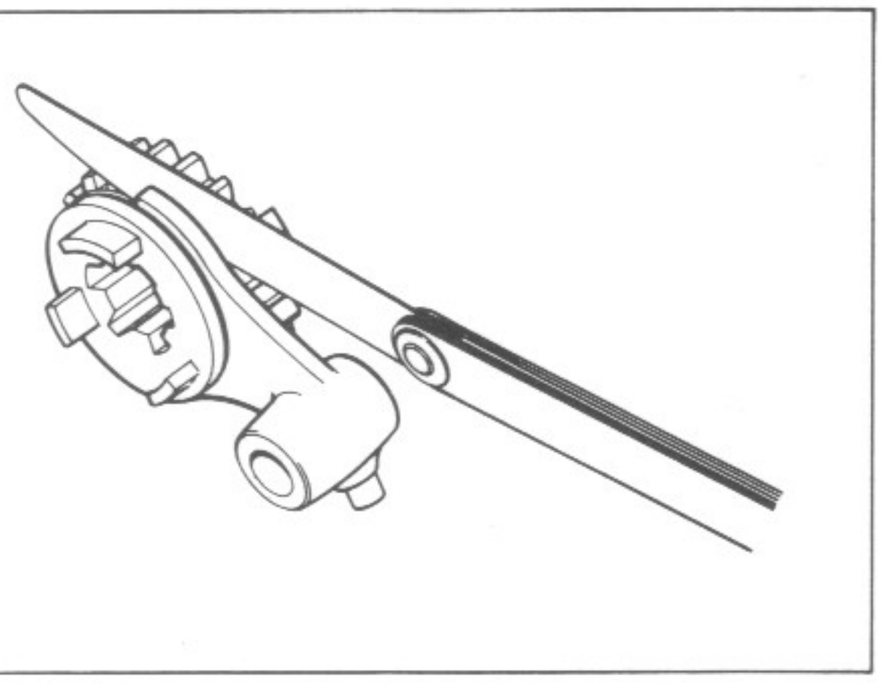
Using a thickness gauge, check the shifting fork clearance in the groove of its gear.

This clearance for each of the three shifting forks plays an important role in the smoothness and positiveness of shifting action. Each fork has its prongs fitted into the annular groove provided in its gear. In operation, there is sliding contact between fork and gear and, when a shifting action is initiated, the fork pushes the gear axially. Too much a clearance is, therefore, liable to cause the meshed gears to slip apart.



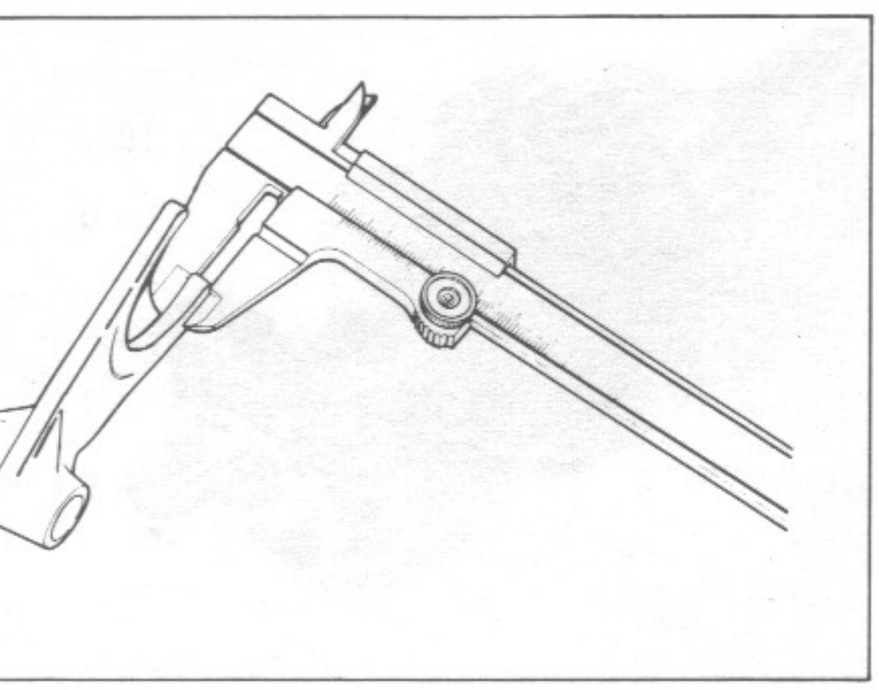
If the clearance checked is noted to exceed the limit specified, replace the fork or its gear, or both.

09900 - 20803	Thickness gauge



Shift fork — groove clearance

		Service Limit
No. 1	for 5th driven gear	0.50 mm (0.020 in)
No. 2	for 6th driven gear	
No. 3	for 3rd/4th drive gears	



Shift forks groove width

Standard	5.50 – 5.60 mm (0.217 – 0.220 in)

Shift fork thickness

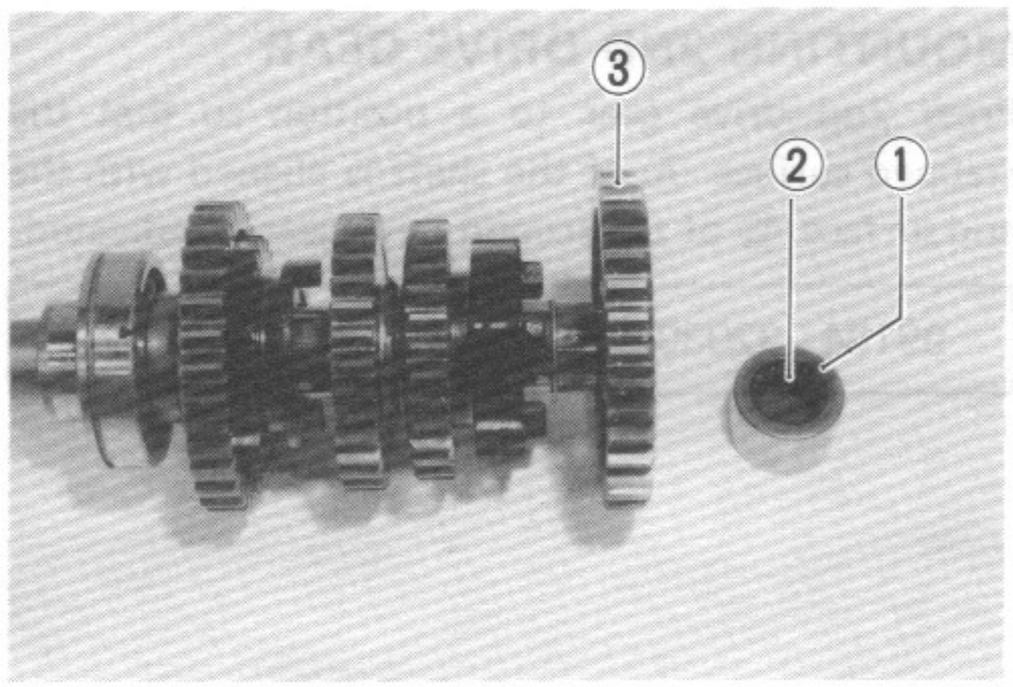
Standard	5.30 – 5.40 mm (0.209 – 0.213 in)

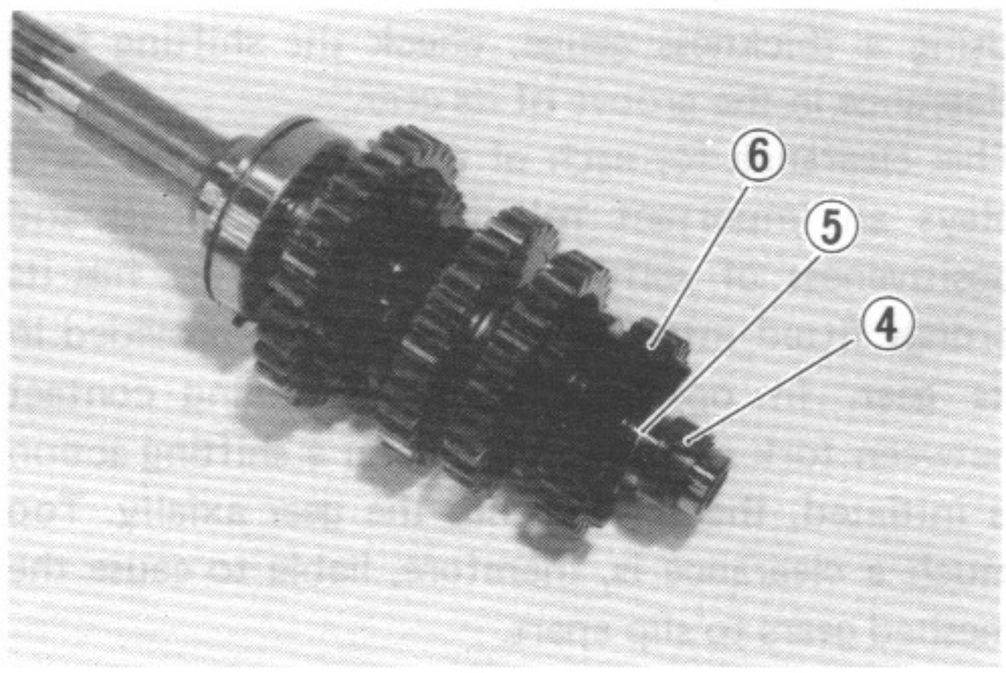
DRIVESHAFT DISASSEMBLY

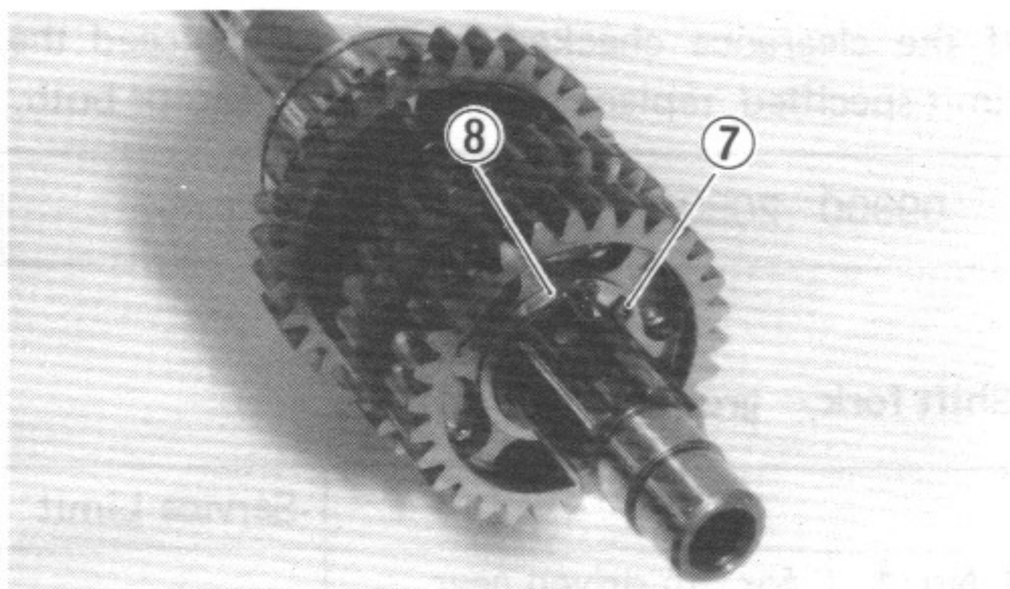
- Remove the washer ①, bearing ②, low driven gear ③, bushing ④ and thrust washer ⑤.
- Remove the 6th driven gear ⑥.
- Remove circlip ⑦, washer ⑧, 4th driven gear ⑨ and bushing ⑩.

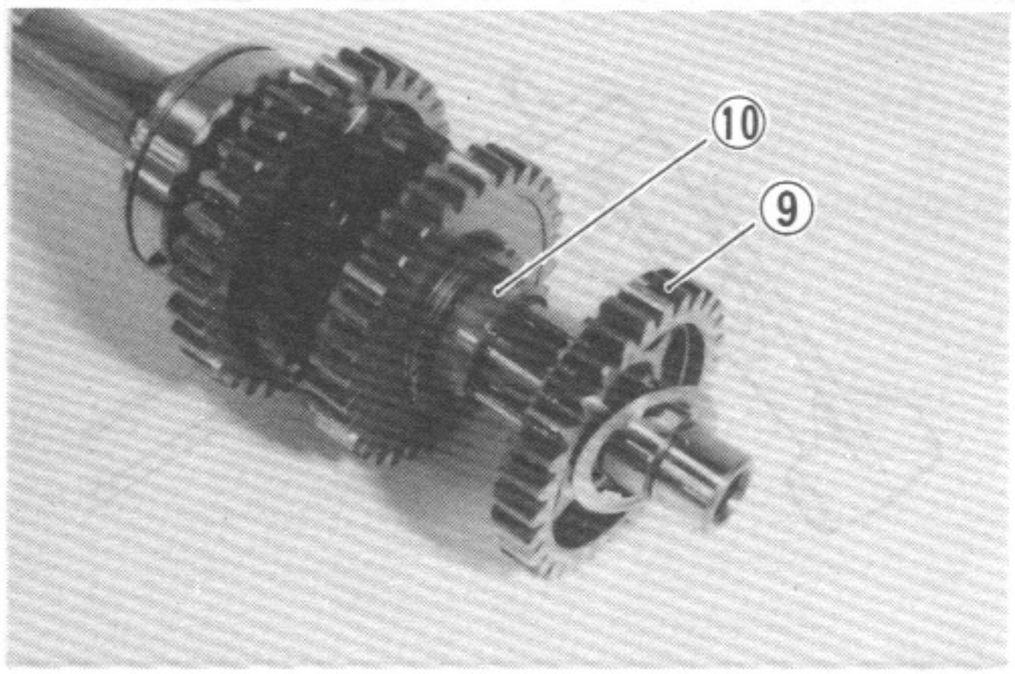
09900 - 06104	Snapring pliers

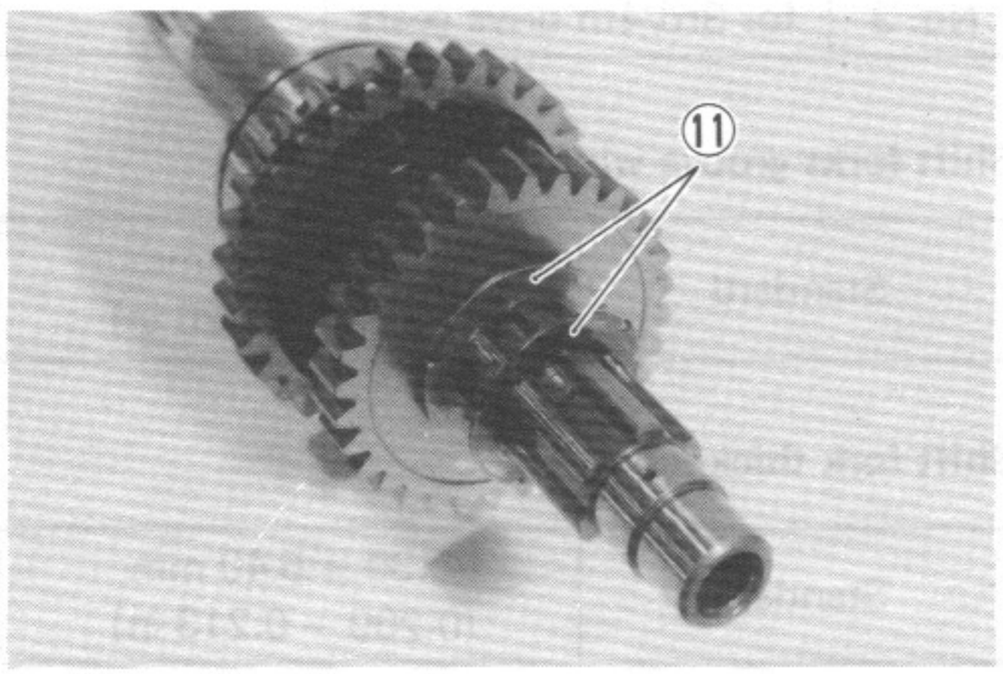
- Remove the pair of lock washers ⑪ and 3rd driven gear.



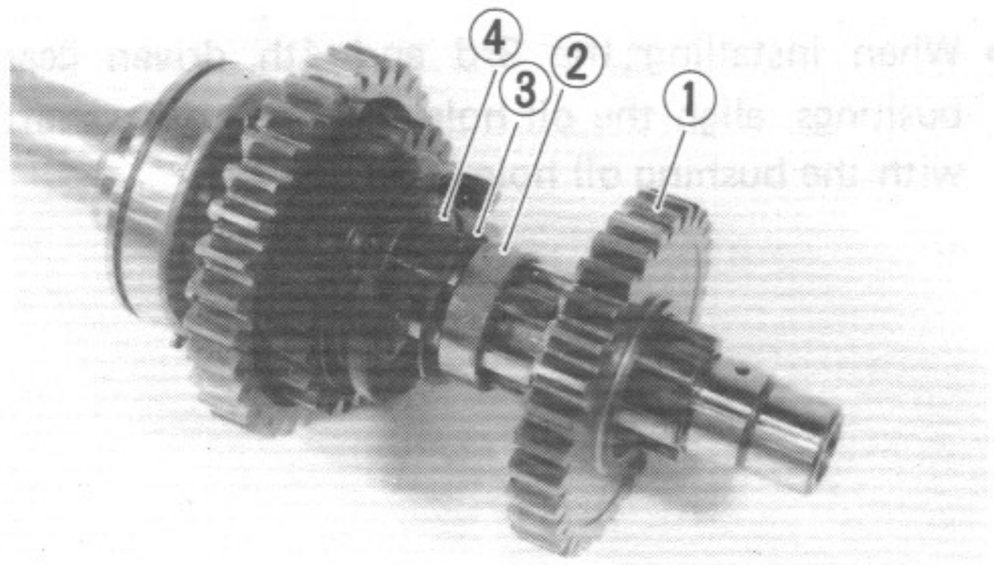






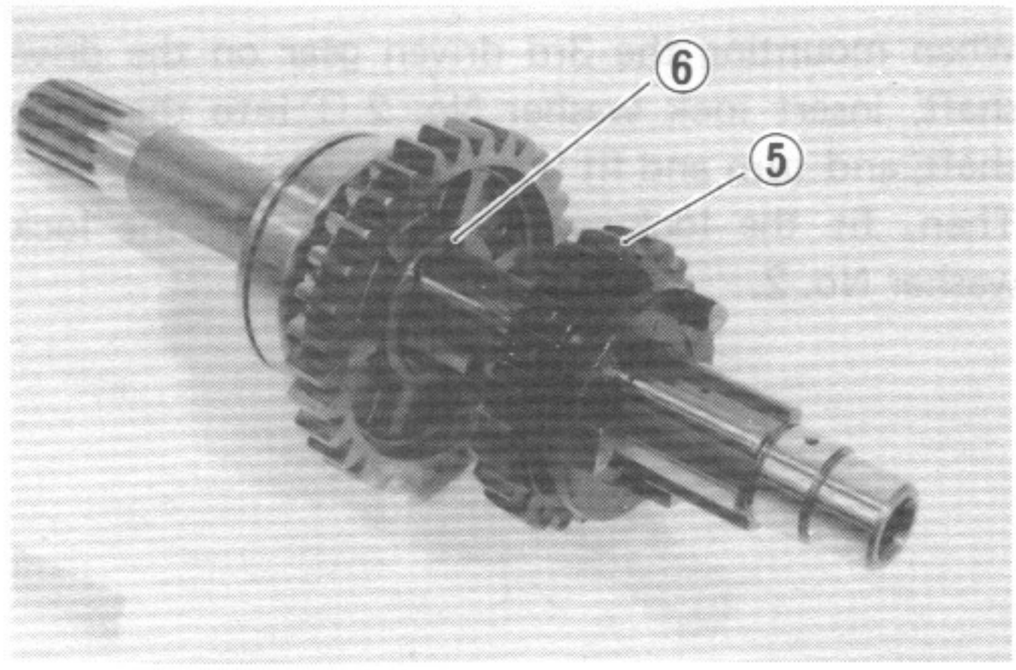


- Remove the 3rd driven gear ①, bushing ②, washer ③ and circlip ④.

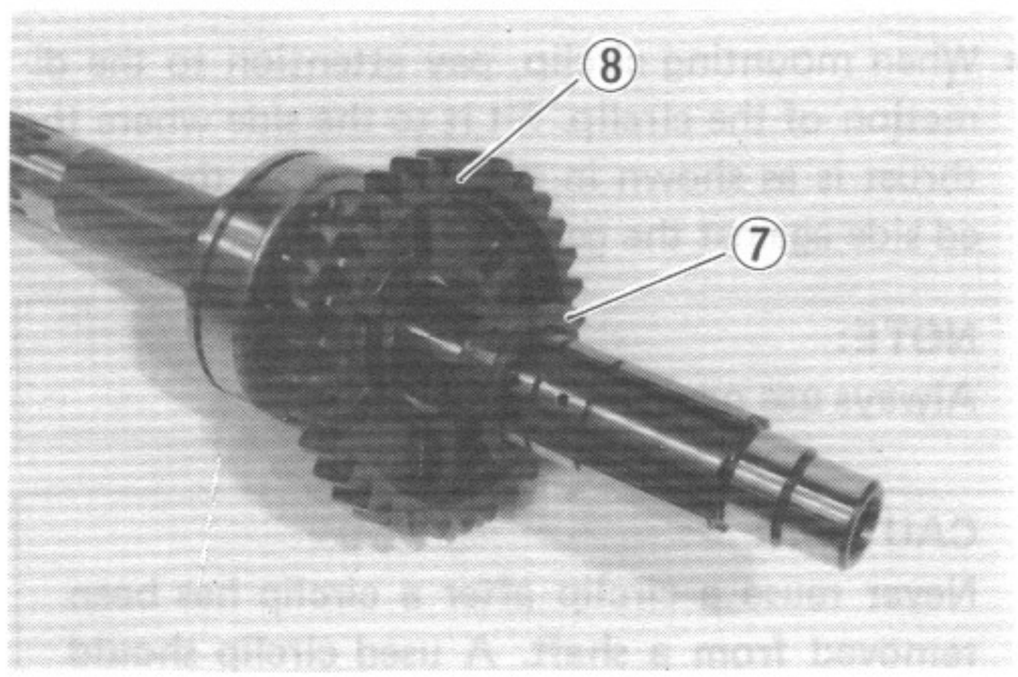


- Remove the 5th driven gear ⑤ and circlip ⑥.

09900 - 06104	Snapring pliers



- Remove the bushing ⑦ and second driven gear ⑧.

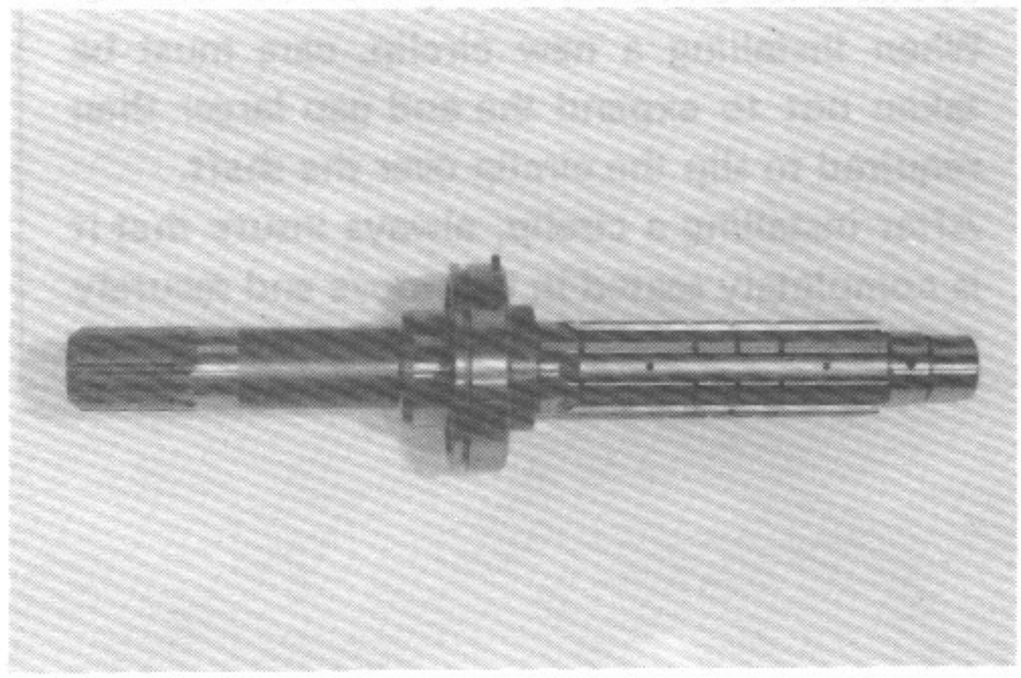


DRIVESHAFT REASSEMBLY

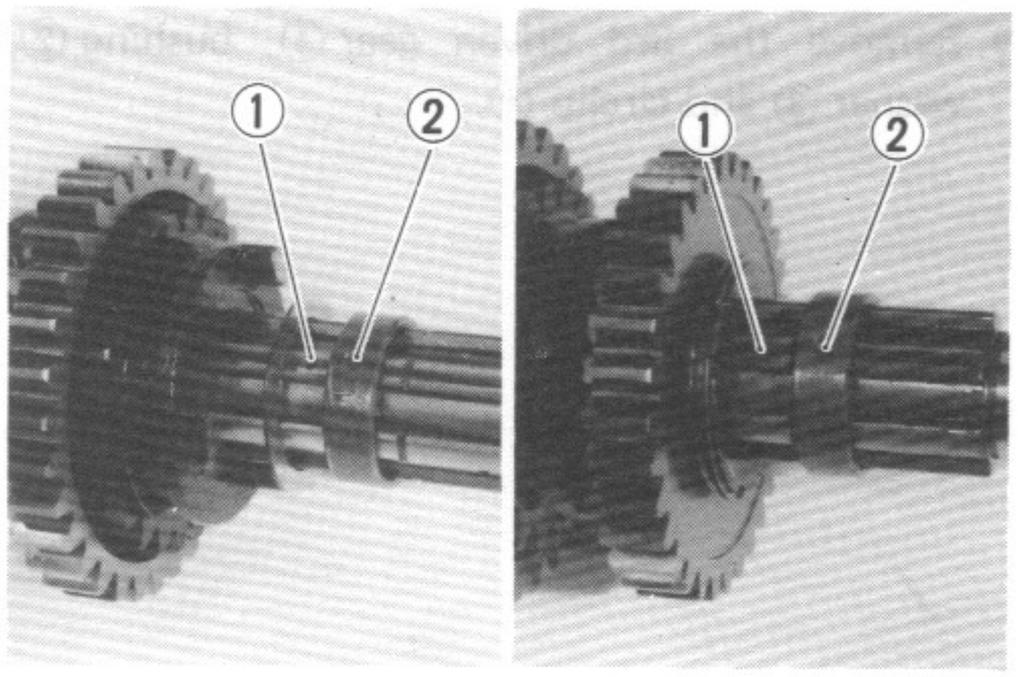
Reassemble the drive shaft gears in the reverse order of disassembly and also carry out the following steps.

- Before installing gears, coat lightly moly paste to the drive shaft.

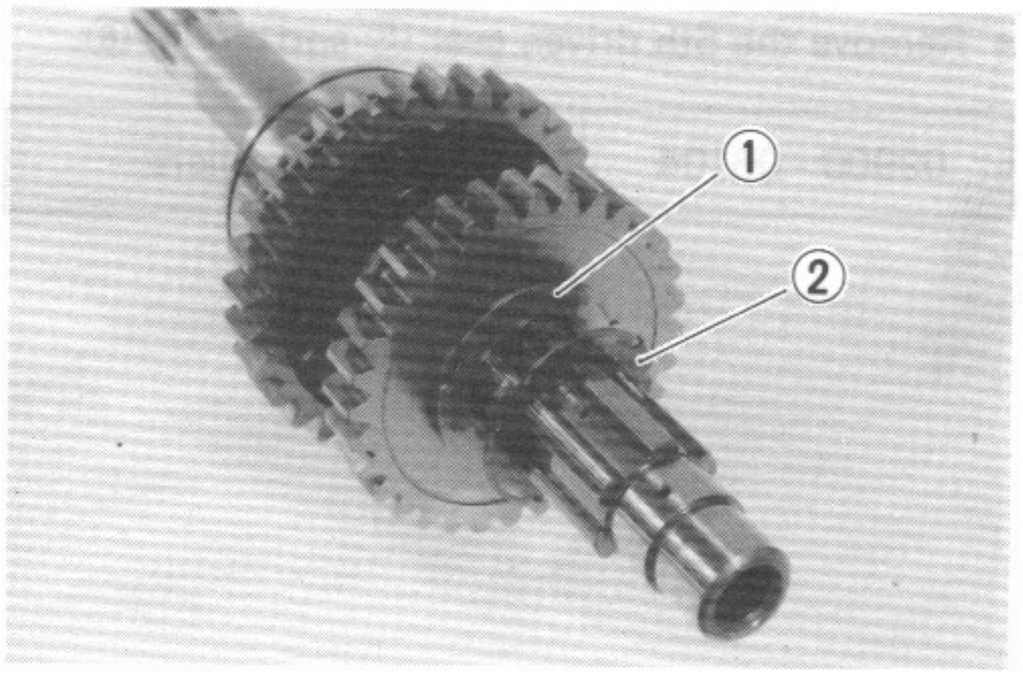
99000 - 25140	SUZUKI Moly paste



- When installing the 3rd and 4th driven gear bushings, align the oil hole ① of the drive shaft with the bushing oil hole ②.



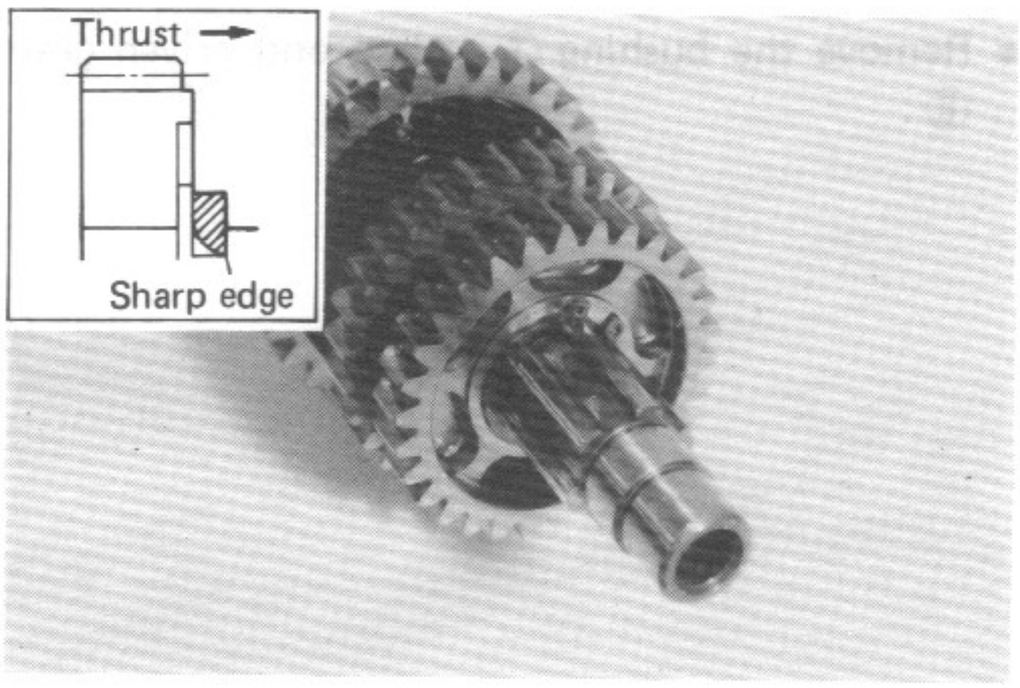
When mounting the 3rd driven gear on the drive shaft, insert lock washer No. 2 ① into the drive shaft, and turn and fit it into the groove.
Then, fit the lock washer No. 1 ② in the lock washer No. 2.



- When mounting circlip, pay attention to the direction of the circlip. Fit it to the side where the thrust is as shown in the figure with the rounded side against the gear surface.

NOTE:
Always use new circlip.

CAUTION:
Never reuse a circlip after a circlip has been removed from a shaft. A used circlip 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.

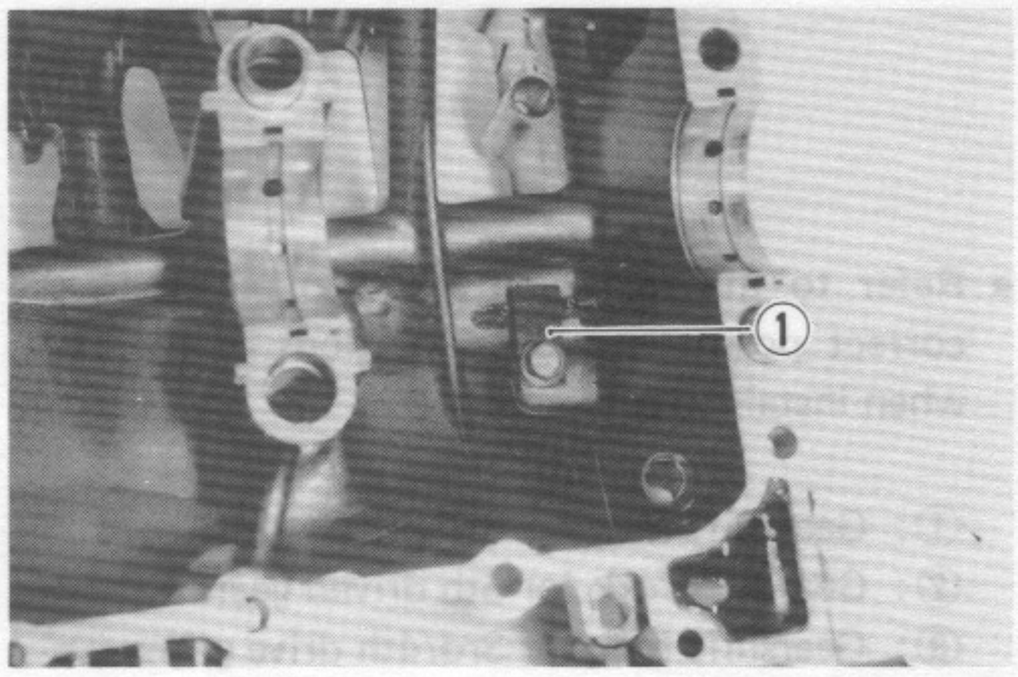


ENGINE REASSEMBLY

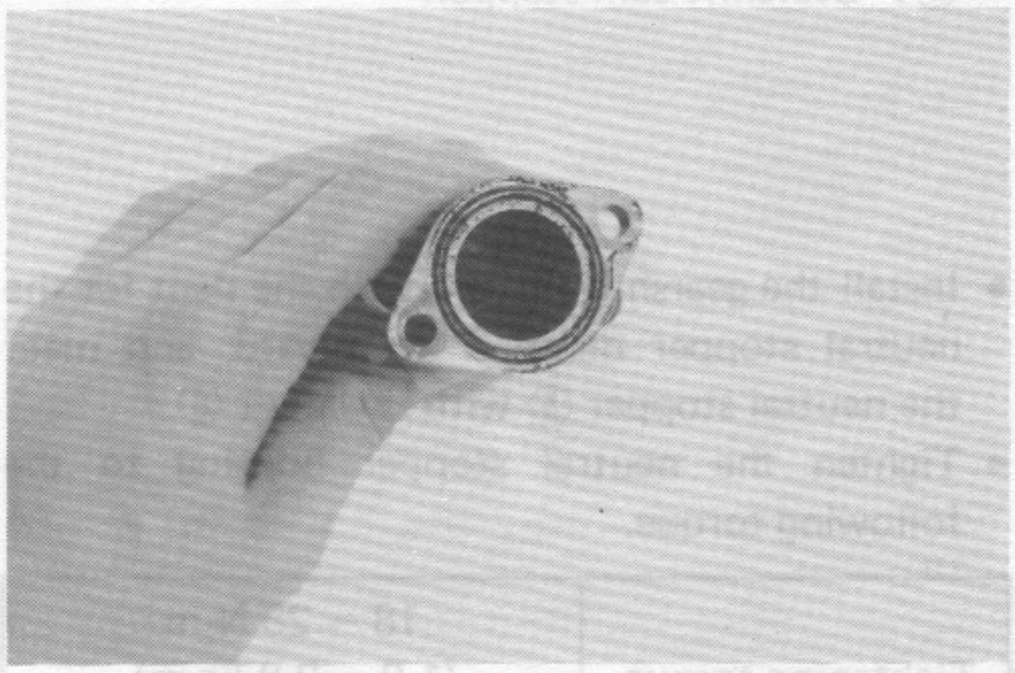
This engine is reassembled by carrying out the steps of disassembly in the reversed order, but there are a number of steps which demand special descriptions or precautionary measures.

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

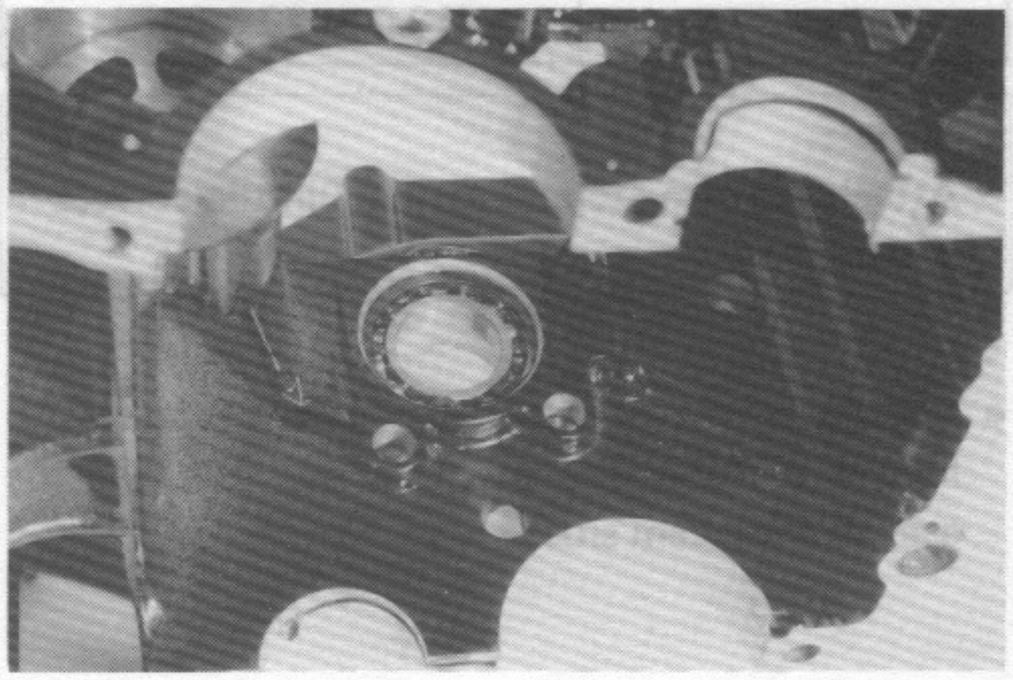
- Clean the magnet ① and install it to the lower crankcase.



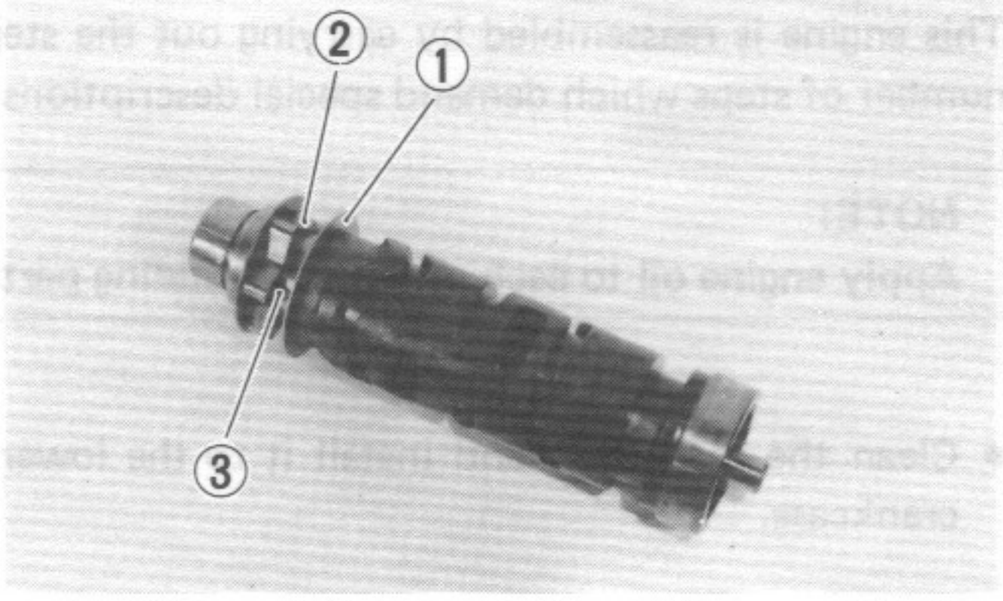
- Install a new O-ring to the groove properly and install the union to the lower crankcase with two screws.



- Install the gearshift cam bearing and its circlip to the lower crankcase.

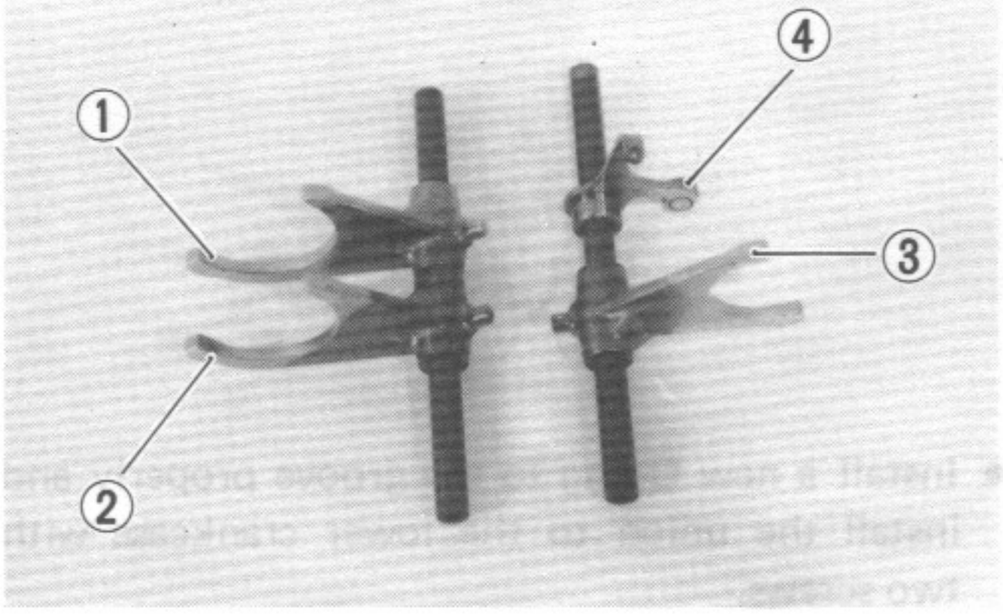


- Install the gearshift cam to the lower crankcase and install washer ① and gearshift cam stopper ② on the positioning pin ③.



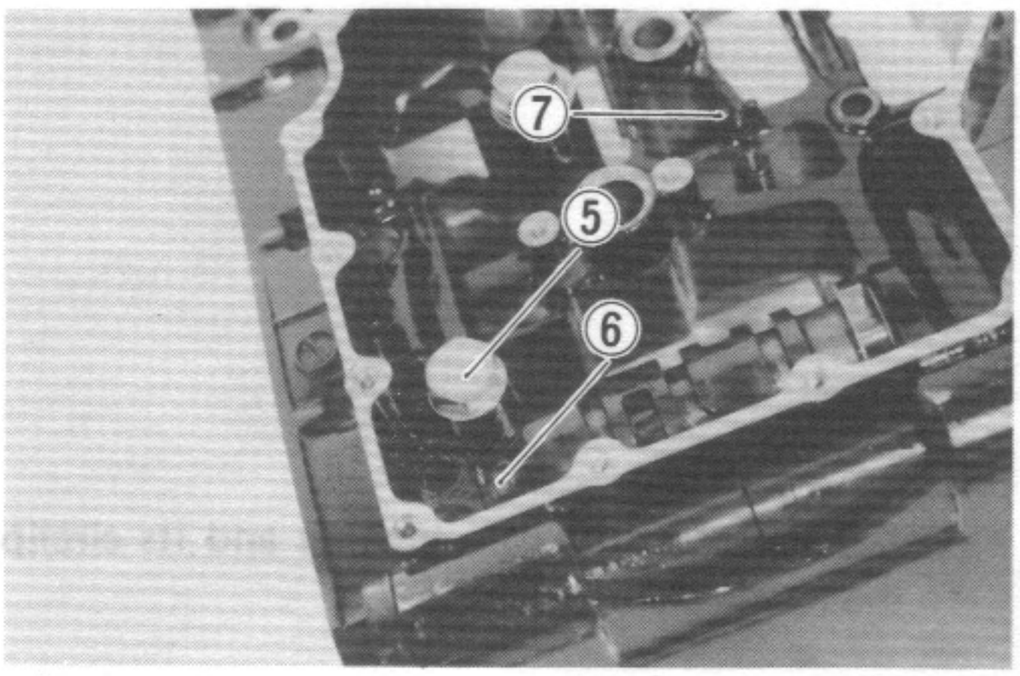
- Refer to the following figure in regard to the correct positions and orientations of the forks when installing these parts.

①: Gearshift fork for 5th driven gear.
②: Gearshift fork for 6th driven gear.
③: Gearshift fork for 3rd/4th drive gears.
④: Gearshift cam stopper.



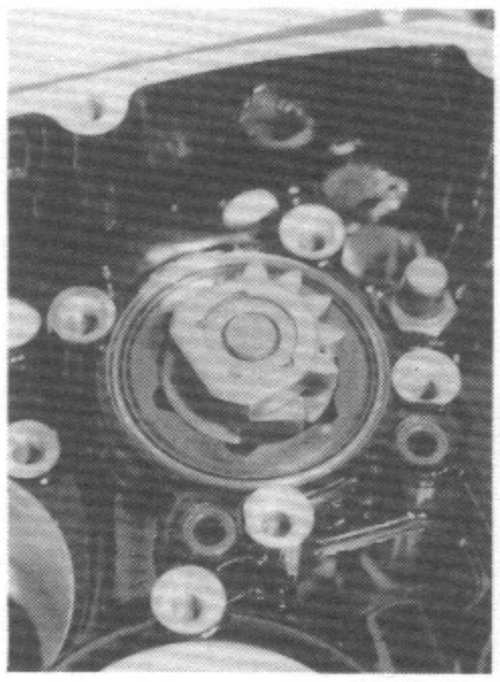
- Install the gearshifting cam with the dent for the neutral stopper directed downward, and meet the neutral stopper ⑤ with this dent ⑥.
- Tighten the neutral stopper housing to the following torque.

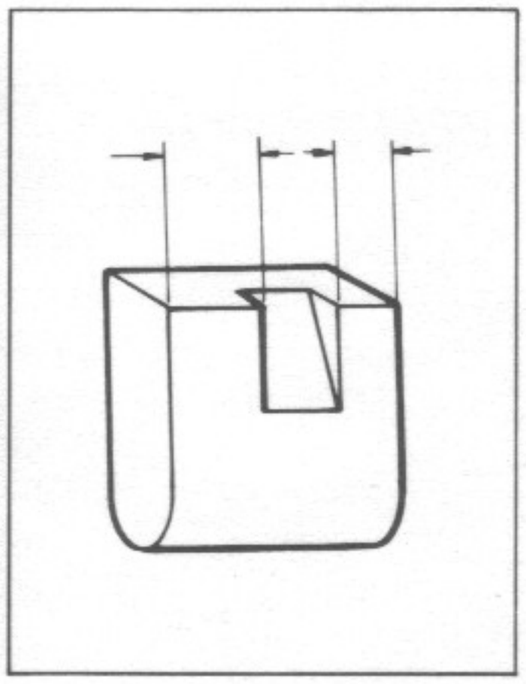
Tightening torque	18 – 28 N·m (1.8 – 2.8 kg-m) (13.0 – 20.0 lb-ft)



NOTE:
Attach the cam stopper spring⑦in the correct position.

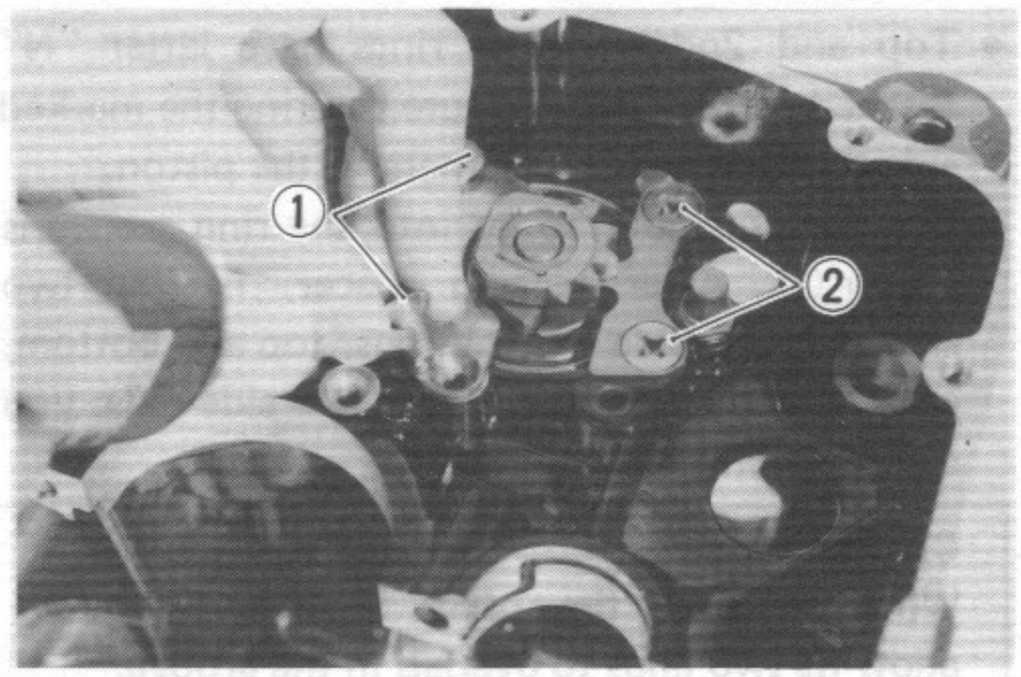
- The shape of each gear shifting pawl is different. Mount the one with the narrower width on the gear shifting cam side.





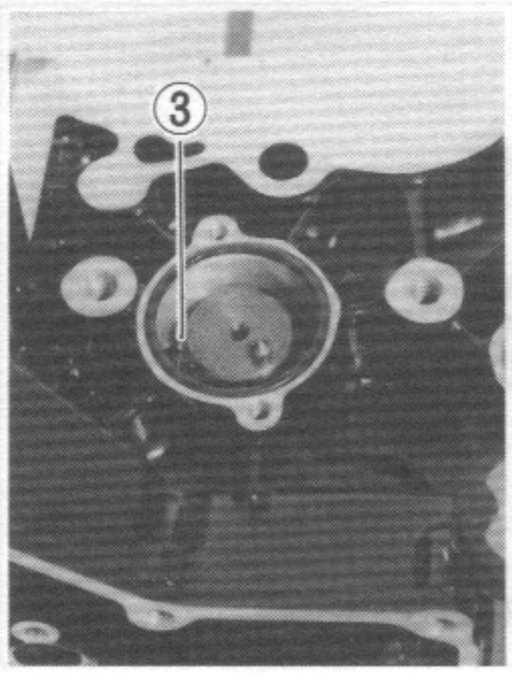
- Before driving in gearshift cam pawl screws ① and cam guide screws ②, apply THREAD LOCK "1363C" to their threads.

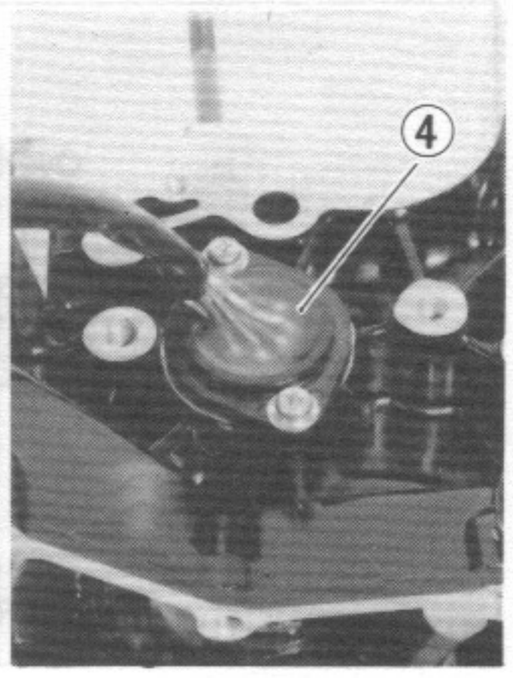
99104 - 32050	Thread lock "1363C"



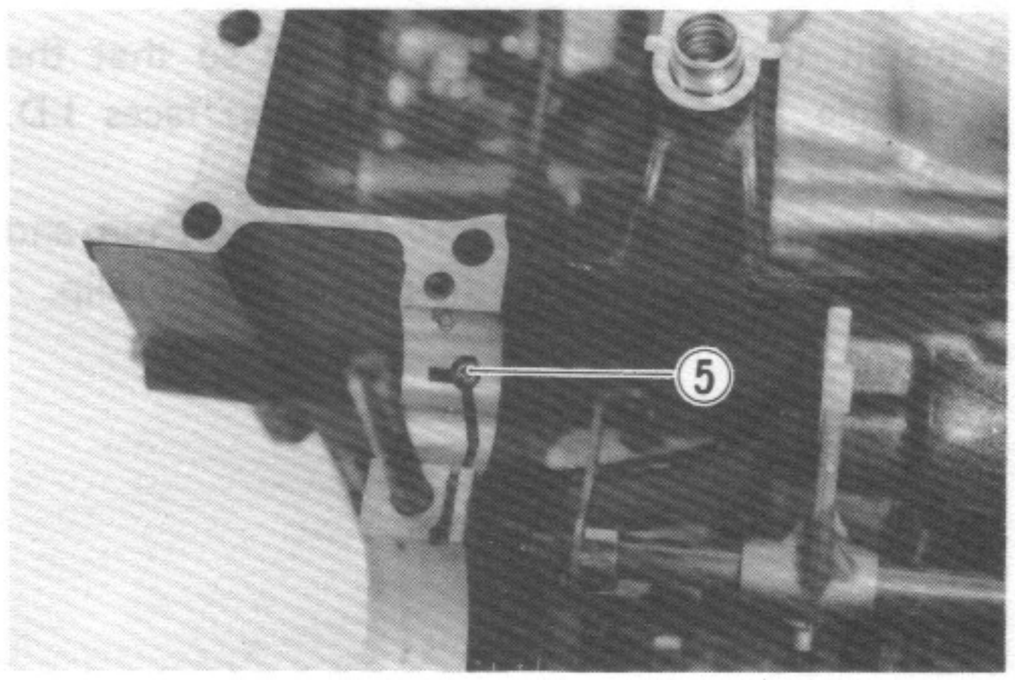
- Install a new circlip ③ to the groove of the gearshift cam and hold the gearshift cam in position.
- Install the gear position indicator switch ④.

NOTE:
When installing gear position indicator switch, be sure to locate spring, switch contact, and O-ring.

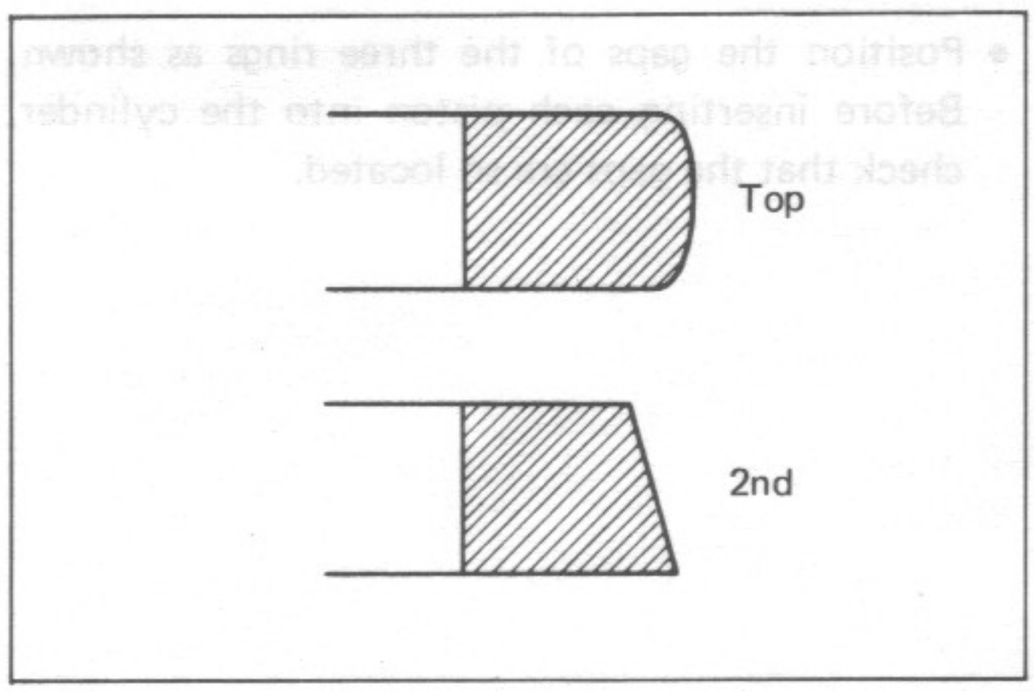




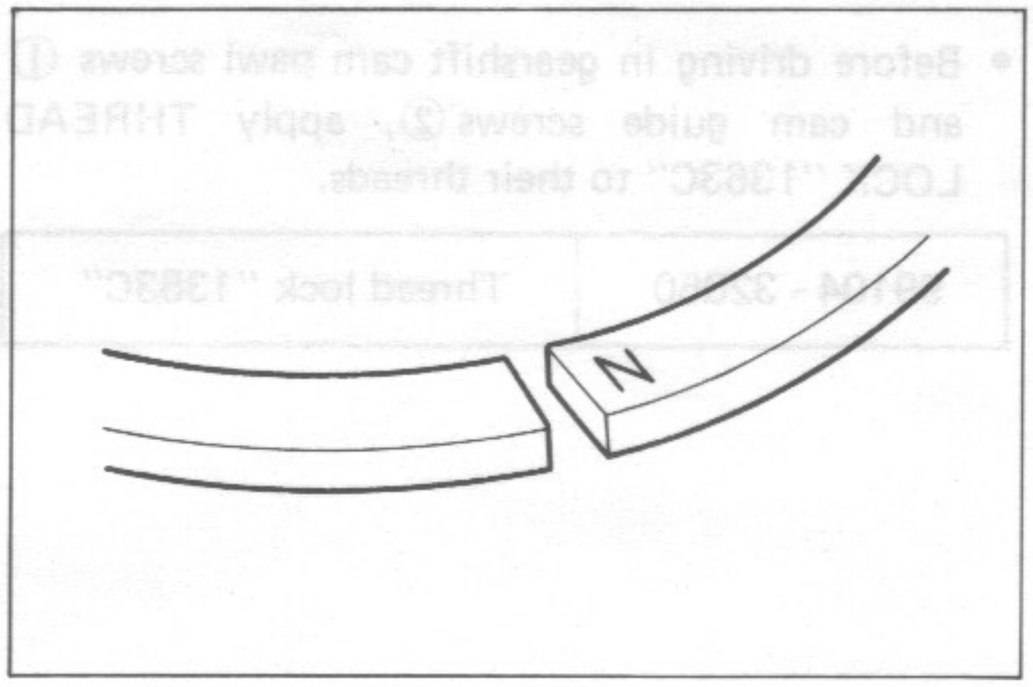
- Check the oil jet ⑤ fitted on the lower crankcase for clogging.



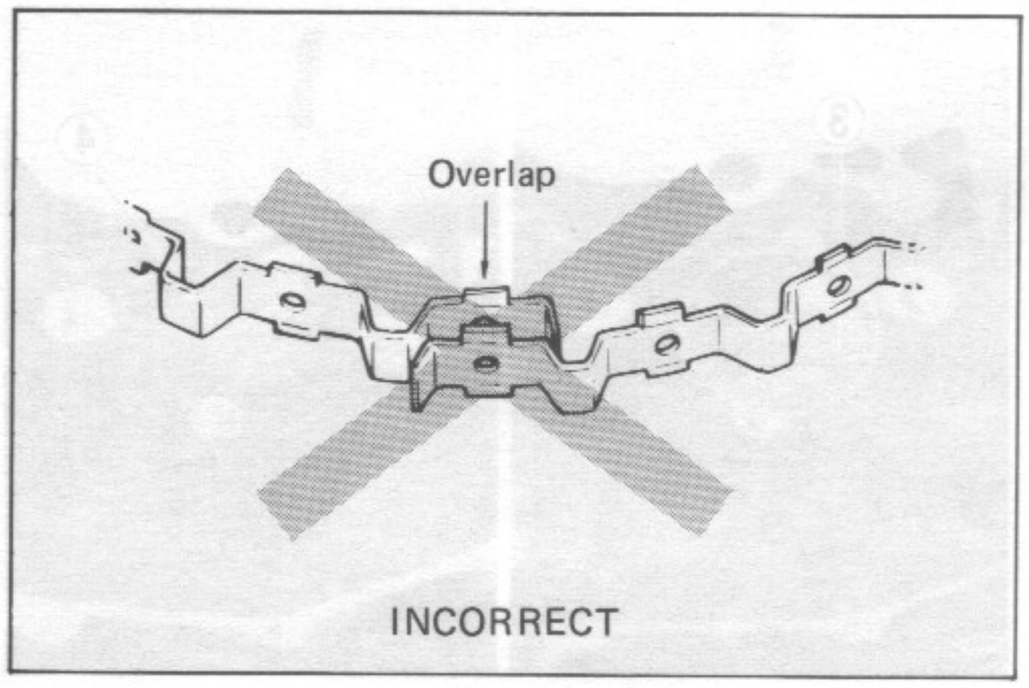
- Mount the piston ring in the order of oil ring, 2nd ring and top ring.
- Top ring and 2nd (middle) ring differ in the shape of ring face, and the face of top ring is chrome-plated whereas that of 2nd ring is not. The color of 2nd ring appears darker than that of the top one.



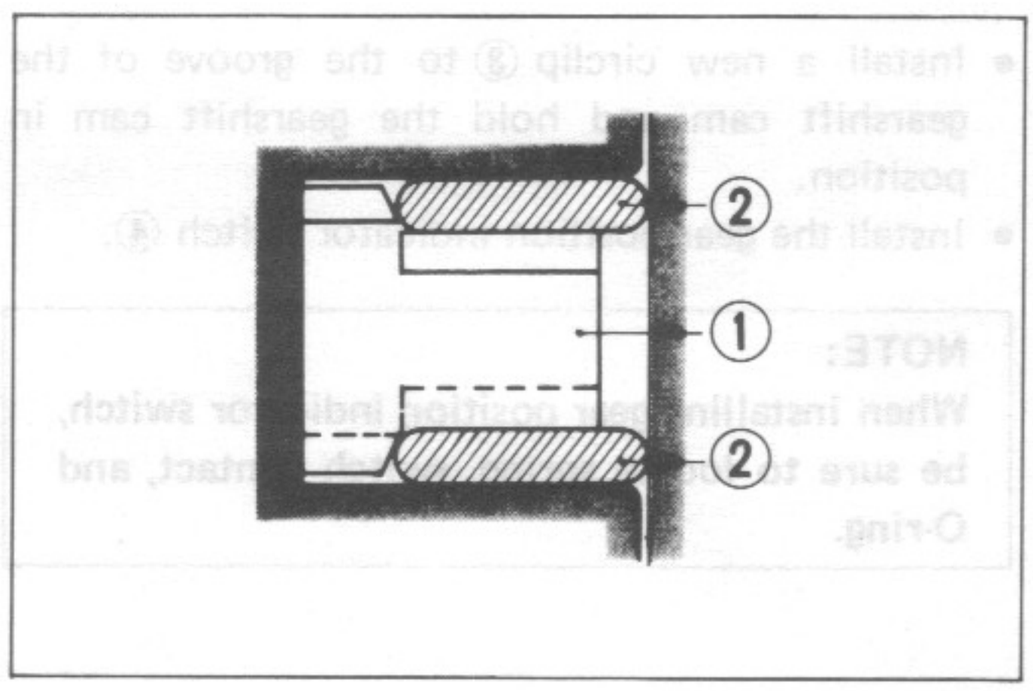
- Top and 2nd (middle) rings have letter "N" marked on the side. Be sure to bring the marked side to top when fitting them to the piston.
- The first member to go into the ring groove is spacer ①. After placing spacer, fit the two side rails ②. Side designations, top and bottom, are not applied to the spacer and side rails: you can position each either way.



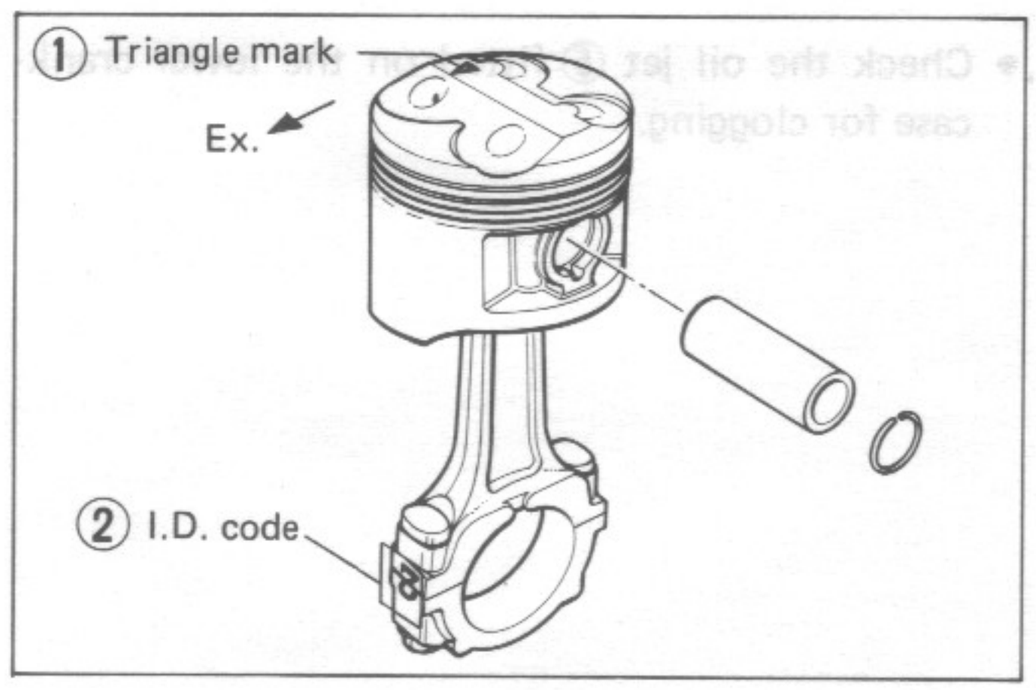
CAUTION:
When mounting the spacer, be careful not to allow its two ends to overlap in the groove.



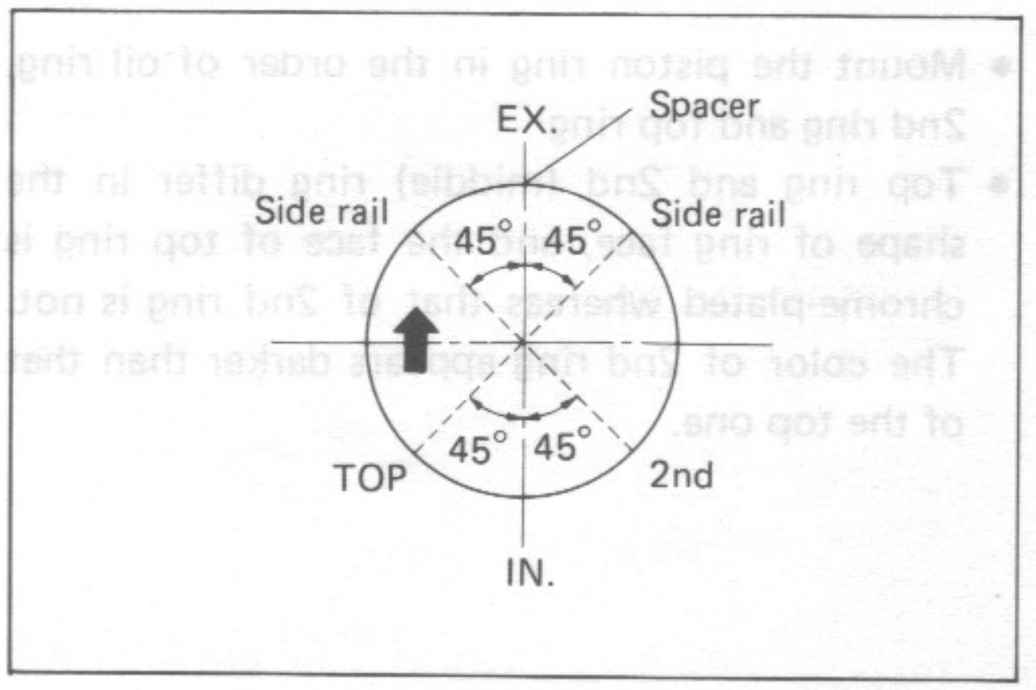
INCORRECT



- Install the piston to the conrod so that the triangle mark ① on the piston top faces I.D. code ② of the conrod.
- Apply engine oil lightly to the piston pin and install the piston pin to the piston with circlip.



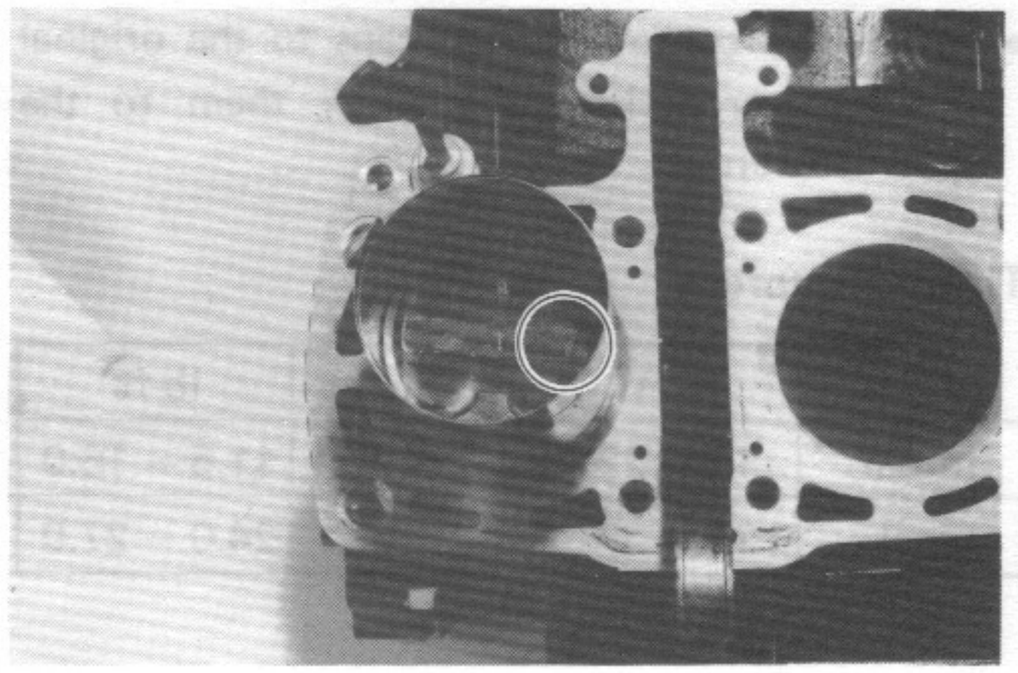
- Position the gaps of the three rings as shown. Before inserting each piston into the cylinder, check that the gaps are so located.



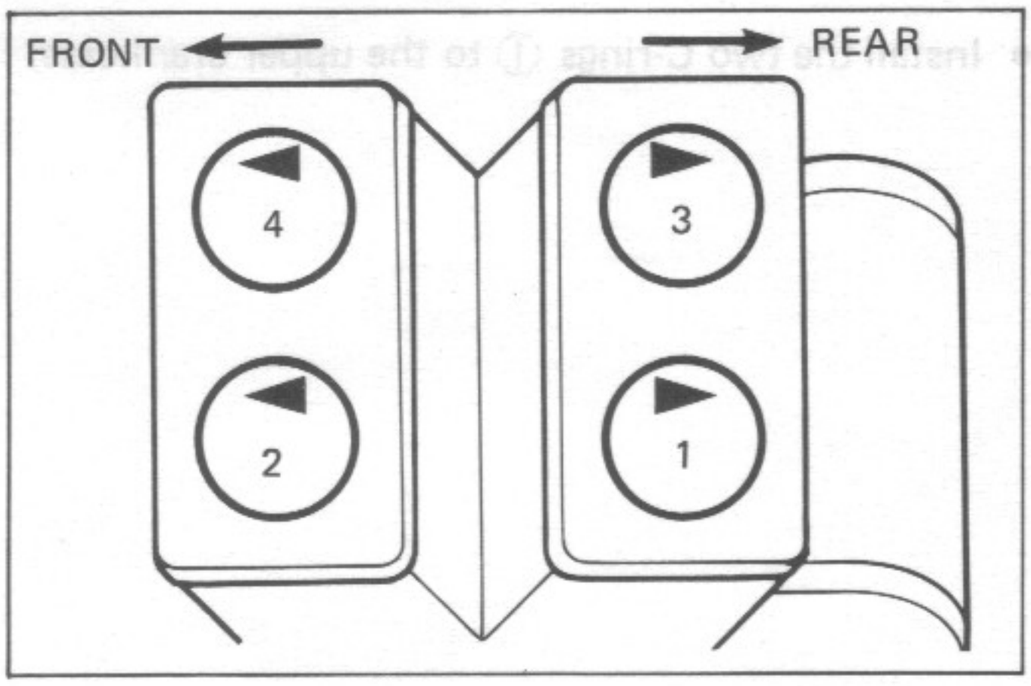
- Apply engine oil to the piston ring and piston surface.
- Using the special tool, install the piston to the cylinder by tapping the piston top with wooden piece.

09916 - 77310	Piston ring compressor

- The piston is in correct position when its triangle (on the top) points exhaust valve side.

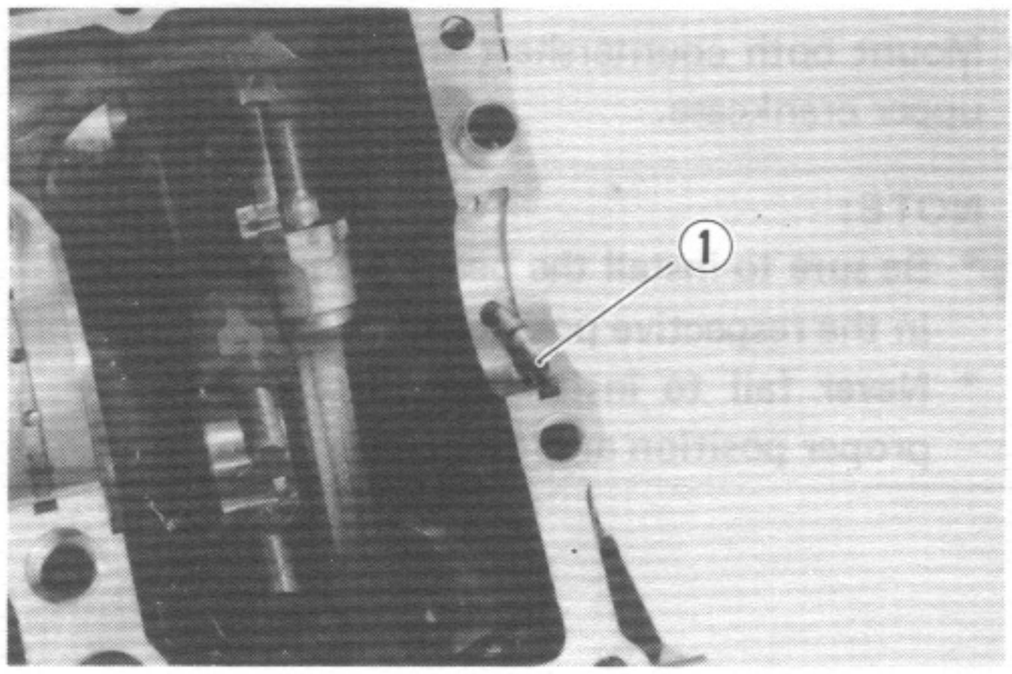


- Be sure to install the pistons in the cylinder from which they were taken out in disassembly, refer to the letter mark, "1" through "4", scribed on the piston.

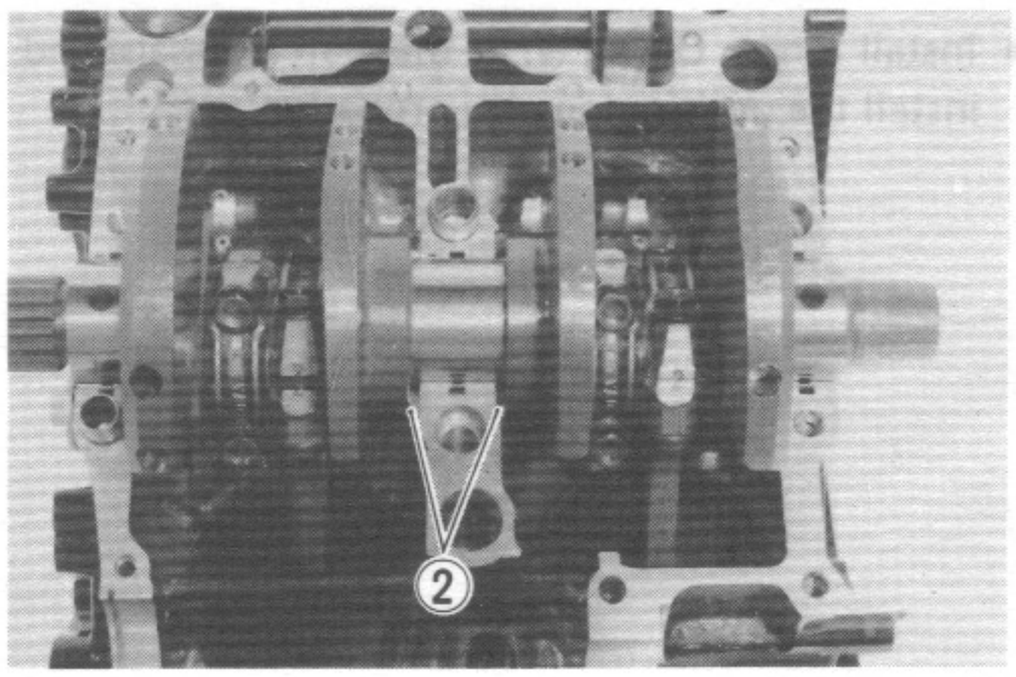


- Check the oil jet ① for clogging.
- Install the jet so that large diameter end faces inside.
- Install the specified crankshaft journal bearings and conrod big end bearings. (See page 3-44 and 47)
- Apply SUZUKI Moly Paste to the bearings lightly.

99000 - 25140	SUZUKI Moly Paste



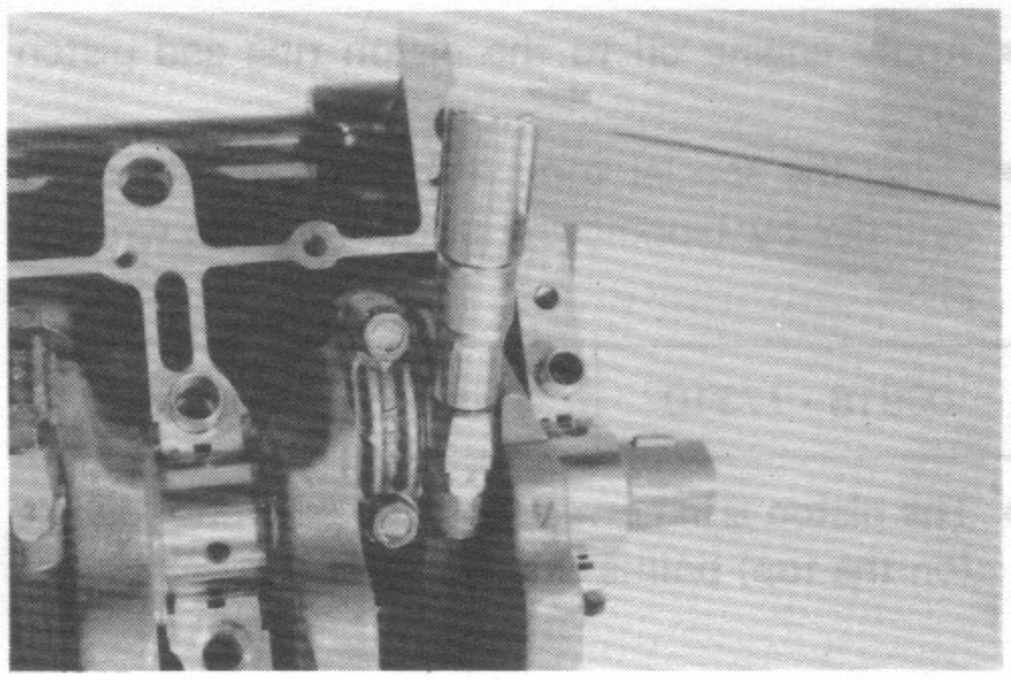
- When installing the crankshaft on the bearings, properly position the four conrods and do not scratch the crank pin journals with conrod's stud bolts.
- Install the specified right and left thrust bearings ②facing the oil groove to the crank web. (See page 3-49)



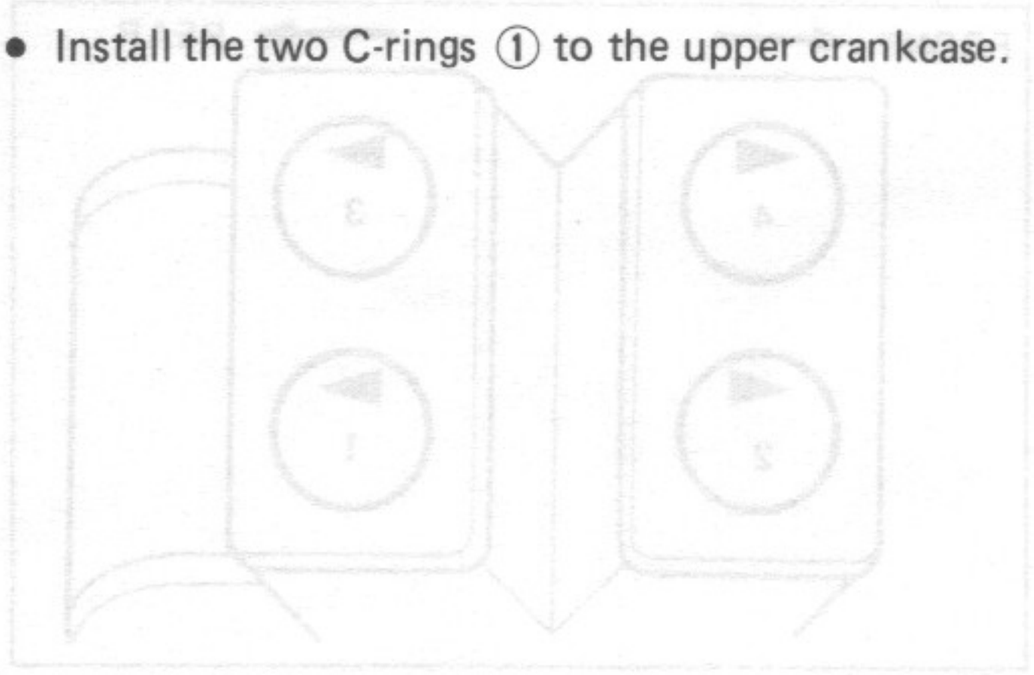
- Install the conrod bearing caps to the original positions properly and tighten them to the specified torque.

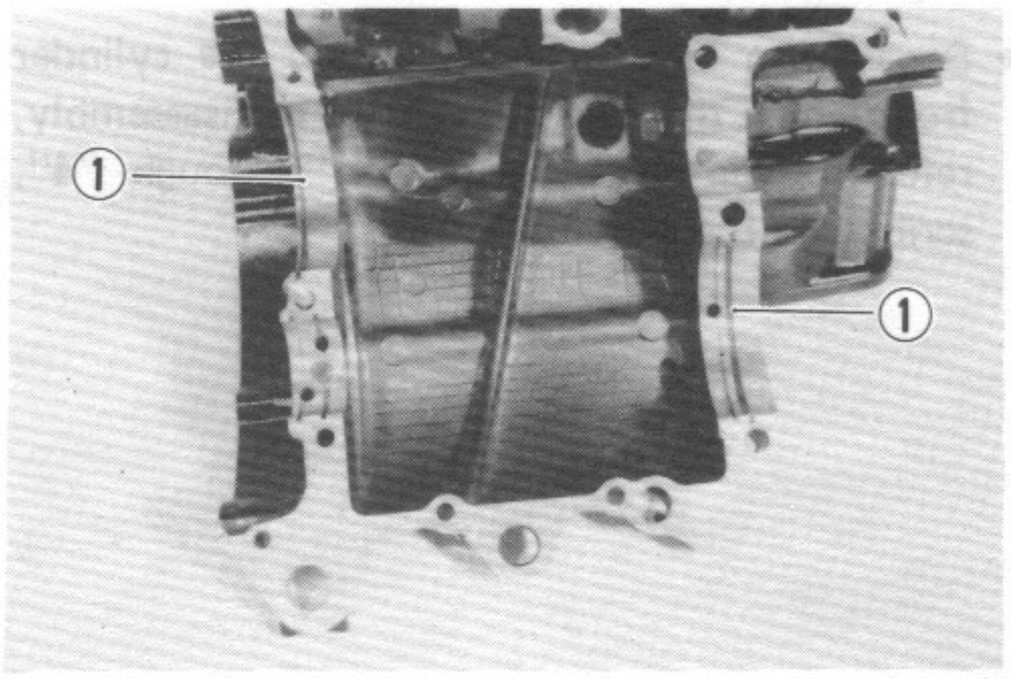
Tightening torque

	N·m	kg-m	lb-ft
Initial	16 – 22	1.6 – 2.2	11.5 – 16.0
Final	33 – 37	3.3 – 3.7	24.0 – 27.0



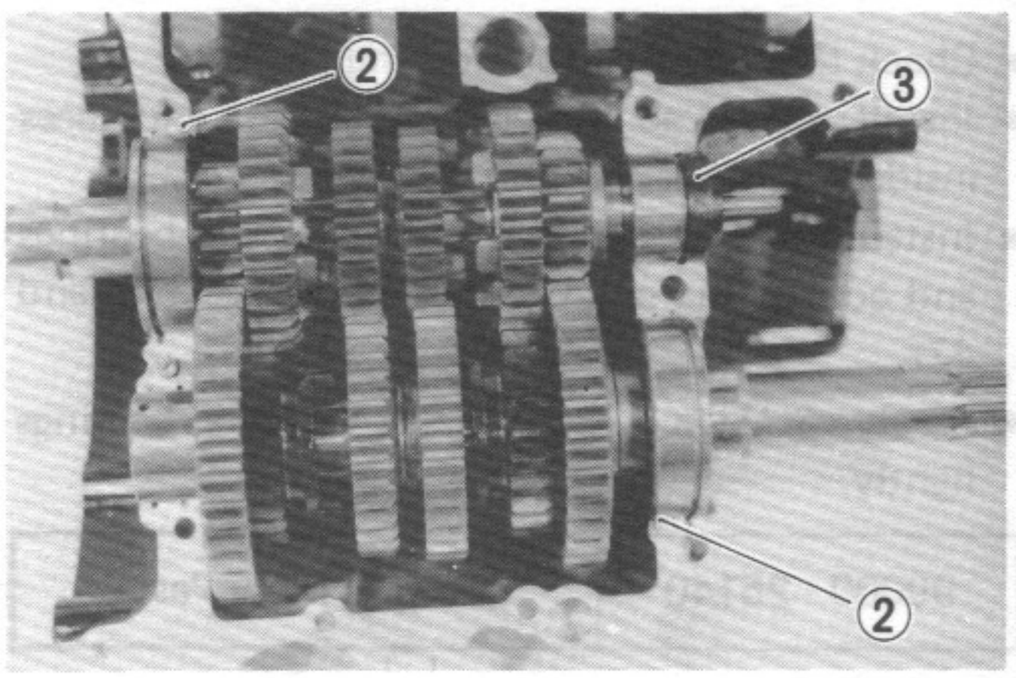
- Install the two C-rings ① to the upper crankcase.



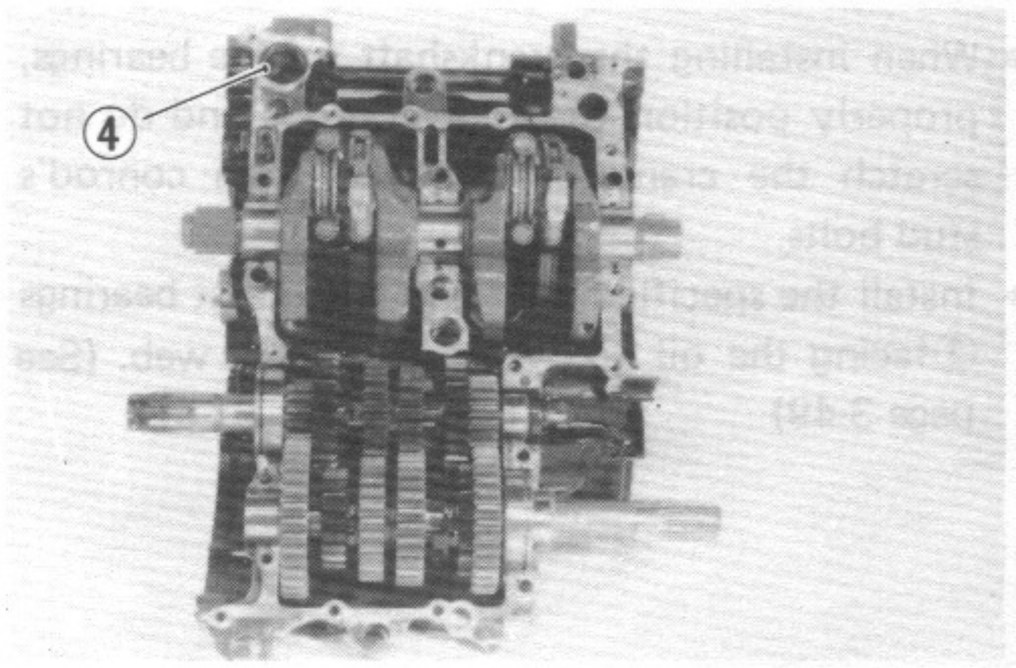


- Mount both countershaft and drive shaft on the upper crankcase.

NOTE:
*** Be sure to install the bearing dowel pins ② in the respective positions.**
*** Never fail to install the oil seal ③ to the proper position and direction.**



- Install a new O-ring ④ at the water passage and install the positioning pins properly.



- Clean the mating surfaces of the crankcases before matching the upper and lower ones.
- Apply SUZUKI BOND No. 1207B to the mating surface of the lower crankcase in the following procedure.

99104 - 31140	SUZUKI Bond No. 1207B

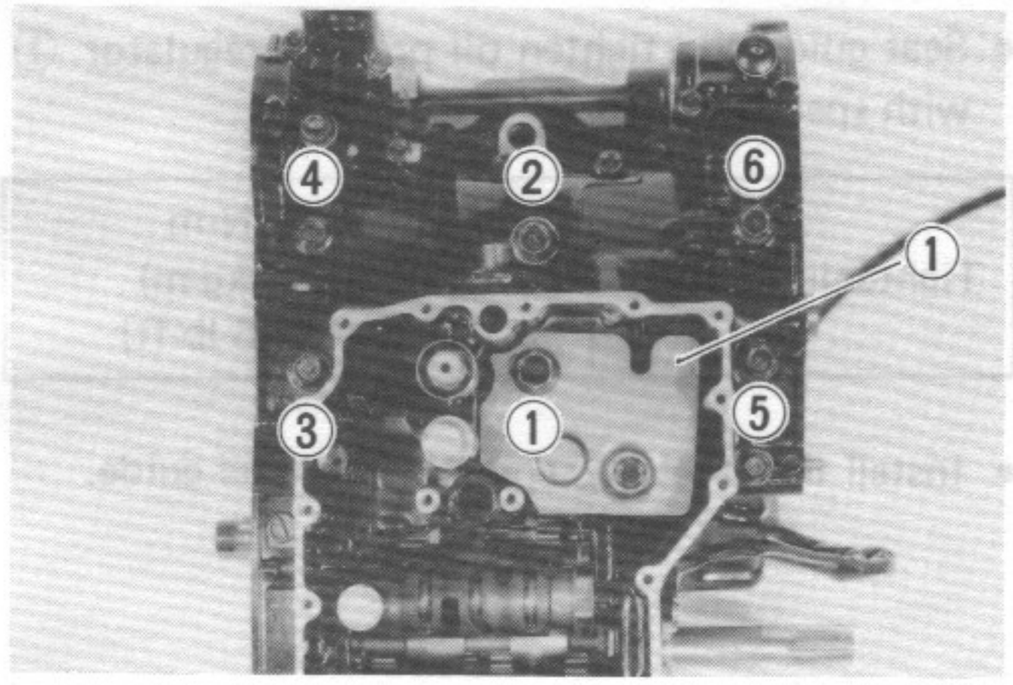
NOTE:
Use of SUZUKI BOND No. 1207B is as follows:

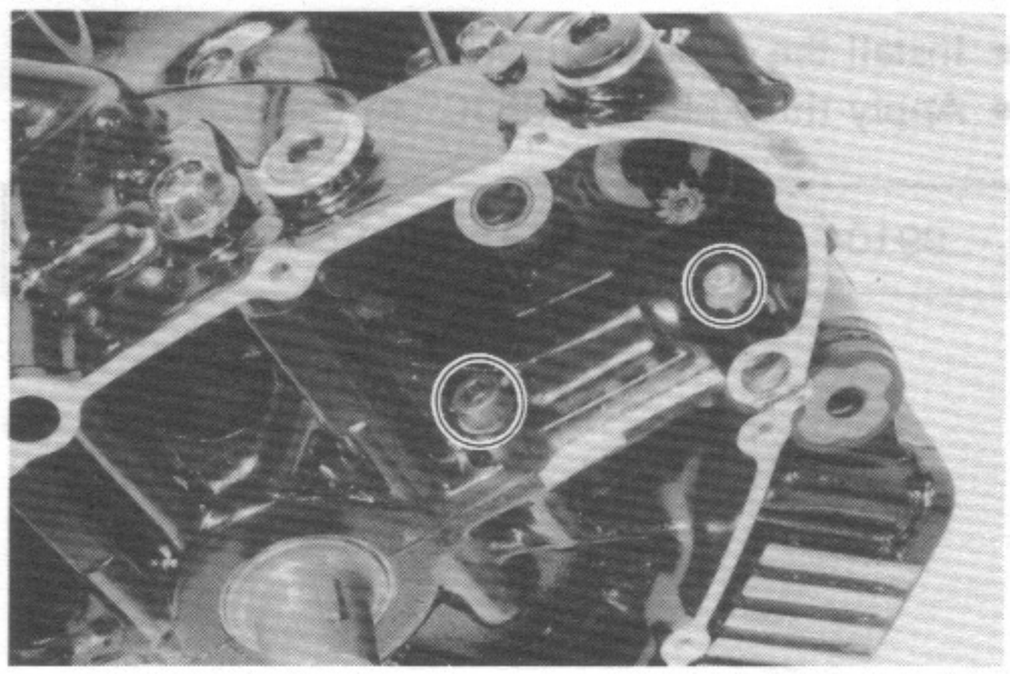
* **Make surfaces free from moisture, oil, dust and other foreign materials.**
* **Spread on surfaces thinly to form an even layer, and assemble the crankcases within few minutes.**
* **Take extreme care not to apply any bond No. 1207B to the bearing surfaces.**
* **Apply to distorted surfaces as it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

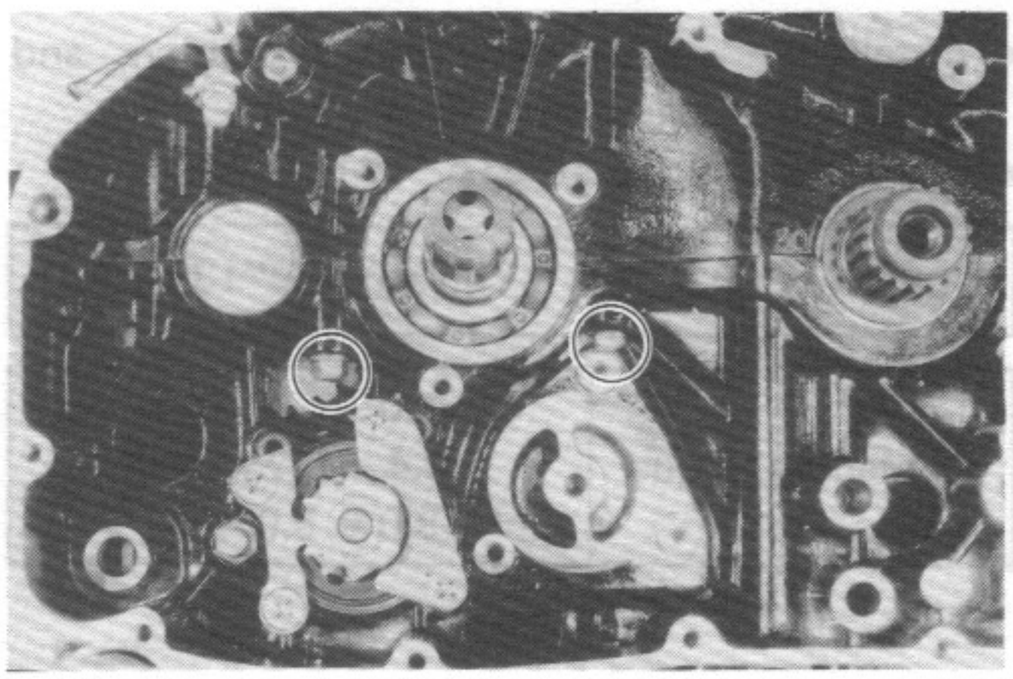
- Place the oil guide plate ① as shown in figure.
- When securing the lower crankcase, tighten the 12-mm bolts and the 10-mm bolts in the ascending order of numbers assigned to these bolts, tightening each bolt a little at a time to equalize the pressure. Apply engine oil to the bolt thread and head lightly and tighten all the securing bolts to the specified torque values.

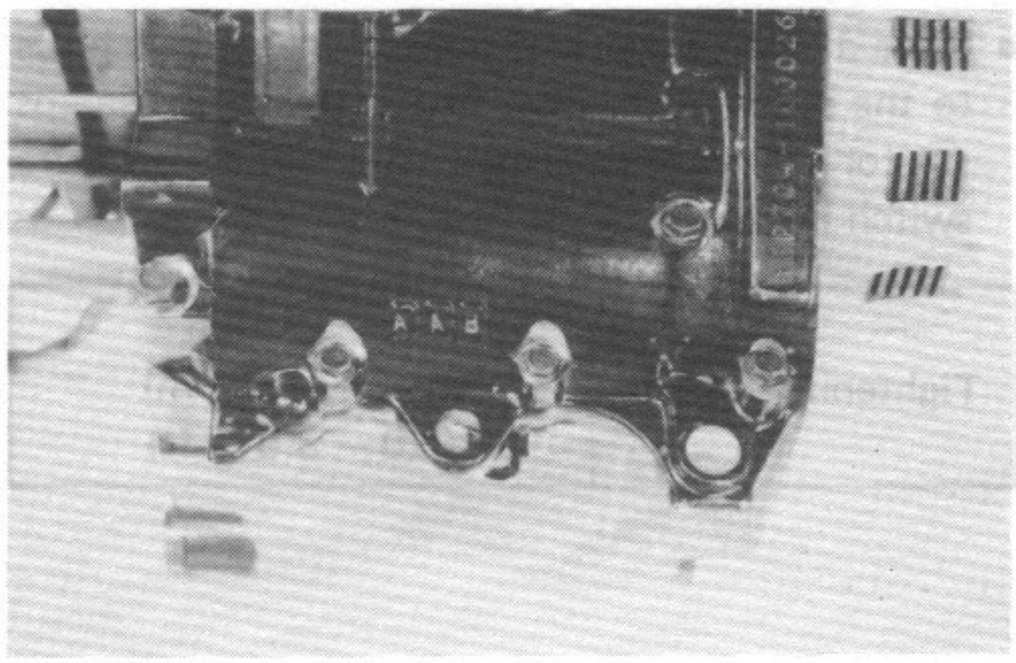
Tightening torque		10 mm bolt	12 mm bolt
Initial	N·m	25 – 35	40 – 50
	kg-m	2.5 – 3.5	4.0 – 5.0
	lb-ft	18.0 – 25.5	29.0 – 36.0
Final	N·m	45 – 55	60 – 70
	kg-m	4.5 – 5.5	6.0 – 7.0
	lb-ft	32.5 – 40.5	43.5 – 50.5

	N·m	kg-m	lb-ft
8 mm Allen bolt	20 – 28	2.0 – 2.8	14.5 – 20.0
6 mm Allen bolt	12 – 16	1.2 – 1.6	8.5 – 11.5
8 mm bolt	24	2.4	17.5
6 mm bolt	13	1.3	9.5



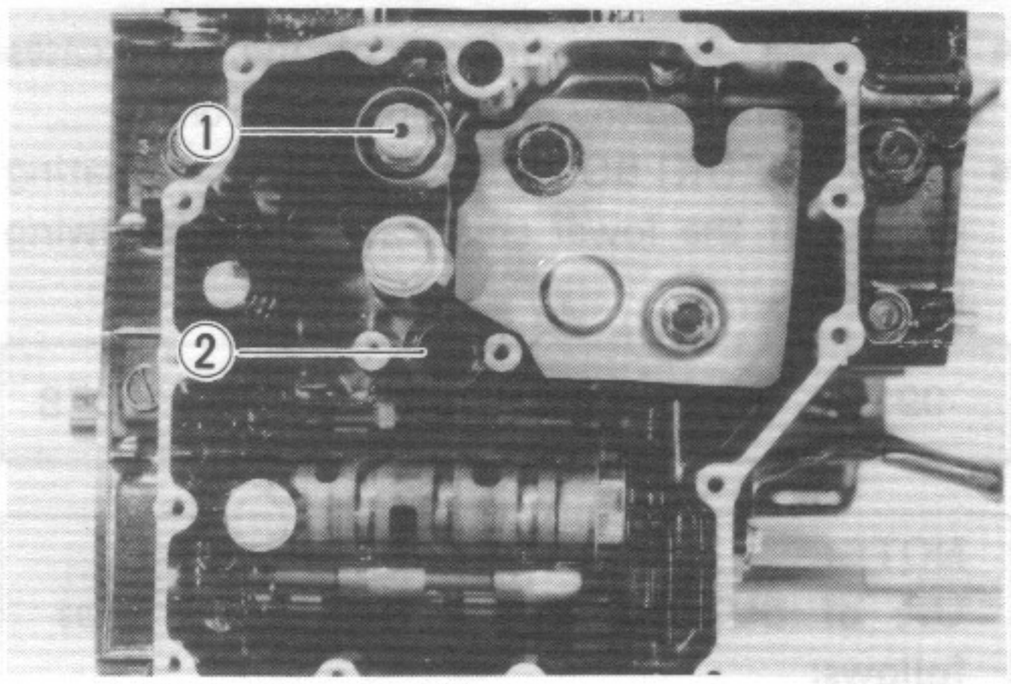






- Seat guide and tighten oil pressure regulator ① with specified torque.

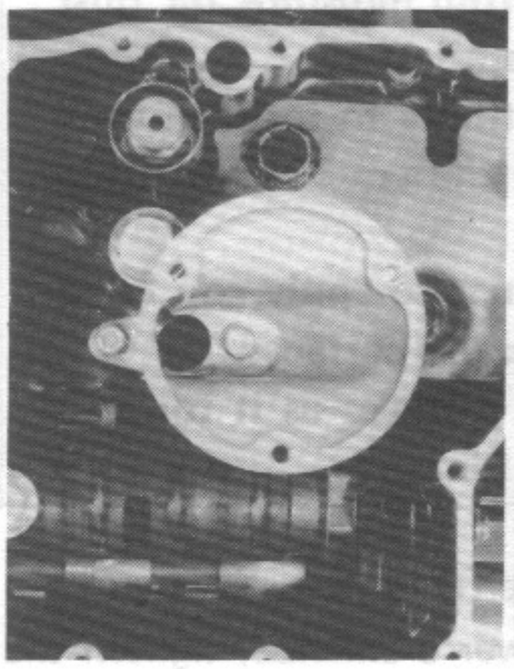
Tightening torque	25 – 30 N·m (2.5 – 3.0 kg-m) (18.0 – 21.5 lb-ft)

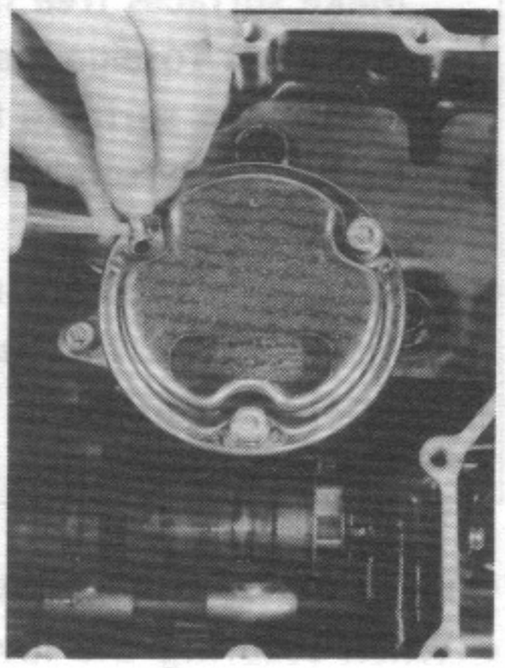


- Install the O-ring ② and install the oil guide.

- Install the oil sump filter in the proper direction.
- Apply thread lock "1363C" to the three screws.

99104 - 32050	Thread Lock "1363C"

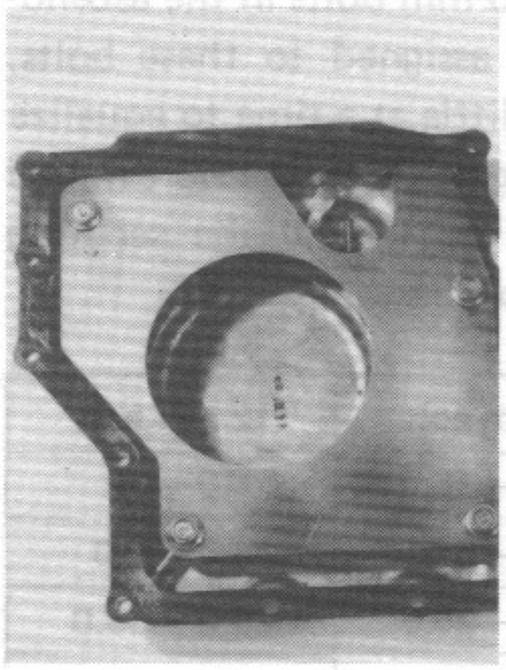


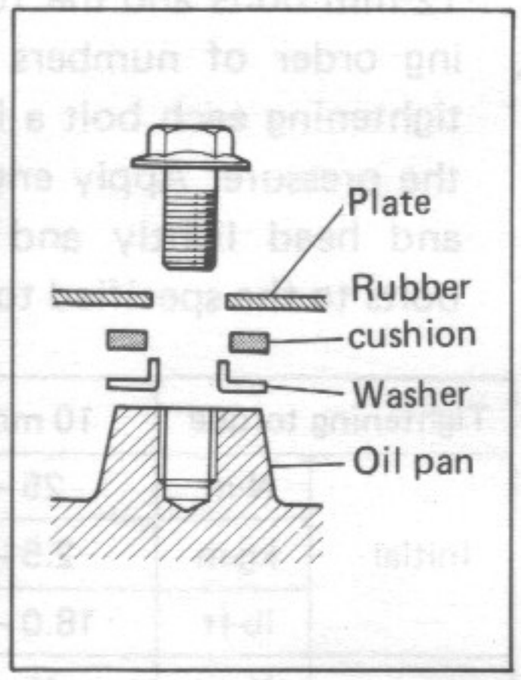


- Install the washer and rubber cushion, and install the oil pan plate with five bolts.
- Apply thread lock "1361A" to the bolts.

99104 - 32020	Thread lock "1361A"

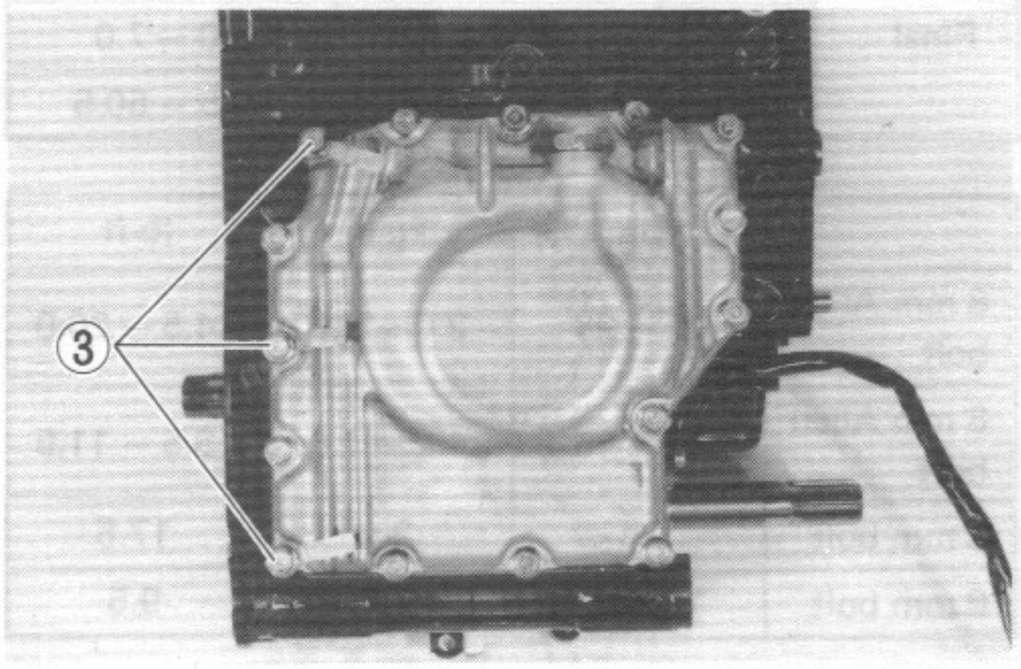
Tightening torque	4.0 – 7.0 N·m (0.4 – 0.7 kg-m) (3.0 – 5.0 lb-ft)



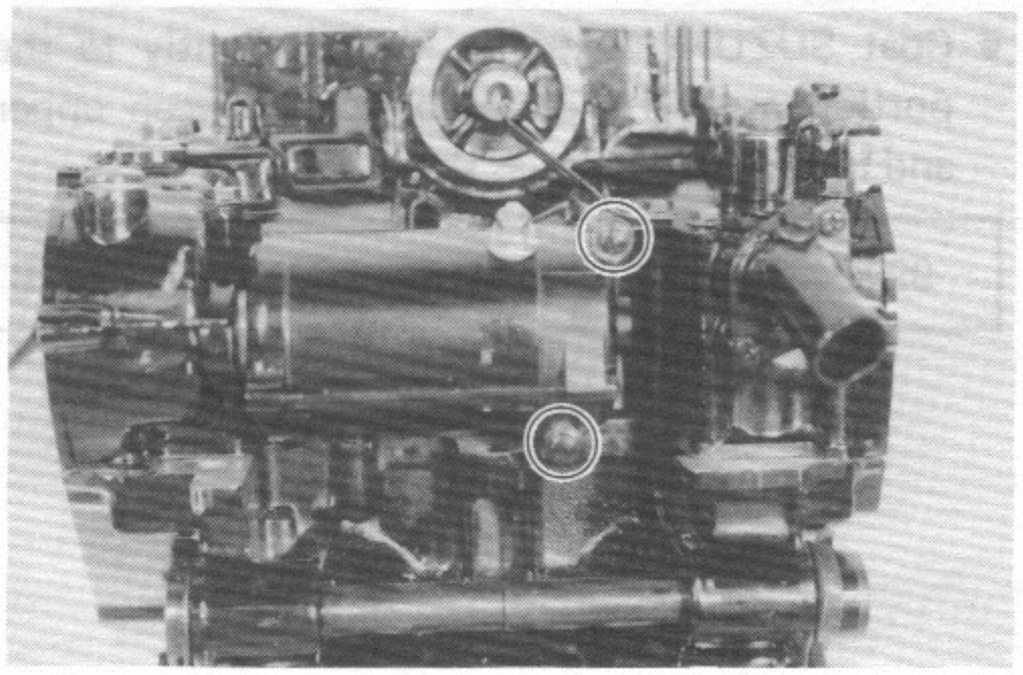


- Place a new gasket and tighten the oil pan bolts to the specified torque. Install the three clamps ③ for starter motor lead wire and oil pressure switch lead wire.

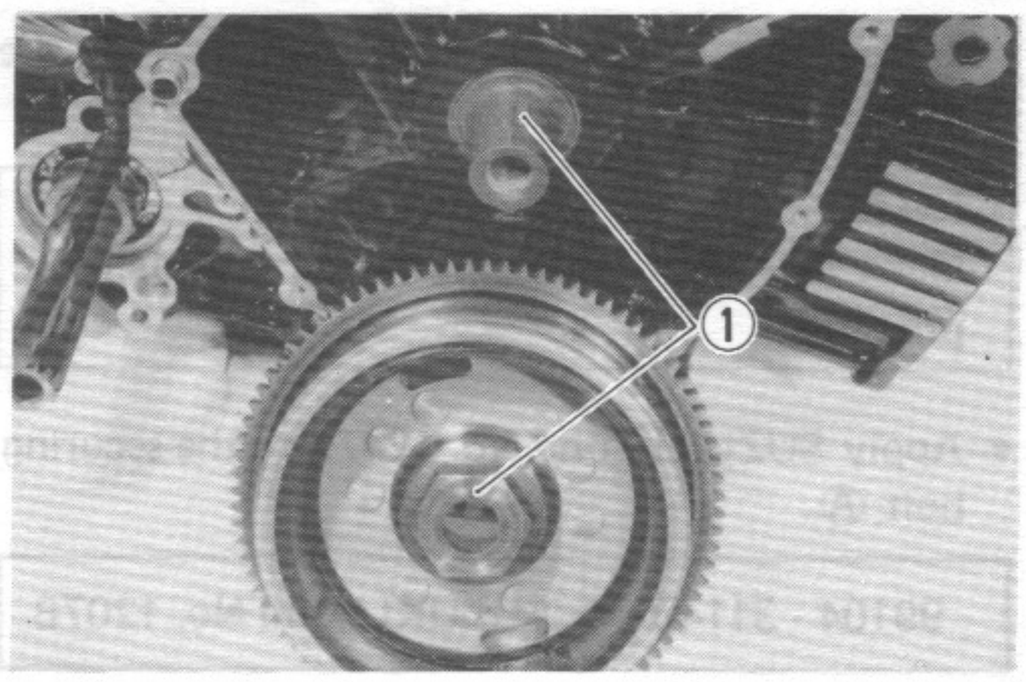
Tightening torque	8 – 12 N·m (0.8 – 1.2 kg-m) (6.0 – 8.5 lb-ft)



- Mount the starter motor to the lower crankcase and route the starter motor lead wire properly.



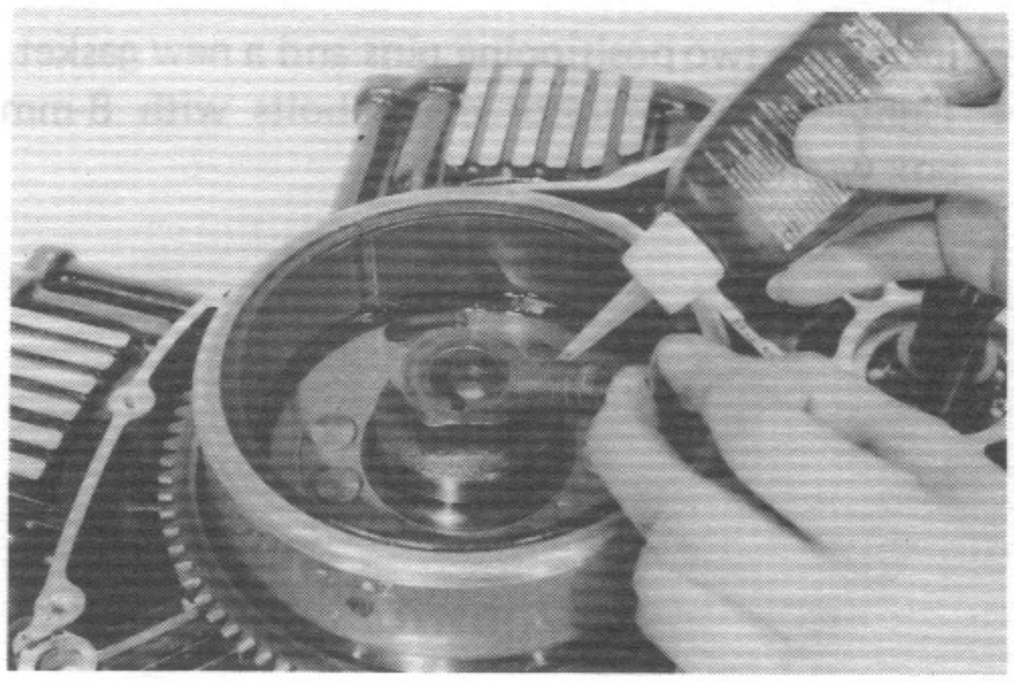
- Degrease the tapered portion of the rotor and also the crankshaft. Use nonflammable cleaning solvent to wipe off the oily or greasy matter to make these surfaces completely dry.
- Align the key groove with the key ① and install the rotor to the crankshaft.
- After mounting the rotor, secure the rotor by tightening the center bolt to the specified torque value.



Tightening torque	140 – 160 N·m (14.0 – 16.0 kg-m) (101.5 – 115.5 lb-ft)

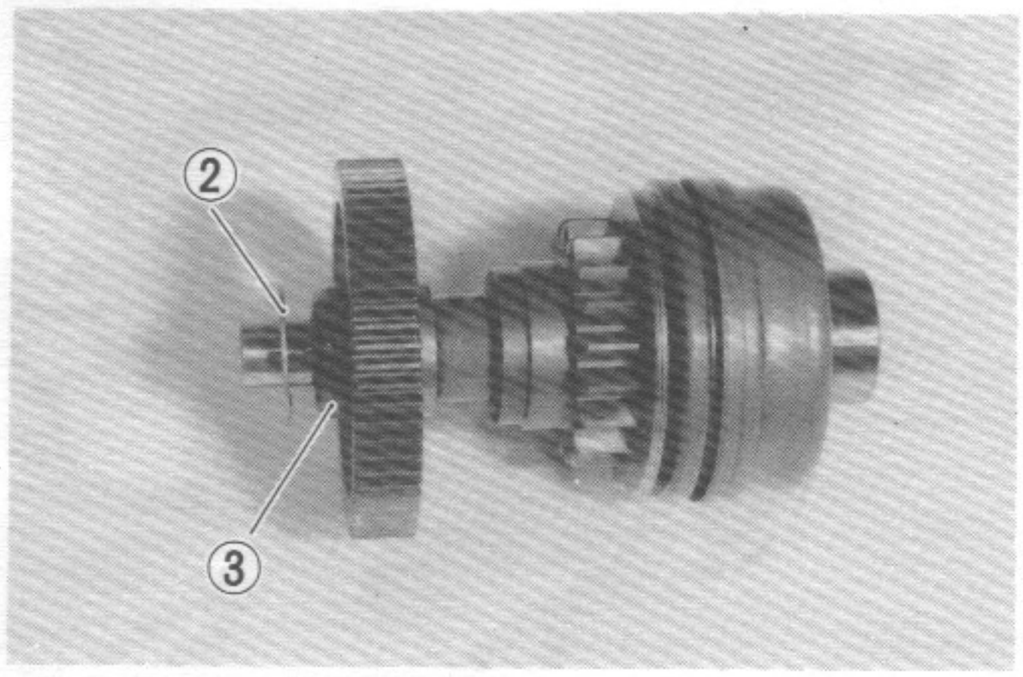
99104 - 32030	Thread Lock Super "1363A"

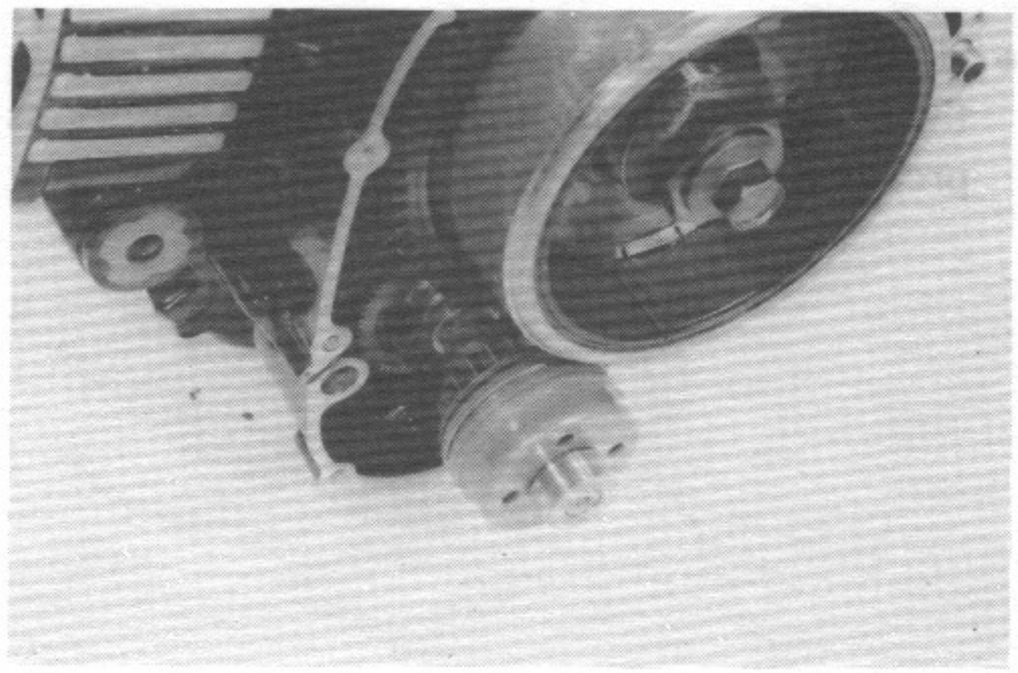
- Slide the washer ② on the starter pinion shaft and engage the starter idle gear to the starter pinion.



NOTE:
When installing the starter idle gear, protrusion side ③ facing in.

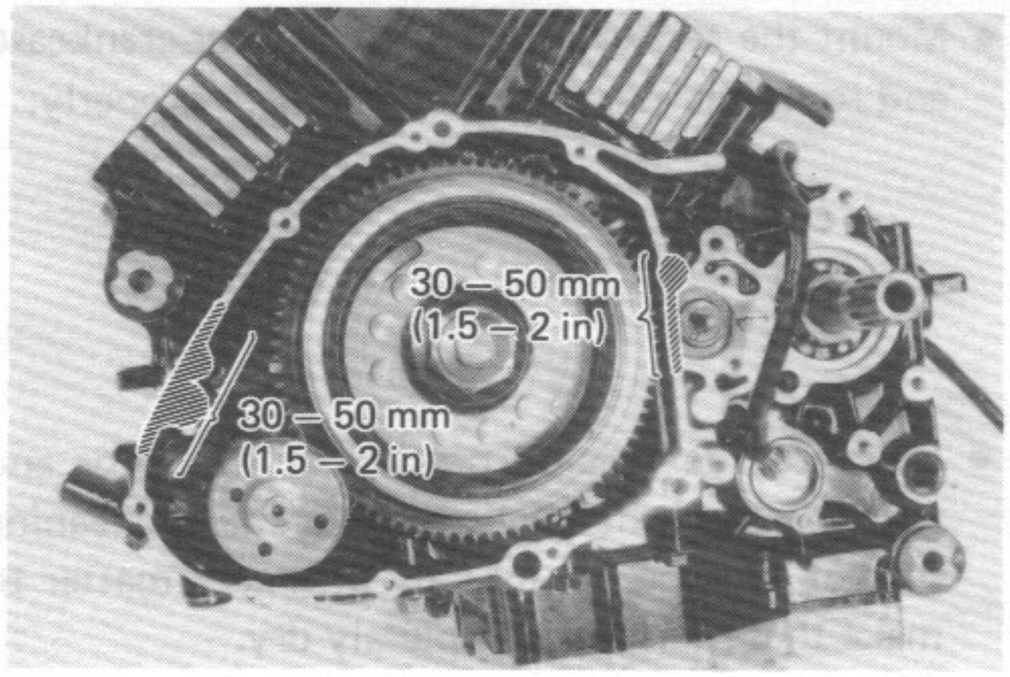
- Install the starter pinion assembly to the crankcase.





- Coat SUZUKI Bond No. 1207B lightly to the portion around mating surface between upper and lower crankcases as shown.

99104 - 31140	SUZUKI BOND No. 1207B

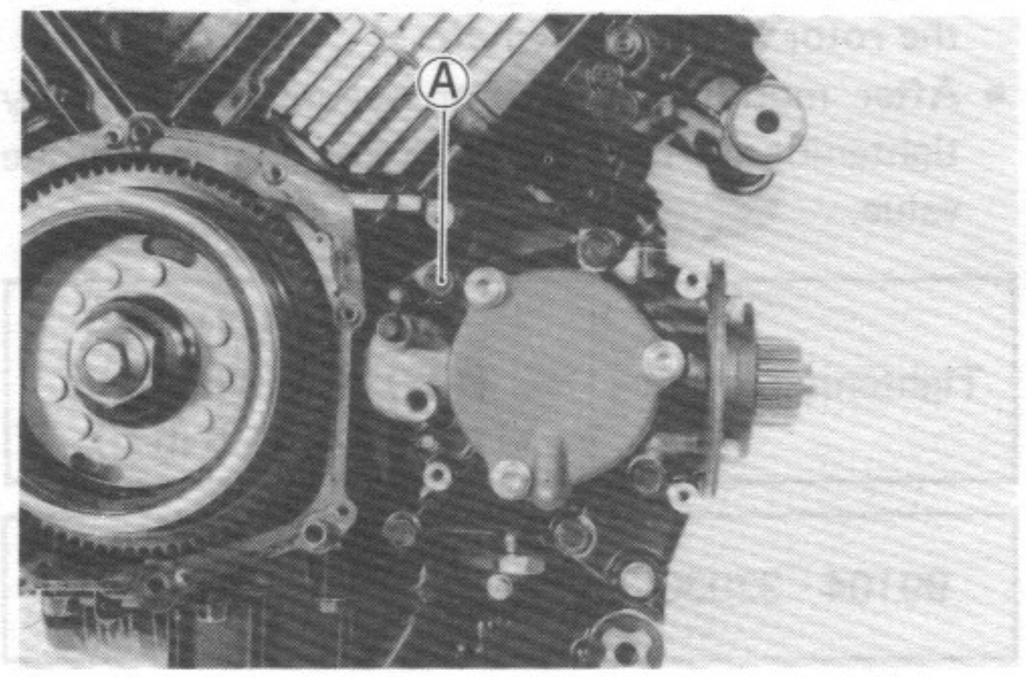


- Install the secondary drive gear case to the crankcase.

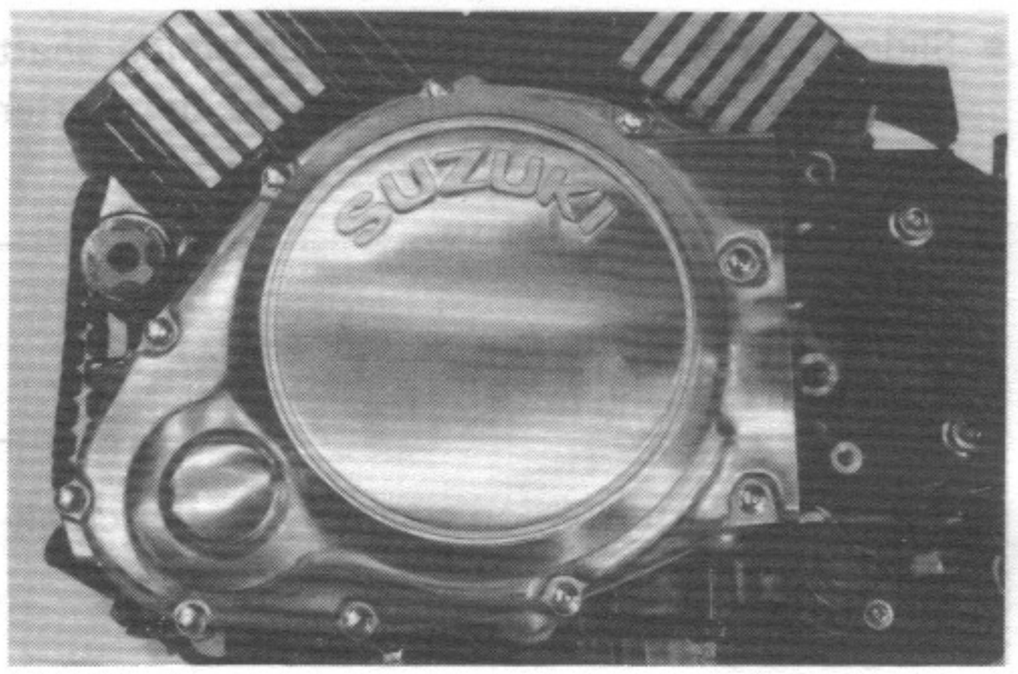
NOTE:
Make sure that clutch push rod is installed properly.

- Apply SUZUKI Bond No. 1207B to the securing bolt Ⓐ.

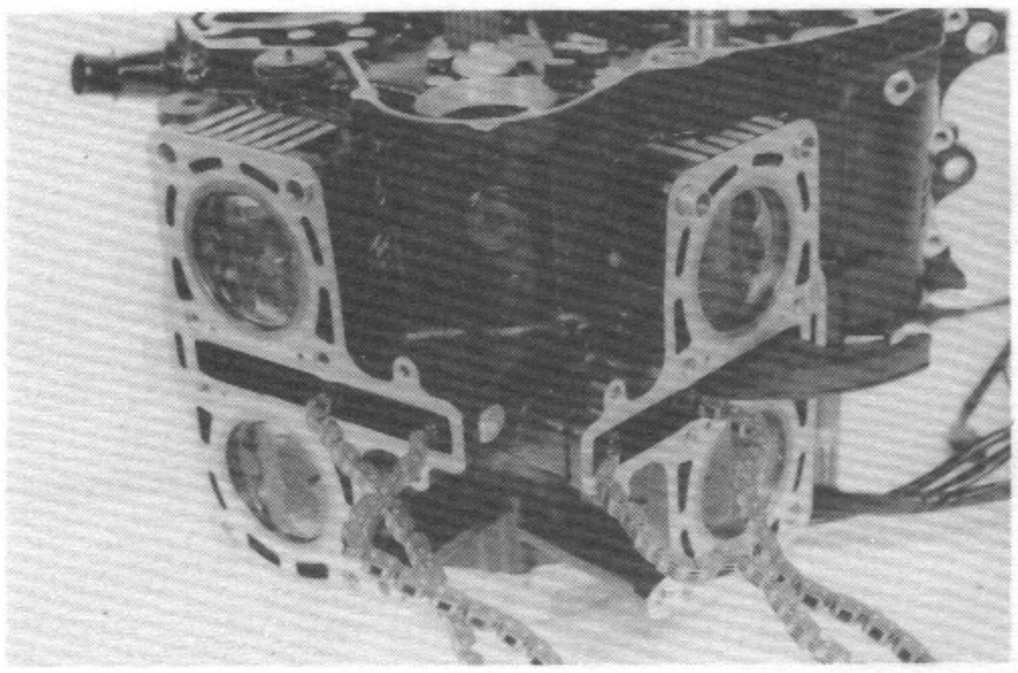
99104 - 31140	SUZUKI Bond No. 1207B



- Install the two positioning pins and a new gasket.
- Tighten the generator cover bolts with 8-mm box wrench.

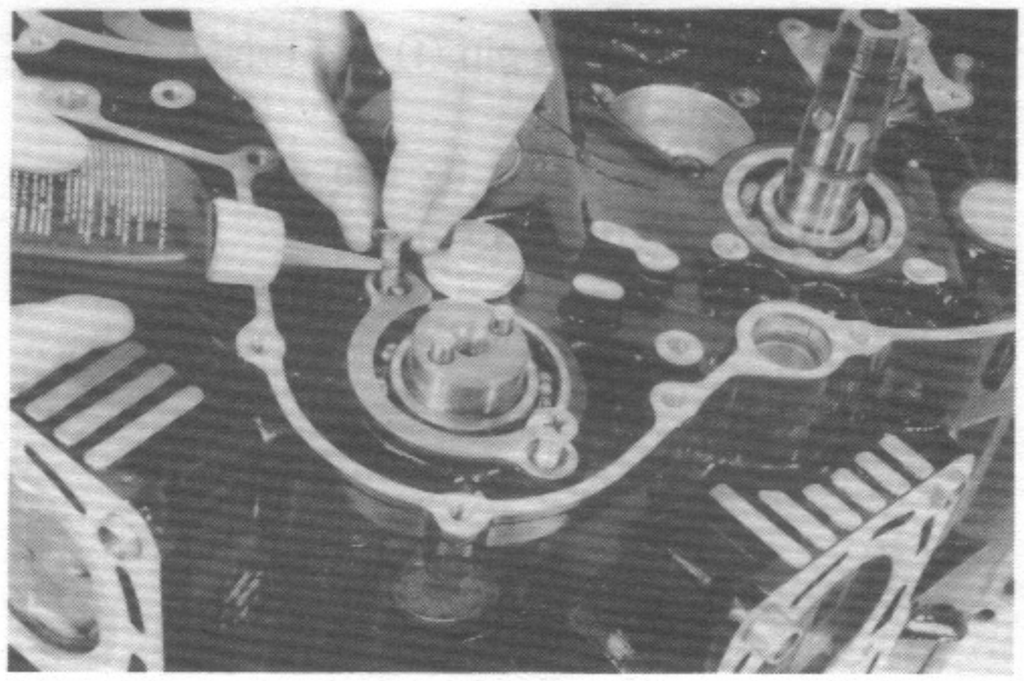


- Hold the two camshaft drive chains and engage the two chains to the idler shaft sprockets properly.



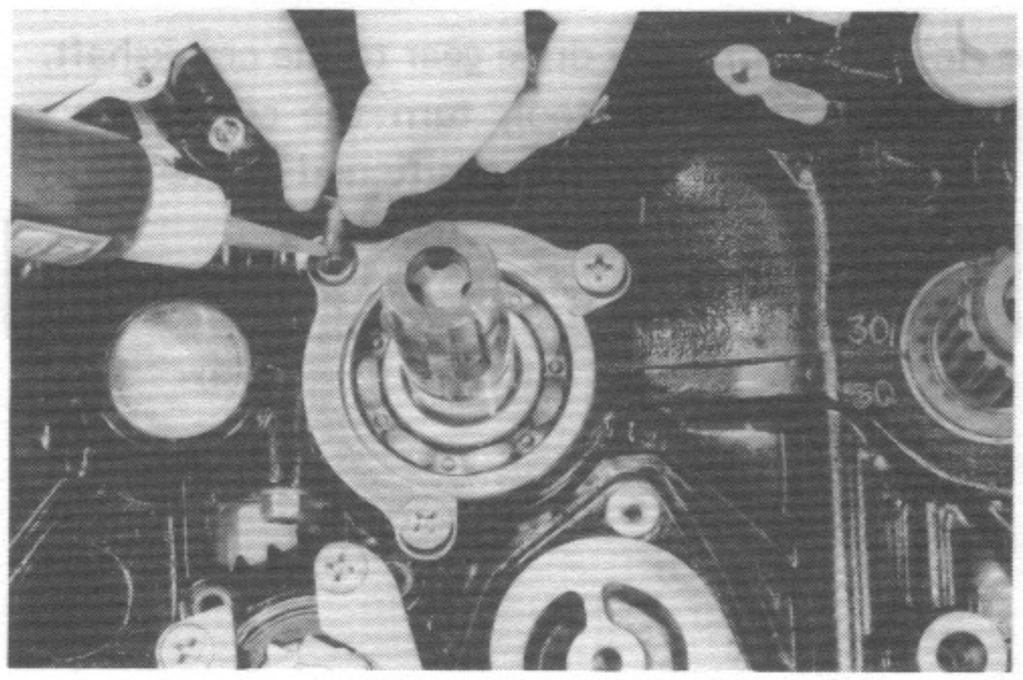
- Tighten the idler shaft bearing retainer with two screws.
- Apply thread lock "1361A" to the screws.

99104 - 32020	Thread lock "1361A"

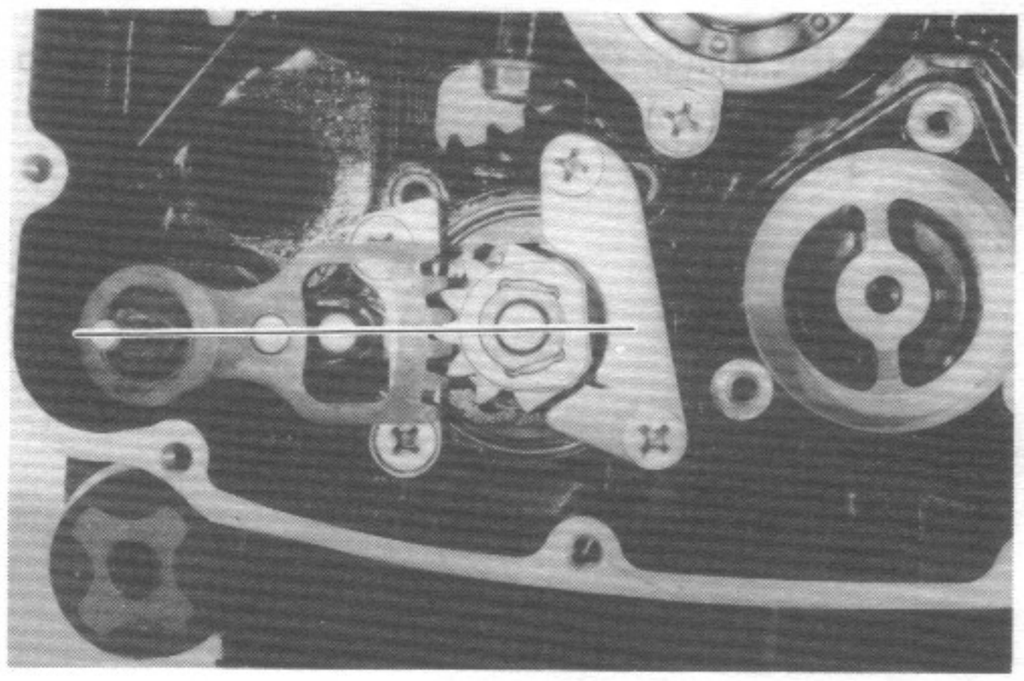


- Tighten the countershaft bearing retainer with three screws.
- Apply thread lock "1363C" to these screws.

99104 - 32050	Thread lock "1363C"

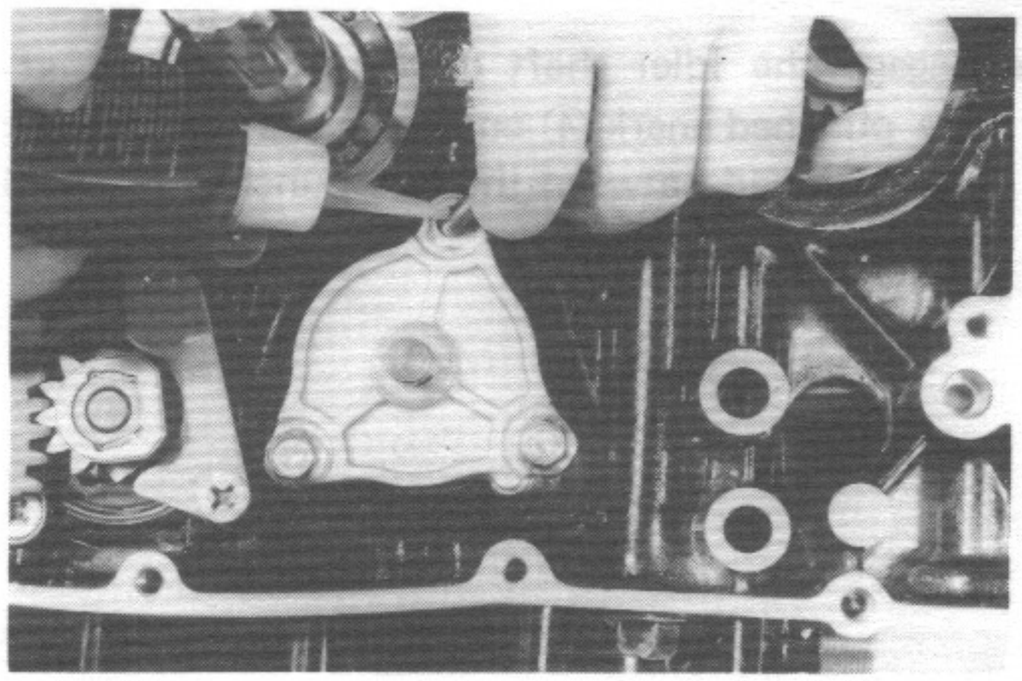


- Install the gearshift shaft, with the center of the gear on shaft side aligned with the center of gear-shift cam driven gear.

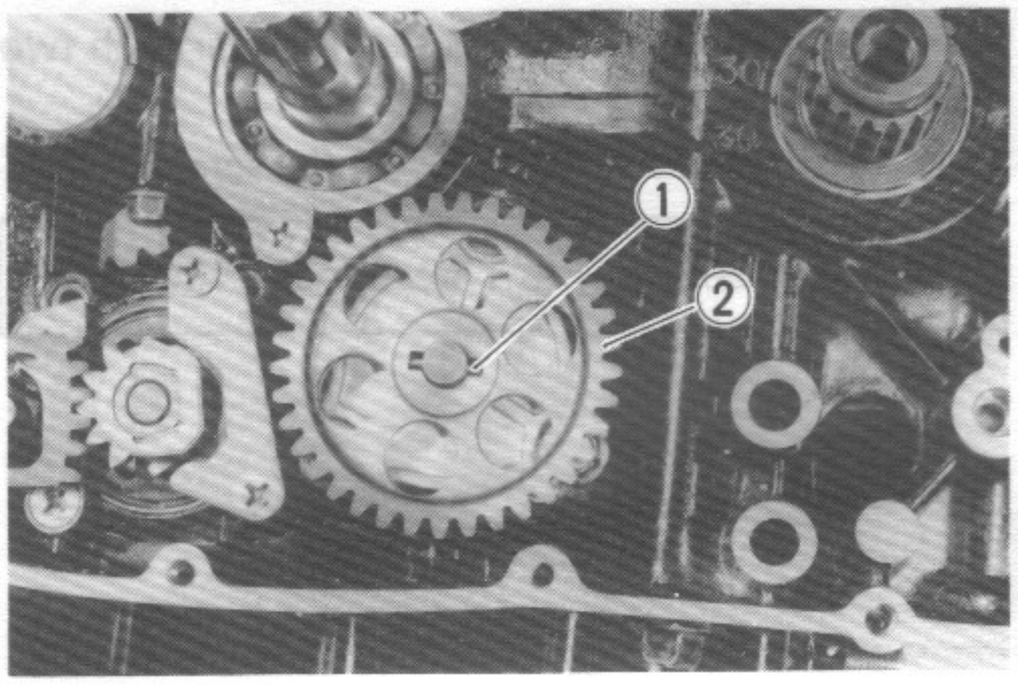


- Install a new O-ring to the oil pump and install the oil pump to the crankcase.

Oil pump tightening torque	7 – 9 N·m (0.7 – 0.9 kg-m) (5.0 – 6.5 lb-ft)

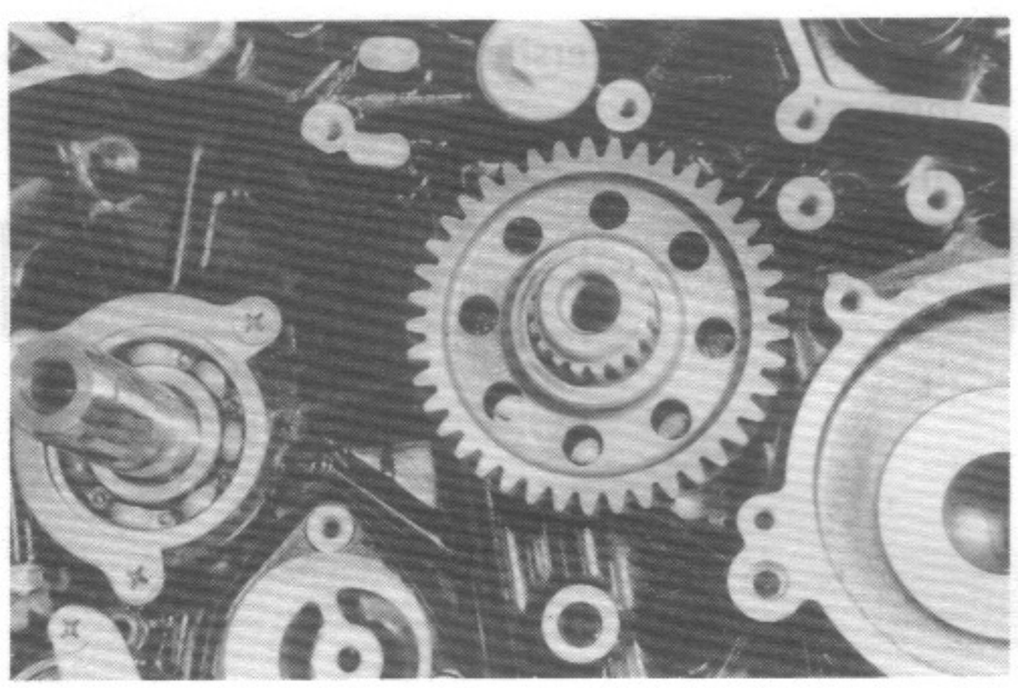


- Install a washer, drive pin ① and driven gear ② to the oil pump shaft.
- Using a snapring pliers, fix the circlip into the groove of the shaft.

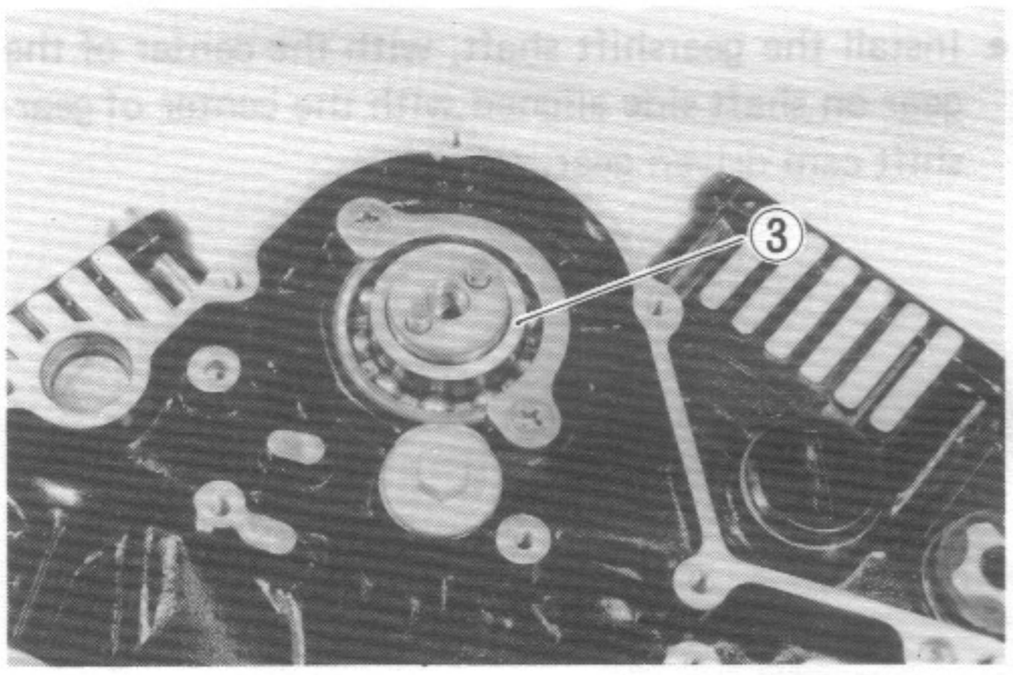


- Install the primary drive gear to the crankshaft.
- Using the special tool, turn the crankshaft so that the No. 1 piston is positioned at T.D.C.

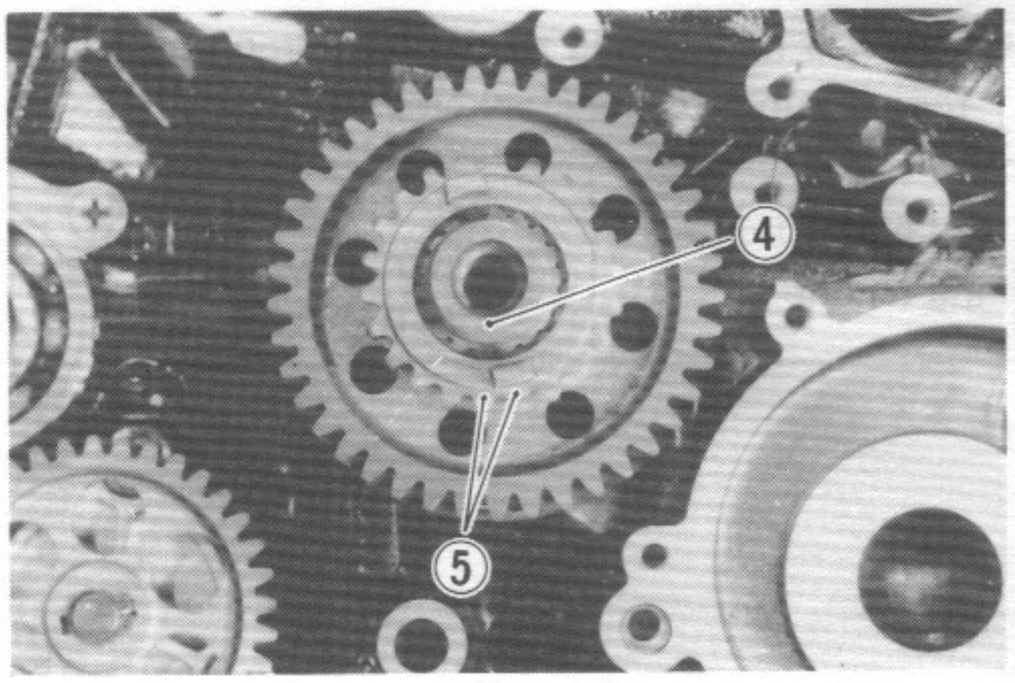
09930 - 40113	Rotor and sprocket holder



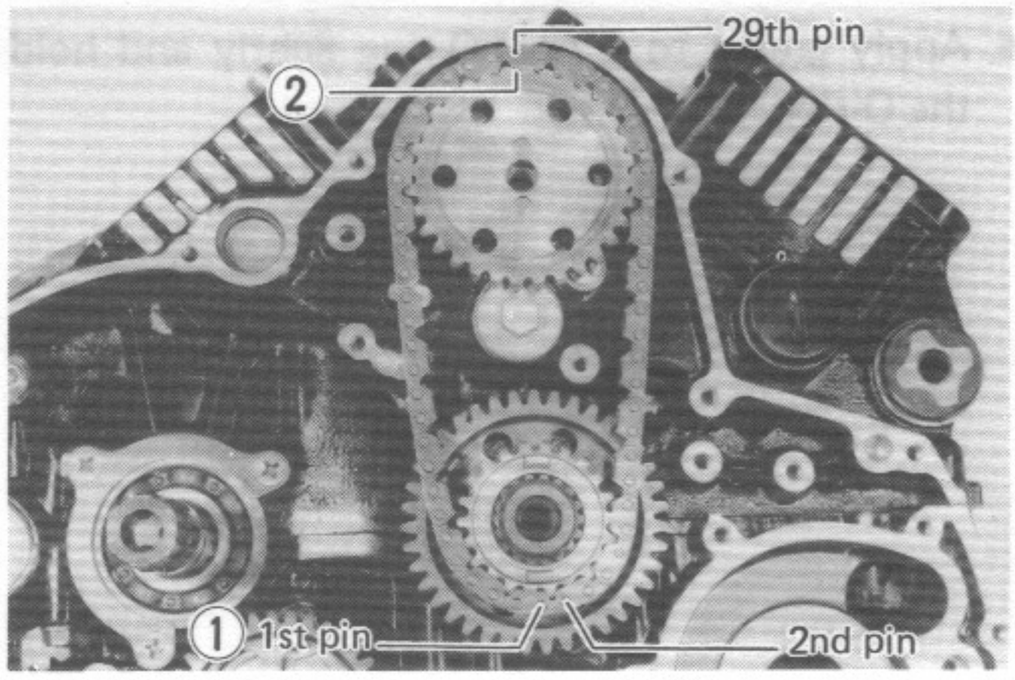
- Install the spacer ③ and two positioning pins to the idler shaft.



- Engage the idler shaft drive sprocket so that the punched mark ④ on the end of crankshaft is positioned between the two punched marks ⑤ on the drive sprocket.



- Engage the idler shaft drive chain to the drive sprocket and count the 29 chain pins starting from the pin ① located between the two punched marks on the sprocket and ending at the 29th pin which should align with the engraved line ② on the driven sprocket.
- Install the driven sprocket to the idler shaft with two positioning pins.

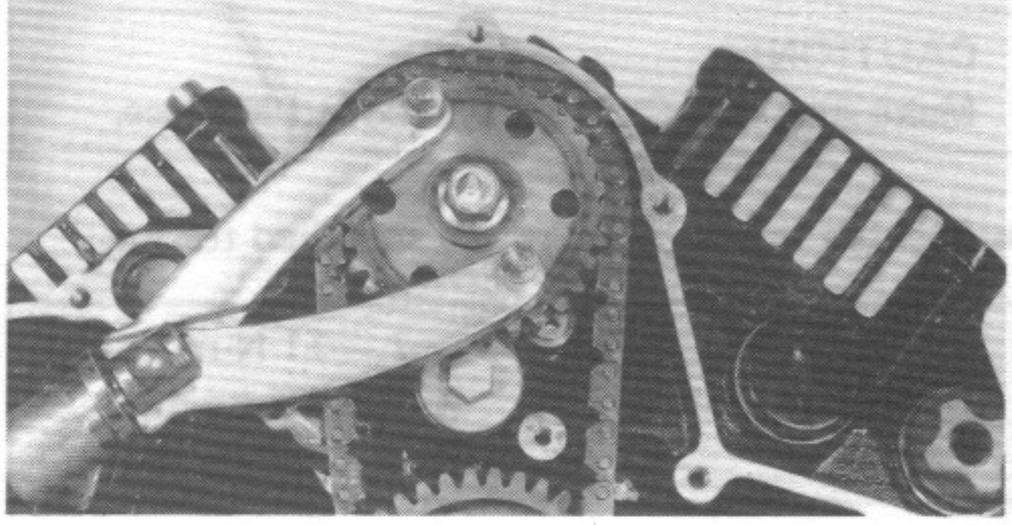


- Slide the washer on the bolt and using the special tool, tighten the idler shaft driven sprocket bolt to the specified torque.

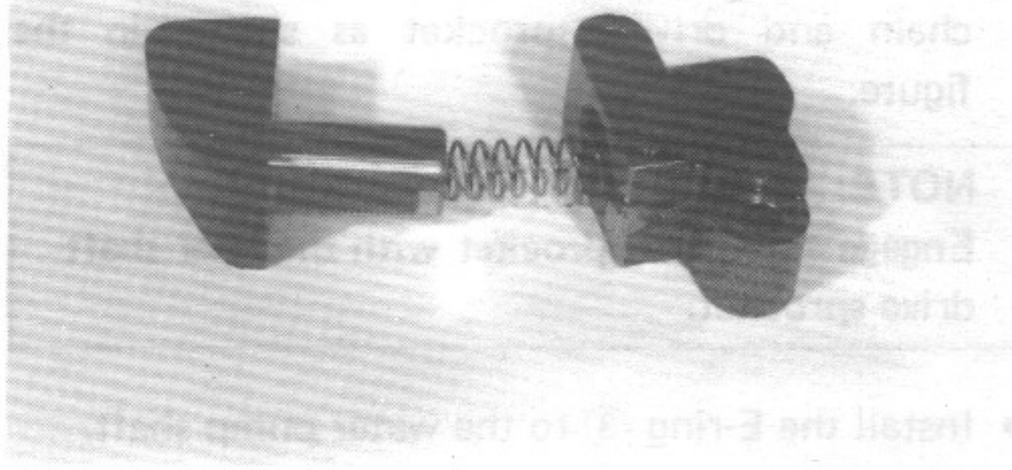
NOTE:
This bolt has left-hand thread and "L"-mark on the crown.

09930 - 40113	Rotor and sprocket holder

Tightening torque	55 – 65 N·m (5.5 – 6.5 kg-m) (40.0 – 47.0 lb-ft)



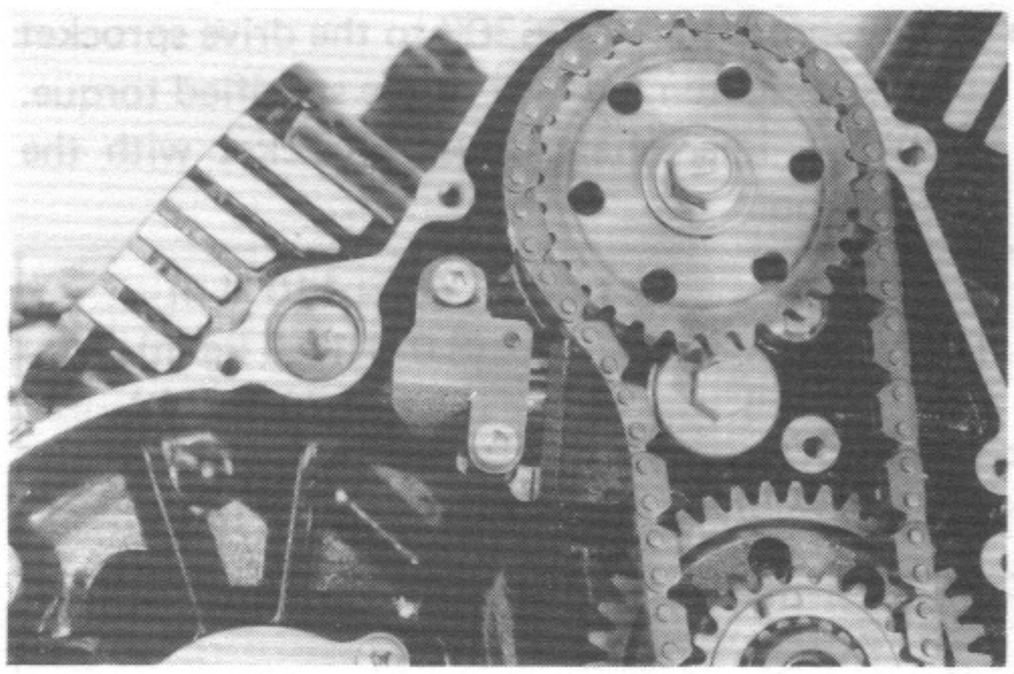
- Unlock the ratchet mechanism and push the push rod fully in the holder body.



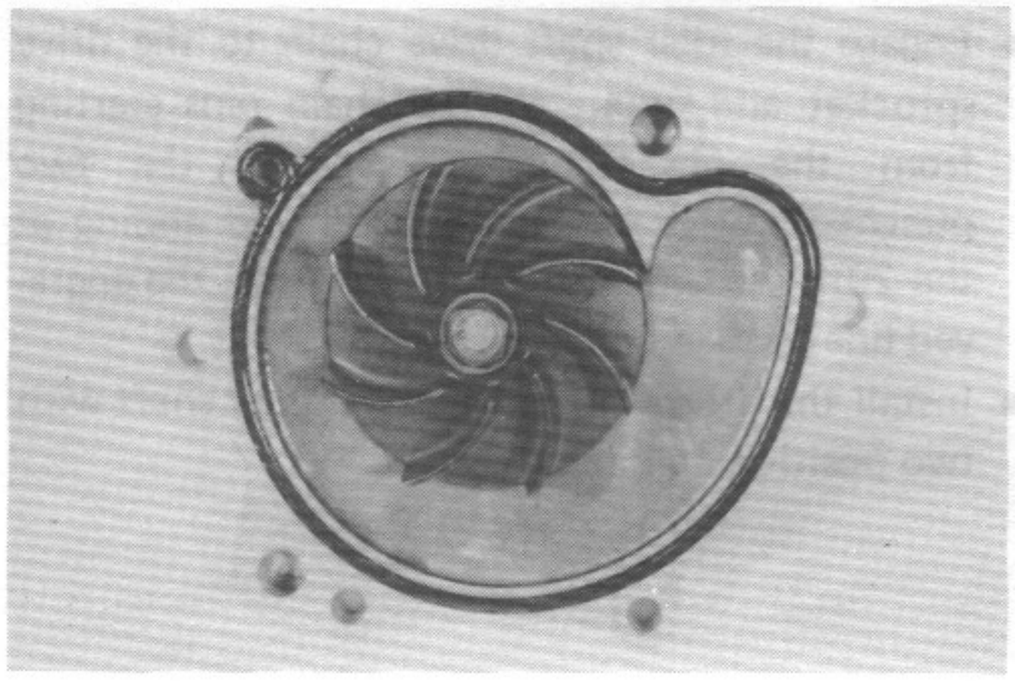
- While holding the chain tensioner push rod in the above position and install the tensioner to the upper crankcase.

99104 - 32050	Thread lock "1363C"

CAUTION:
Do not turn the crankshaft until camshafts are installed.

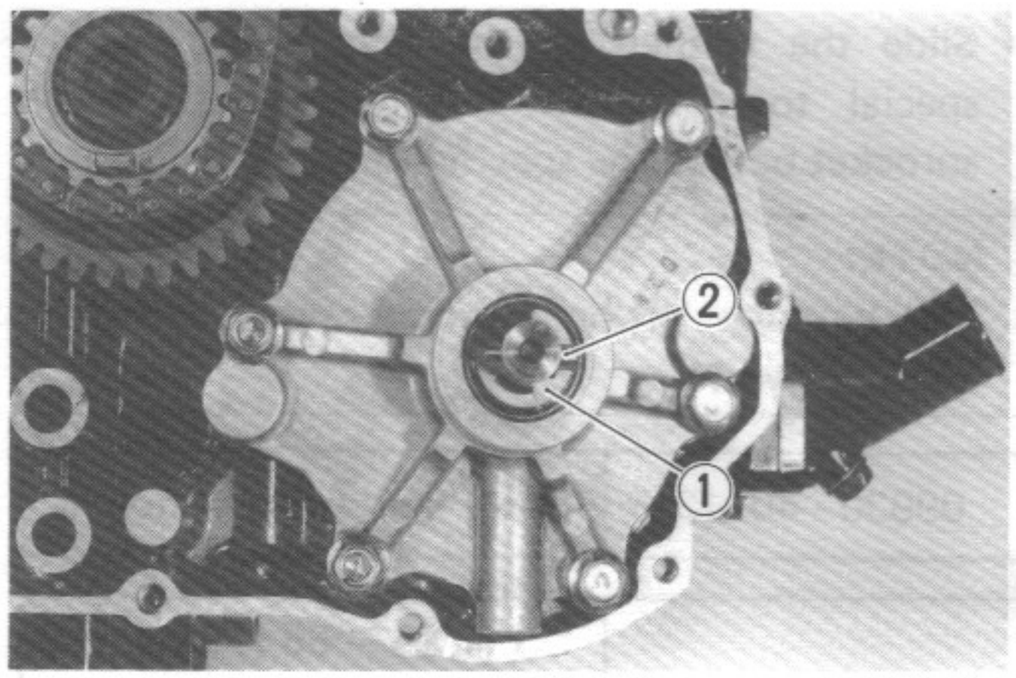


- Apply grease to a new O-ring lightly and hold the O-ring in place.



- Install the two positioning pins and install the water pump to the lower crankcase.

CAUTION:
Make sure that O-ring is positioned in place.



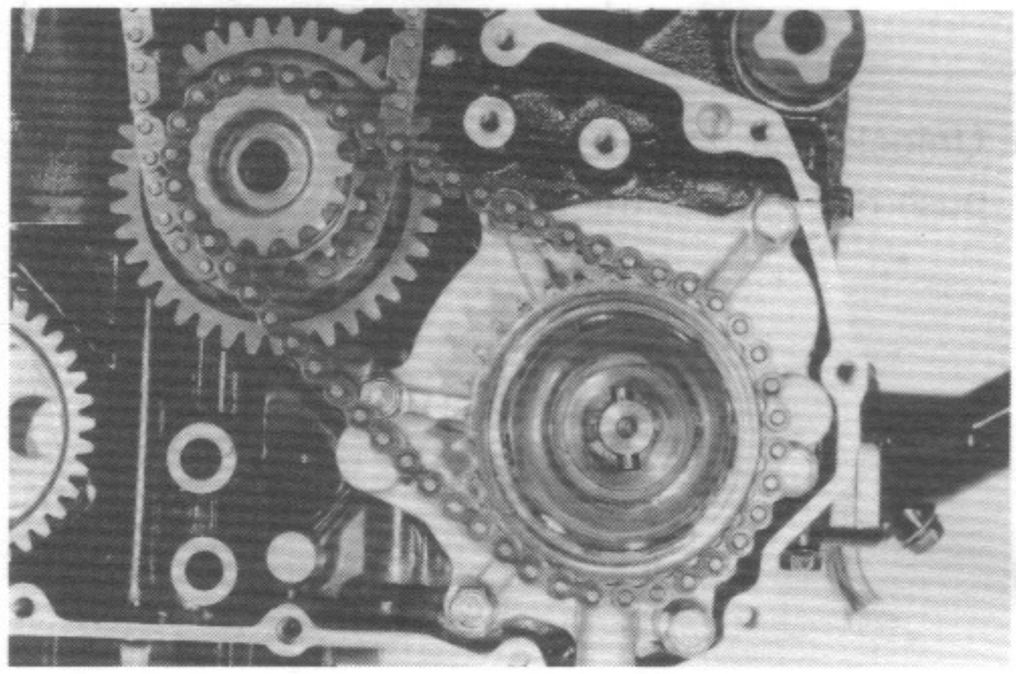
- Tighten the six bolts to the specified torque.

Tightening torque	7 – 11 N·m (0.7 – 1.1 kg-m) (5.0 – 8.0 lb-ft)

- Install the E-ring ① and drive pin ② to the water pump shaft.

- Install the water pump drive sprocket, drive chain and driven sprocket as shown in the figure.

NOTE:
Engage the drive sprocket with the idler shaft drive sprocket.

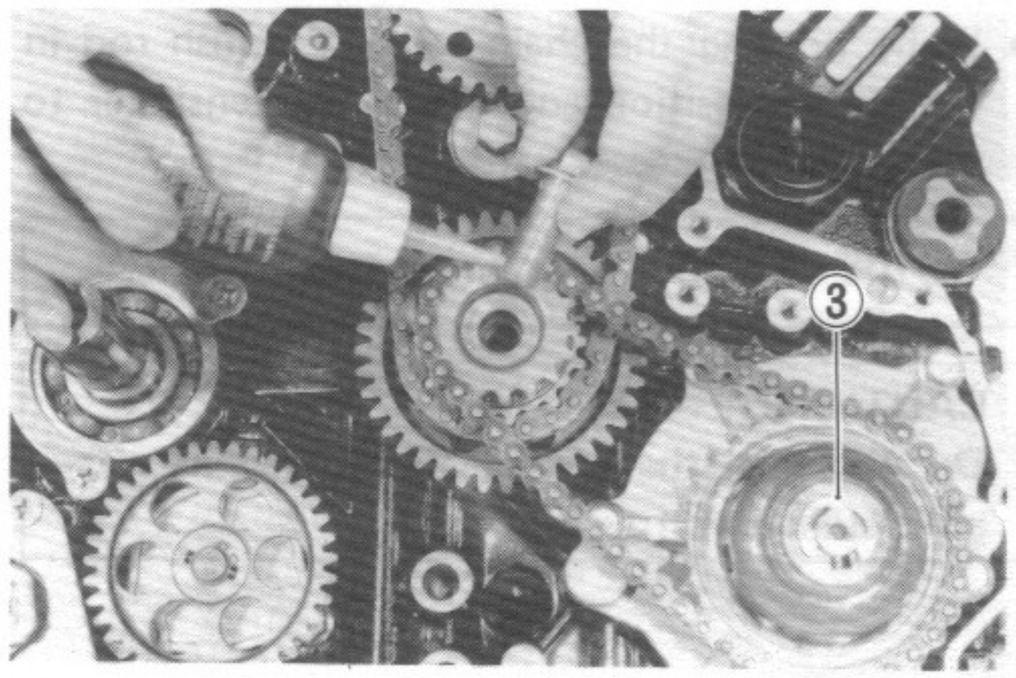


- Install the E-ring ③ to the water pump shaft.

- Apply thread lock "1363C" to the drive sprocket bolt and tighten the bolt to the specified torque. Hold the idler shaft driven sprocket with the special tool.

Tightening torque	80 – 110 N·m (8.0 – 11.0 kg-m) (58.0 – 79.5 lb-ft)
99104 - 32050	Thread lock "1363C"

NOTE:
This bolt has left-hand thread and "L"-mark on the crown.

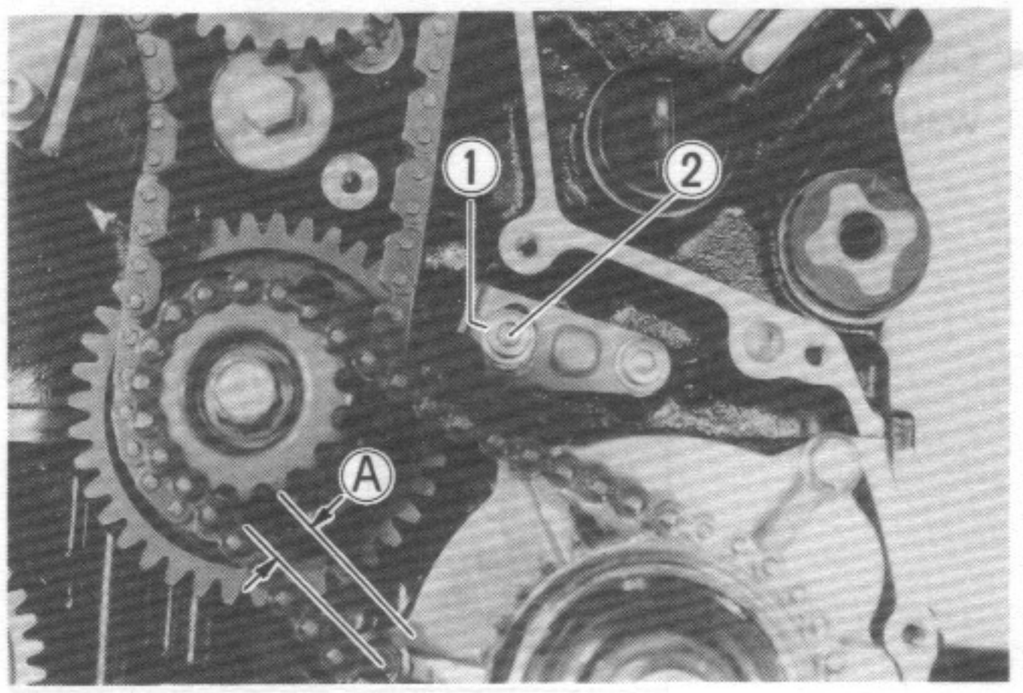


- Install the chain tensioner with two bolts.
- Remove the chain slack by pushing the chain tensioner and tighten the bolts.

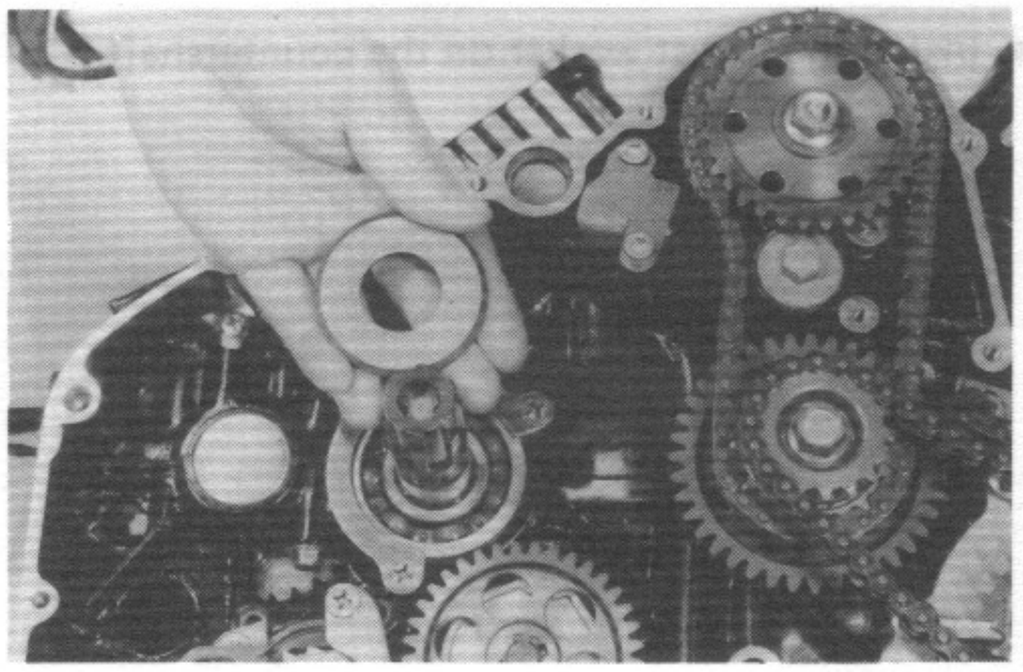
CAUTION:
*** Do not stretch the chain too tight.**
*** Bring the index line ① on the chain tensioner to the center of the bolt ②.**

Water pump chain slack Ⓐ	3 – 5 mm (0.12 – 0.2 in)

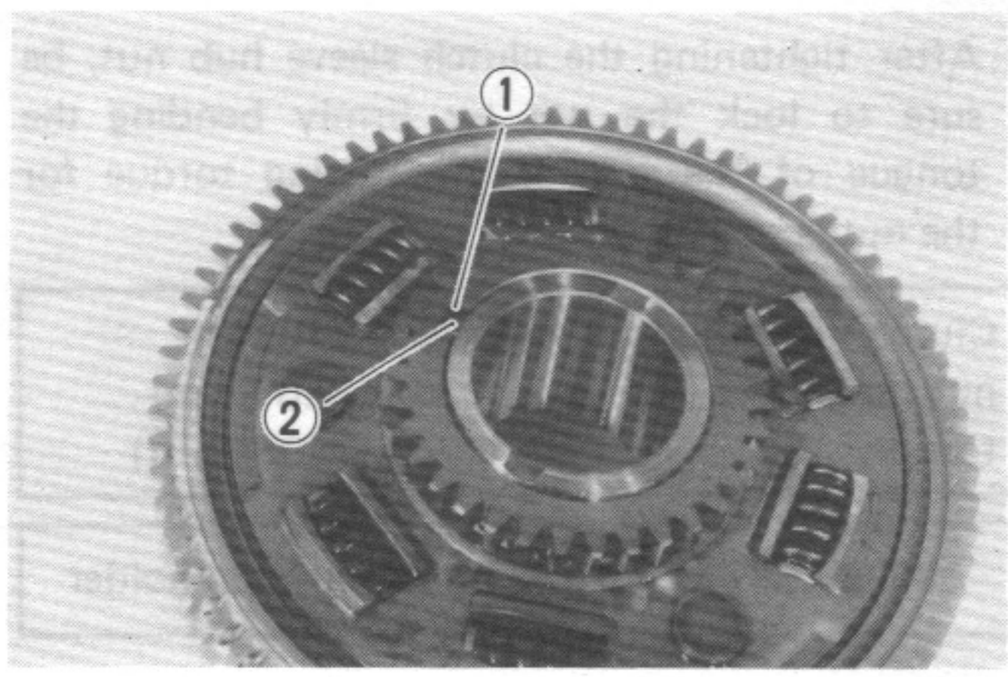
Tightening torque	12 – 17 N·m (1.2 – 1.7 kg-m) (8.5 – 12.5 lb-ft)



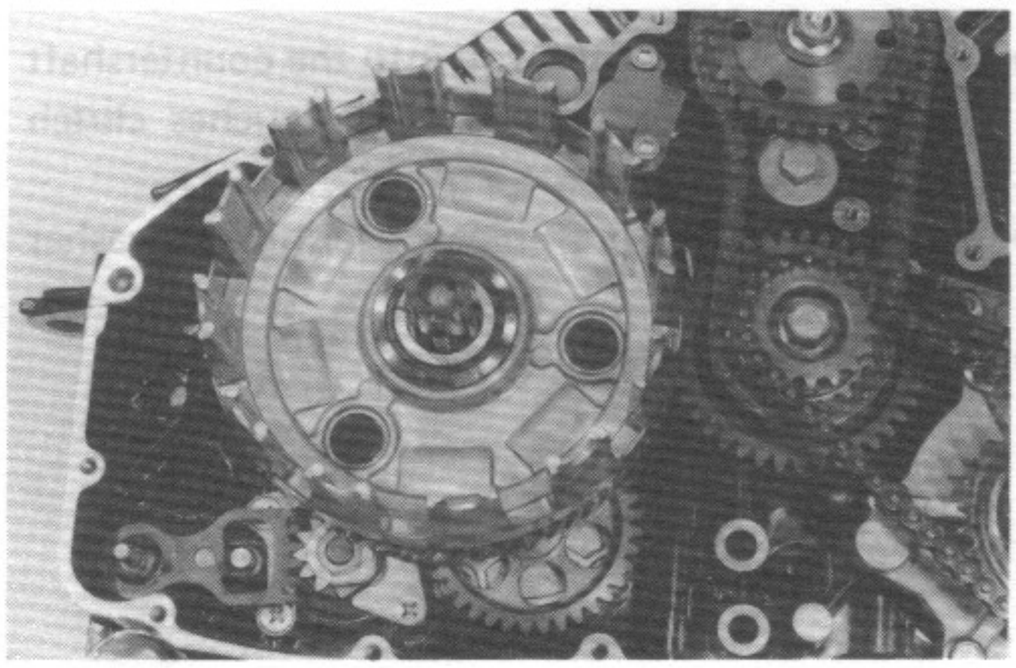
- When installing the thrust washer to the countershaft, chamfered side of the washer faces inwards.



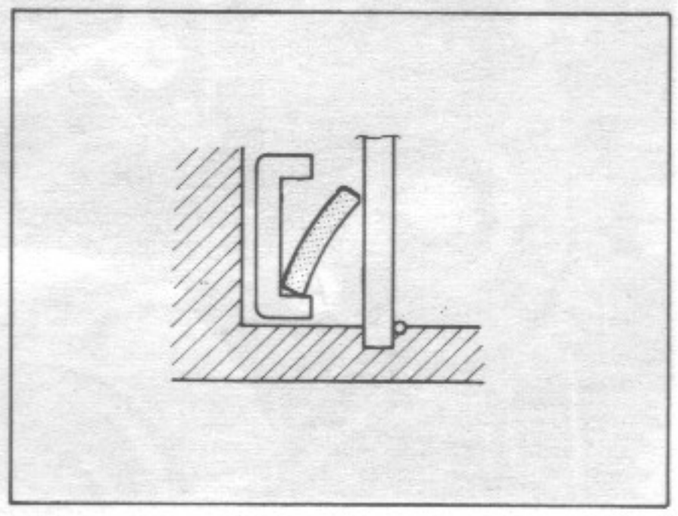
- Align the notch ① of the oil pump drive gear with the positioning pin ② and install the pump drive gear to the primary driven gear assembly.

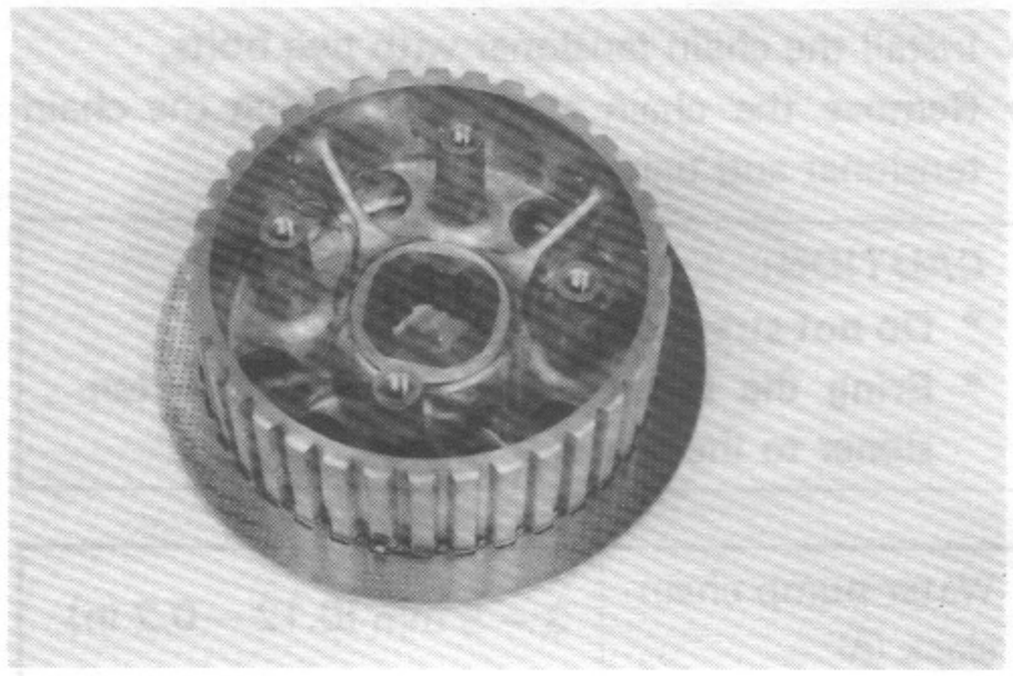


- Apply engine oil to the primary driven gear bearing and spacer and assemble the primary driven gear to the countershaft.

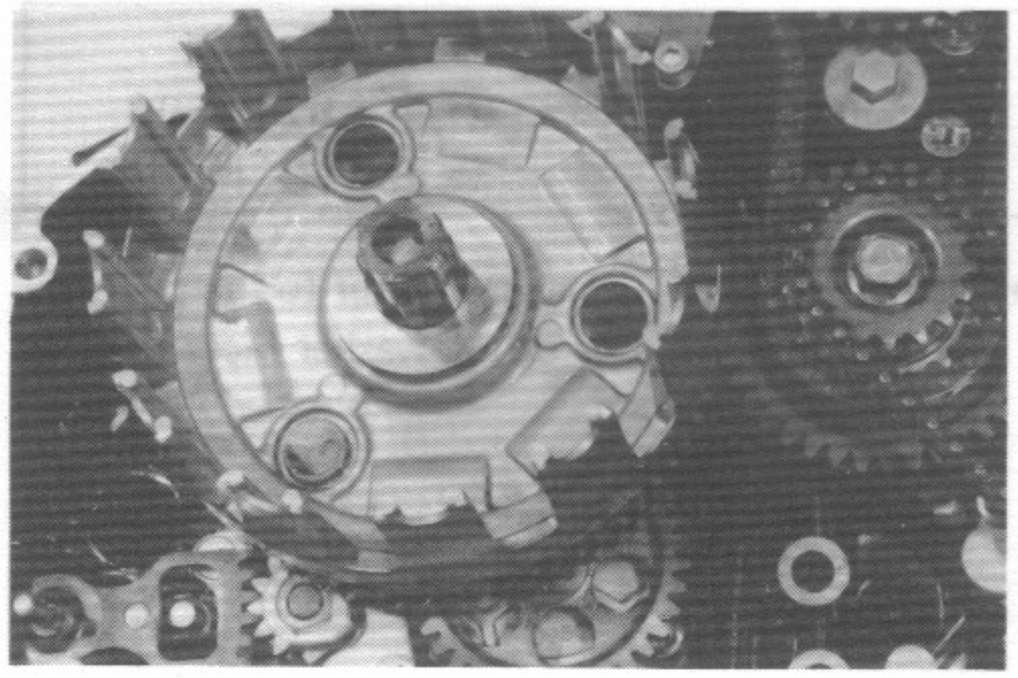


- Check to be sure that the piano wire, wave washer and driven plate are properly installed.





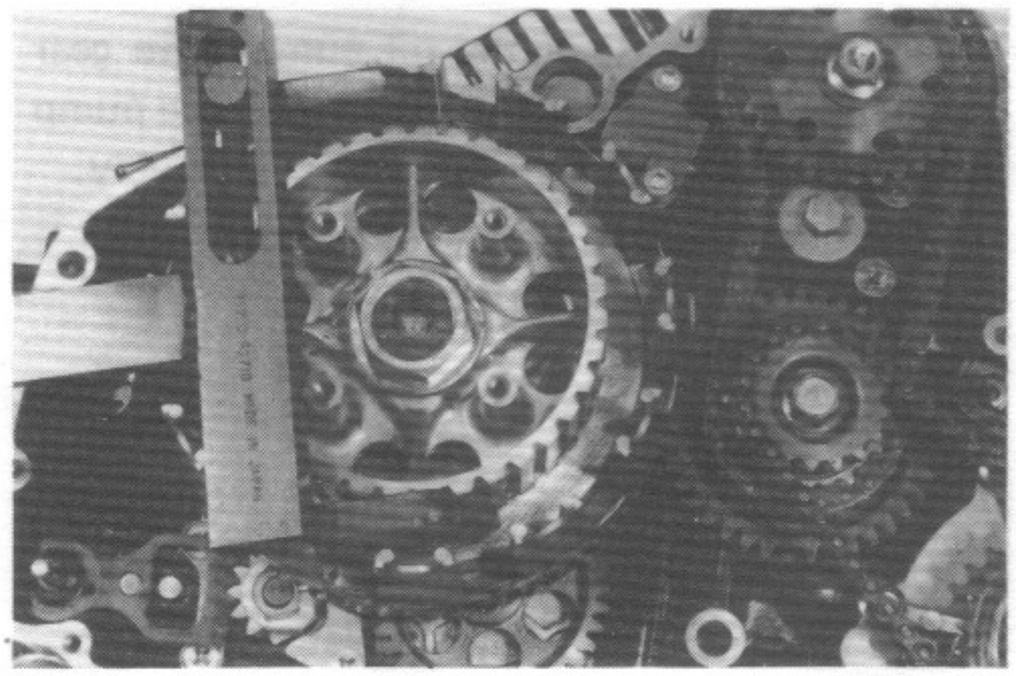
- Install the thrust washer on the countershaft.



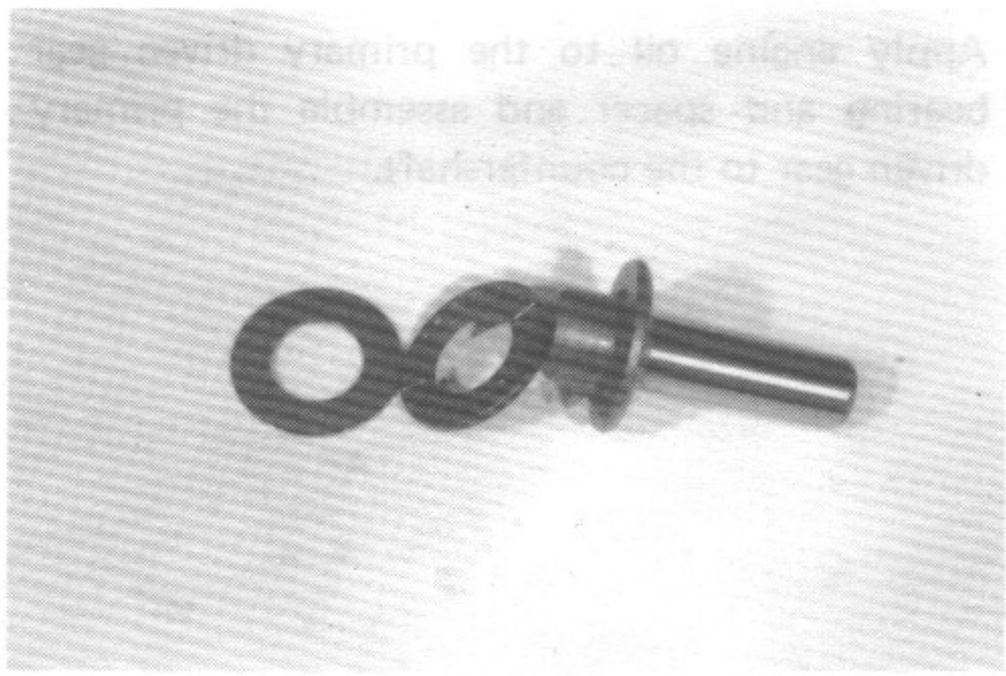
- After tightening the clutch sleeve hub nut, be sure to lock the nut by firmly bending the tongue of the washer. Tightening torque for the nut is specified.

Clutch sleeve hub nut tightening torque	50 – 70 N·m (5.0 – 7.0 kg-m) (36.0 – 50.5 lb-ft)

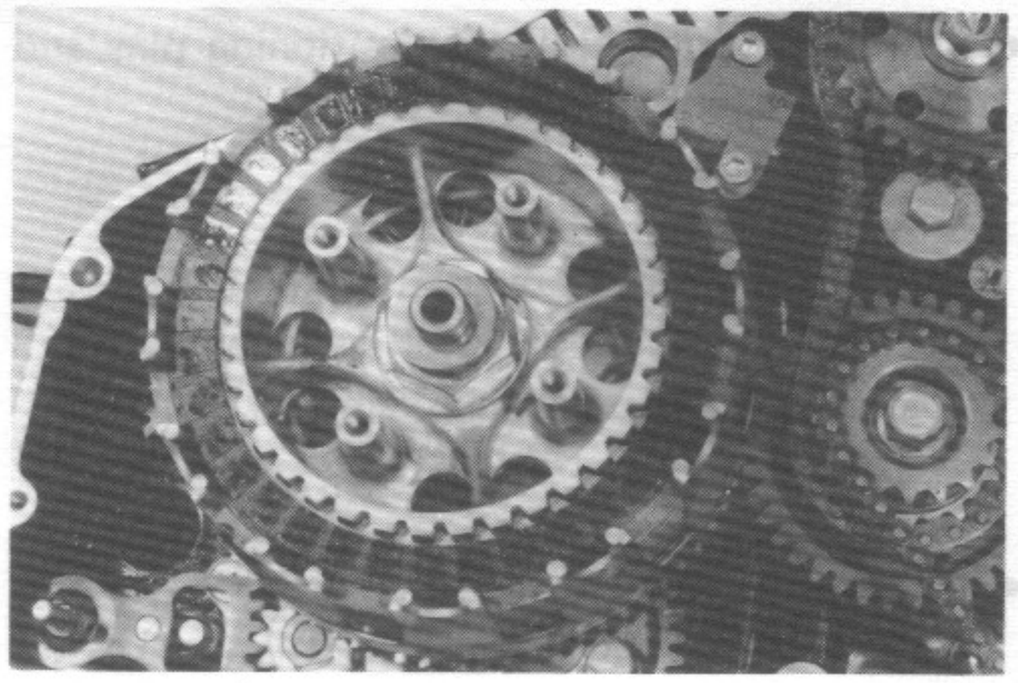
09920 - 53710	Clutch sleeve hub holder



- Install the clutch push rod into the countershaft so that the large diameter end touches clutch push piece.
- Install the clutch push piece, bearing and washer in that order.
- Apply engine oil to the bearing.



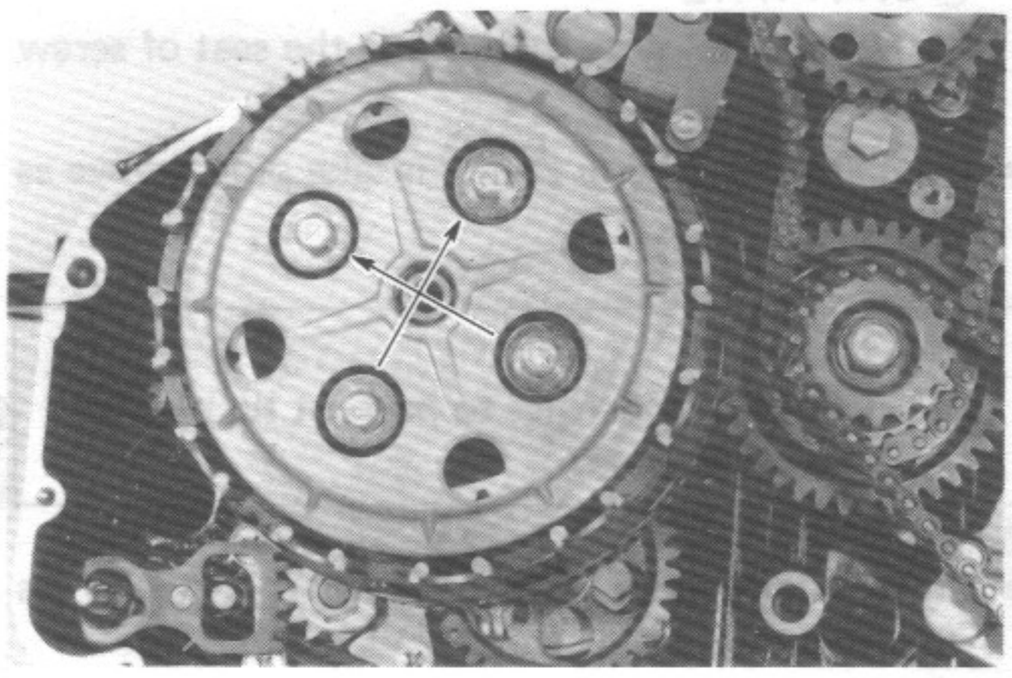
- Insert clutch drive plate and driven plate one by one into sleeve hub in the prescribed order, cork plate first. Insert clutch push piece, bearing and thrust washer into pressure plate, making sure that the thrust washer is between the bearing and sleeve hub. Then fit pressure plate into sleeve hub.



- Tighten clutch spring bolts in the order shown in the photo.

NOTE:
Tighten the clutch spring set bolts in the manner indicated, tightening them by degrees until they attain a uniform tightness.

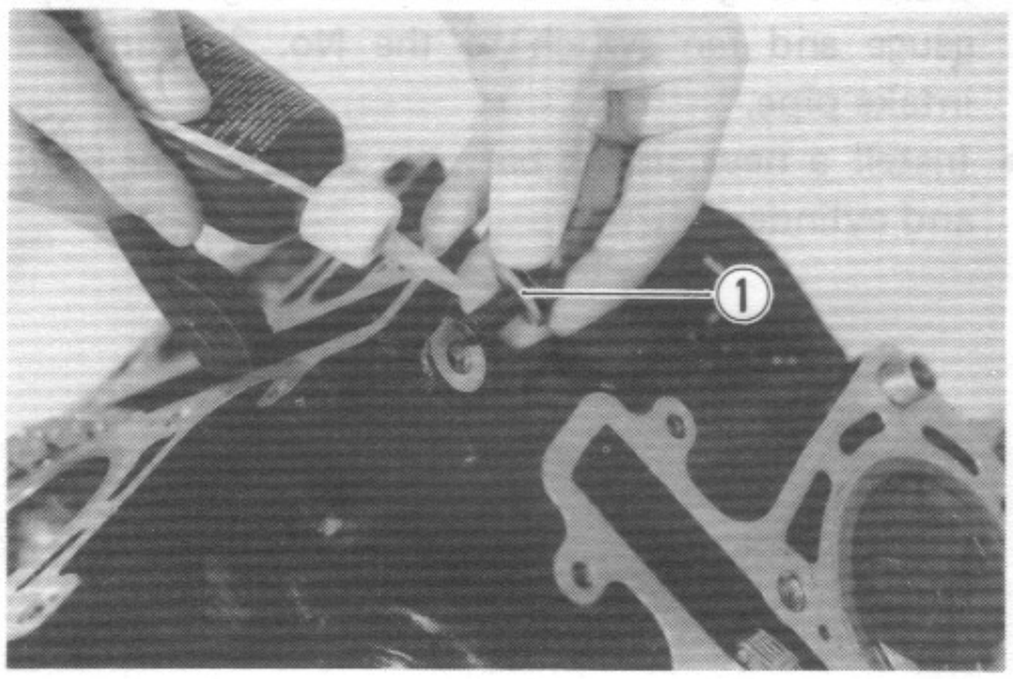
Clutch spring bolt tightening torque	11 – 13 N·m (1.1 – 1.3 kg-m) (8.0 – 9.5 lb-ft)



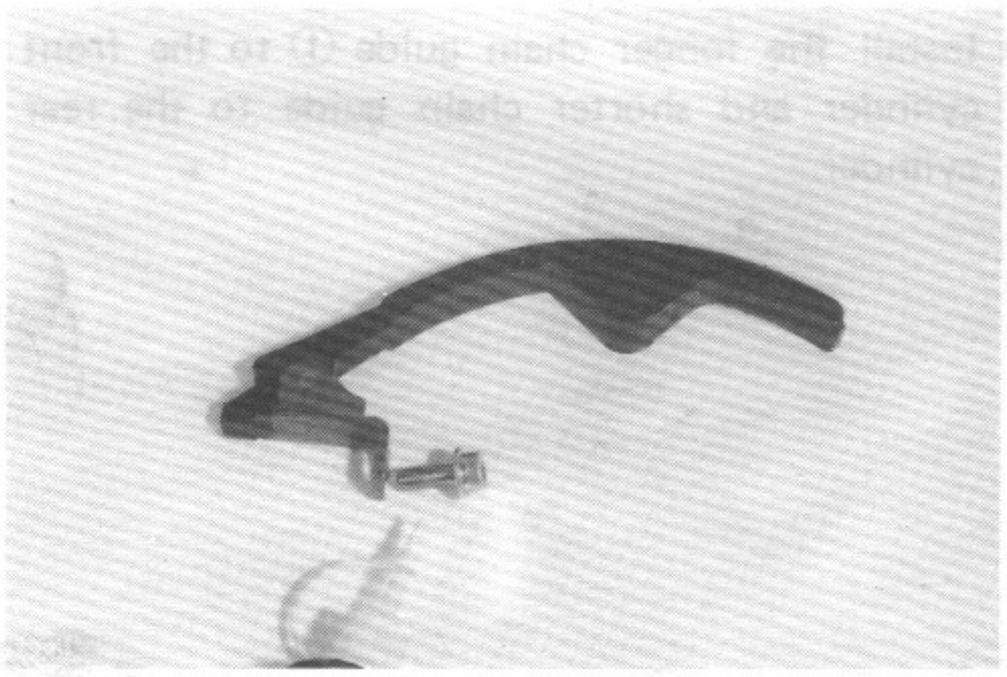
- Slide the gasket ① on the bolt and install the front cam chain tensioner to the front chain cavity.

99104 - 32050	Thread lock "1363C"

Tightening torque	20 – 25 N·m (2.0 – 2.5 kg-m) (14.5 – 18.0 lb-ft)

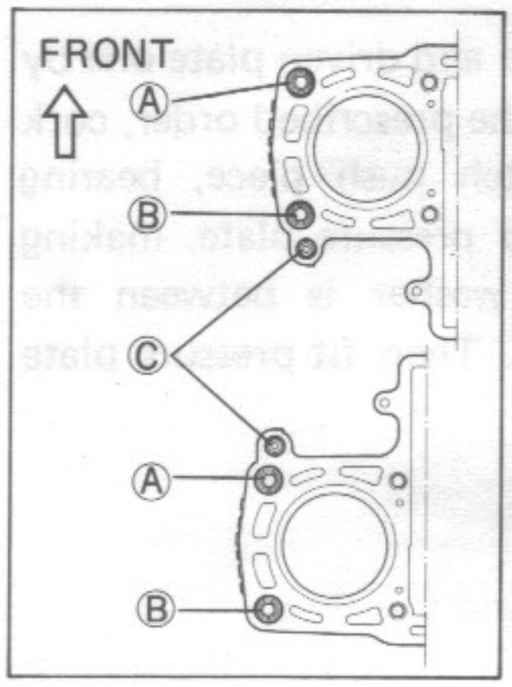


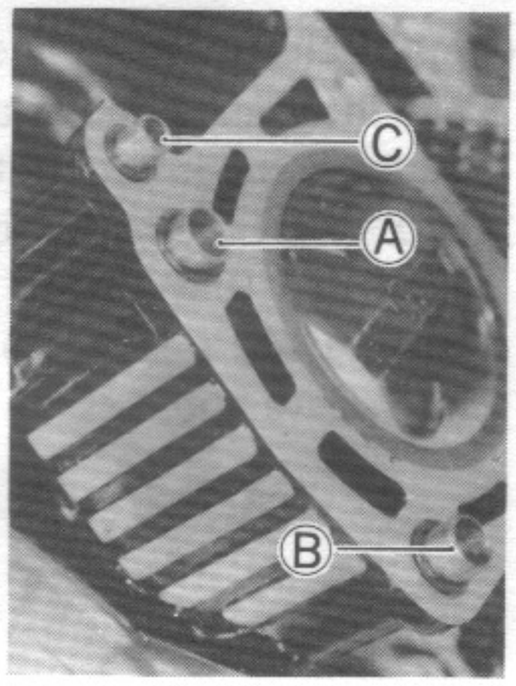
- Install the rear chain tensioner to the rear chain cavity in the same manner as front.



- Install the three kinds of positioning pins and O-rings properly.

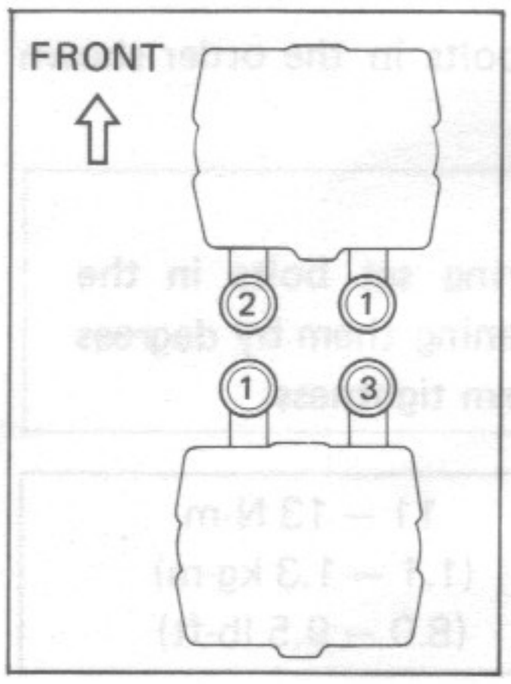
Ⓐ : Short positioning pin.
Ⓑ : Long positioning pin.
Ⓒ : Smaller diam. pin.

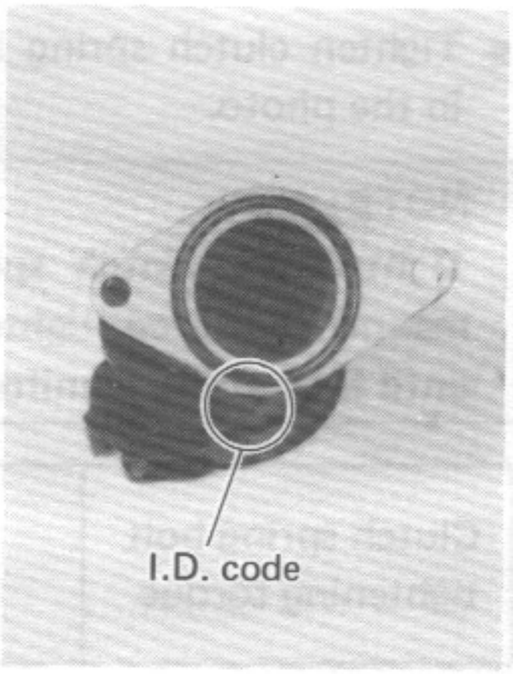




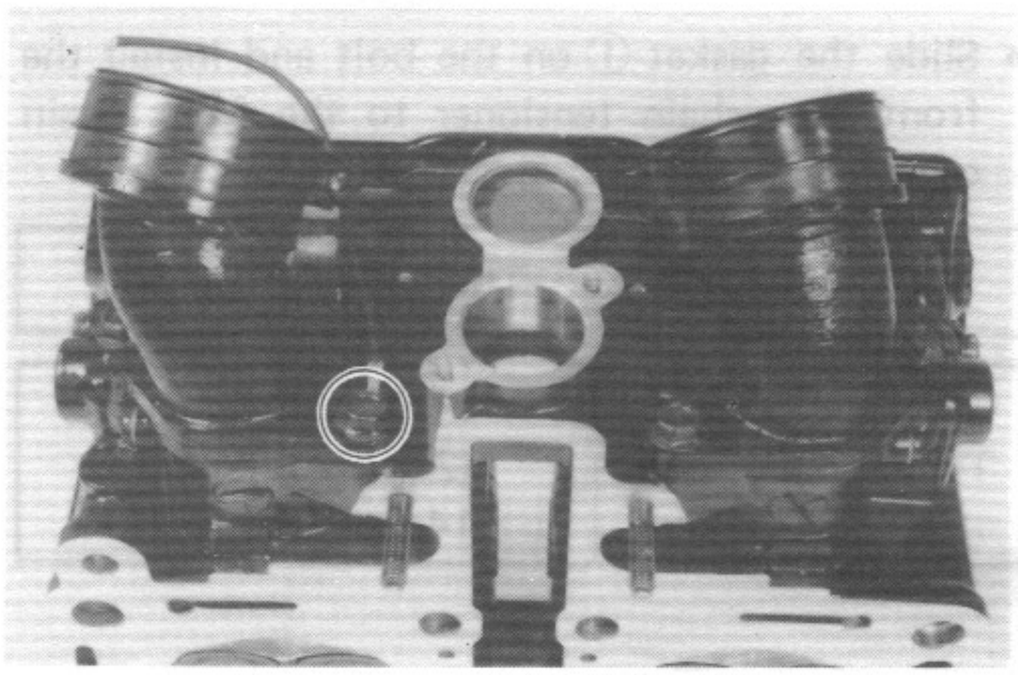
- Identify the three different intake pipes according to each I.D. code.
  ① 07A FR RL
  ② 07A FL RR with masking at the seat of screw
  ③ 07A FL RR
- Install a new O-ring to the intake pipe groove as shown.

CAUTION:
Always use new O-rings to prevent sucking air from the joint part.

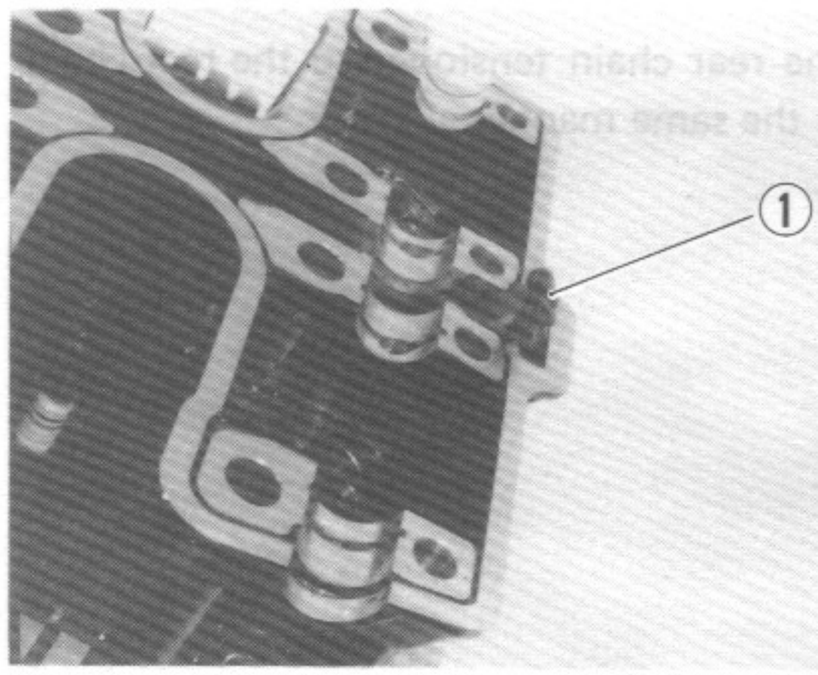




- Each intake pipe should position properly as shown in the illustration.
- Install the ground lead wire for engine Temp. gauge and fan switch to the No. 2 cylinder's intake pipe.
- Install a new gasket between the cylinder head and cylinder.

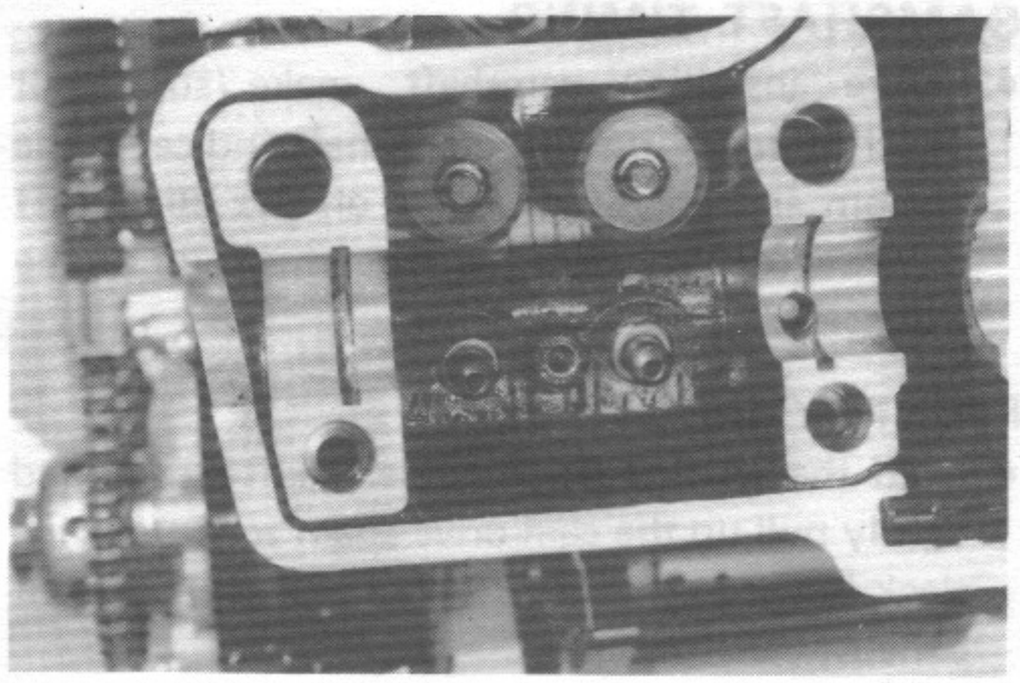


- Install the longer chain guide ① to the front cylinder and shorter chain guide to the rear cylinder.

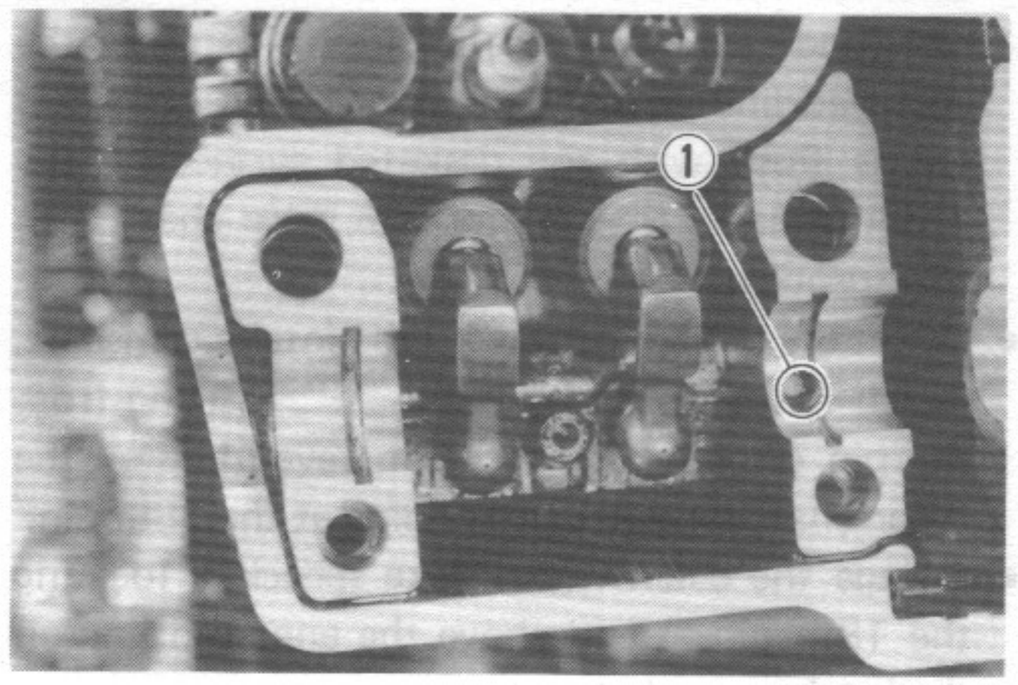


- After charging lash adjuster with kerosene, install the lash adjuster to the proper position. (See page 3-29)

NOTE:
Pour engine oil into the hole for lash adjuster.

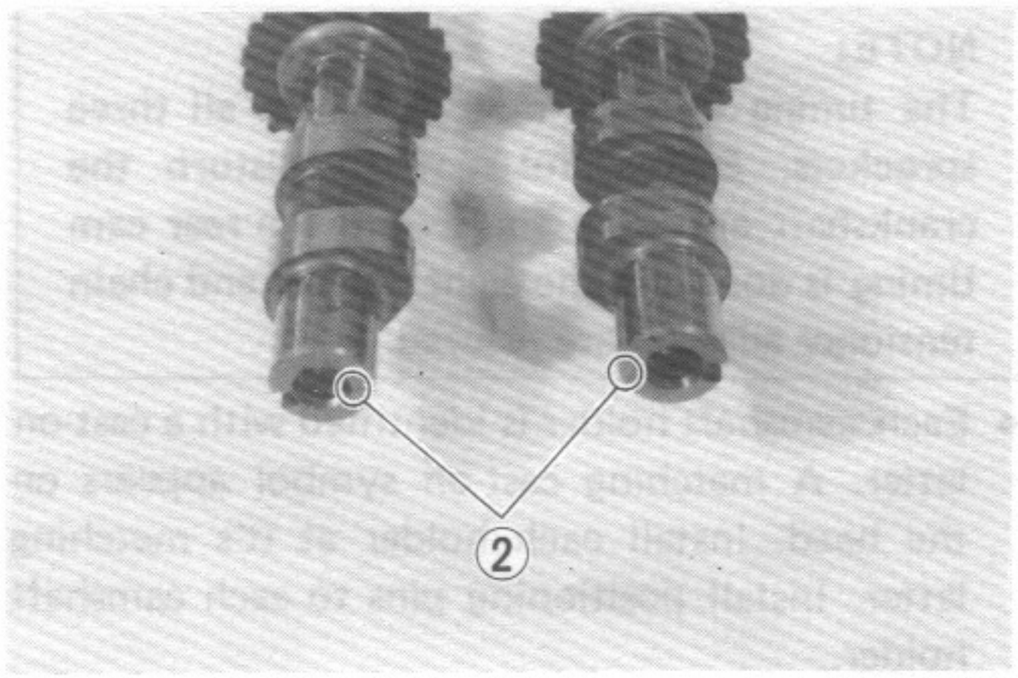


- Check the filters ① located under the camshaft journal holder for clogging.
- Put cam followers on the valve stem and lash adjuster.



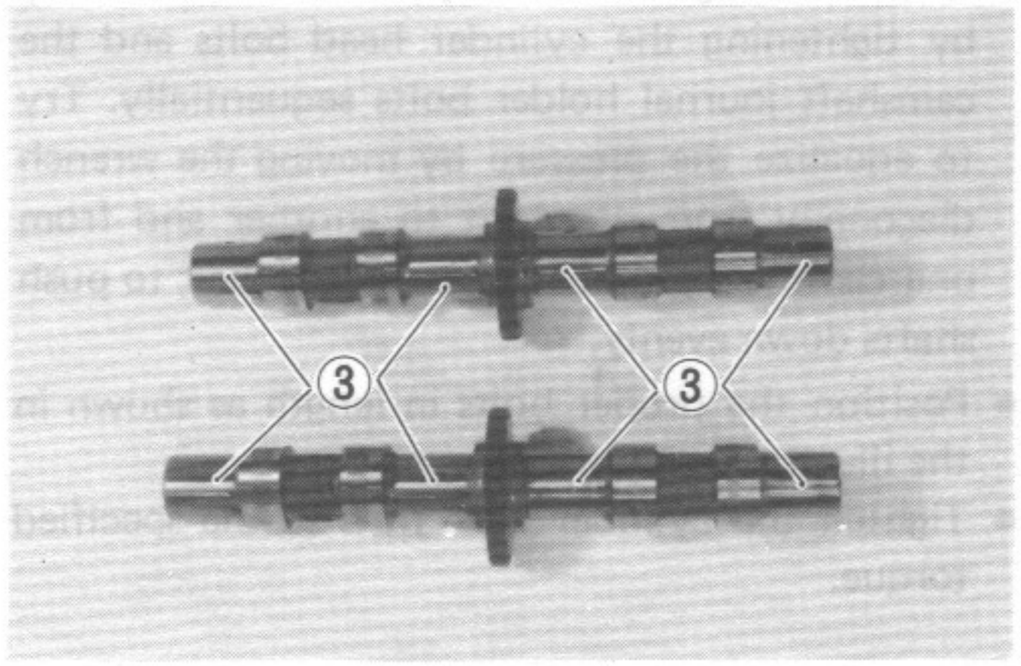
- Identify each camshaft with the Identification letters ②, "E", "F", "G" or "H", which is punched at the right end of the camshaft.

E : Front exhaust camshaft
F : Front intake
G : Rear intake
H : Rear exhaust



NOTE:
Just before placing the camshaft on the cylinder head, apply high quality molybdenum disulfide lubricant to its journals, fully coating each journal ③ with the paste taking care not to leave any dry spot. Apply engine oil to the journal bearings.

99000 - 25140	SUZUKI Moly Paste



CAMSHAFT TIMING

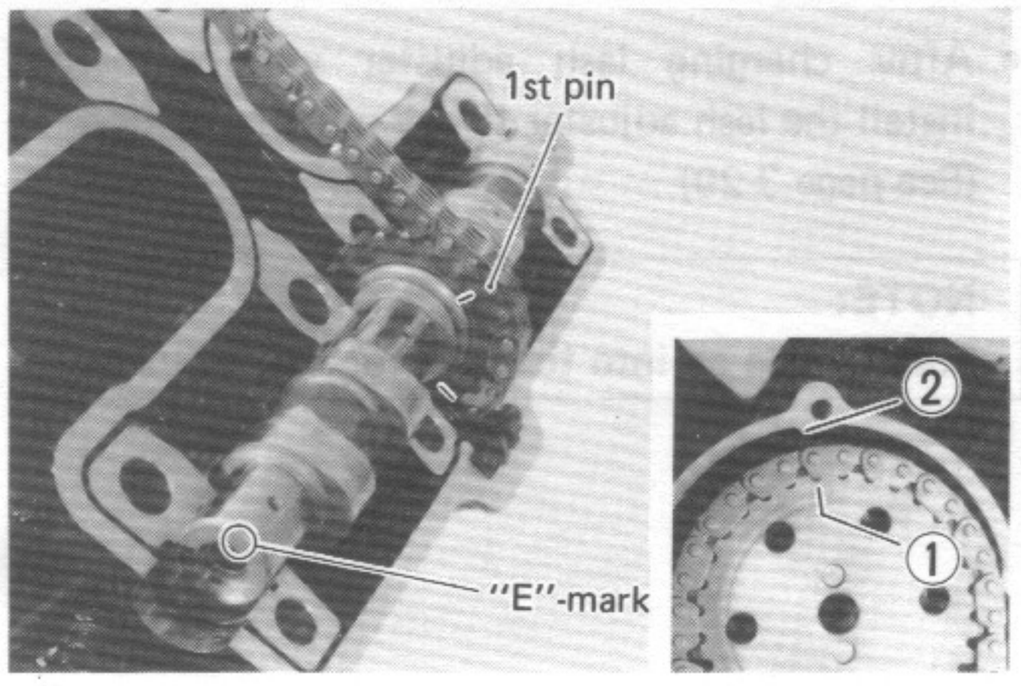
- Before installing camshaft, make sure that punched mark on the crankshaft indicates the bottom and engraved line ① on the idler shaft driven sprocket meets the index mark ② on the crankcase.

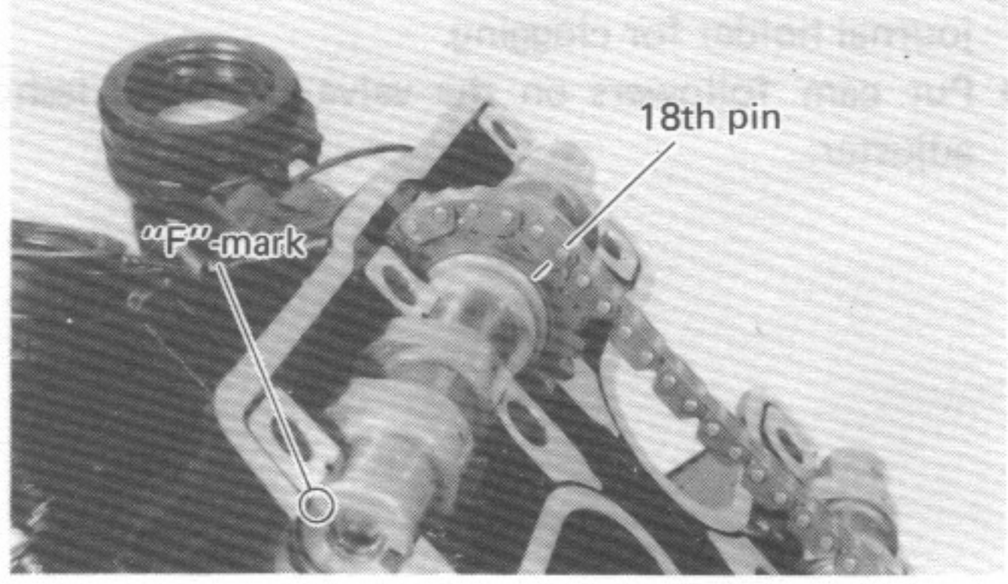
FRONT CYLINDER

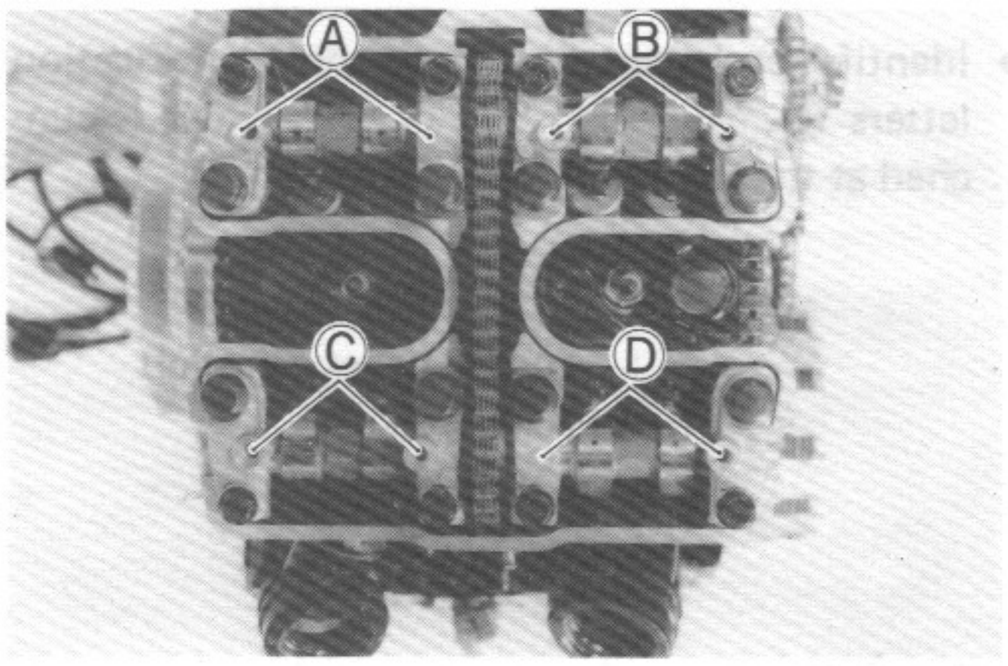
- Hold the crankshaft and idler shaft steady and lightly pull up the cam drive chain to remove the slack between the idler shaft sprocket and front exhaust cam sprocket.
- Exhaust camshaft bears a marked "E" on its right end. Turn over the E-camshaft so that the engraved line on the right end of the E-camshaft points flush with the gasketed surface of the cylinder head. Engage the cam drive chain with this sprocket.
- Count the chain pins toward the intake camshaft, which is identified by letter "F", starting from the pin directly above the engraved line on the E-camshaft sprocket and ending at the 18th pin.
- Engage the chain with intake sprocket, locating the 18th pin at and above the engraved line on the intake sprocket.

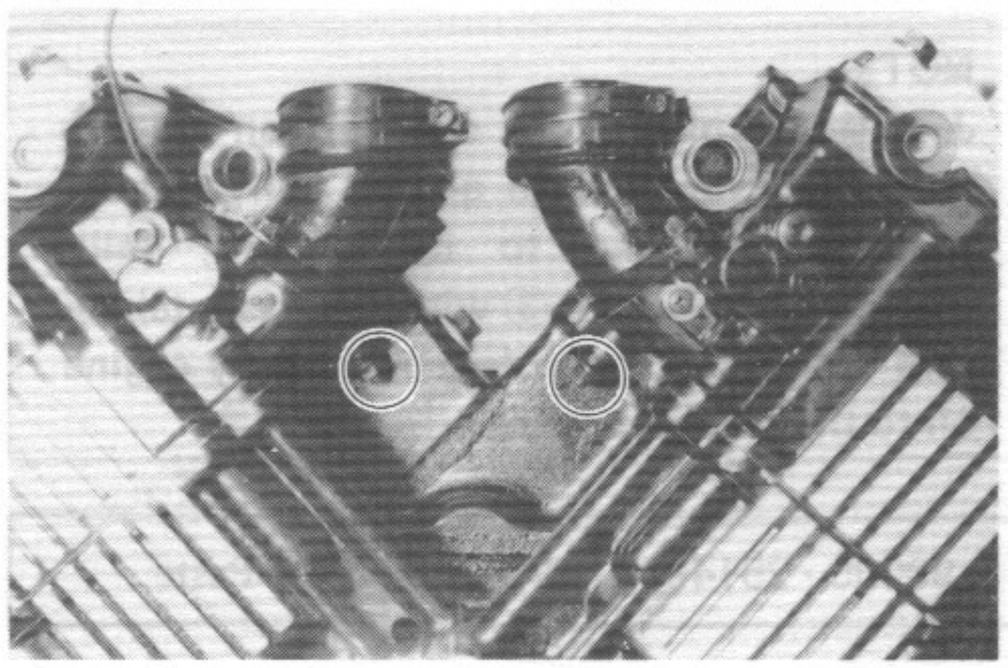
NOTE:
The timing chain is now riding on all three sprockets. Be careful not to disturb the crankshaft and idler shaft until the rear cam timing is done and the eight holders and chain tensioner adjuster are secured.

- Each camshaft holder is identified with a cast-on letter. A matching cast-on symbol appears on the head. Install each holder at it's matching letter. Install positioning pins to each camshaft holder.
- Secure the eight camshaft journal holders evenly by tightening the cylinder head bolts and the camshaft journal holder bolts sequentially. Try to equalize the pressure by moving the wrench diagonally from one bolt to another and from one camshaft journal holder to another, to push shafts down evenly.
- Position the proper bolts in length as shown in the illustration on the next page.
- Tighten the cylinder head nuts to the specified torque.









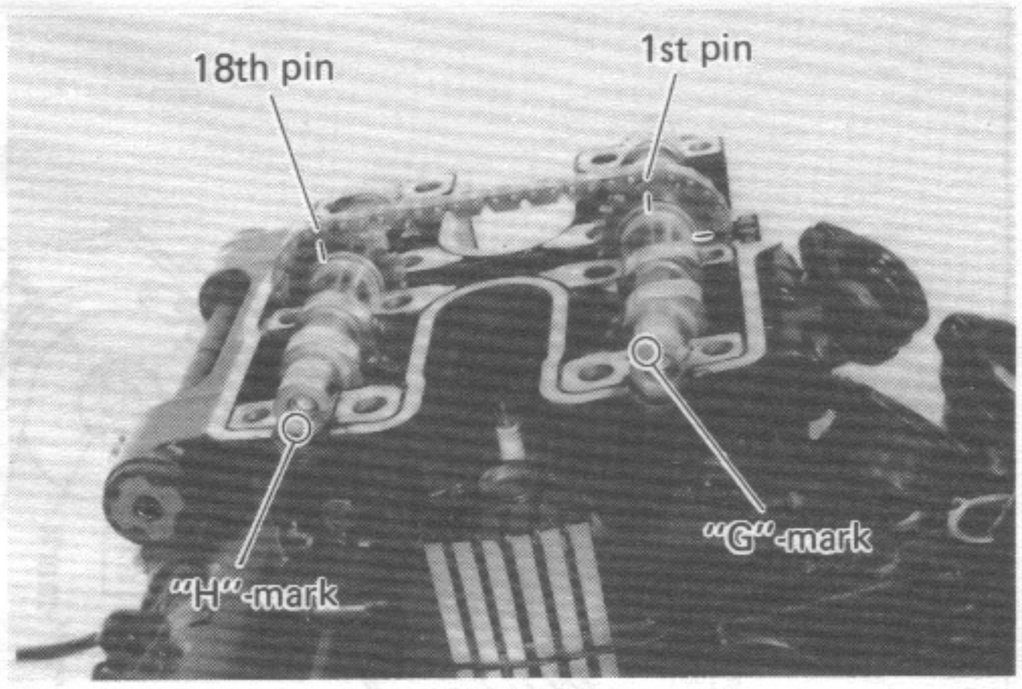
REAR CYLINDER

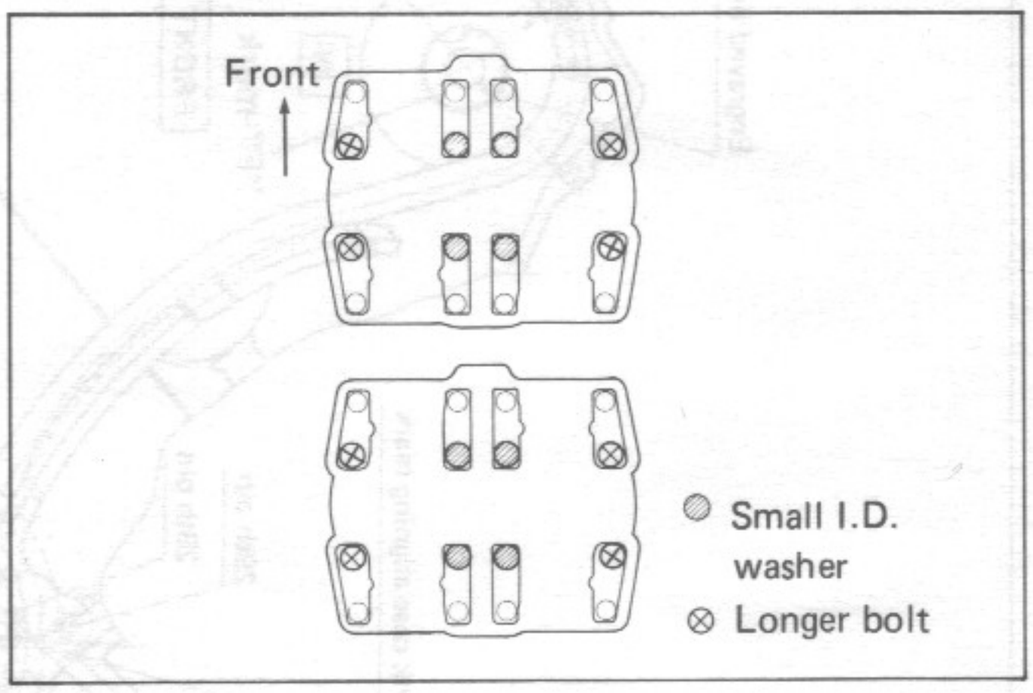
- Repeat the above procedure when reinstalling the rear cylinder head, camshafts and camshaft journal holders.

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

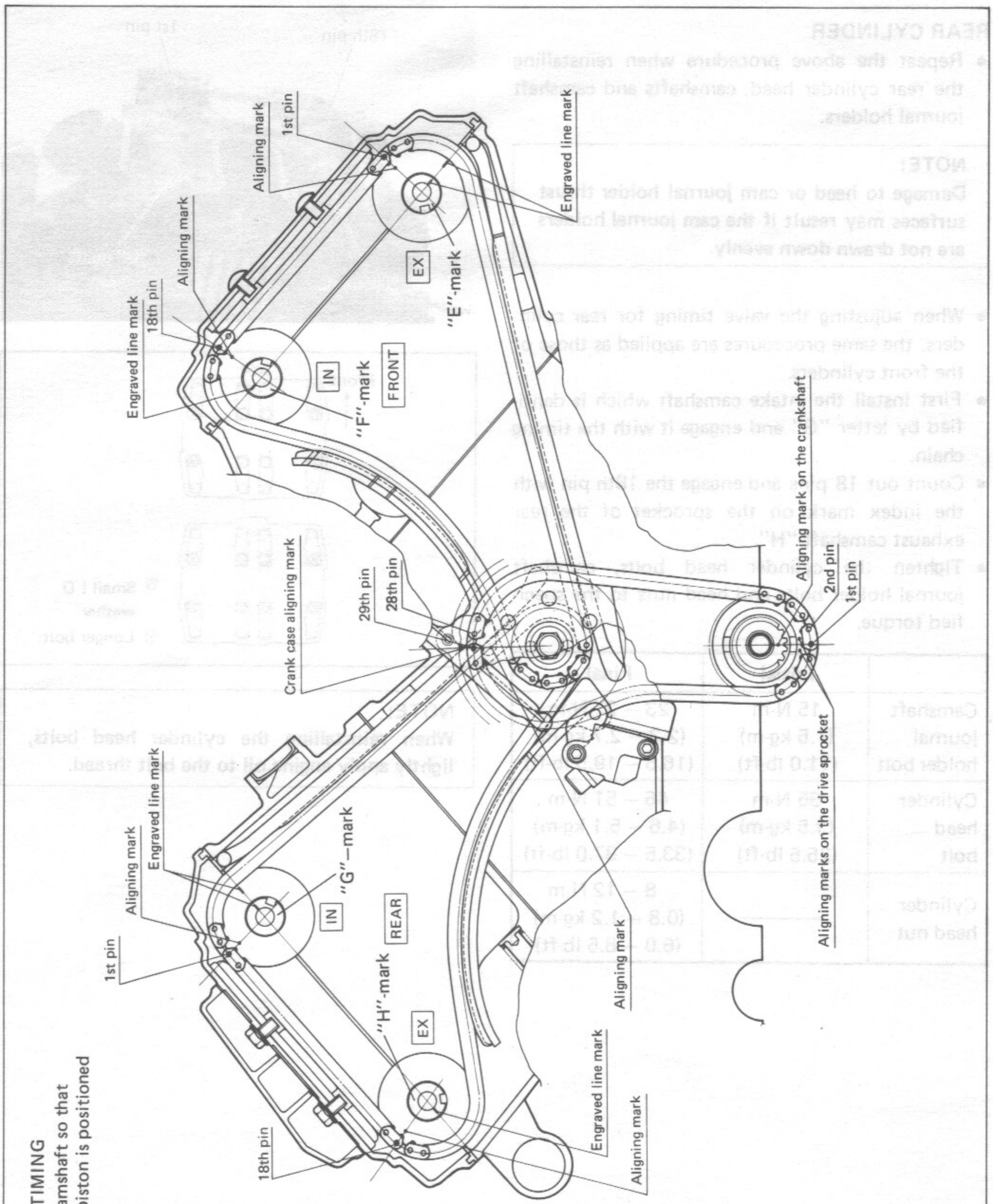
- When adjusting the valve timing for rear cylinders, the same procedures are applied as those of the front cylinders.
- First install the intake camshaft which is dentified by letter "G" and engage it with the timing chain.
- Count out 18 pins and engage the 18th pin with the index mark on the sprocket of the rear exhaust camshaft "H".
- Tighten the cylinder head bolts, camshaft journal holder bolts and head nuts to the specified torque.

	Initial	Final
Camshaft journal holder bolt	15 N·m (1.5 kg-m) (11.0 lb-ft)	23 – 27 N·m (2.3 – 2.7 kg-m) (16.5 – 19.5 lb-ft)
Cylinder head bolt	35 N·m (3.5 kg-m) (25.5 lb-ft)	46 – 51 N·m (4.6 – 5.1 kg-m) (33.5 – 37.0 lb-ft)
Cylinder head nut	———	8 – 12 N·m (0.8 – 1.2 kg-m) (6.0 – 8.5 lb-ft)





NOTE:
When reinstalling the cylinder head bolts, lightly apply engine oil to the bolt thread.



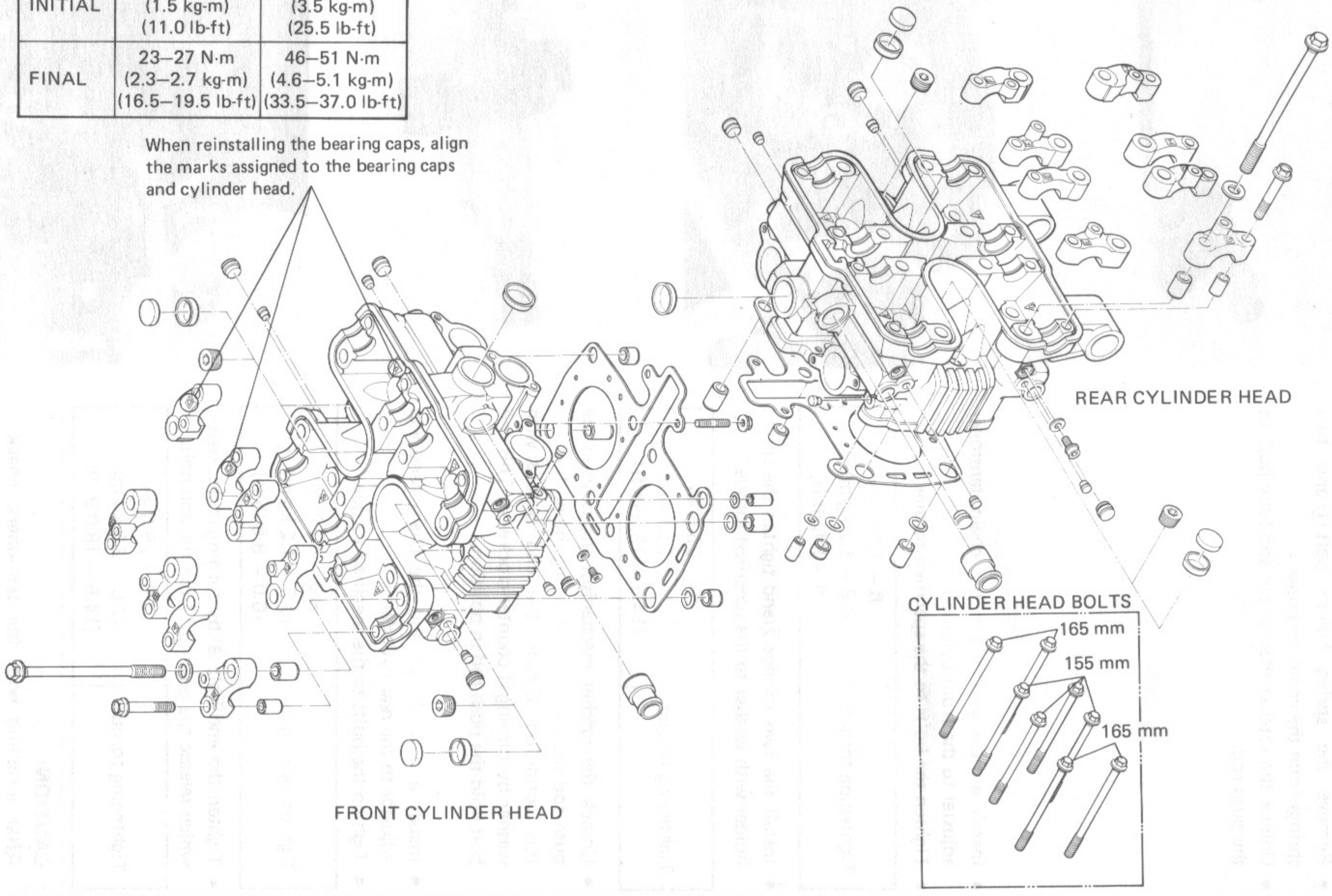
CAMSHAFT TIMING

- Turn the camshaft so that the No. 1 piston is positioned at T.D.C.

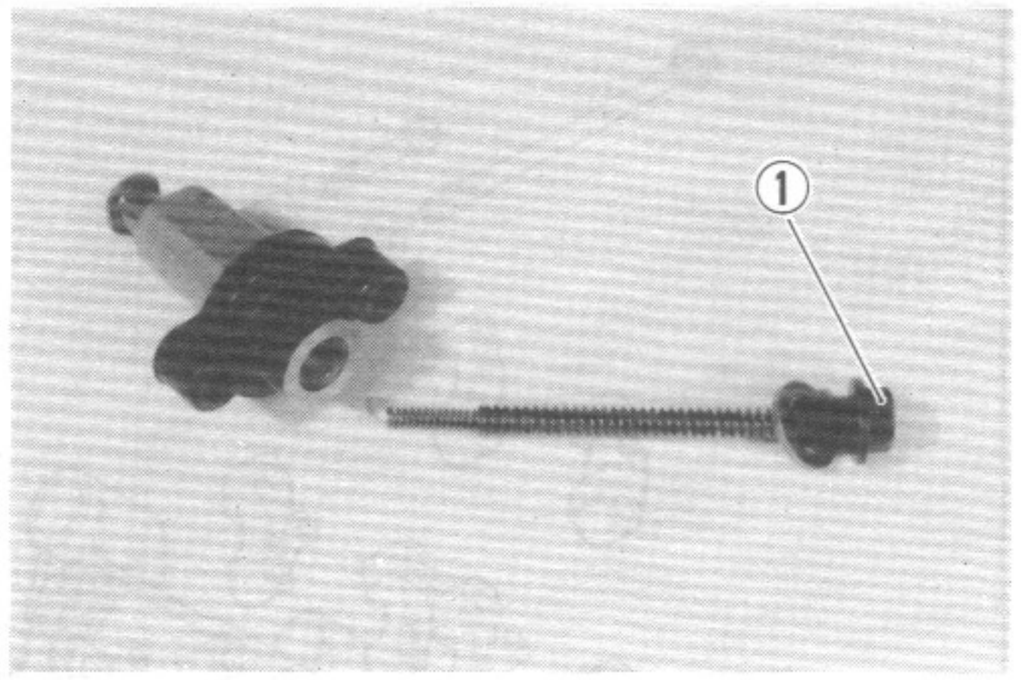
Tightening torque

	8 mm bolt	10 mm bolt
INITIAL	15 N·m (1.5 kg-m) (11.0 lb-ft)	35 N·m (3.5 kg-m) (25.5 lb-ft)
FINAL	23–27 N·m (2.3–2.7 kg-m) (16.5–19.5 lb-ft)	46–51 N·m (4.6–5.1 kg-m) (33.5–37.0 lb-ft)

When reinstalling the bearing caps, align the marks assigned to the bearing caps and cylinder head.



- Remove the spring holder bolt ① and two springs from the chain tensioner.
- Unlock the ratchet mechanism and fully push in the push rod.

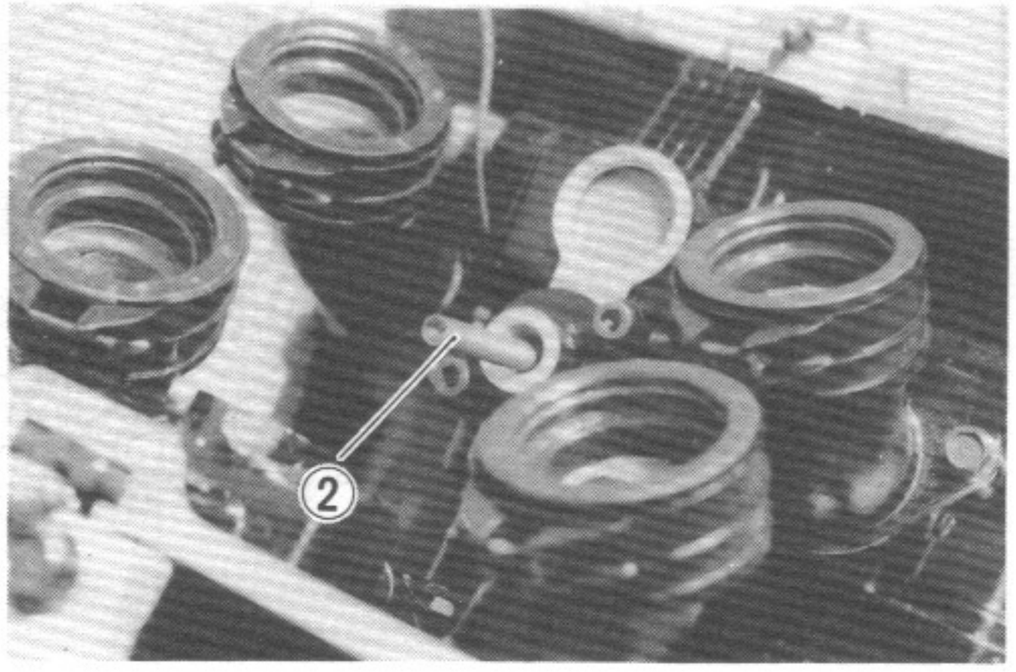


- Install a new gasket and the chain tensioner adjuster to the front cylinder.
- Tighten the bolts to the specified torque.

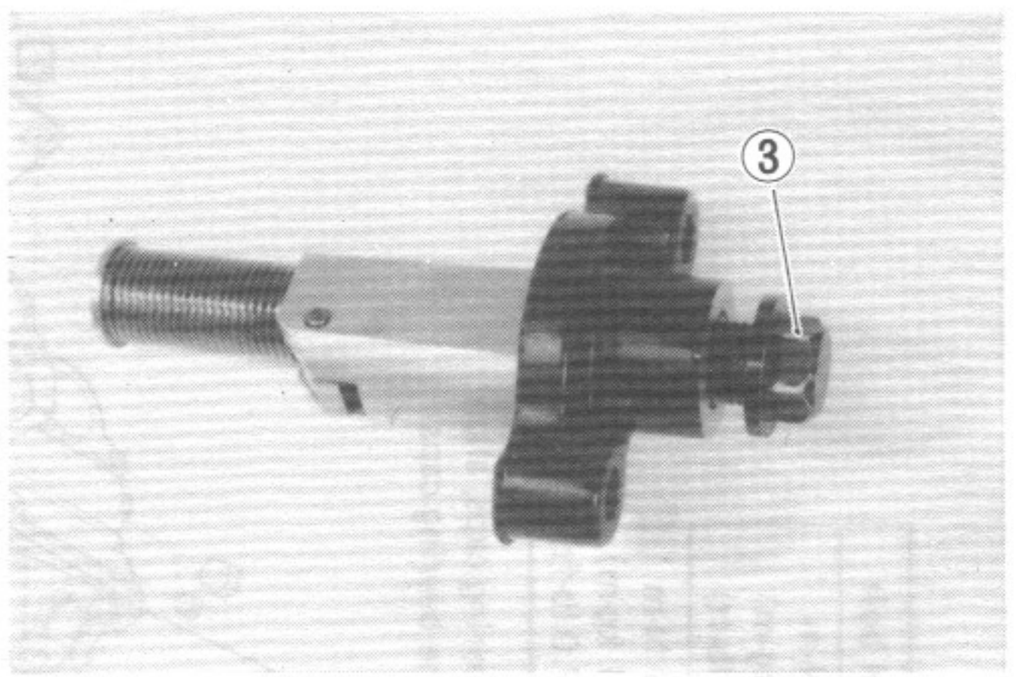
Tightening torque	8 – 12 N·m (0.8 – 1.2 kg-m) (6.0 – 8.5 lb-ft)

- Install the two springs ② and tighten the spring holder with washer to the specified torque.

Tightening torque	20 – 25 N·m (2.0 – 2.5 kg-m) (14.5 – 18.0 lb-ft)



- Unlock the ratchet mechanism and push in the push rod fully and while holding the push rod in this condition tighten the end bolt ③ with washer by turning it counter-clockwise. This end bolt hold the push rod in position.

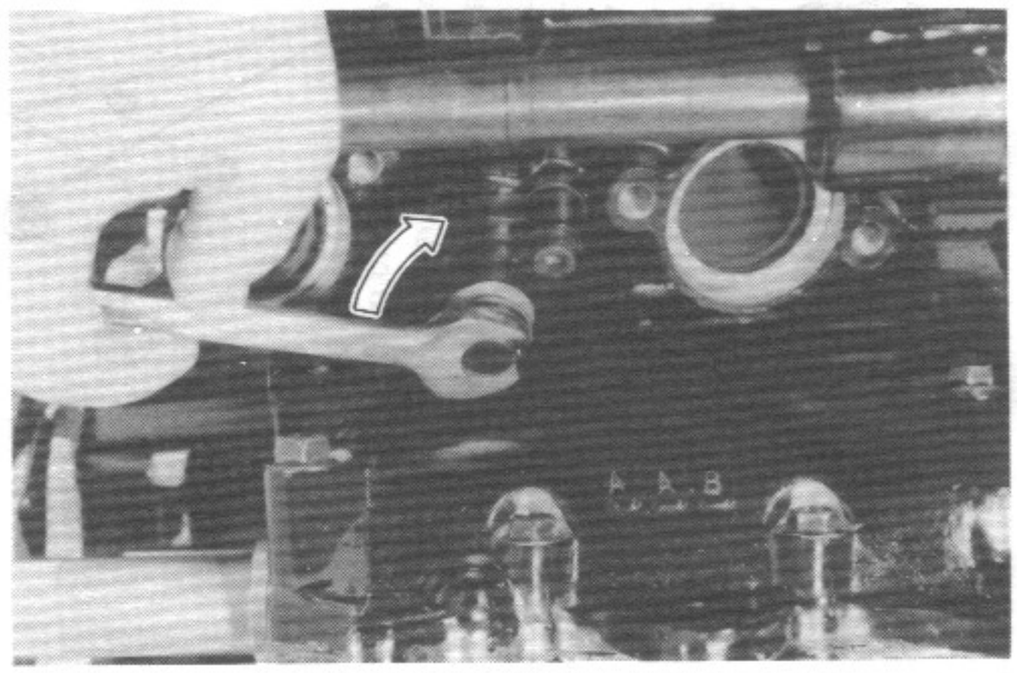


- Install a new gasket and the chain tensioner adjuster to the rear cylinder.
- Tighten the bolts to the specified torque.

Tightening torque	8.0 – 12 N·m (0.8 – 1.2 kg-m) (6.0 – 8.5 lb-ft)

- Tighten the end bolt ③ by turning it clockwise, which release the push rod from the end bolt.

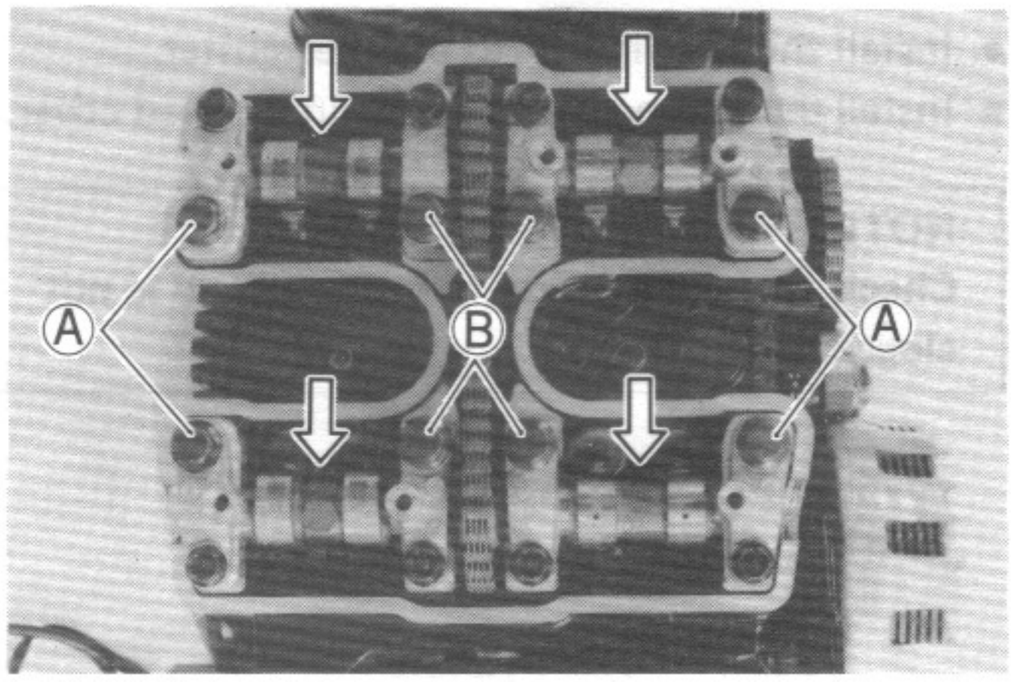
Tightening torque	20 – 25 N·m (2.0 – 2.5 kg-m) (14.5 – 18.0 lb-ft)



CAUTION:
After installing both the tensioners, check to be sure that both tensioners work properly by checking the slack of timing chains.

- Tighten the engine oil drain plug and oil filter, and pour about 100 ml (cc) of engine oil in each oil pocket in the head.

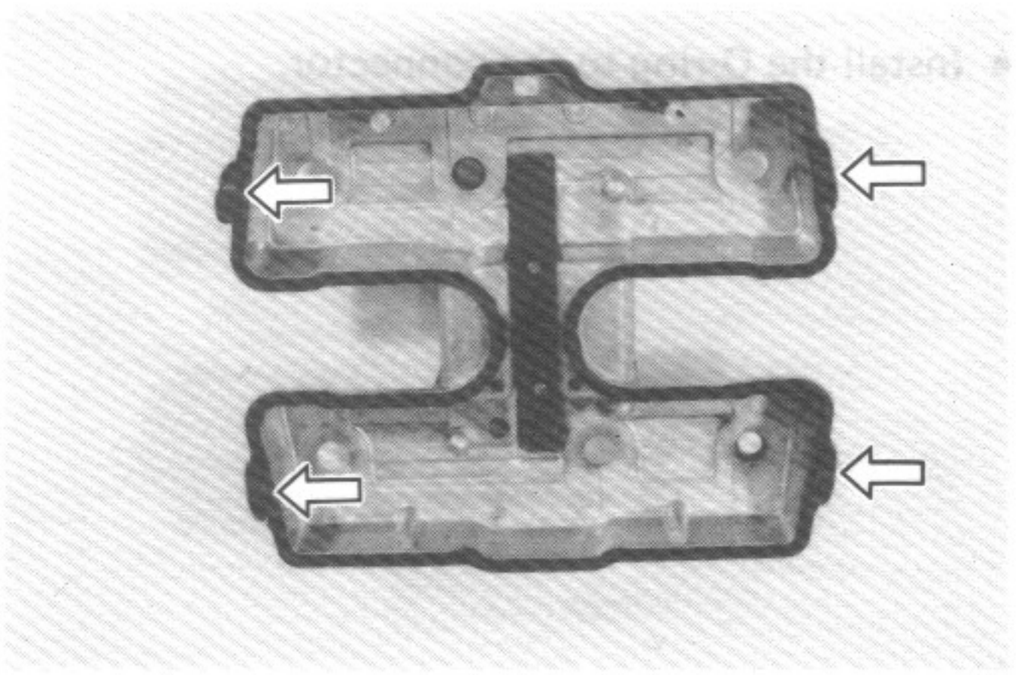
CAUTION:
Install the longer bolts to the positions Ⓐ and small I.D. washers to the positions Ⓑ.



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

- When reinstalling the cylinder head cover, apply SUZUKI Bond No. 1207B to the mating surface between oil seal and head cover, and four camshaft end seals.

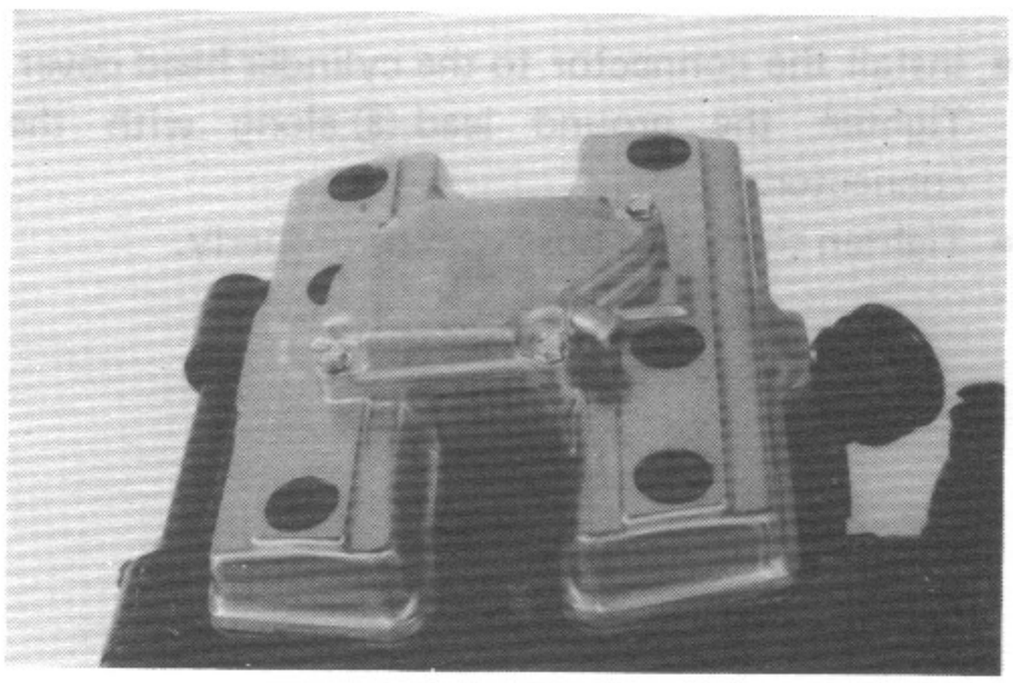
99104 - 31140	SUZUKI Bond No. 1207B



- Apply engine oil to the cover bolt gaskets lightly and tighten the cover bolts to the specified torque.

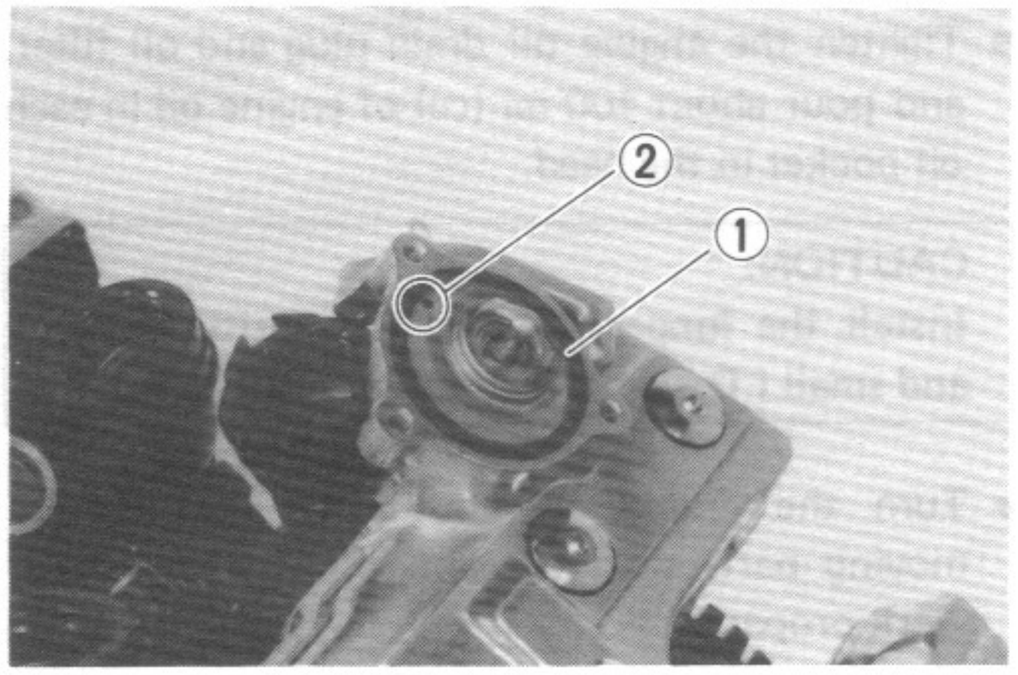
Tightening torque	Initial	10 N·m (1.0 kg-m) (7.0 lb-ft)
	Final	13 – 15 N·m (1.3 – 1.5 kg-m) (9.5 – 11.0 lb-ft)

NOTE:
Always install a new gasket to the cylinder head cover bolts.



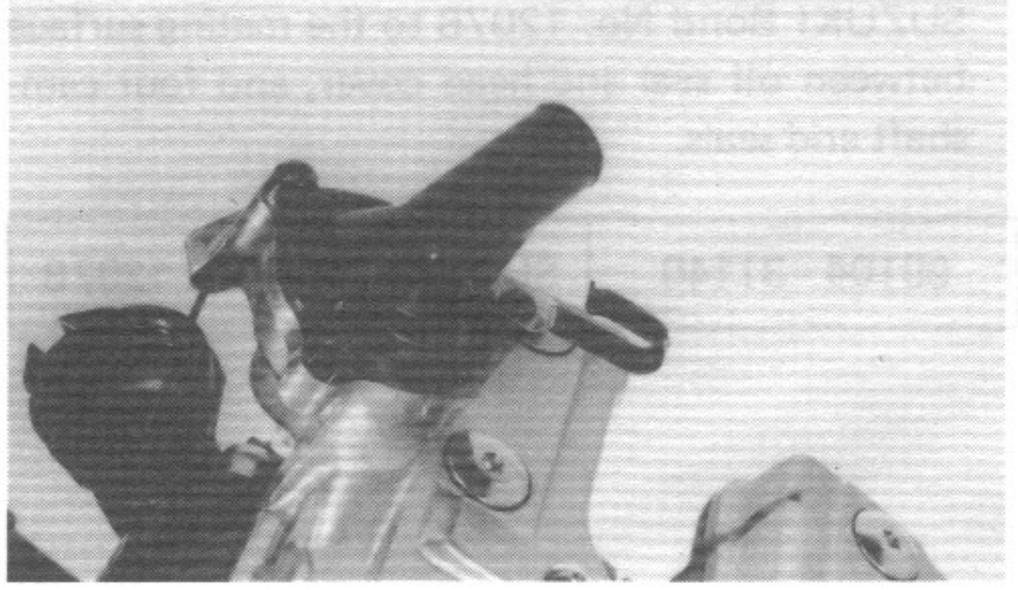
- Install the seal ring ① to the thermostat.
- Install the thermostat to the cylinder head cover.

NOTE:
Check to be sure that by-pass hole ② is not clogged.



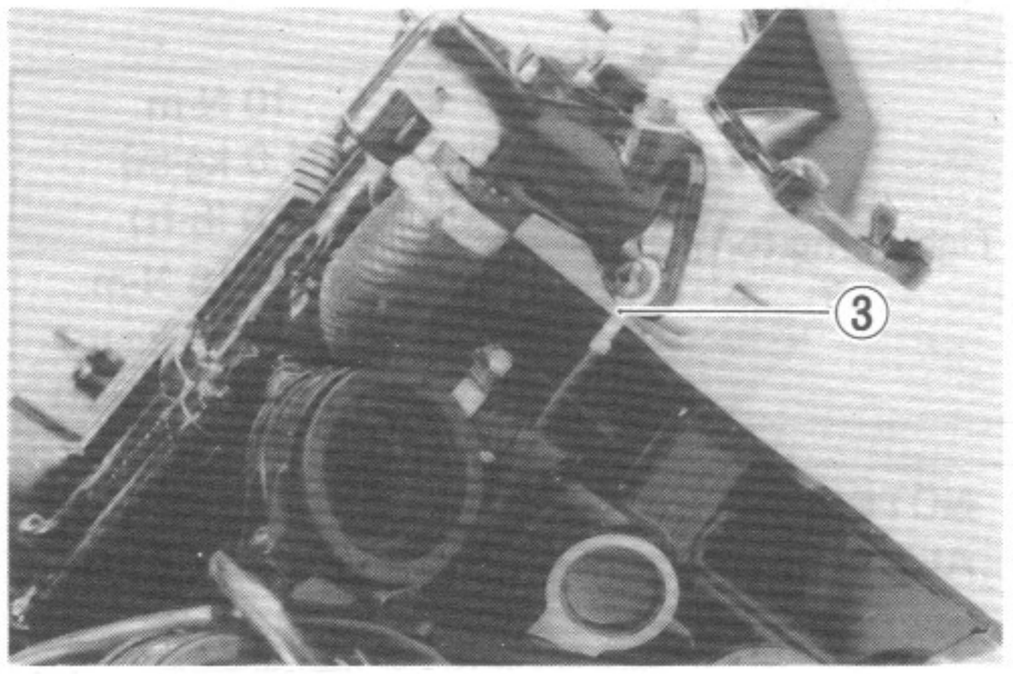
- Install the radiator hose union with three bolts.

NOTE:
Install the clamp for high tension cord as shown.



- Install the O-ring to the connector.

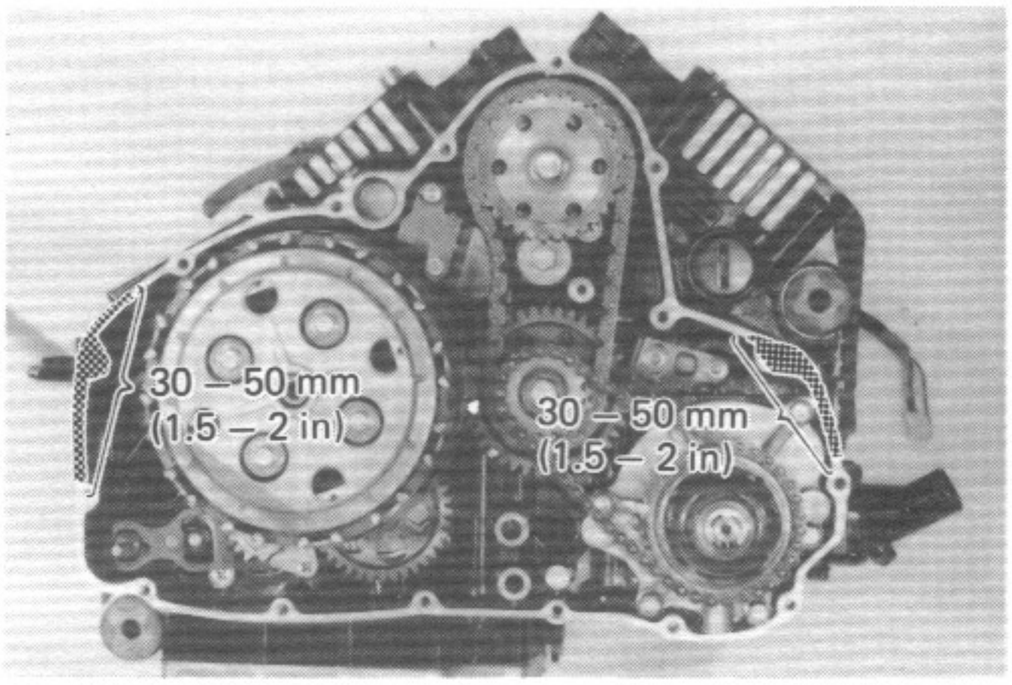
- Install the connector to the cylinder head cover. Tighten the ground lead ③ along with the connector.
- Tighten the water hose clamps properly.

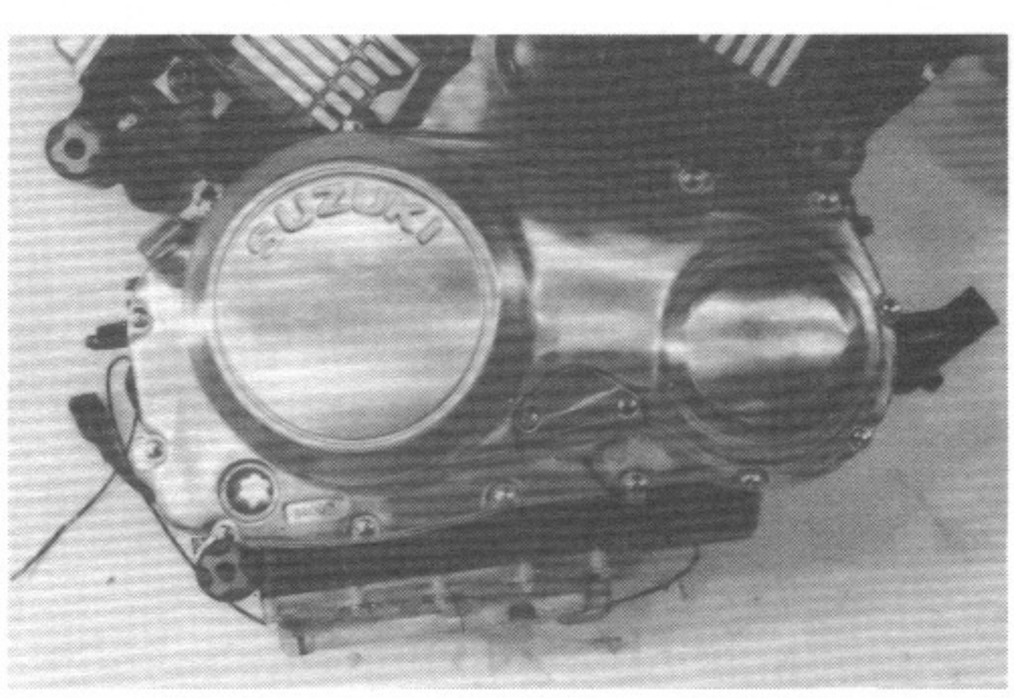


- Coat SUZUKI Bond No. 1207B lightly to the portion around mating surface between crankcases as shown.

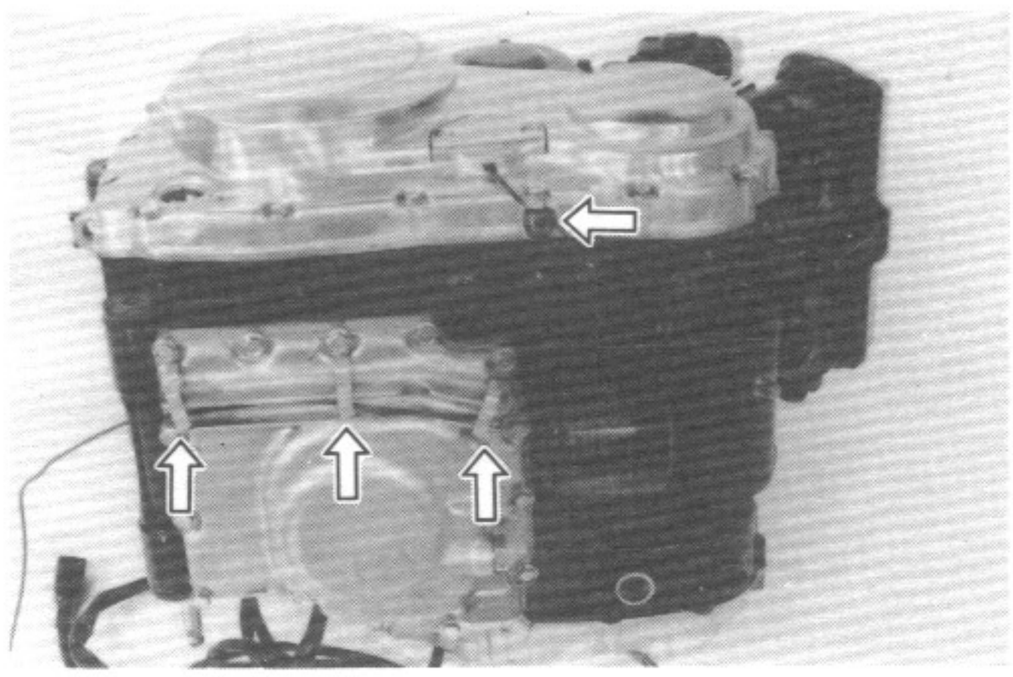
99104 - 31140	SUZUKI Bond No. 1207B

- Replace clutch cover gasket with a new one to prevent oil leakage.
- Install the clutch cover.



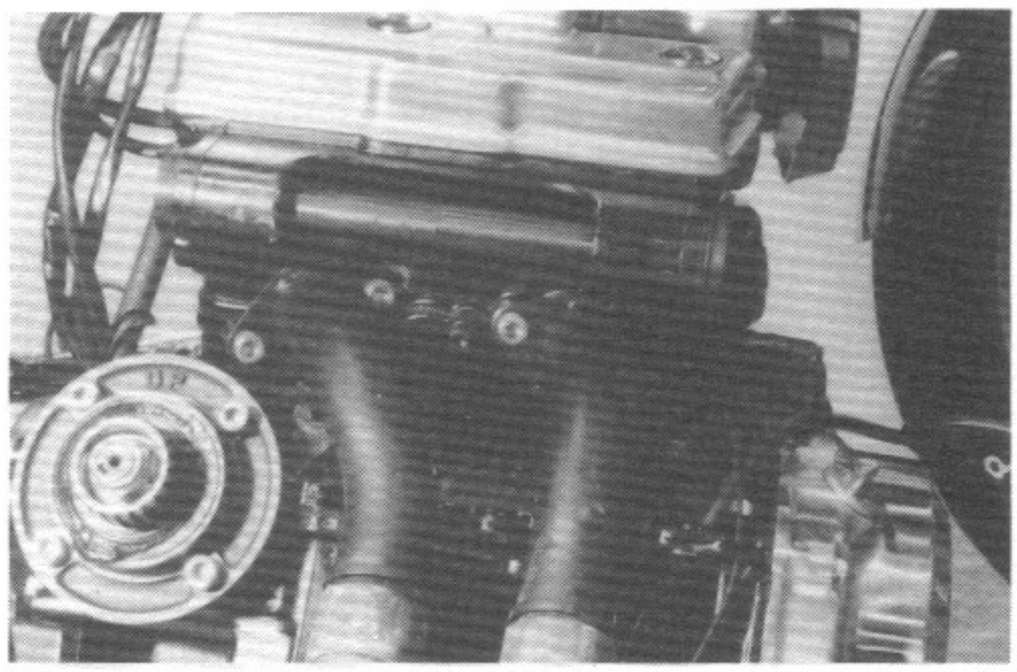


- Route the oil pressure switch lead wire and clamp it with four clamps as shown.



- Install the exhaust pipes for rear cylinders.

Tightening torque	20 – 25 N·m (2.0 – 2.5 kg-m) (14.5 – 18.0 lb-ft)



SHAFT DRIVE

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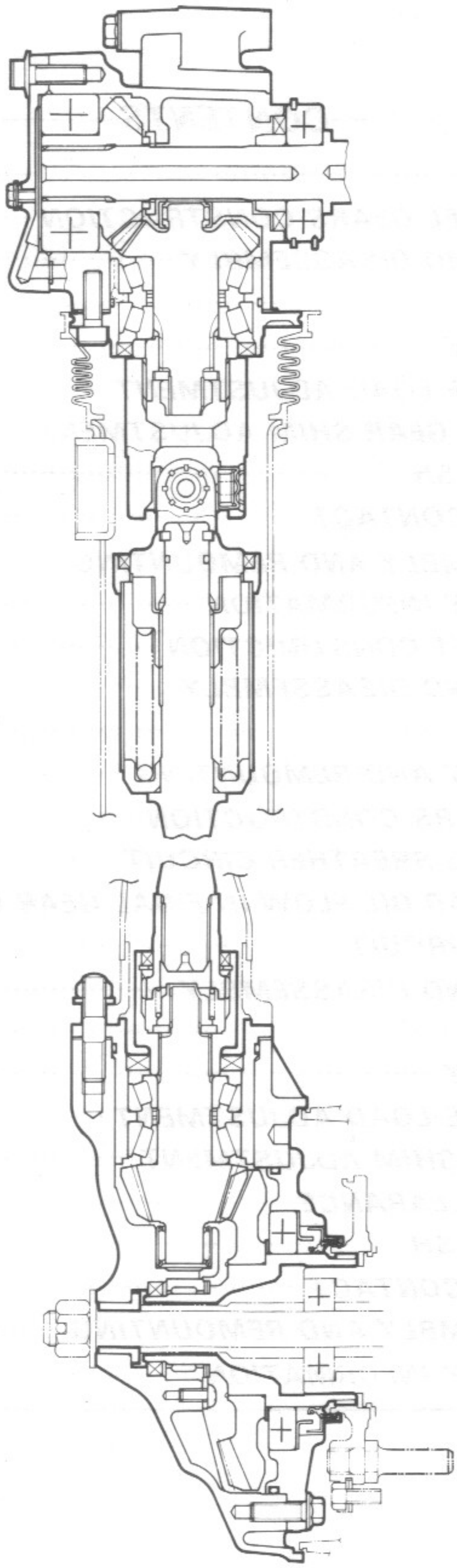
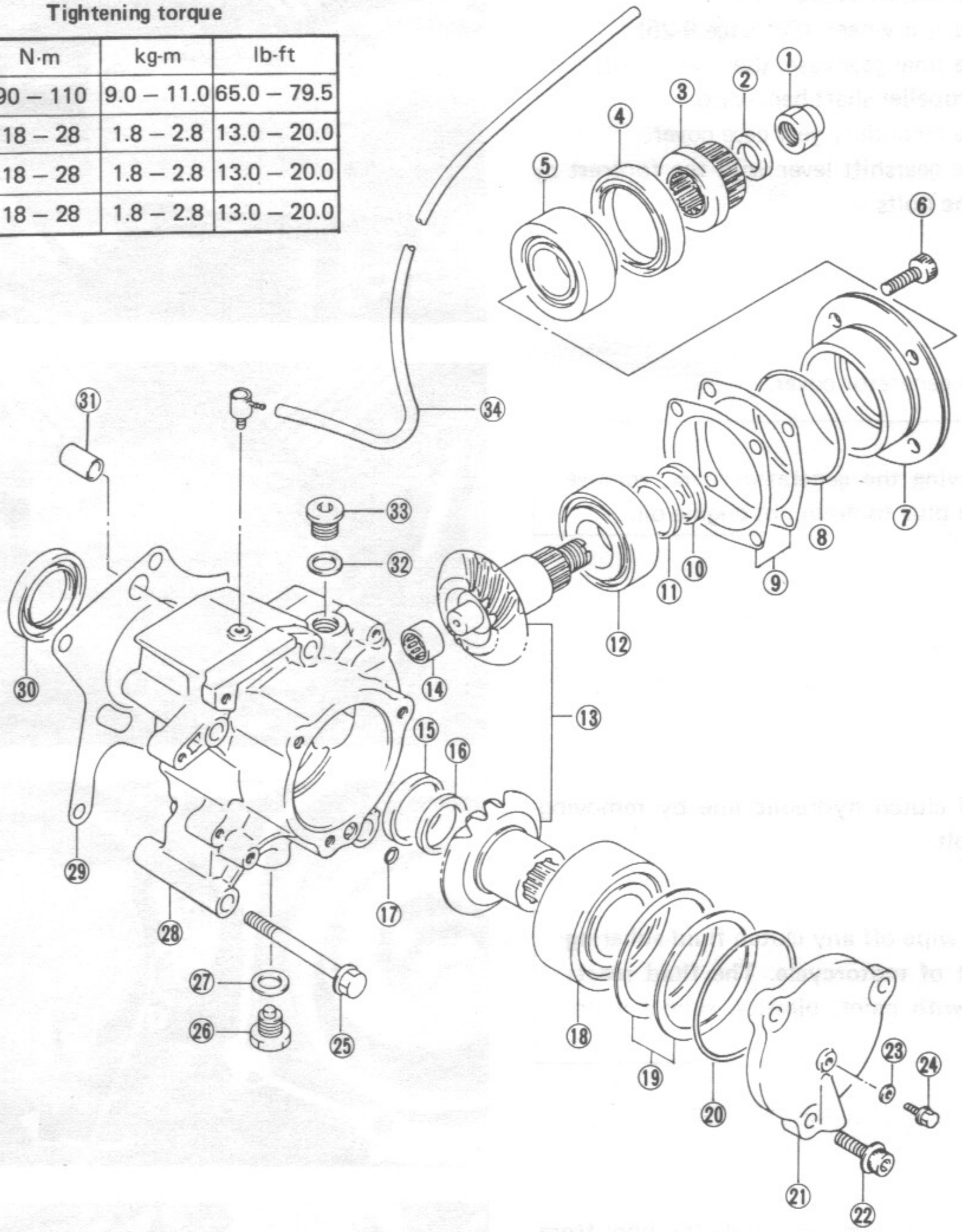
SHAFT DRIVE



SECONDARY BEVEL GEARS CONSTRUCTION

Tightening torque

Item	N·m	kg-m	lb-ft
①	90 – 110	9.0 – 11.0	65.0 – 79.5
⑥	18 – 28	1.8 – 2.8	13.0 – 20.0
㉒	18 – 28	1.8 – 2.8	13.0 – 20.0
㉕	18 – 28	1.8 – 2.8	13.0 – 20.0

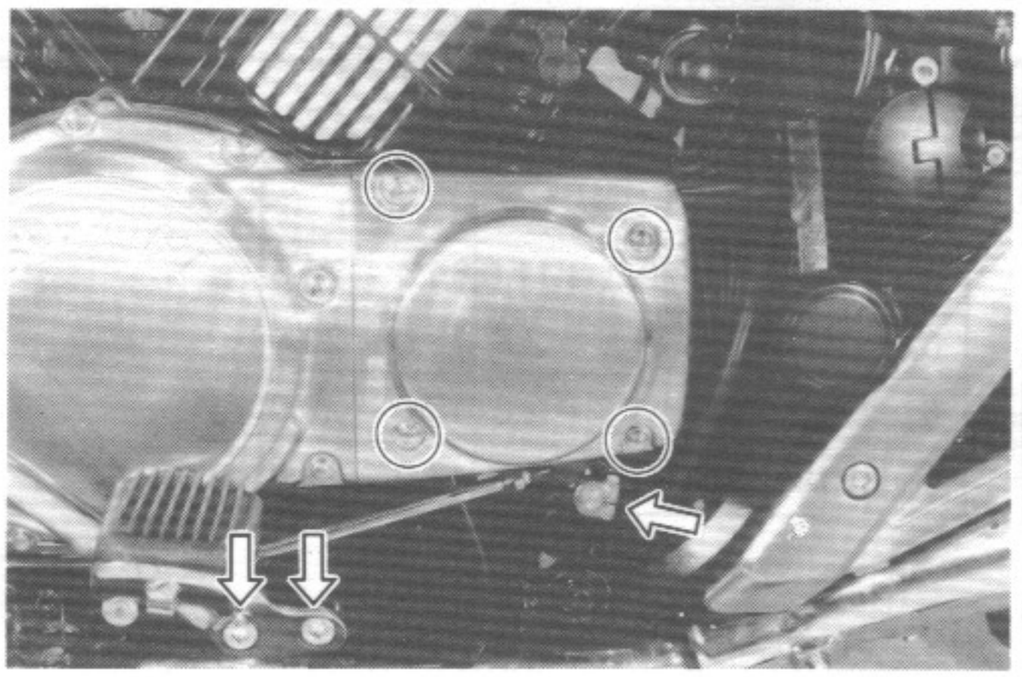


① Nut
② Washer
③ Secondary driven coupling
④ Oil seal
⑤ Bearing
⑥ Bolts (4 pcs)
⑦ Secondary driven bevel gear housing
⑧ O-ring
⑨ Shims (5 kinds)
⑩ Shims (9 kinds)
⑪ Spacer
⑫ Bearing
⑬ Secondary bevel gear set
⑭ Pilot bearing
⑮ Shim seat
⑯ Shims (19 kinds)
⑰ O-ring
⑱ Bearing
⑲ Shims (5 kinds)
⑳ O-ring
㉑ Secondary drive bevel gear cover
㉒ Bolts (3 pcs)
㉓ Gasket
㉔ Oil level screw
㉕ Bolts (5 pcs)
㉖ Oil drain plug
㉗ Gasket
㉘ Secondary gear case
㉙ Gasket
㉚ Oil seal
㉛ Dowel pin
㉜ Gasket
㉝ Oil filler plug
㉞ Breather hose

REMOVAL AND DISASSEMBLY

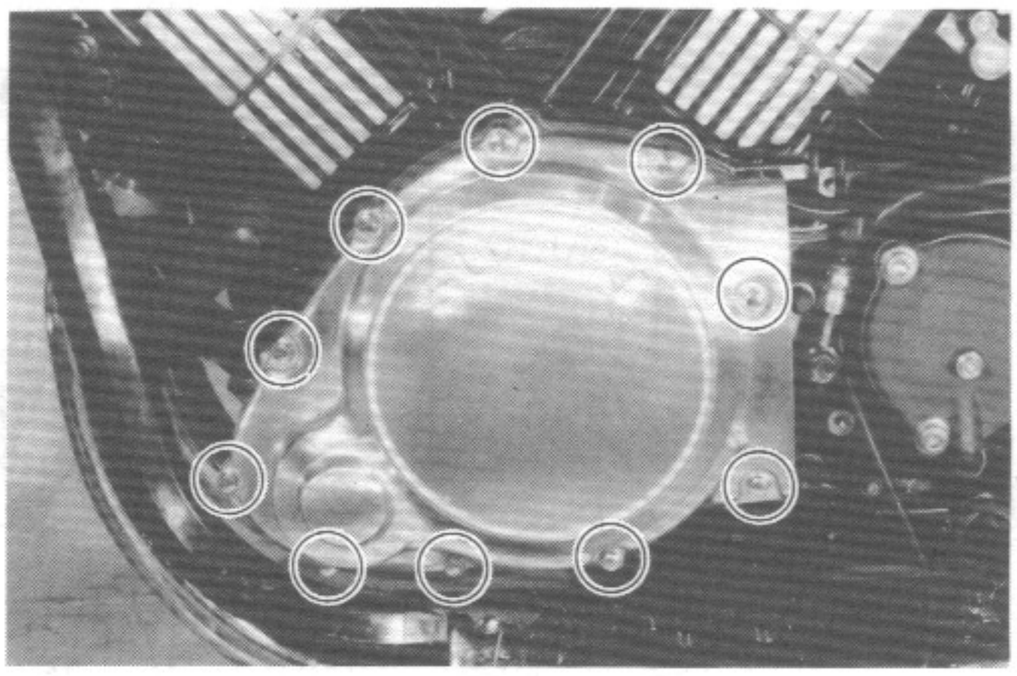
SECONDARY GEAR CASE

- Remove the rear wheel. (See page 9-25)
- Remove the final gear case. (See page 4-22)
- Slide the propeller shaft backward.
- Remove the secondary gear case cover.
- Remove the gearshift lever with the footrest by removing the bolts.



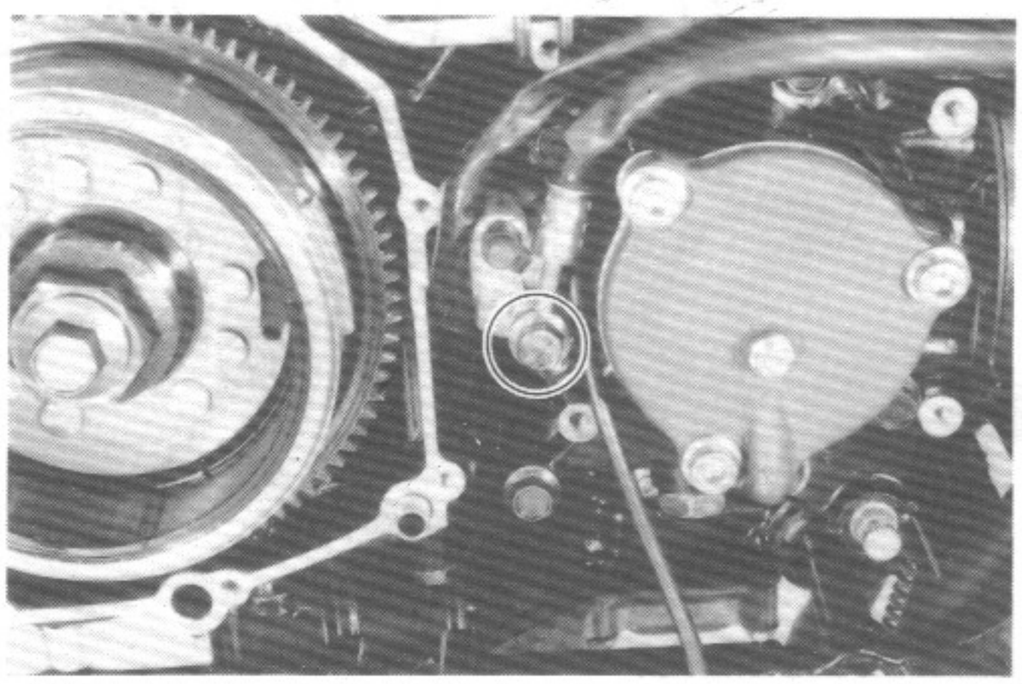
- Remove the generator cover.

NOTE:
When removing the generator cover, remove the oil drain plug to drain out engine oil.

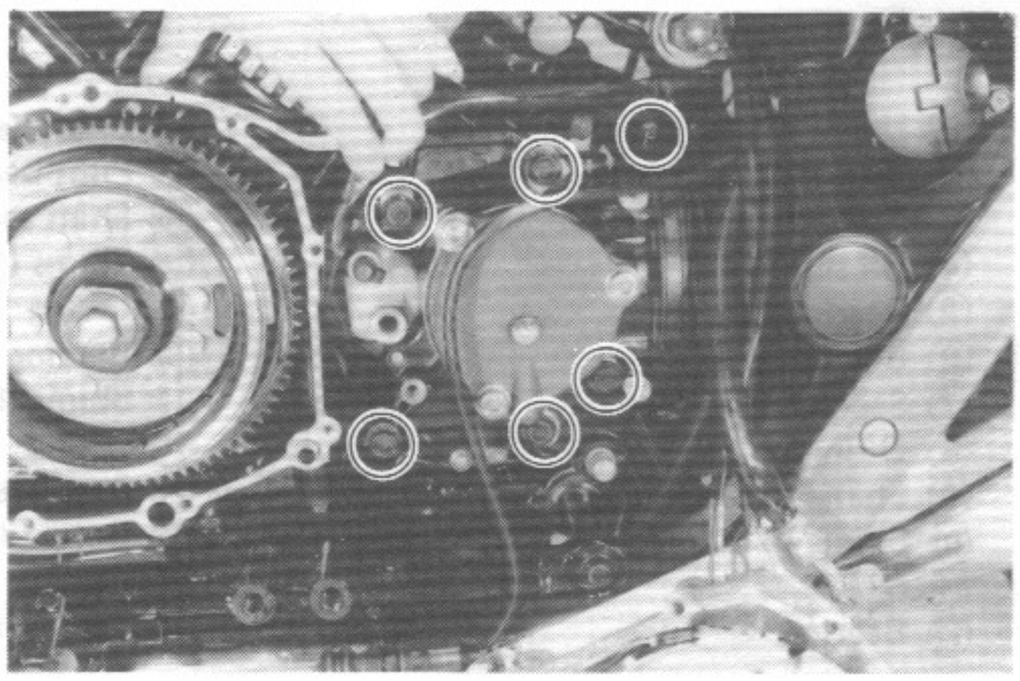


- Remove the clutch hydraulic line by removing the union bolt.

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

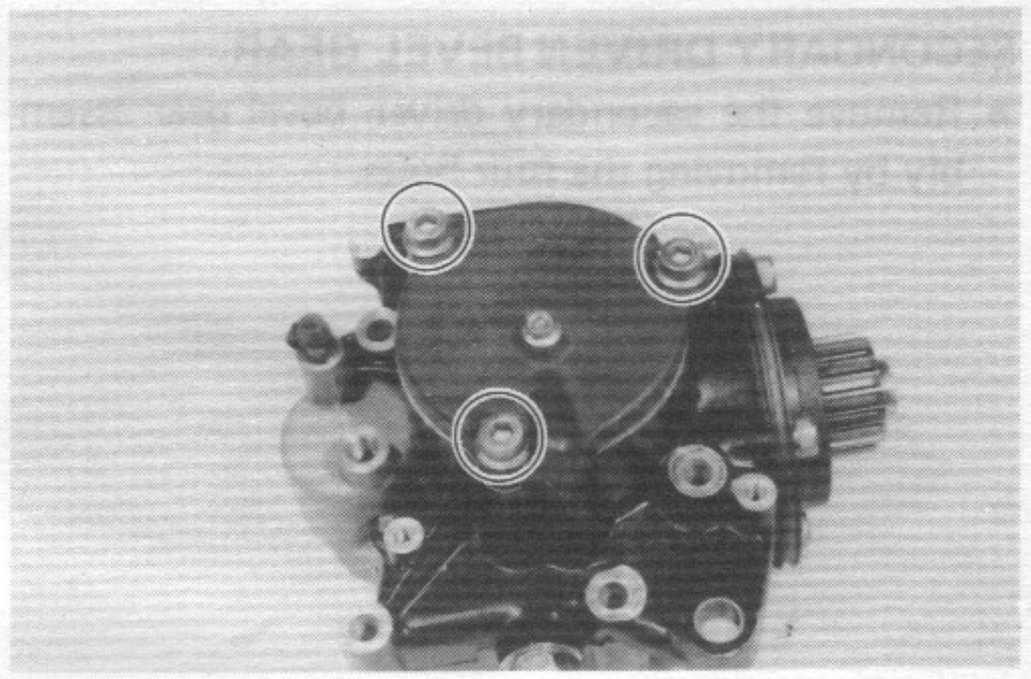


- Loosen the boot clamp and slide the boot from the secondary gear case.
- Place an oil pan under the secondary gear case and remove the oil drain plug to drain out gear oil.
- Remove the secondary gear case from the crankcase by removing the five bolts.



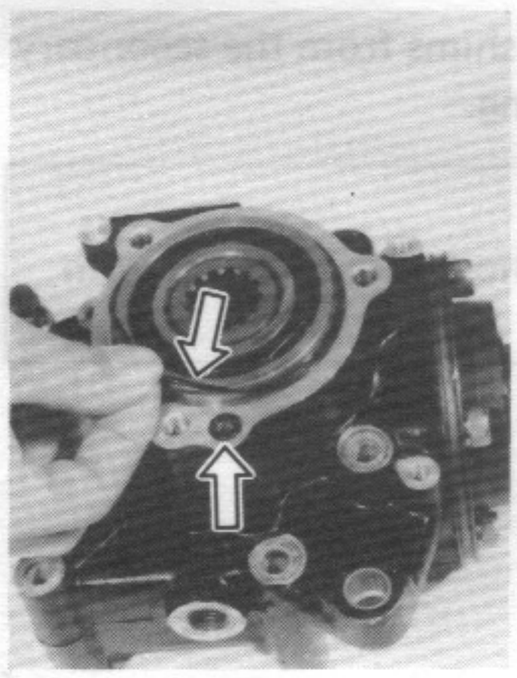
SECONDARY DRIVE BEVEL GEAR

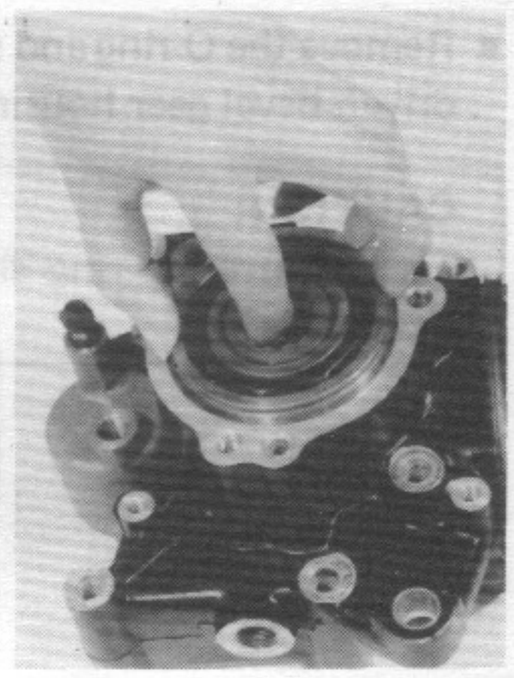
- Remove the secondary drive bevel gear cover and shims by removing the three bolts.



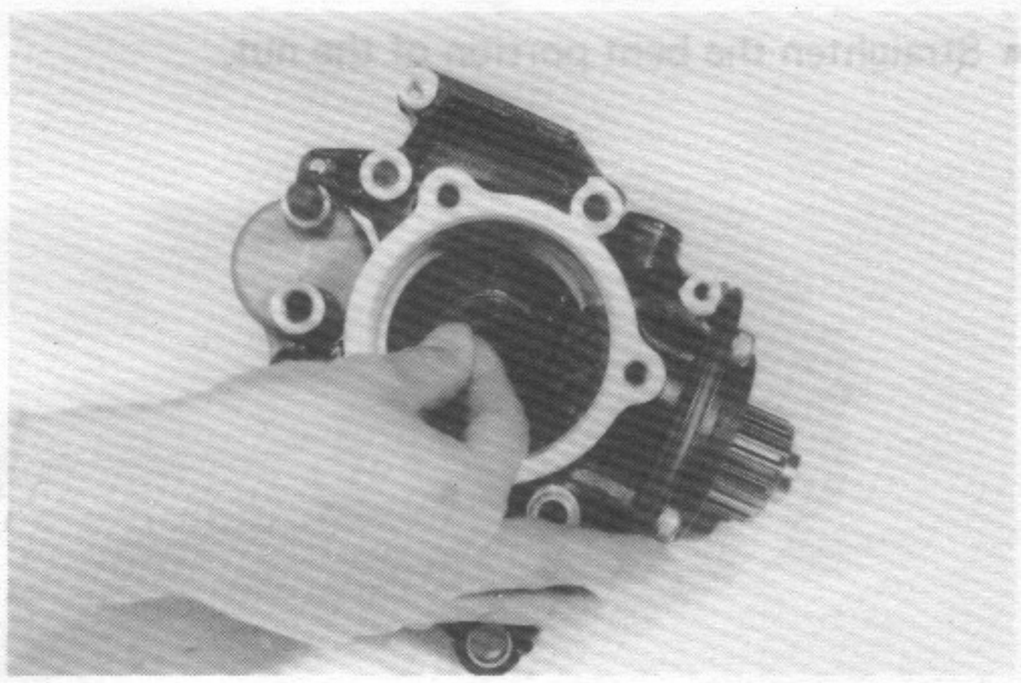
- Remove the O-rings and draw out the bearing with the secondary drive bevel gear.

CAUTION:
The removed O-rings should be replaced with new ones.



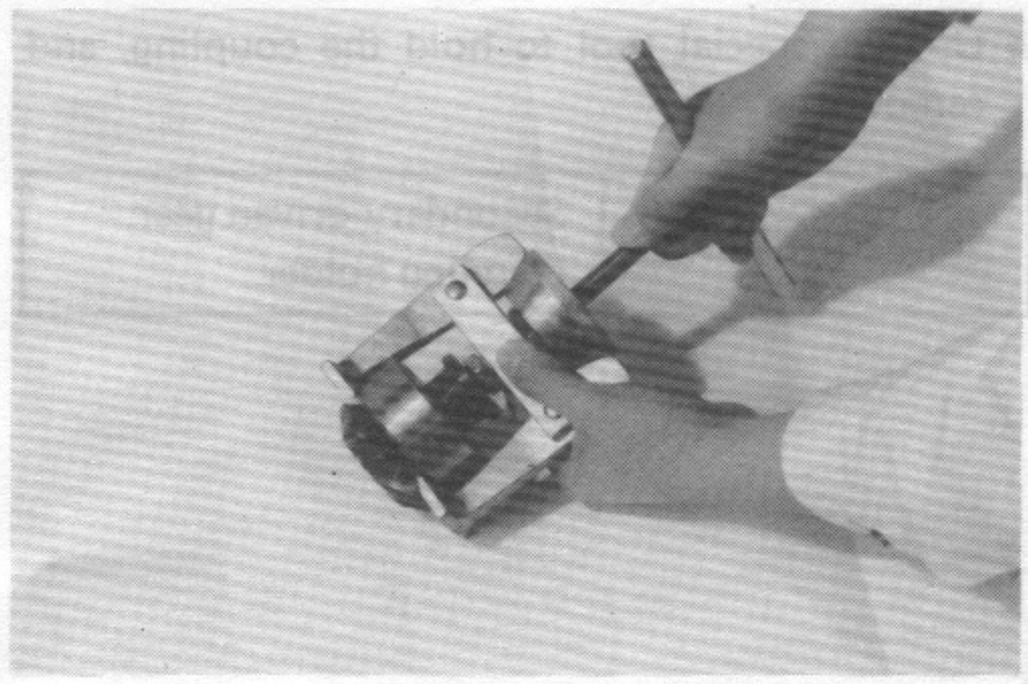


- Remove the secondary drive bevel gear shim.



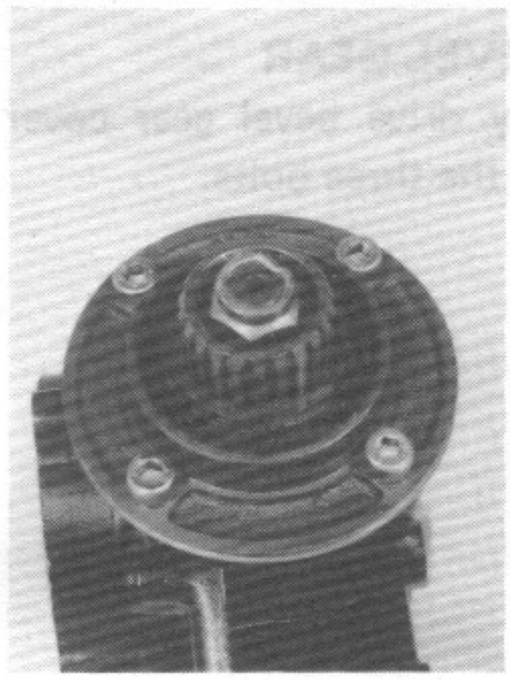
- Draw out the bearing from the secondary drive bevel gear by using the bearing puller and appropriate drift.

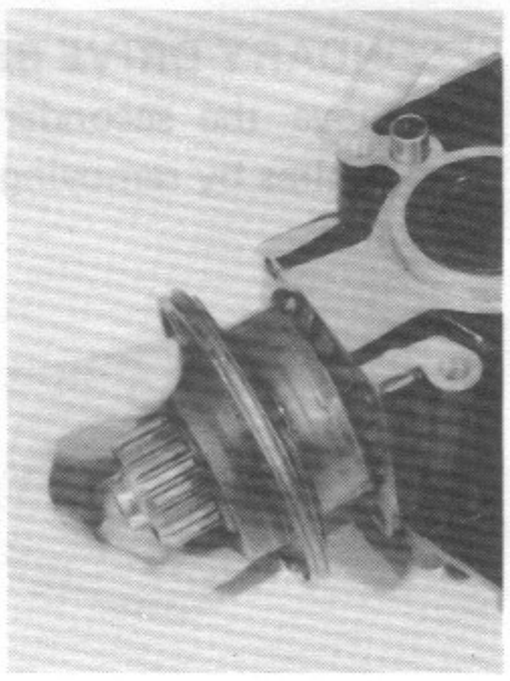
09913 - 61510	Bearing puller



SECONDARY DRIVEN BEVEL GEAR

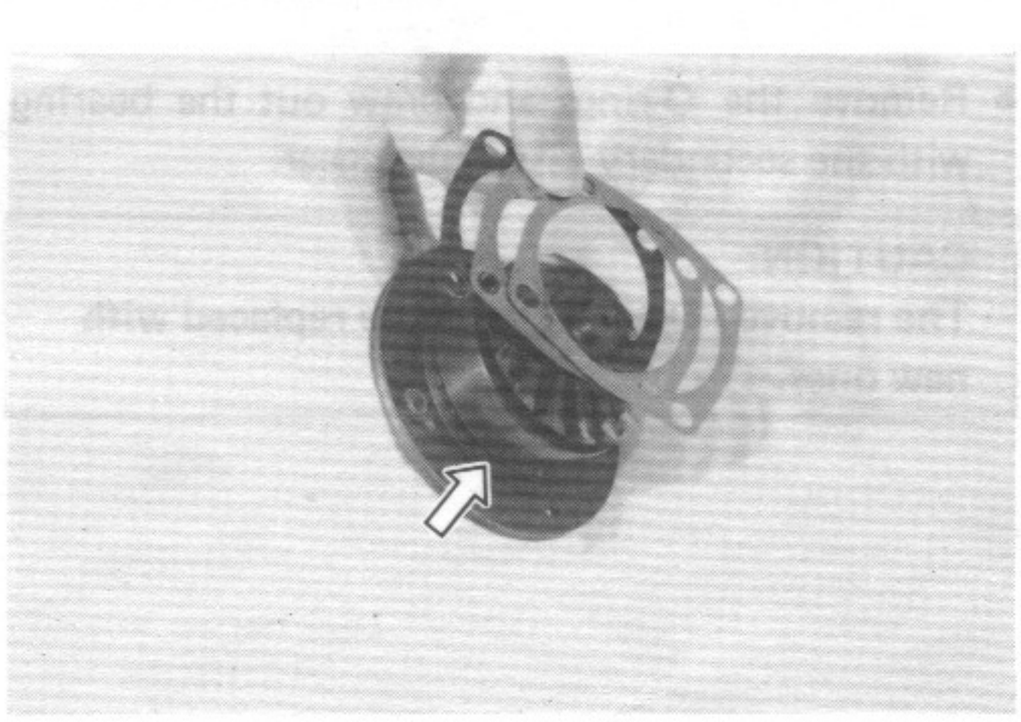
- Remove the secondary driven bevel gear assembly by removing the four bolts.



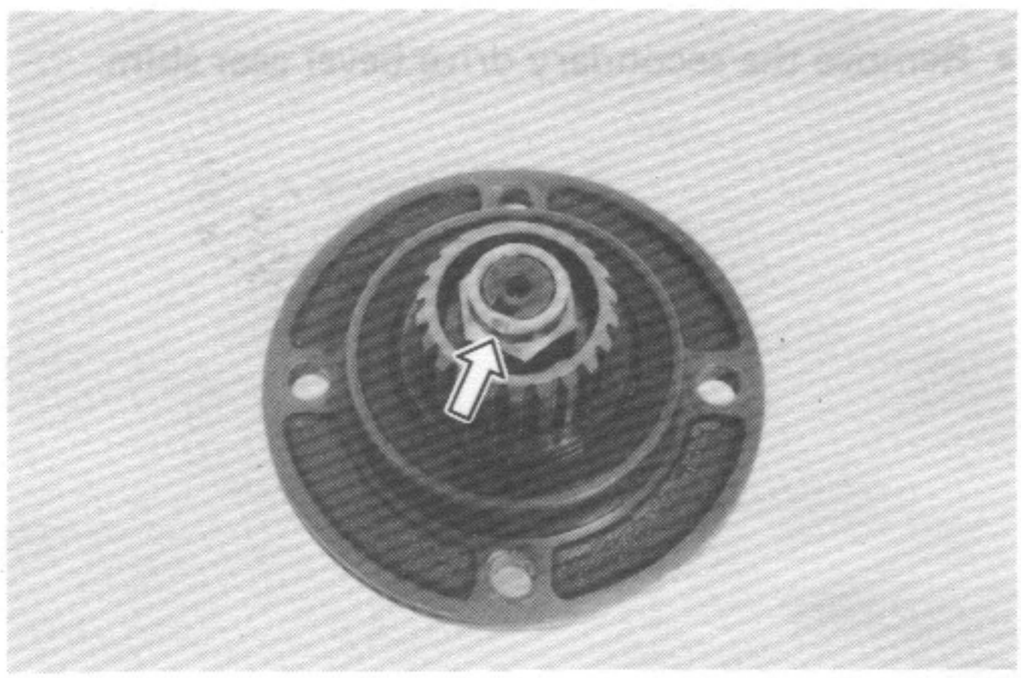


- Remove the O-ring and shims from the secondary driven bevel gear housing.

CAUTION:
The removed O-ring should be replaced with a new one.

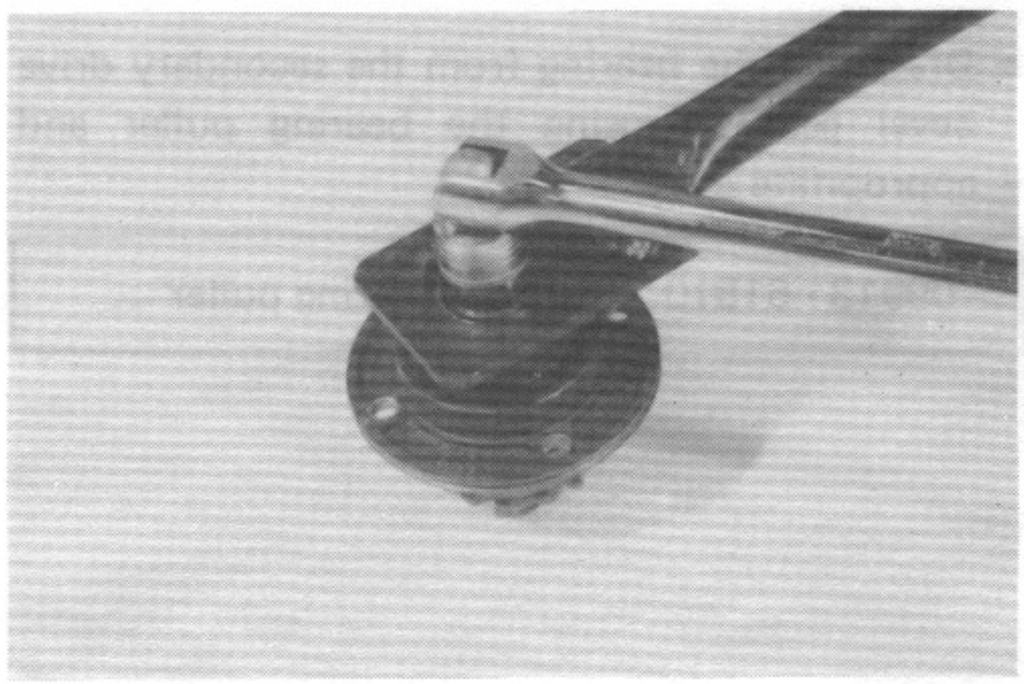


- Straighten the bent portion of the nut.

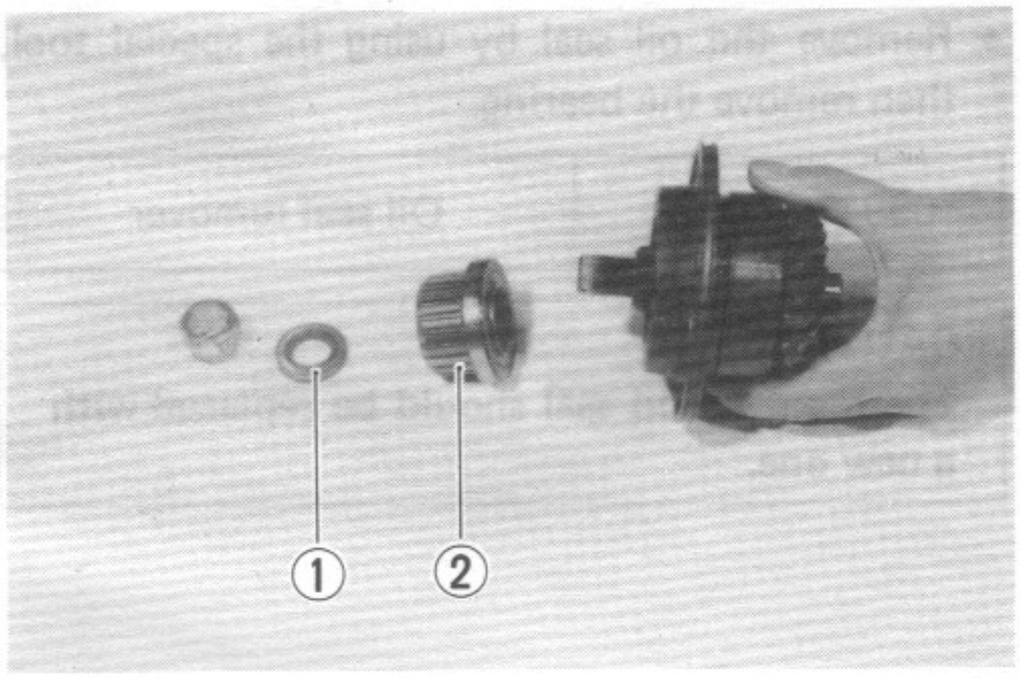


- Use the special tool to hold the coupling, and remove the nut.

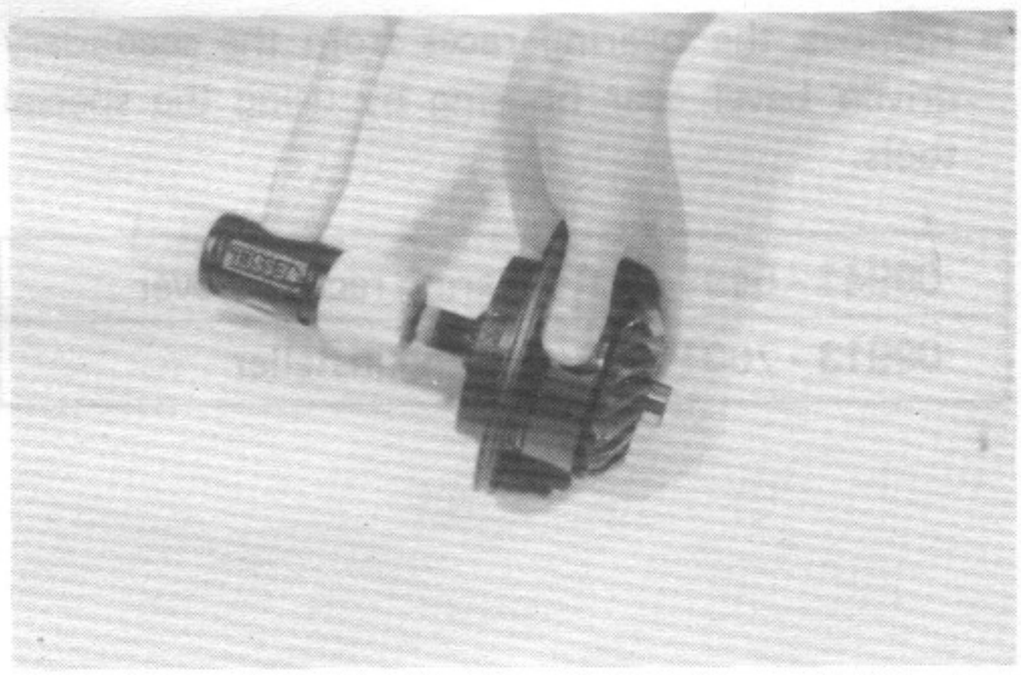
09920 - 80710	Secondary driven gear coupling holder



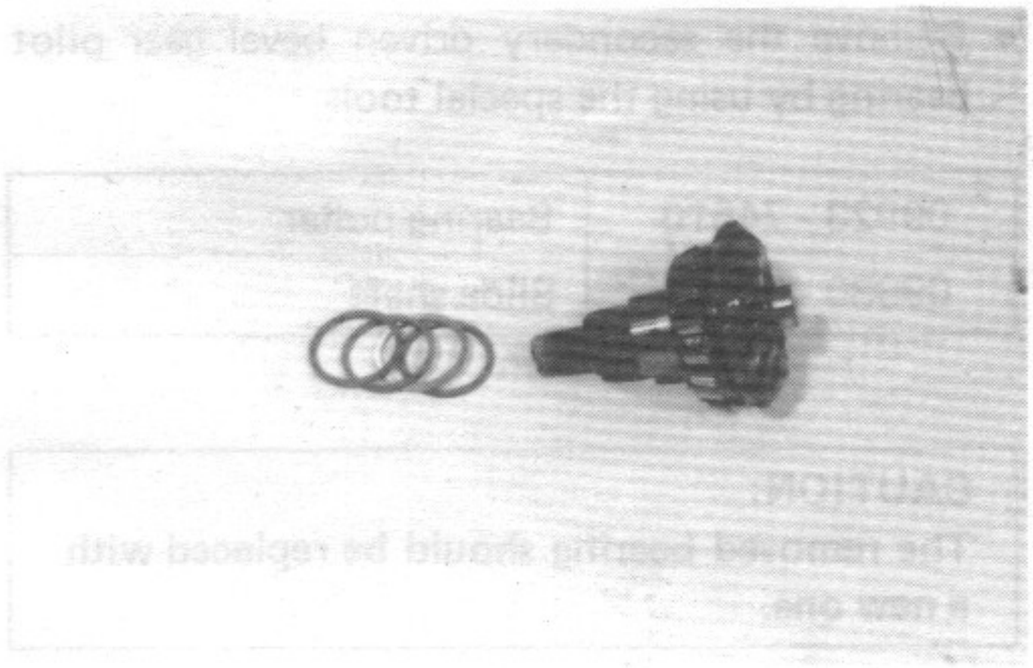
- Remove the washer ① and coupling ② from the secondary driven bevel gear shaft.



- Tap the secondary driven bevel gear shaft with a plastic hammer to remove it from the secondary driven bevel gear housing.



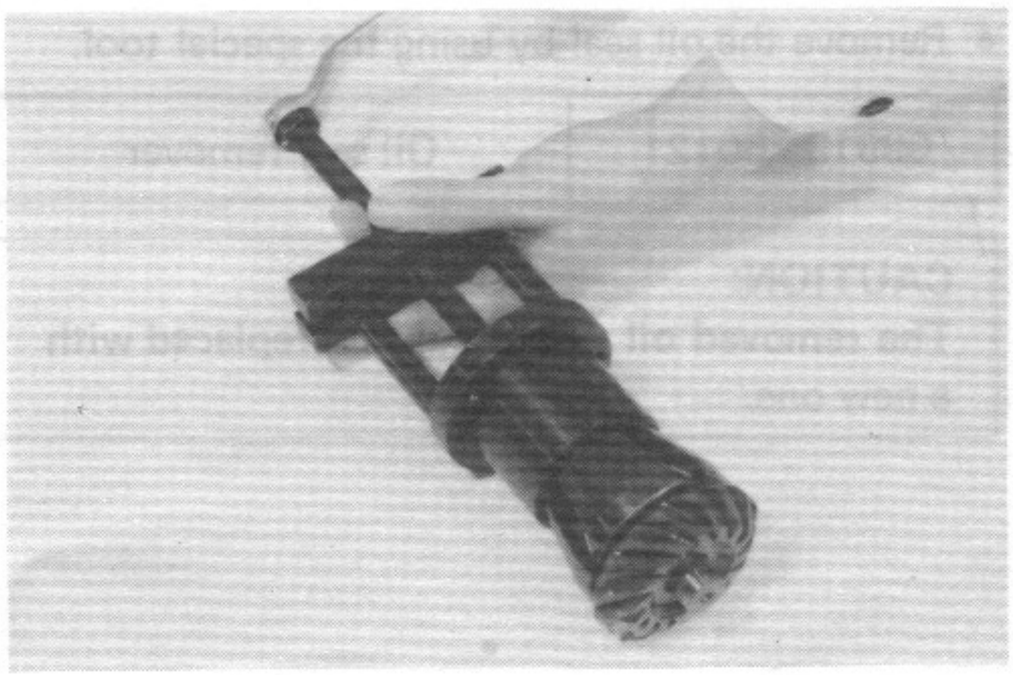
- Remove the shims and spacer from the secondary driven bevel gear shaft.



- Remove the bearing from the secondary driven bevel gear shaft by using the special tool.

09941 - 84510	Bearing race remover

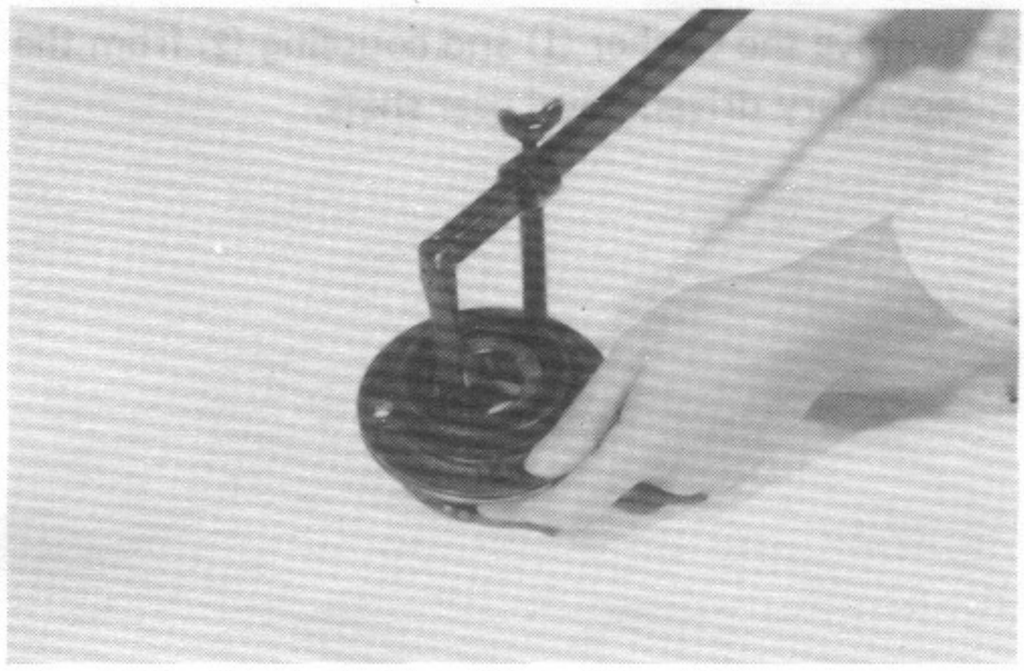
CAUTION:
The removed bearing should be replaced with a new one.



- Remove the oil seal by using the special tool, then remove the bearing.

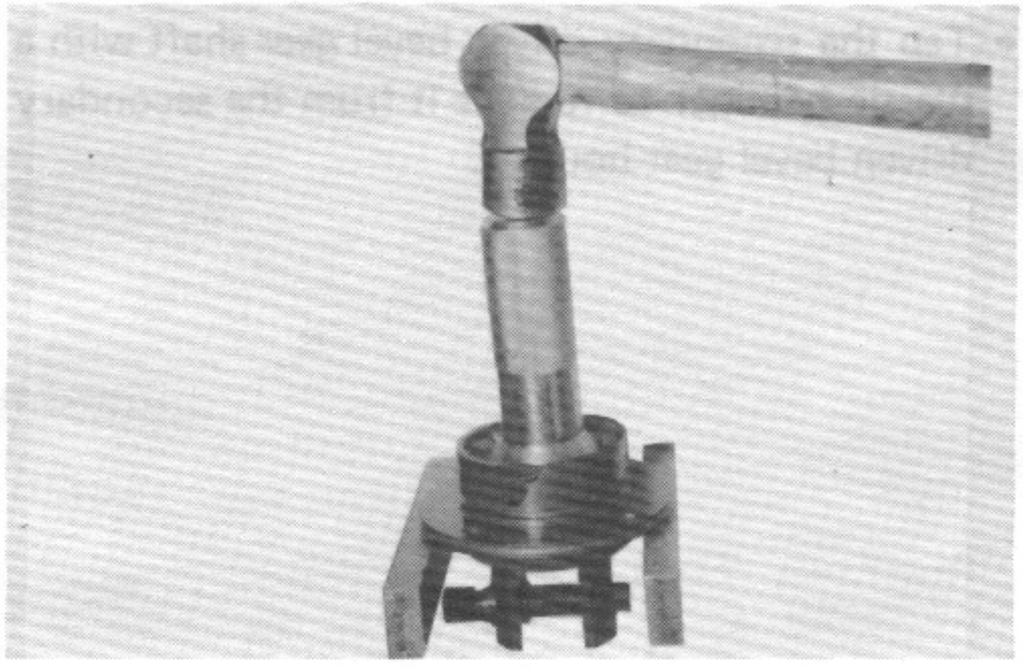
09913 - 50121	Oil seal remover

CAUTION:
The removed oil seal should be replaced with a new one.



- Remove the bearing races from the secondary driven bevel gear housing by using the special tools.

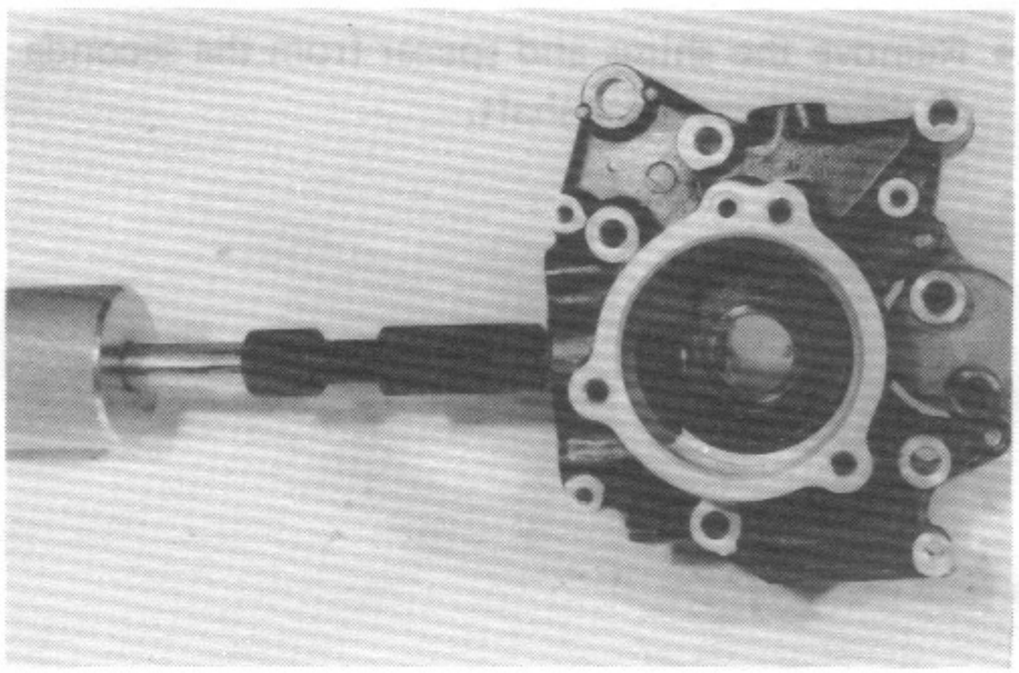
09941 - 54911	Bearing race remover
09913 - 76010	Bearing installer



- Remove the secondary driven bevel gear pilot bearing by using the special tools.

09923 - 74510	Bearing puller
09930 - 30102	Slide shaft

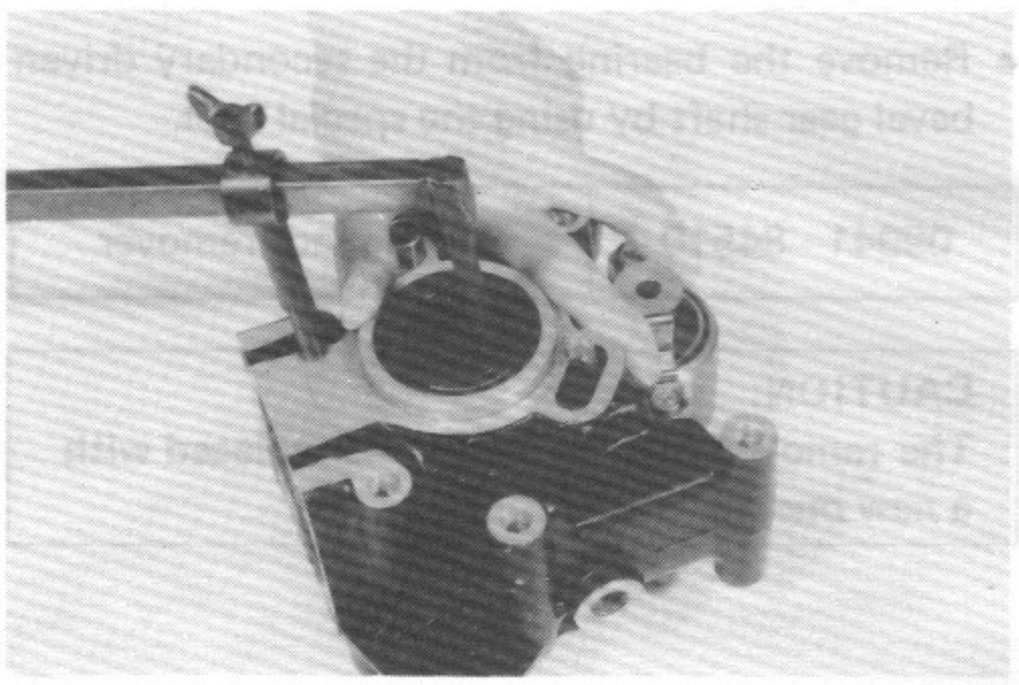
CAUTION:
The removed bearing should be replaced with a new one.



- Remove the oil seal by using the special tool.

09913 - 50121	Oil seal remover

CAUTION:
The removed oil seal should be replaced with a new one.



INSPECTION

Inspect the removed parts for the following abnormalities.

* Drive and driven bevel gears damage or wear
* Improper tooth contact
* Abnormal noise of bearings
* Bearing damage or wear.

REASSEMBLY

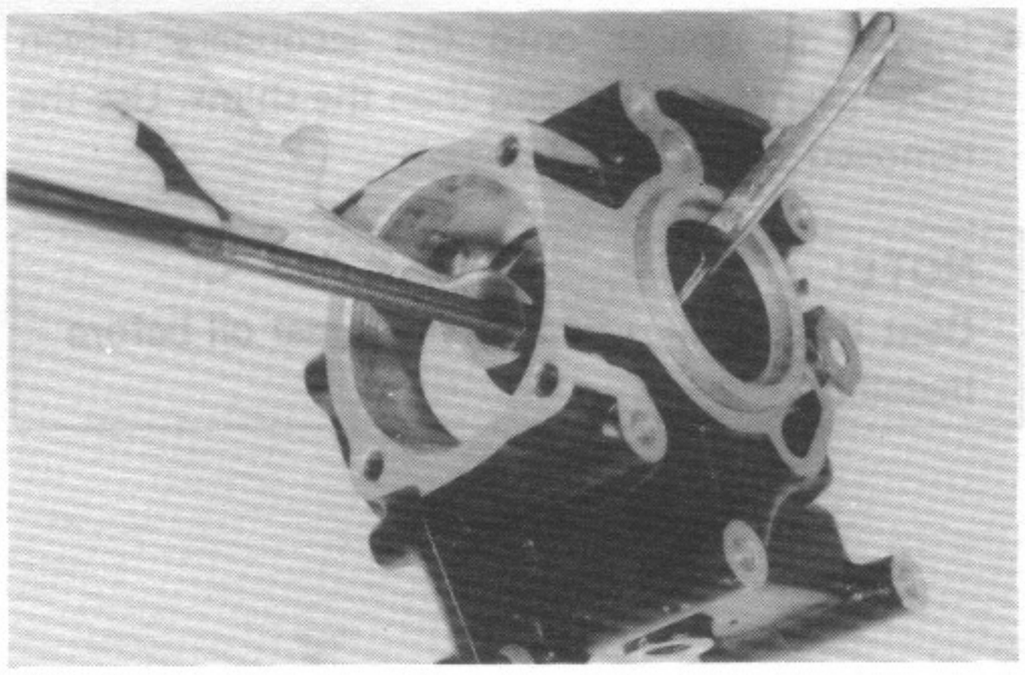
Reassemble the secondary bevel gears in the reverse order of disassembly. Pay attention to the following points.

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

SECONDARY DRIVEN BEVEL GEAR

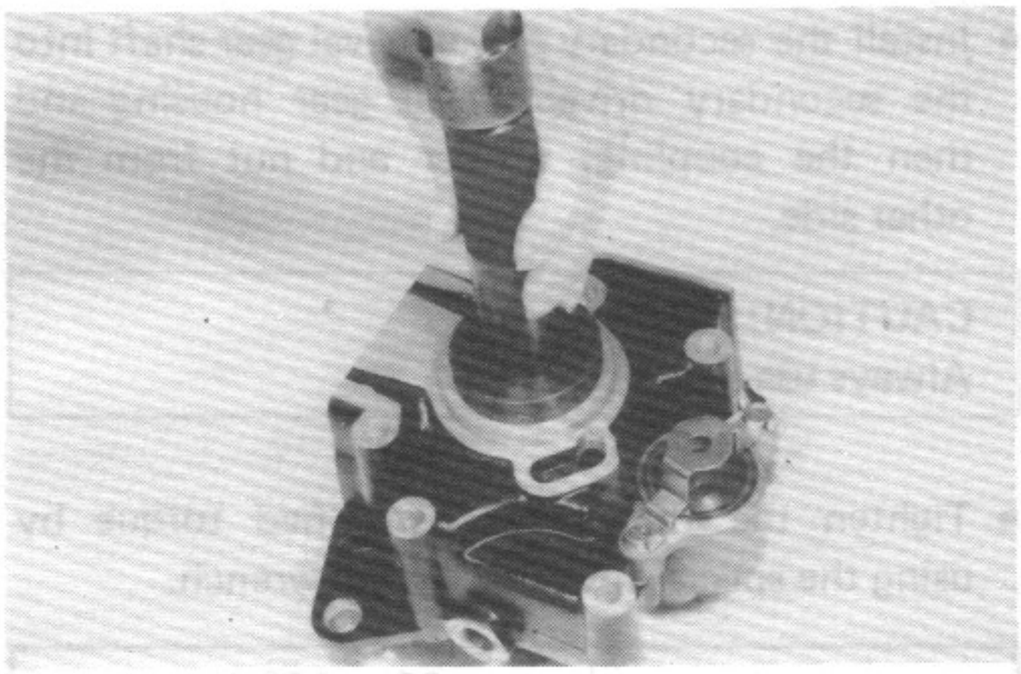
- Install the secondary driven bevel gear pilot bearing by using the special tool.

09924 - 84520	Bearing installer



- Install a new oil seal by using the special tools.

09924 - 74560	Oil seal installer
09924 - 74510	Bearing and oil seal installer handle

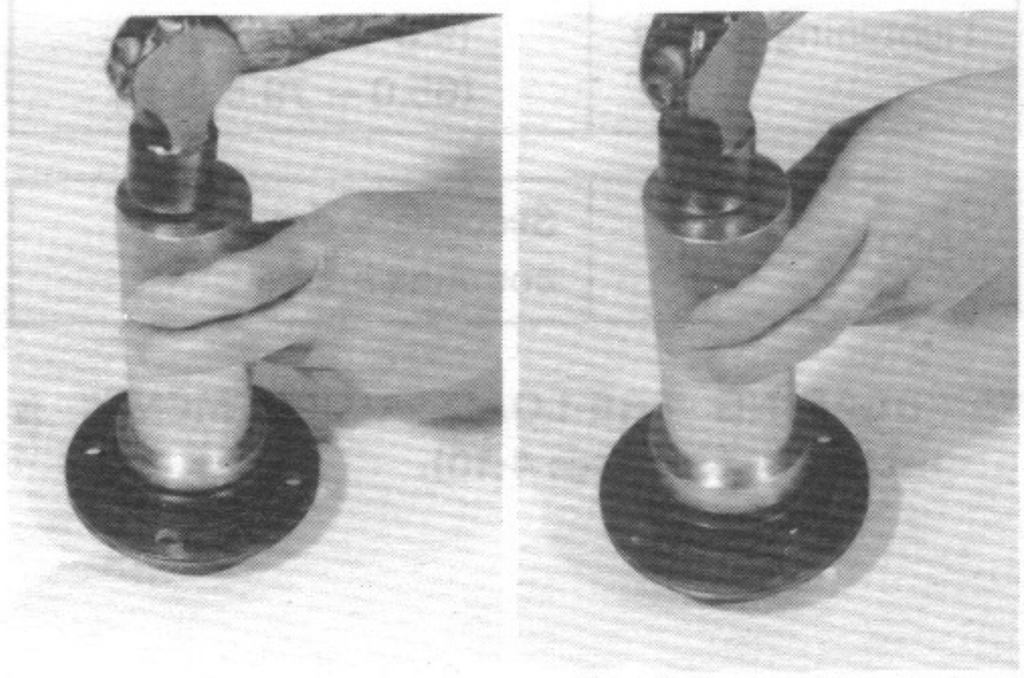


NOTE:
The oil seal has a letter mark on its one end, which must face upside.

- Install the bearing races into the secondary driven bevel gear housing by using the special tool.
- After installing the bearing into the secondary driven bevel gear housing, install a new oil seal by using the special tool.
- Apply grease to the lip of oil seal.

09913 - 85210	Bearing installer

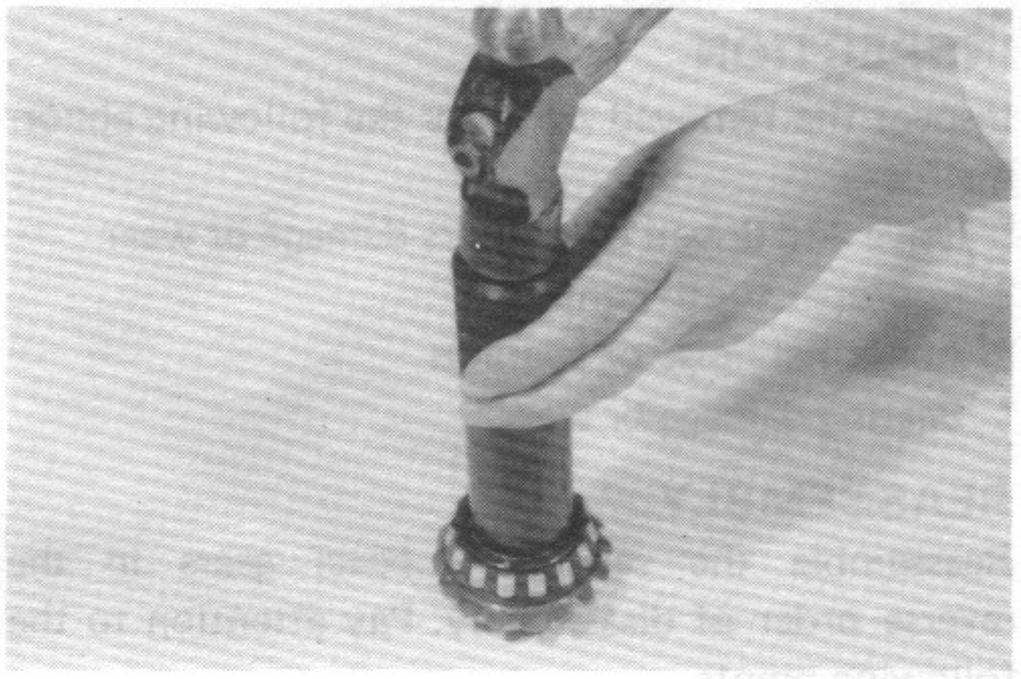
99000 - 25030	SUZUKI super grease "A"



- Install the bearing onto the secondary driven bevel gear shaft by using the special tool.

09913 - 84510	Bearing installer

CAUTION:
When replacing the secondary driven bevel gear, replace the secondary drive bevel gear also, as they must be replaced together.

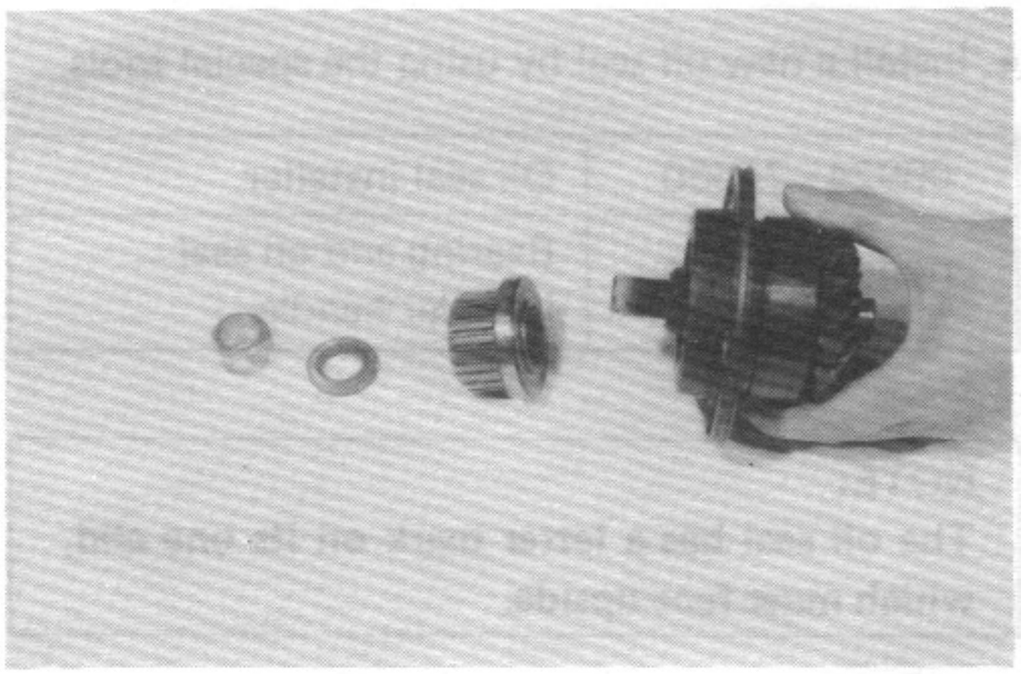


- Install the spacer onto the secondary driven bevel gear shaft first and then the shims. Use the removed spacer and shims.

NOTE:
Coat the bearings with hypoid gear oil before installing.

- Install the secondary driven bevel gear shaft into the secondary driven bevel gear housing and then the coupling, washer and nut from the other side.

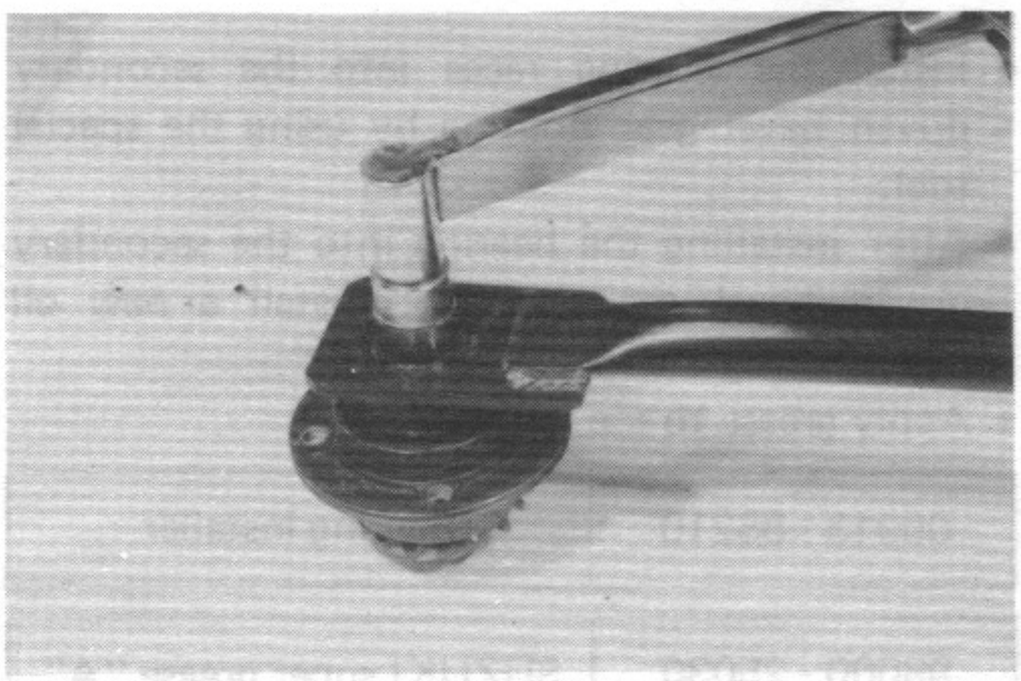
CAUTION:
Always use a new nut.



- Tighten the nut to the specified torque by using the special tool and torque wrench.

Tightening torque	90 – 110 N·m (9.0 – 11.0 kg-m) (65.0 – 79.5 lb-ft)

09920 - 80710	Secondary driven gear coupling holder



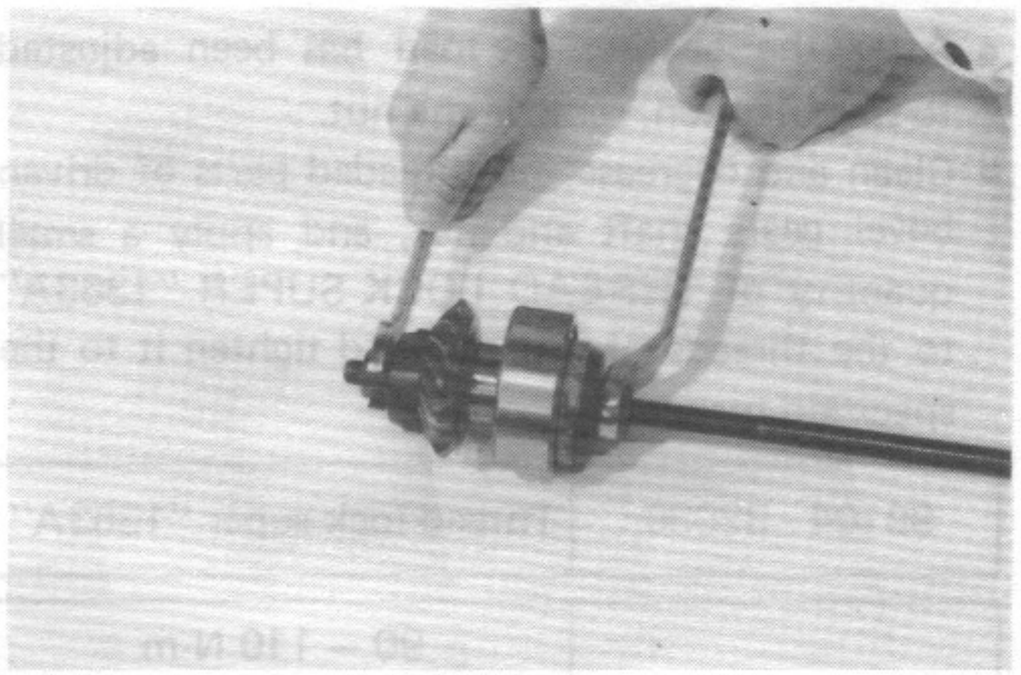
** **"BEARING PRE-LOAD ADJUSTMENT" is necessary. (See page 4-10)**

SECONDARY DRIVE BEVEL GEAR

- Install the secondary drive bevel gear shaft into the bearing by using the special tool.

09941 - 34513	Bearing installer

CAUTION:
When replacing the secondary drive bevel gear, replace the secondary driven bevel gear also, as they must be replaced together.

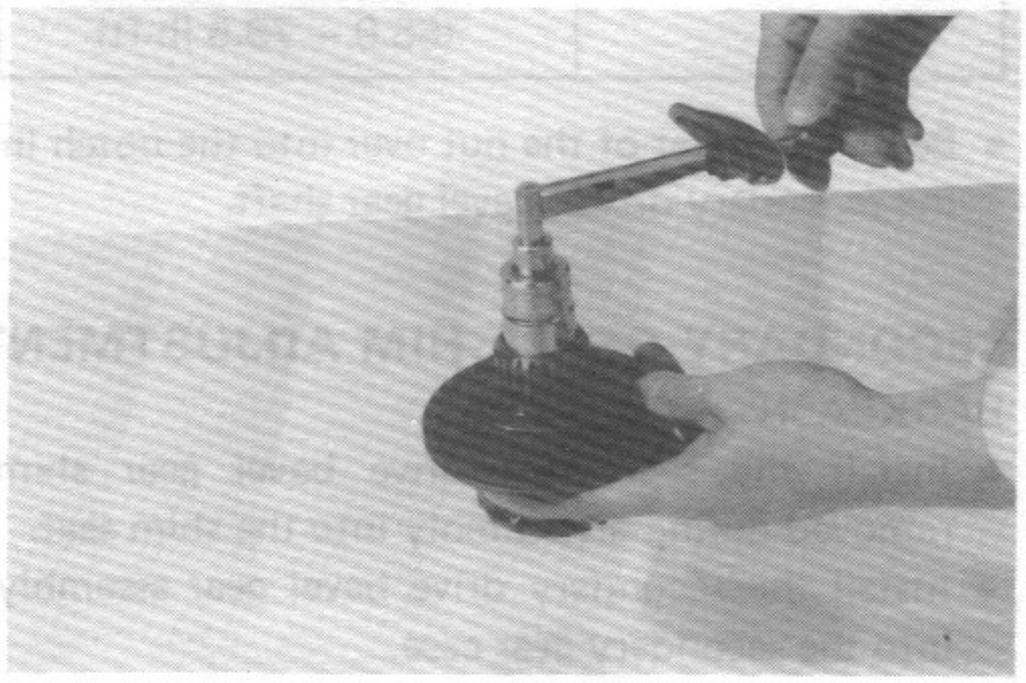


BEARING PRE-LOAD ADJUSTMENT

- After the nut is tightened to specification, rotate the gear several turns in both directions to seat the bearings.
- Measure the bearing pre-load by using the special tools.

09900 - 21107	Torque wrench 0 – 15 kg-cm
09915 - 24550	Adapter socket 12.7 – 6.3 mm

Pre-load	40 – 70 N·cm (4.0 – 7.0 kg-cm) (3.5 – 6.0 lb-in)



- If the bearing pre-load is not within specification, the shims between the bearings must be changed. Refer to the chart at right and make the appropriate adjustment, re-check the pre-load measurement procedure as necessary.

Pre-load	Shim adjustment
Under 40 N·cm (4.0 kg-cm, 3.5 lb-in)	Decrease shim thickness
40 – 70 N·cm (4.0 – 7.0 kg-cm) (3.5 – 6.0 lb-in)	Correct
Over 70 N·cm (7.0 kg-cm, 6.0 lb-in)	Increase shim thickness

NOTE:
Whenever the pre-load is checked after a shim change, the gear must be rotated in both directions to seat the bearings after the nut is retorqued to specification.

NOTE:
When changing the shims, measure the thickness of the old shims. Using thickness of the old shims as a guide, adjust the pre-load by referring to the chart at right.

List of shims © (Refer to page 4-16)

Part No.	Shim thickness
09181 - 30028	1.60 mm
09181 - 30029	1.62 mm
09181 - 30030	1.64 mm
09181 - 30031	1.66 mm
09181 - 30032	1.68 mm
09181 - 30033	1.70 mm
09181 - 30034	1.80 mm
09181 - 30035	1.90 mm
09181 - 30036	2.00 mm

- After the bearing pre-load has been adjusted to specification, remove the nut.
- Clean and degrease the threaded parts of driven bevel gears shaft and nut, and apply a small quantity of THREAD LOCK SUPER "1363A" to the threads of the nut and tighten it to the specified torque.

99104 - 32030	Thread lock super "1363A"
Tightening torque	90 – 110 N·m (9.0 – 11.0 kg-m) (65.0 – 79.5 lb-ft)

- Bend the collar of the nut over into the notch in the secondary driven bevel gear shaft.

SECONDARY GEAR SHIM ADJUSTMENT

BACKLASH

- Install the secondary drive bevel gear shim removed during disassembly into the shim seat.
- Install the secondary drive bevel gear assembly into the secondary gear case.

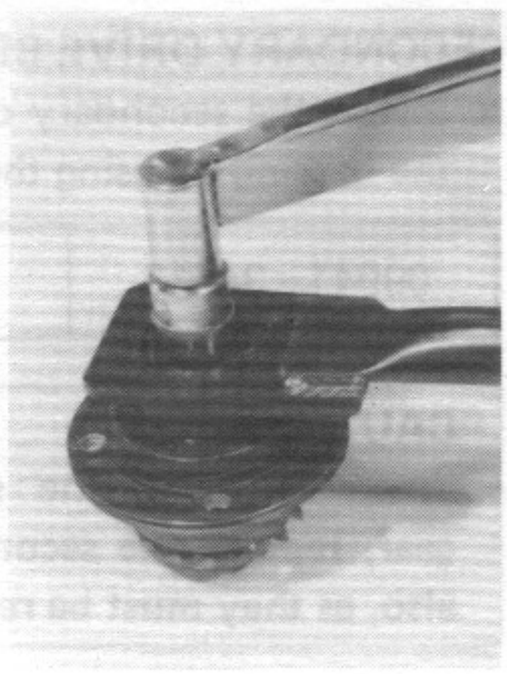
- Install the secondary driven bevel gear shims removed during disassembly onto the secondary driven bevel gear housing.

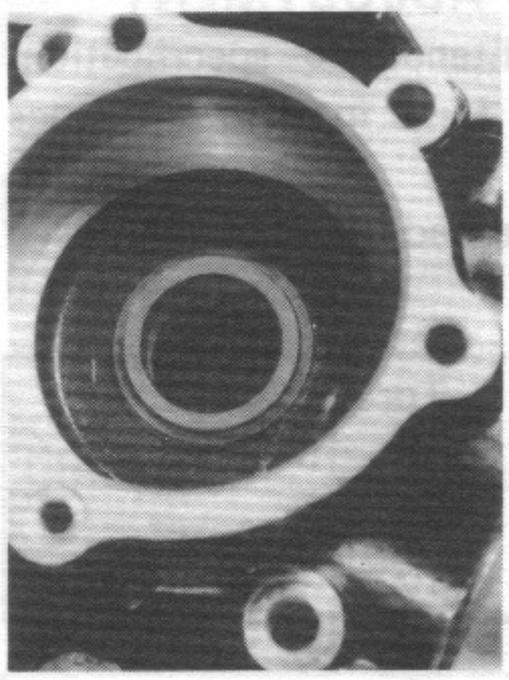
NOTE:
Do not install the O-ring at this point. O-ring is installed after backlash and tooth contact are correct.

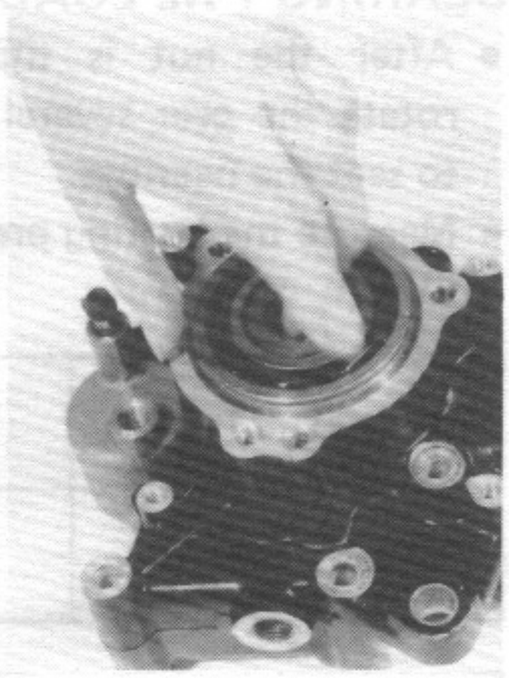
- Install the secondary driven bevel gear assembly into the secondary gear case and tighten the four bolts to the specified torque.

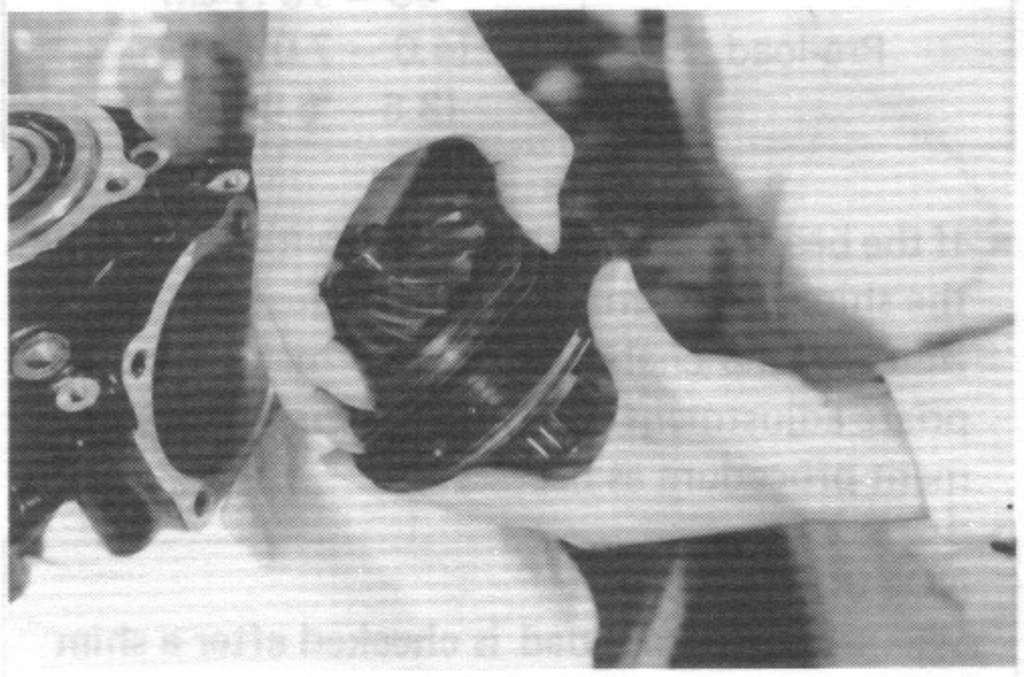
CAUTION:
The secondary driven bevel gear assembly must be installed with "UP" mark facing upward as shown in Fig.

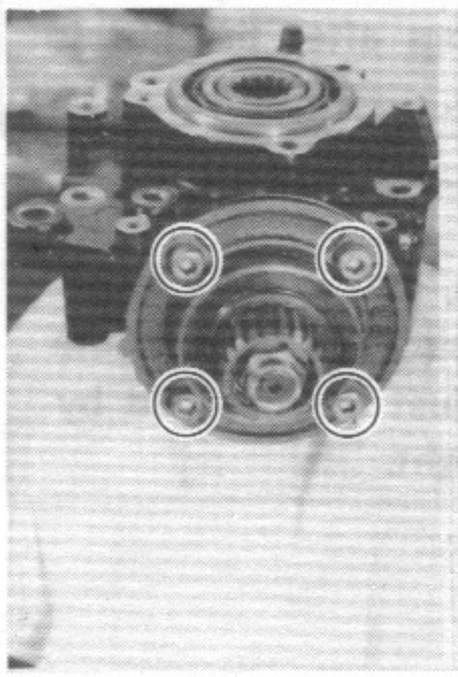
Tightening torque	18 – 28 N·m (1.8 – 2.8 kg-m) (13.0 – 20.0 lb-ft)

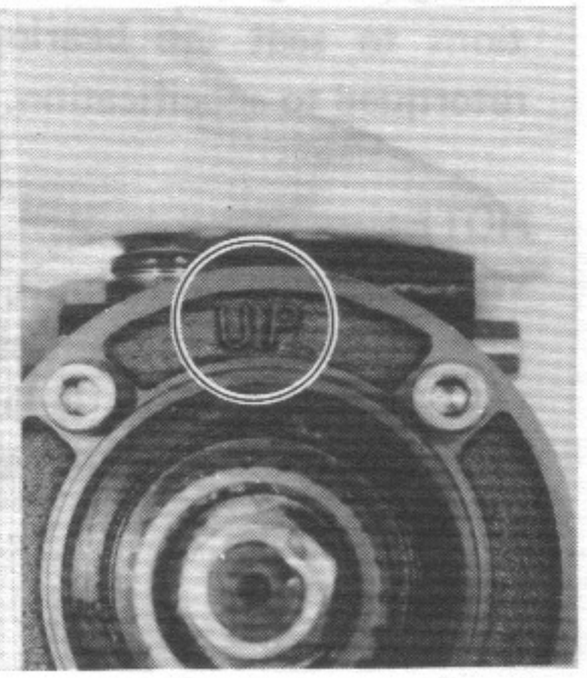






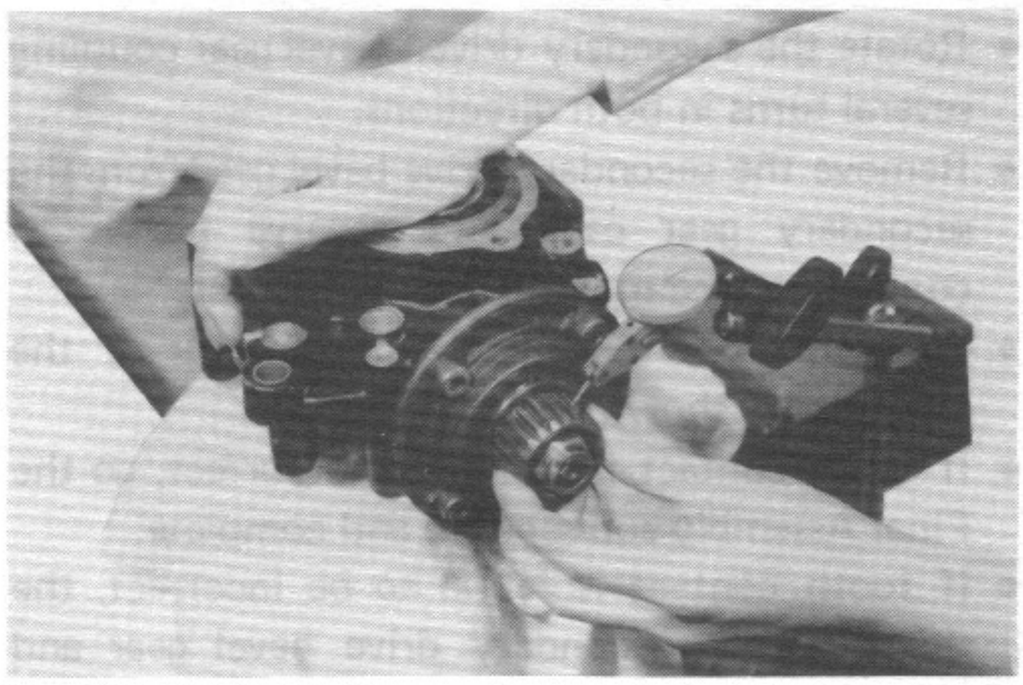






- Place a dial gauge as shown on the secondary driven bevel gear coupling and measure the backlash by turning the coupling in each direction until it stops while holding the secondary drive bevel gear by hand.

Secondary bevel gear backlash	0.05 – 0.032 mm (0.002 – 0.013 in)



- If the backlash is not within specification, the shims must be changed and the backlash should be re-checked until correct.
  Refer to the chart at right for appropriate changes.

Backlash	Shim adjustment
Under 0.05 mm (0.002 in)	Increase shim thickness
0.05 – 0.32 mm (0.002 – 0.013 in)	Correct
Over 0.32 mm (0.013 in)	Decrease shim thickness

NOTE:
When changing the shims, measure the thickness of old shims. Using thickness of the old shims as a guide, adjust the backlash by referring to the chart at right.

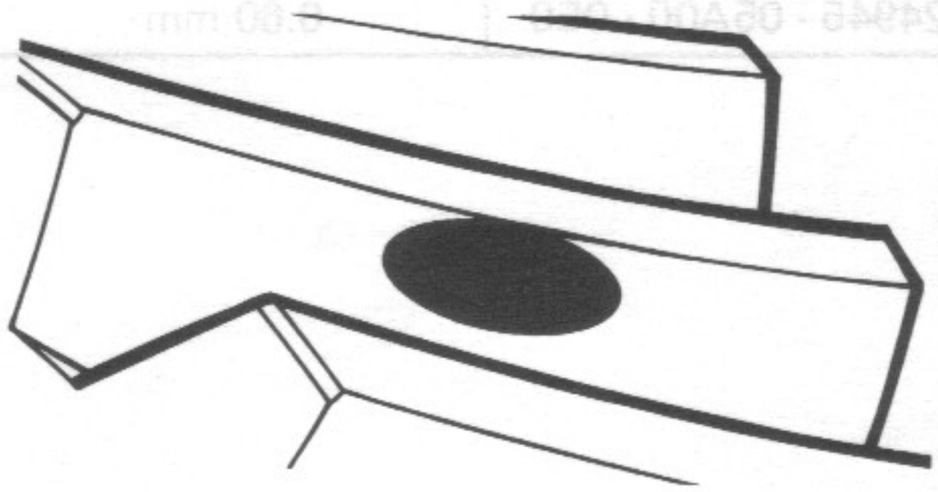
List of shims Ⓓ (Refer to page 4-16)

Part No.	Shim thickness
24945 - 05A00 - 0A0	0.30 mm
24945 - 05A00 - 0B0	0.35 mm
24945 - 05A00 - 0C0	0.40 mm
24945 - 05A00 - 0D0	0.50 mm
24945 - 05A00 - 0E0	0.60 mm

TOOTH CONTACT

- After bringing the backlash within specification by changing the secondary driven bevel gear shims, it will be necessary to check tooth contact.
- Remove the drive bevel gear assembly from the secondary gear case.
- Clean and degrease the secondary drive bevel gear teeth, and apply a coating of machinist's layout dye or paste to several teeth.
- Reinstall the secondary drive bevel gear assembly, with correct shim, into the secondary gear case.

① INCORRECT (Contact at tooth top)



- Rotate the secondary driven bevel gear coupling several turns in both directions.
- Remove the secondary drive bevel gear from the secondary gear case, and observe the tooth contact pattern made in the dye or paste.
- Compare the tooth contact pattern to the examples as shown in ①, ② and ③.
- If tooth contact is found to be correct, go the Final Assembly sub-section, and complete.
- If tooth contact is found to be incorrect, the shims of the secondary drive bevel gear and secondary driven bevel gear must be changed, tooth contact should be re-checked until correct.

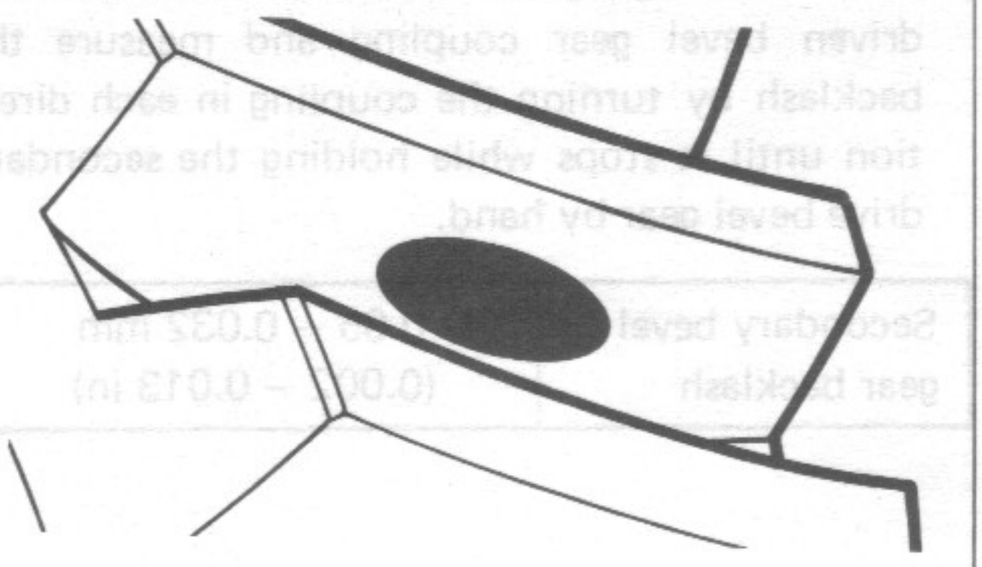
CAUTION:
After the tooth contact adjustment is made, the backlash must be re-checked, as it may change. Refer to the backlash checking sub-section, and readjust until both backlash and tooth contact are correct.

Tooth contact	Shim adjustment
Contact at tooth top ①	Decrease thickness of shims Ⓐ or Ⓓ
Contact at tooth roof ③	Increase thickness of shims Ⓐ or Ⓓ

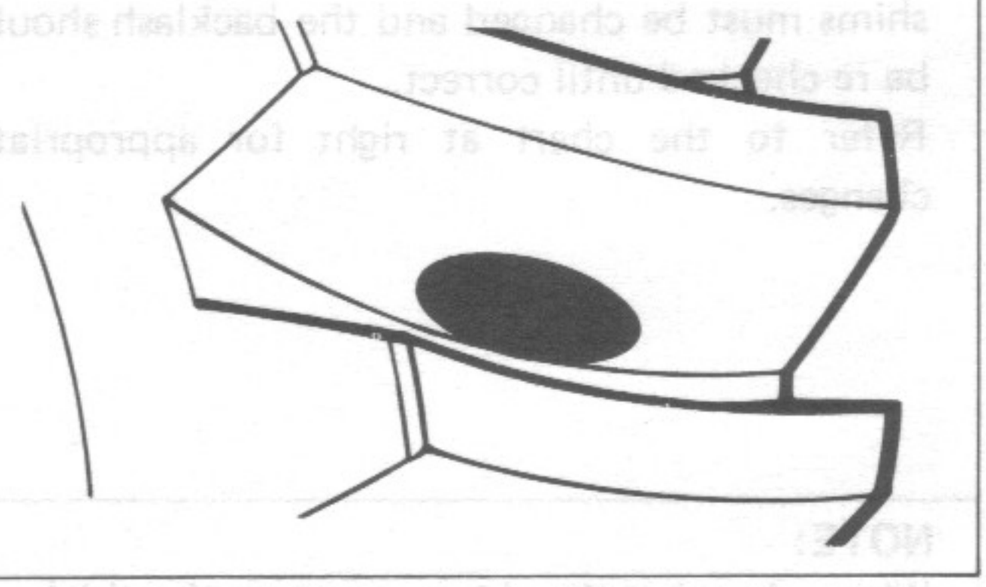
List of shims Ⓓ (Refer to page 4-16)

Part No.	Shim thickness
24945 - 05A00 - 0A0	0.30 mm
24945 - 05A00 - 0B0	0.35 mm
24945 - 05A00 - 0C0	0.40 mm
24945 - 05A00 - 0D0	0.50 mm
24945 - 05A00 - 0E0	0.60 mm

② CORRECT



③ INCORRECT (Contact at tooth roof)

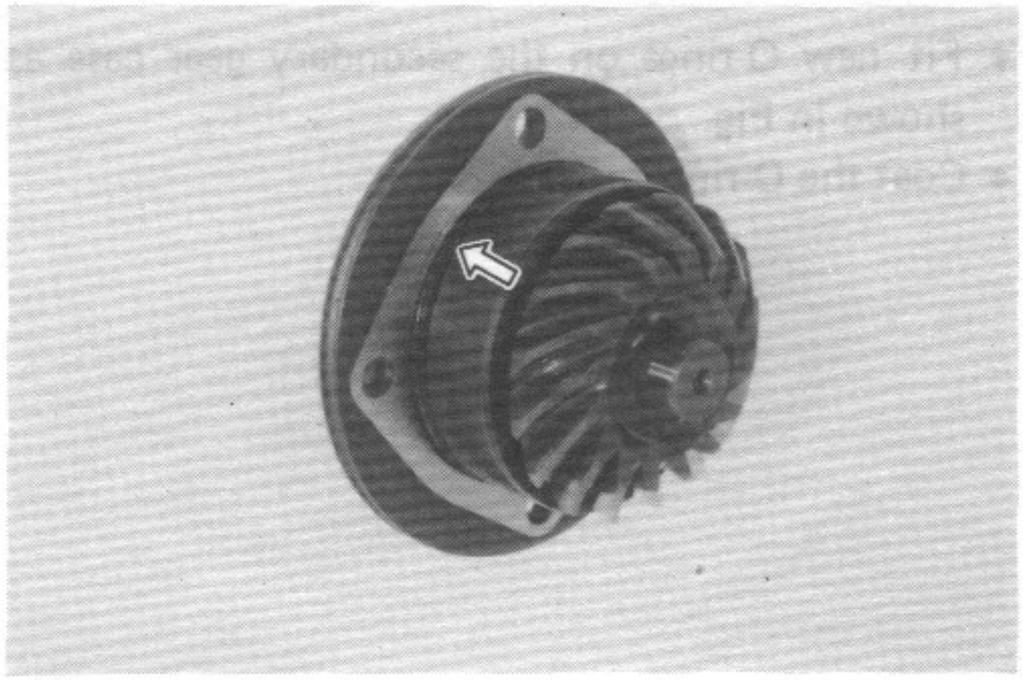


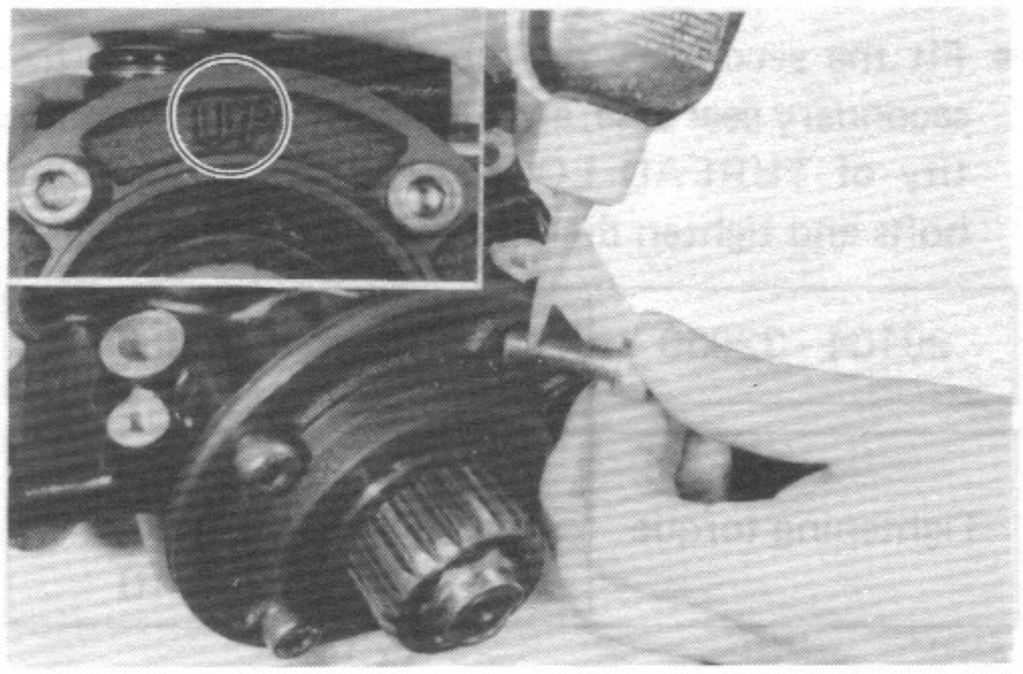
List of shims Ⓐ (Refer to page 4-16)

Part No.	Shim thickness
24934 - 05A00 - 0A0	2.90 mm
24934 - 05A00 - 0B0	3.00 mm
24934 - 05A00 - 0C0	3.10 mm
24934 - 05A00 - 0D0	3.20 mm
24934 - 05A00 - 0E0	3.25 mm
24934 - 05A00 - 0F0	3.30 mm
24934 - 05A00 - 0G0	3.35 mm
24934 - 05A00 - 0H0	3.40 mm
24934 - 05A00 - 0I0	3.45 mm
24934 - 05A00 - 0J0	3.50 mm
24934 - 05A00 - 0K0	3.55 mm
24934 - 05A00 - 0L0	3.60 mm
24934 - 05A00 - 0M0	3.65 mm
24934 - 05A00 - 0N0	3.70 mm
24934 - 05A00 - 0P0	3.75 mm
24934 - 05A00 - 0Q0	3.80 mm
24934 - 05A00 - 0R0	3.90 mm
24934 - 05A00 - 0S0	4.00 mm
24934 - 05A00 - 0T0	4.10 mm

FINAL ASSEMBLY AND REMOUNTING

- After both gear backlash and tooth contact are correct, remove the secondary drive bevel gear assembly and secondary driven bevel gear assembly from the secondary gear case.
- Clean off any machinist's dye or paste from the gear teeth, and lubricate the teeth with Hypoid gear oil.
- Install a new O-ring on the secondary driven bevel gear housing. Coat the O-ring with grease.
- Install the secondary driven bevel gear assembly into the secondary gear case and apply a small quantity of THREAD LOCK "1363C" to the four bolts and tighten them with specified torque.





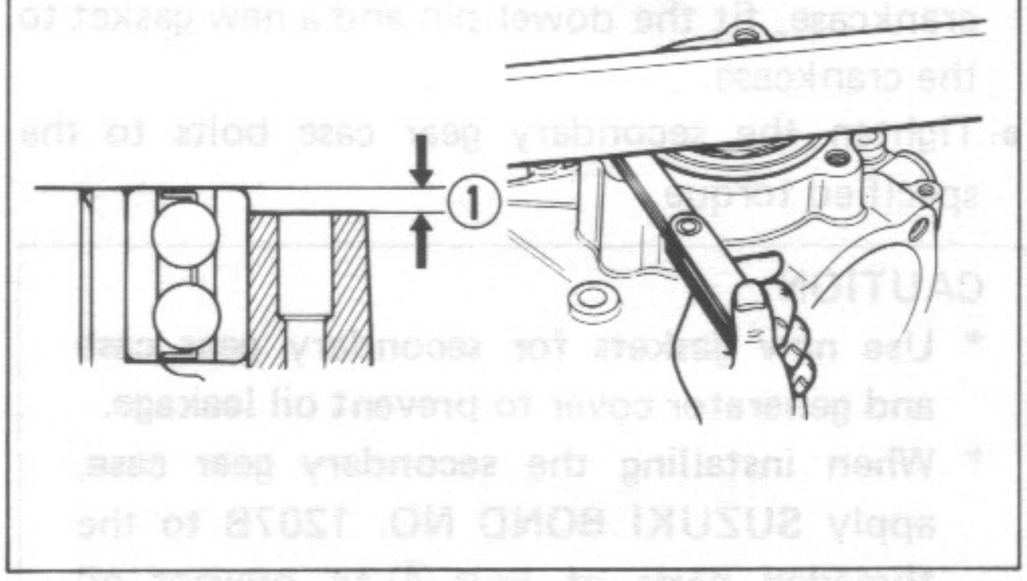
99104 - 32050	Thread lock "1363C"

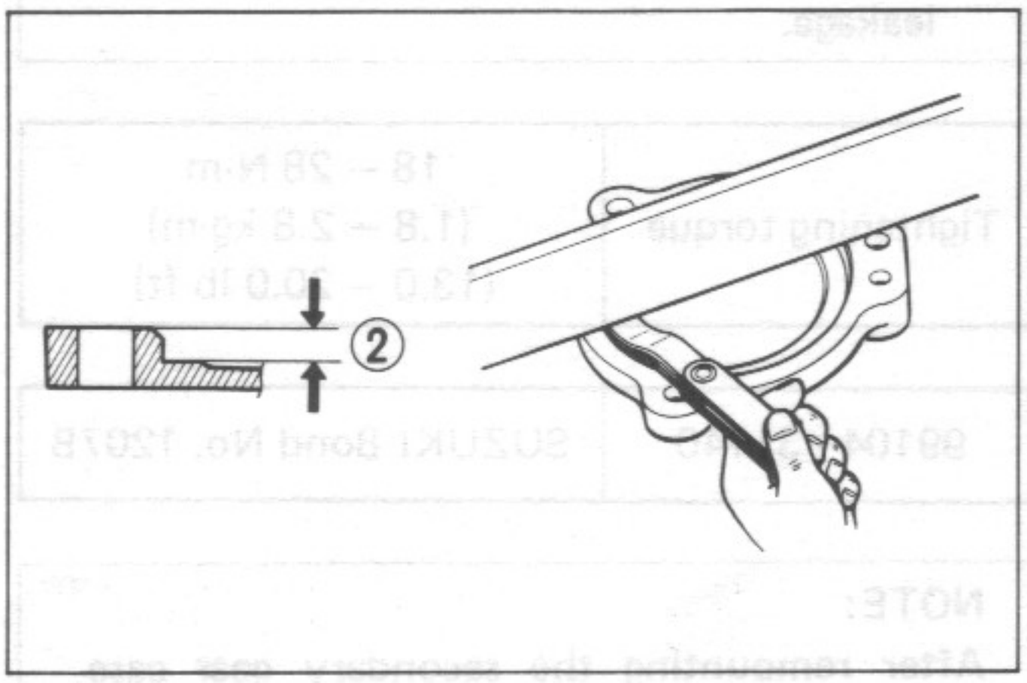
Tightening torque	18 – 28 N·m (1.8 – 2.8 kg-m) (13.0 – 20.0 lb-ft)

CAUTION:
"UP" mark on the gear housing should face upward.

- Install the secondary drive bevel gear assembly into the secondary gear case.

NOTE:
Before installing the secondary drive bevel gear cover, measure the height ① of bearing and height ② of secondary drive bevel gear cover with a straightege and thickness gauge as shown in the illustrations. Select the proper size of shims so that the difference between the height ① and height ② is 0.1 mm.

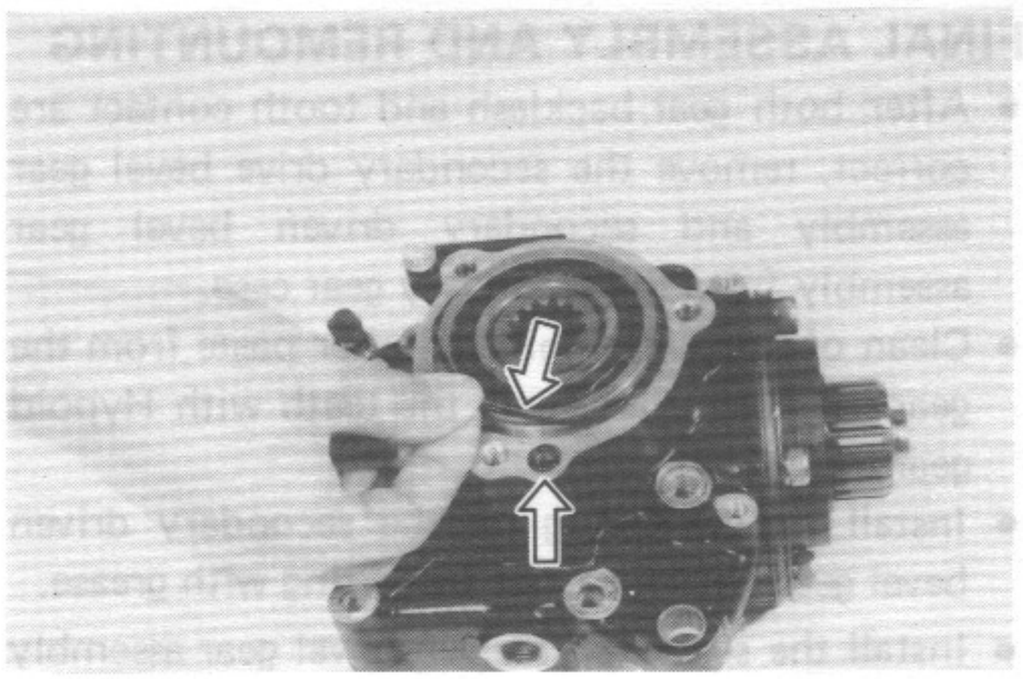




List of shims Ⓑ (Refer to page 4-16)

Part No.	Shim thickness
24935 - 05A00 - 0A0	0.30 mm
24935 - 05A00 - 0B0	0.35 mm
24935 - 05A00 - 0C0	0.40 mm
24935 - 05A00 - 0D0	0.50 mm
24935 - 05A00 - 0E0	0.60 mm

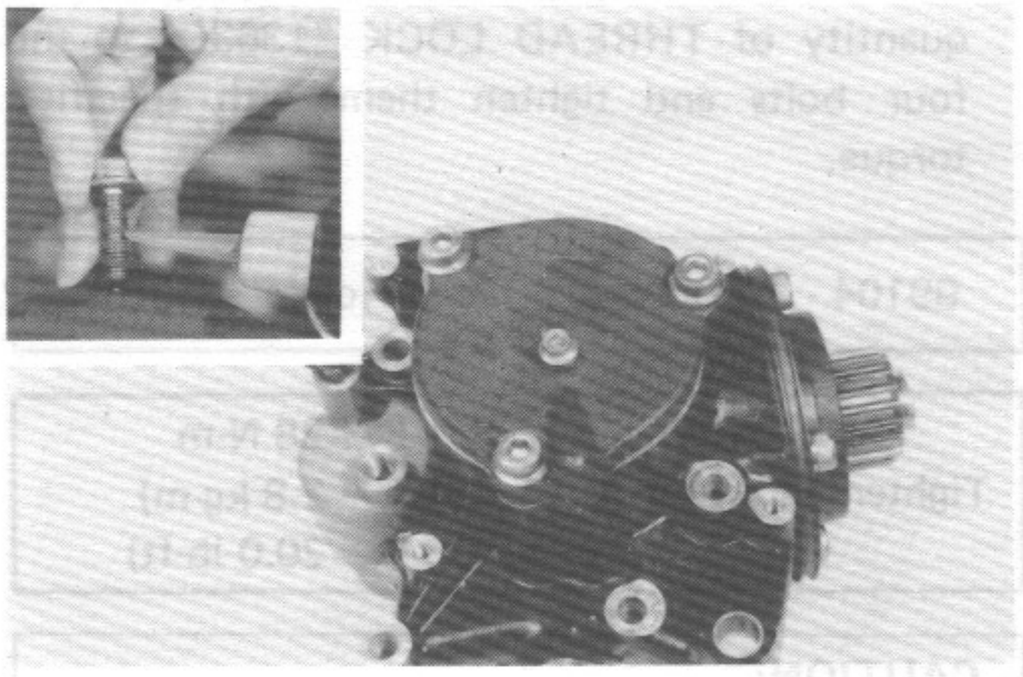
- Fit new O-rings on the secondary gear case as shown in Fig.
- Coat the O-ring with grease.



- Fit the secondary drive bevel gear cover on the secondary gear case, and then apply a small quantity of THREAD LOCK "1363C" to the three bolts and tighten them to the specified torque.

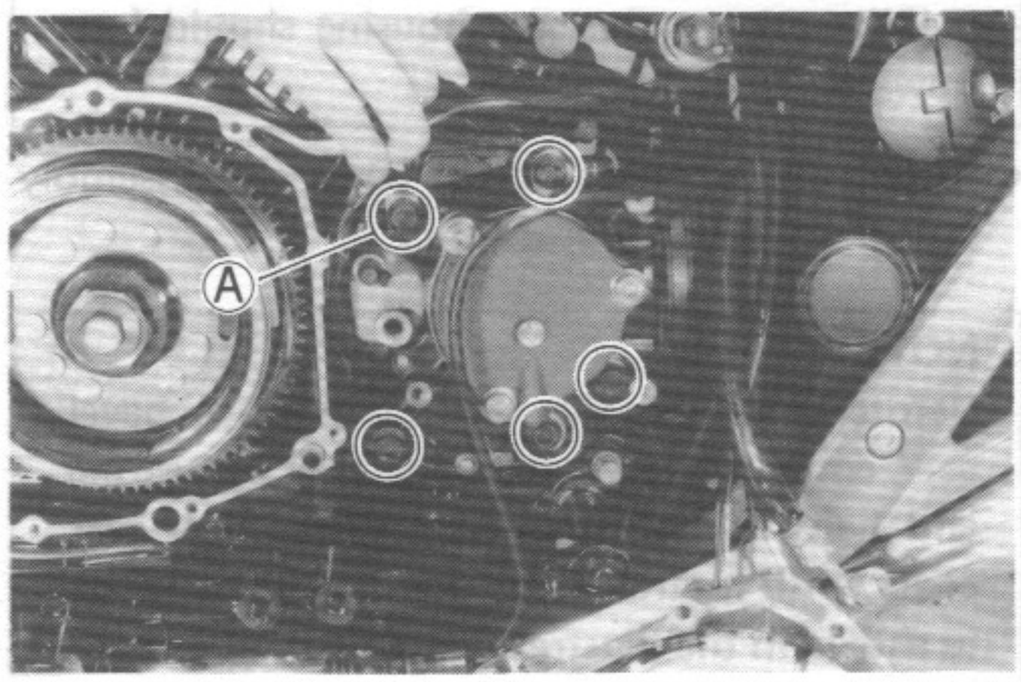
99104 - 32050	Thread lock "1363C"

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



- Before installing the secondary gear case to the crankcase, fit the dowel pin and a new gasket to the crankcase.
- Tighten the secondary gear case bolts to the specified torque.

CAUTION:
*** Use new gaskets for secondary gear case and generator cover to prevent oil leakage.**
*** When installing the secondary gear case, apply SUZUKI BOND NO. 1207B to the threaded parts of bolt Ⓐ to prevent oil leakage.**



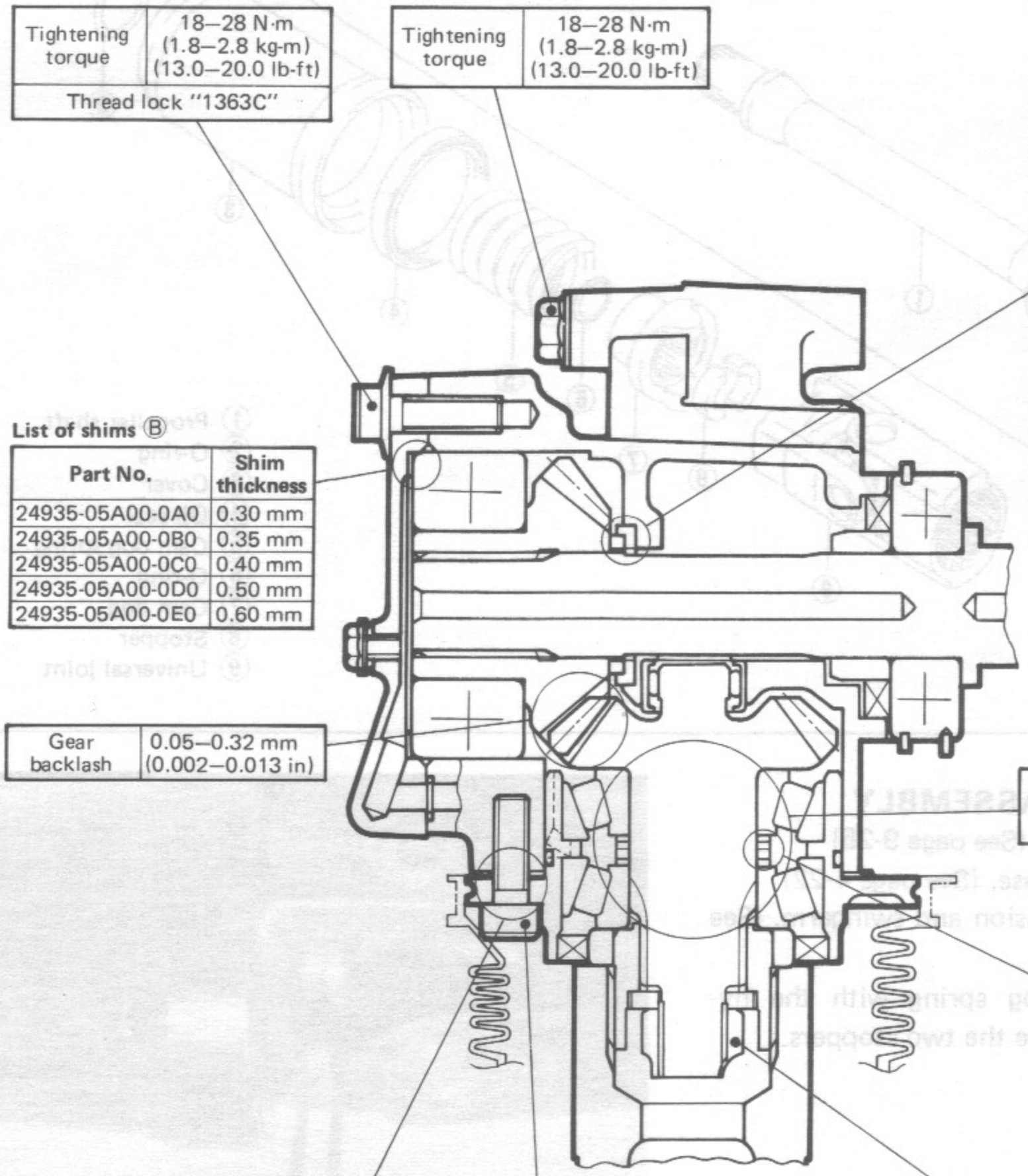
Tightening torque	18 – 28 N·m (1.8 – 2.8 kg-m) (13.0 – 20.0 lb-ft)

99104 - 31140	SUZUKI Bond No. 1207B

NOTE:
After remounting the secondary gear case, the following service procedures are necessary.

*** Fill the secondary gear case with Hypoid gear oil.**
Specified capacity: 180 – 200 ml
(6.1/6.3 – 6.8/7.0 US/Imp oz)
*** Fill the engine with engine oil. (See page 2-5)**
*** Bleed air after reinstalling the clutch hydraulic line. (See page 2-7)**
*** Apply BOND NO. 1207B to mating surface of swingarm and final gear case. (See page 4-36)**
*** Adjust the rear brake. (See page 2-12)**

REASSEMBLY INFORMATION



Tightening torque	18–28 N·m (1.8–2.8 kg-m) (13.0–20.0 lb-ft)
Thread lock "1363C"	

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

List of shims Ⓐ

Part No.	Shim thickness
24934-05A00-0A0	2.90 mm
24934-05A00-0B0	3.00 mm
24934-05A00-0C0	3.10 mm
24934-05A00-0D0	3.20 mm
24934-05A00-0E0	3.25 mm
24934-05A00-0F0	3.30 mm
24934-05A00-0G0	3.35 mm
24934-05A00-0H0	3.40 mm
24934-05A00-0I0	3.45 mm
24934-05A00-0J0	3.50 mm
24934-05A00-0K0	3.55 mm
24934-05A00-0L0	3.60 mm
24934-05A00-0M0	3.65 mm
24934-05A00-0N0	3.70 mm
24934-05A00-0P0	3.75 mm
24934-05A00-0Q0	3.80 mm
24934-05A00-0R0	3.90 mm
24934-05A00-0S0	4.00 mm
24934-05A00-0T0	4.10 mm

List of shims Ⓑ

Part No.	Shim thickness
24935-05A00-0A0	0.30 mm
24935-05A00-0B0	0.35 mm
24935-05A00-0C0	0.40 mm
24935-05A00-0D0	0.50 mm
24935-05A00-0E0	0.60 mm

Gear backlash	0.05–0.32 mm (0.002–0.013 in)

Bearing pre-load	40–70 N-cm (4.0–7.0 kg-cm) (3.5–6.0 lb-in)

List of shims Ⓒ

Part No.	Shim thickness
09181-30028	1.60 mm
09181-30029	1.62 mm
09181-30030	1.64 mm
09181-30031	1.66 mm
09181-30032	1.68 mm
09181-30033	1.70 mm
09181-30034	1.80 mm
09181-30035	1.90 mm
09181-30036	2.00 mm

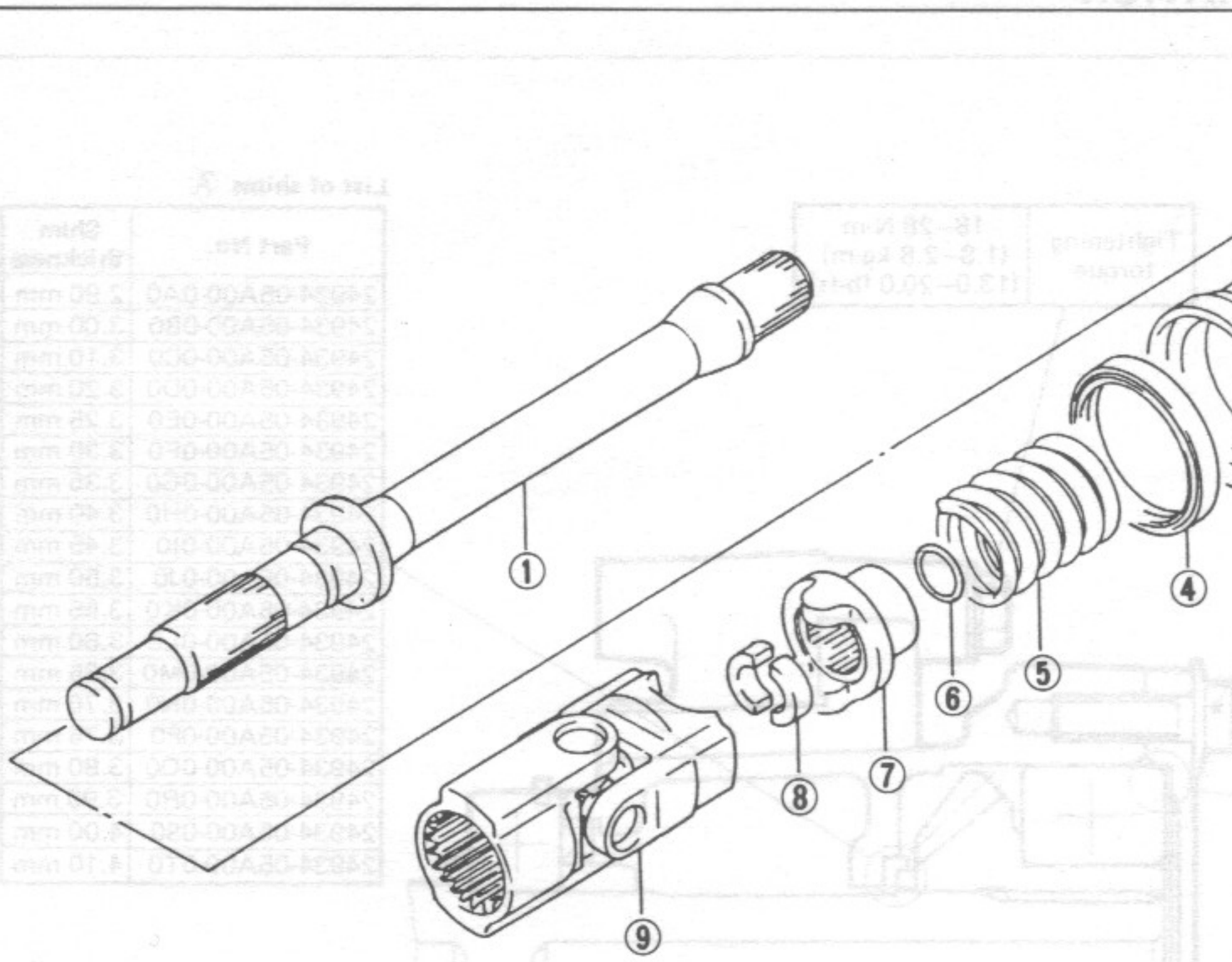
List of shims Ⓓ

Part No.	Shim thickness
24945-05A00-0A0	0.30 mm
24945-05A00-0B0	0.35 mm
24945-05A00-0C0	0.40 mm
24945-05A00-0D0	0.50 mm
24945-05A00-0E0	0.60 mm

Tightening torque	18–28 N·m (1.8–2.8 kg-m) (13.0–20.0 lb-ft)
Thread lock "1363C"	

Tightening torque	90–110 N·m (9.0–11.0 kg-m) (65.0–79.5 lb-ft)
Thread lock super "1363A"	

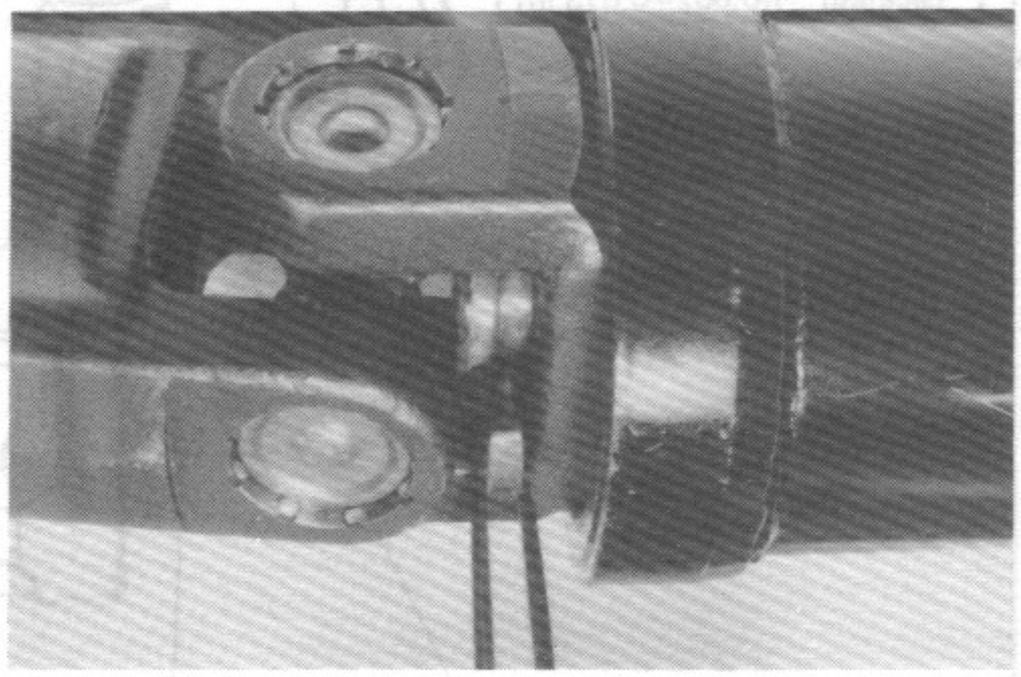
PROPELLER SHAFT CONSTRUCTION



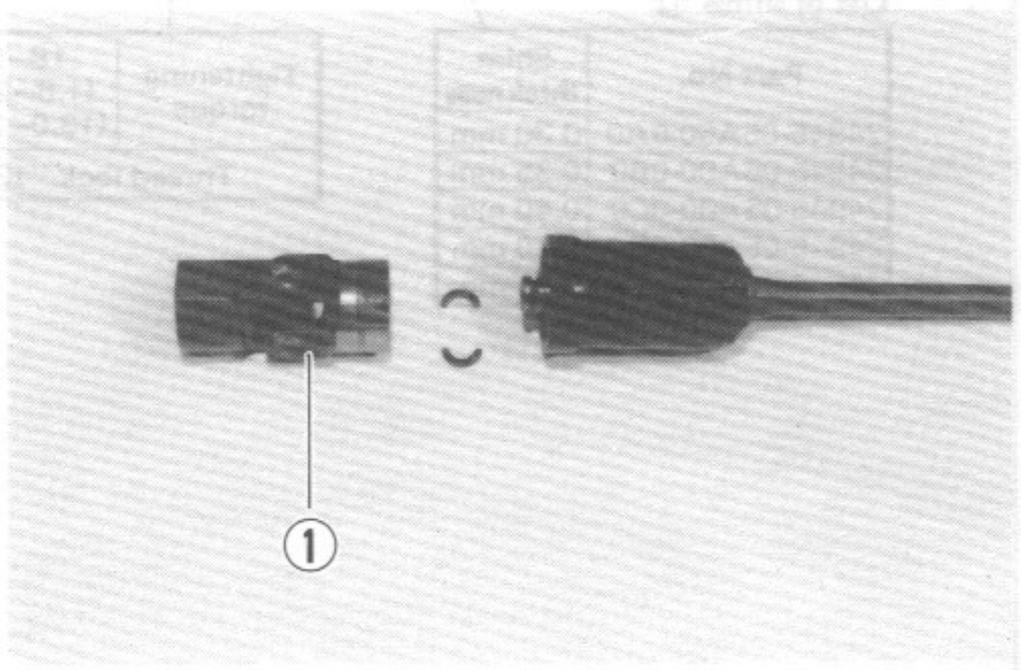
① Propeller shaft
② O-ring
③ Cover
④ Oil seal
⑤ Cam dog spring
⑥ O-ring
⑦ Cam dog
⑧ Stopper
⑨ Universal joint

REMOVAL AND DISASSEMBLY

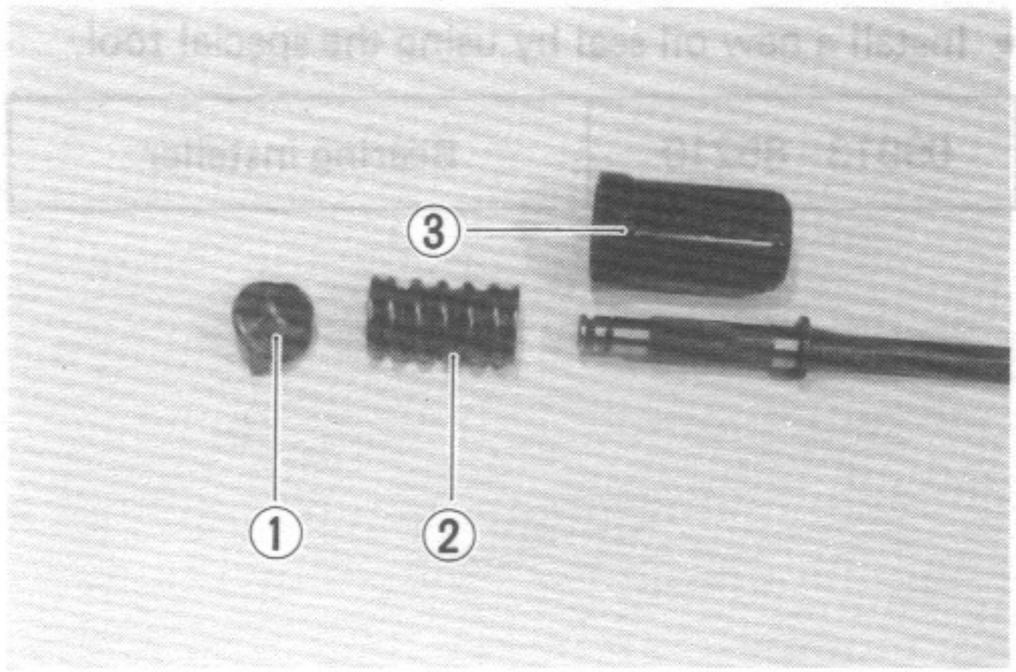
- Remove the rear wheel. (See page 9-25)
- Remove the final gear case. (See page 4-22)
- Remove the rear suspension and swingarm. (See page 9-32)
- Compress the cam dog spring with the hydraulic press, and remove the two stoppers.



- Separate the universal joint ① from the propeller shaft and drain out the hypoid gear oil.

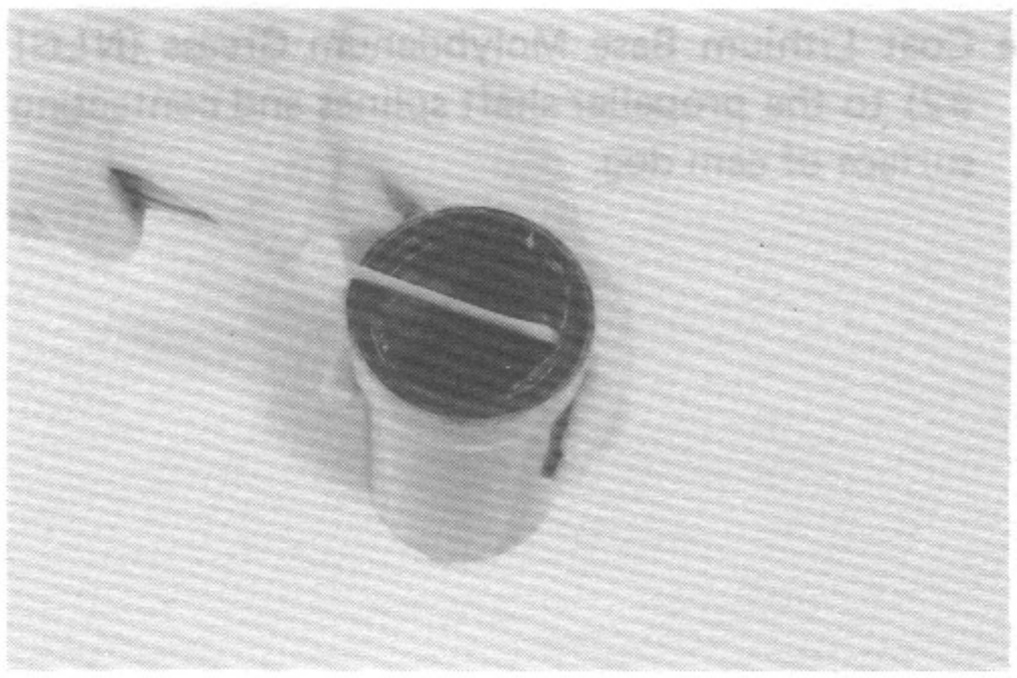


- Separate the cam dog ①, cam dog spring ② and cover ③ from the propeller shaft.



- Remove the oil seal from the cover.

CAUTION:
The removed oil seal should be replaced with a new one.



INSPECTION

Inspect the removed parts for the following abnormalities.

* Propeller shaft distortion or bends
* Propeller shaft splines damage or wear
* Cam dog contacting surface wear or damage
* Universal joint damage

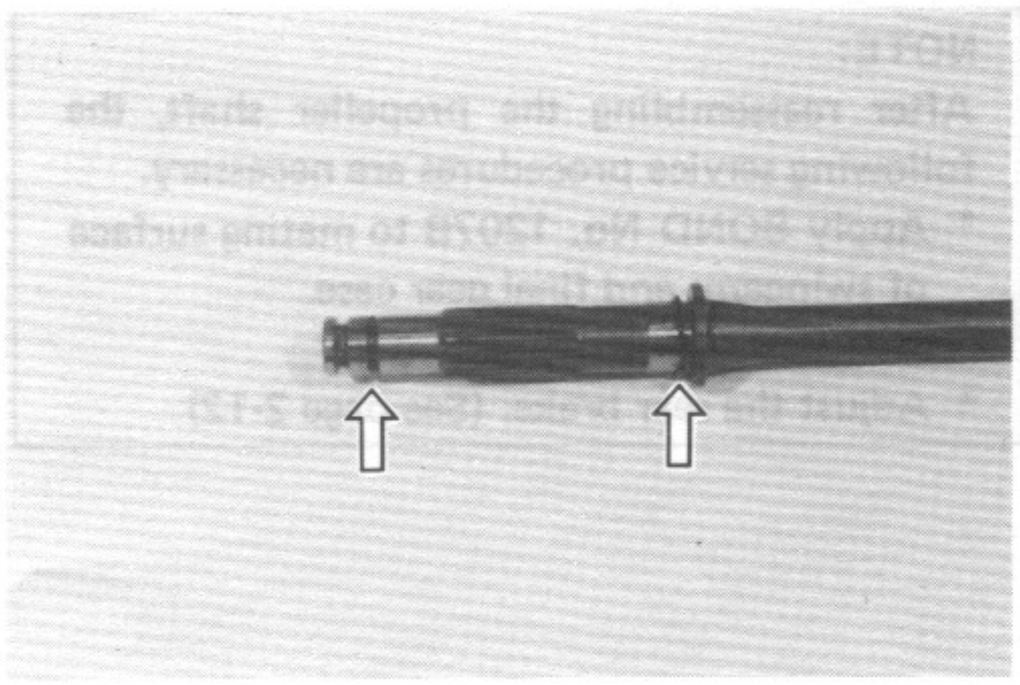
REASSEMBLY AND REMOUNTING

Reassemble and remount the propeller shaft in the reverse order of disassembly and removal. Pay attention to the following points.

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

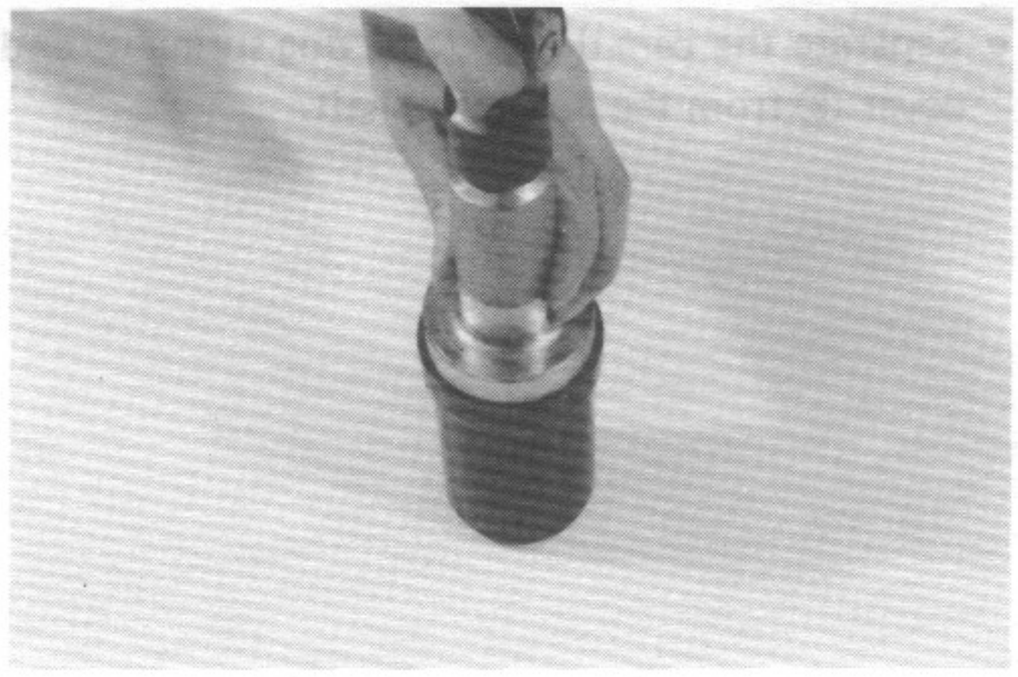
- Install new O-rings onto the propeller shaft.
- Coat the O-rings with grease.
- Apply SUZUKI MOLY PASTE to the splines of propeller shaft.

99000 - 25140	SUZUKI moly paste

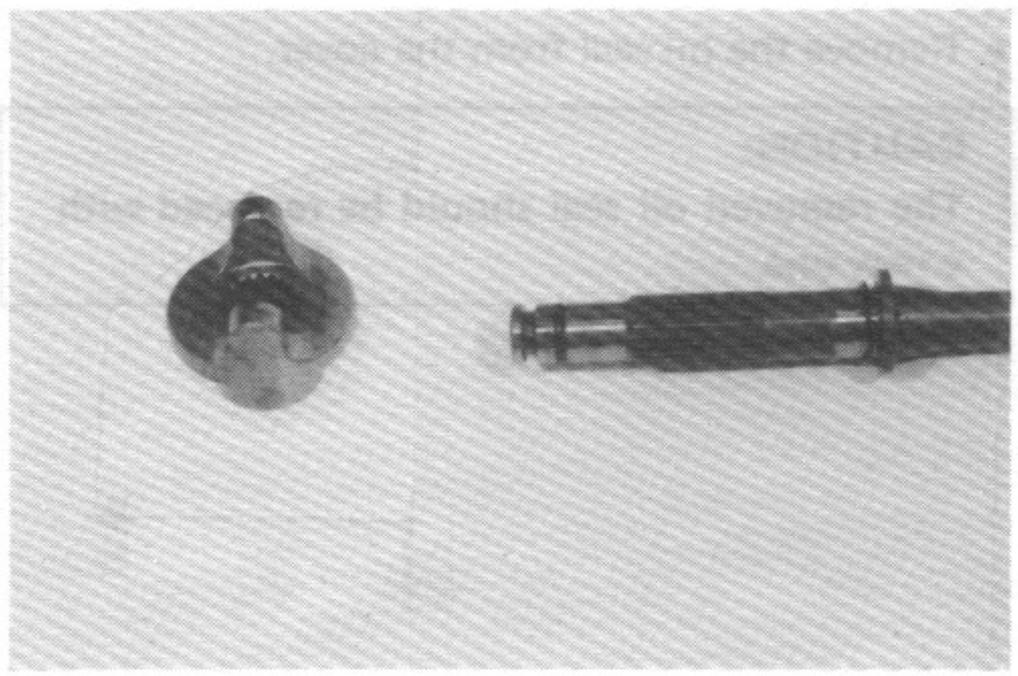


- Install a new oil seal by using the special tool.

09913 - 85210	Bearing installer



- Coat Lithium Base Molybdenum Grease (NLGI #2) to the propeller shaft splines and contacting surface of cam dog.



- Coat the lip of oil seal with grease.

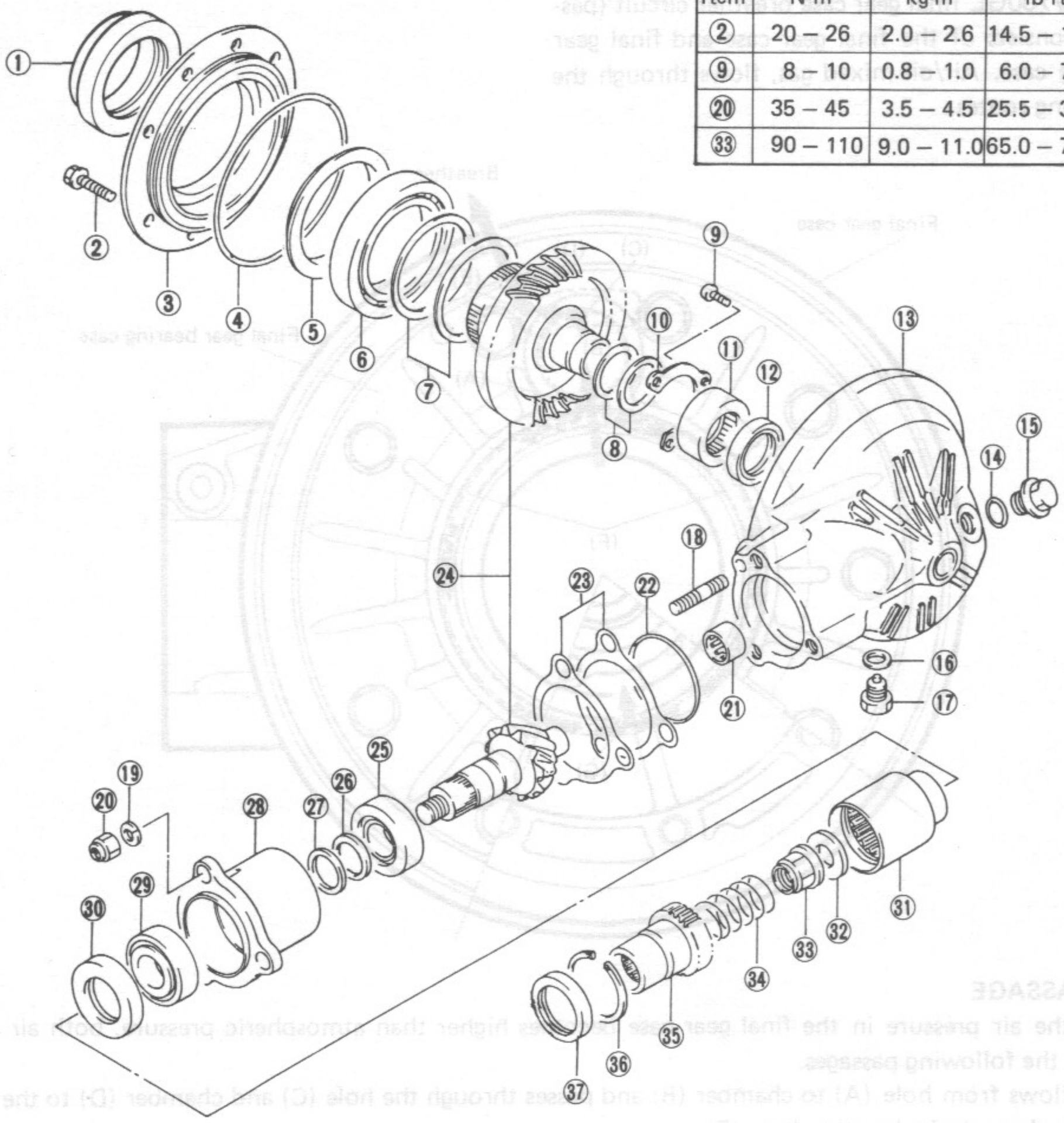
99000 - 25030	SUZUKI super grease "A"

- Before installing the two stoppers, pour about 90 ml (3.0/3.2 US/Imp oz) of hypoid gear oil into the cover.

NOTE:
After reassembling the propeller shaft, the following service procedures are necessary.
*** Apply BOND No. 1207B to mating surface of swingarm and final gear case. (See page 4-36)**
*** Adjust the rear brake. (See page 2-12)**

FINAL BEVEL GEARS CONSTRUCTION

	Tightening torque		
Item	N·m	kg-m	lb-ft
②	20 – 26	2.0 – 2.6	14.5 – 19.0
⑨	8 – 10	0.8 – 1.0	6.0 – 7.0
⑳	35 – 45	3.5 – 4.5	25.5 – 32.5
㉝	90 – 110	9.0 – 11.0	65.0 – 79.5



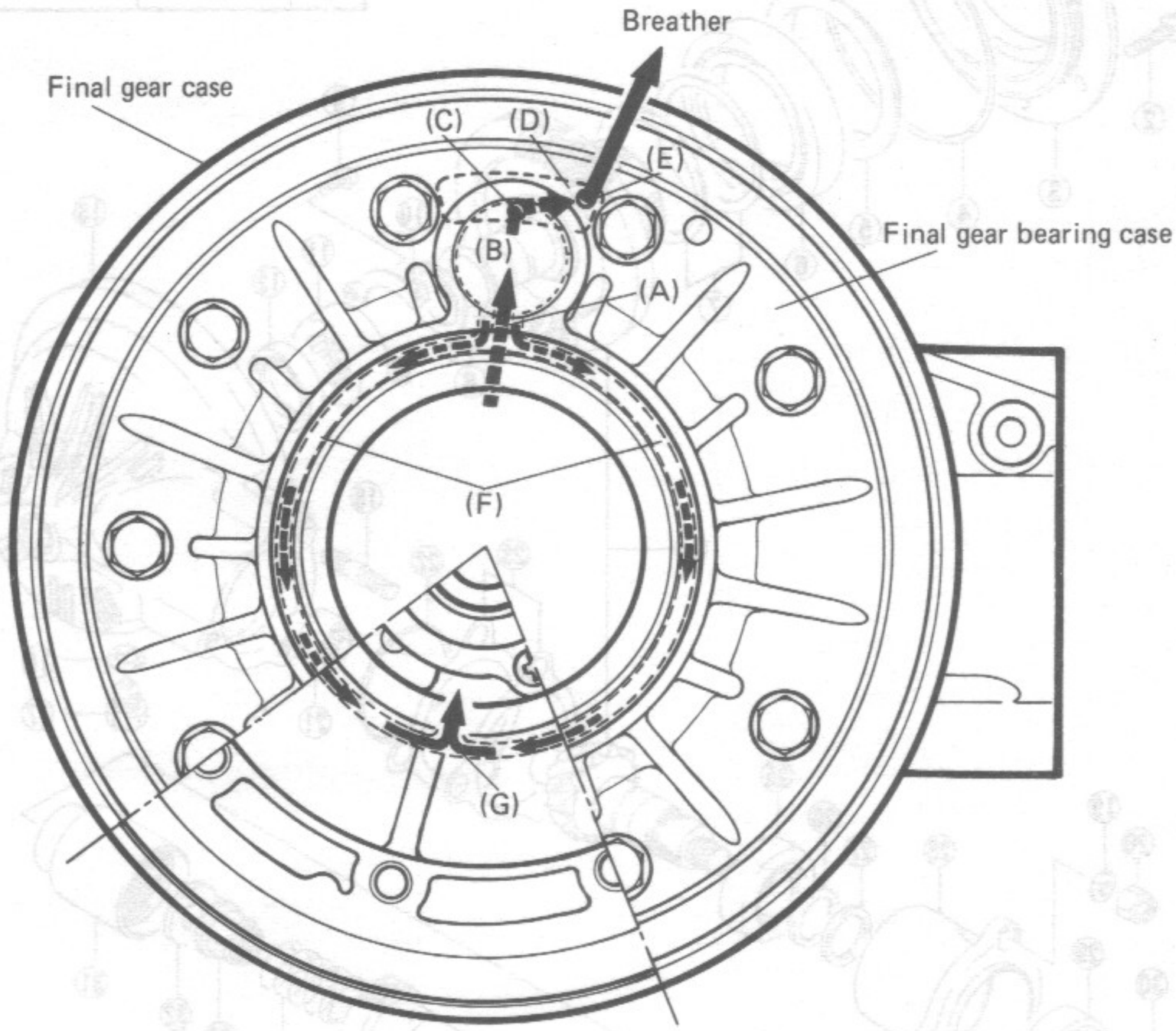
① Oil seal
② Bolts (9 pcs)
③ Final gear bearing case
④ O-ring
⑤ Bearing plate
⑥ Bearing
⑦ Shims (4 kinds)
⑧ Shims (5 kinds)
⑨ Screws (3 pcs)
⑩ Bearing retainer plate
⑪ Needle bearing
⑫ Oil seal
⑬ Final gear case
⑭ O-ring
⑮ Oil filler plug
⑯ Gasket
⑰ Oil drain plug
⑱ Stud bolts (3 pcs)
⑲ Spring washer
⑳ Nuts (3 pcs)
㉑ Pilot bearing
㉒ O-ring
㉓ Shims (4 kinds)
㉔ Final bevel gear set
㉕ Bearing
㉖ Spacer
㉗ Shims (9 kinds)
㉘ Final drive bevel gear housing
㉙ Bearing
㉚ Oil seal
㉛ Final drive coupling
㉜ Washer
㉝ Nut
㉞ Spring
㉟ Propeller shaft coupling
㊱ Circlip
㊲ Oil seal

FINAL GEAR CASE BREATHER CIRCUIT

AIR AND GEAR OIL FLOW IN FINAL GEAR CASE BREATHER CIRCUIT

BREATHER CIRCUIT

The GV700GL final gear case breather circuit (passage) consists of the final gear case and final gear bearing case. Air/oil mixed gas, flows through the following routes.



AIR PASSAGE

When the air pressure in the final gear case becomes higher than atmospheric pressure, both air and oil flow in the following passages.

- Air flows from hole (A) to chamber (B) and passes through the hole (C) and chamber (D) to the atmosphere through the breather hole (E).

OIL PASSAGE

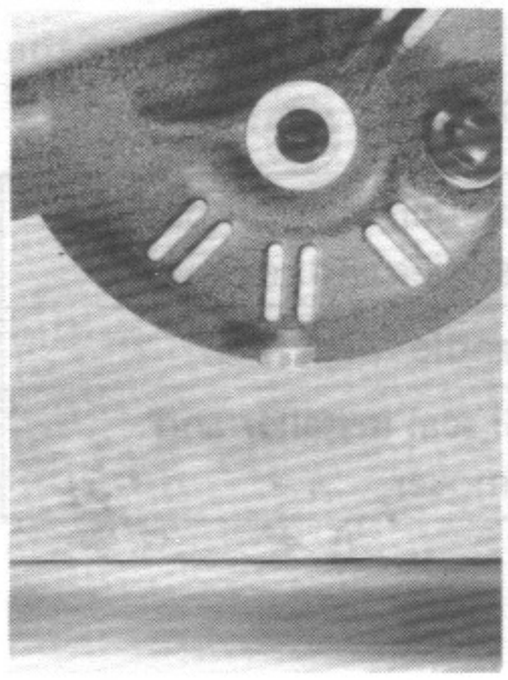
When the final gear case pressure rises abruptly or when the gear case oil level changes during cornering, the gear oil may sometime flow out into the air passage.

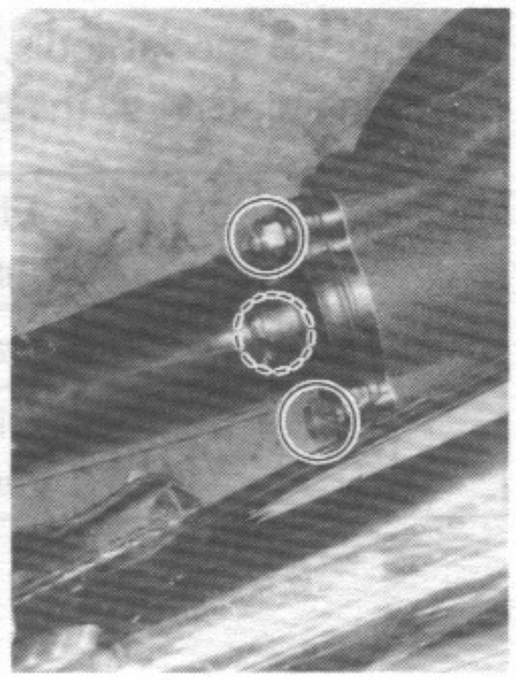
- In this case, the gear oil which has traveled into hole (A) goes into chamber (B), where the oil is separated from the air.
- The air flows through the hole (C) and chamber (D), and goes out through the breather.
- The gear oil, however, flows through the passage (F) and returns to the gear case from gear oil return port (G).

REMOVAL AND DISASSEMBLY

FINAL GEAR CASE

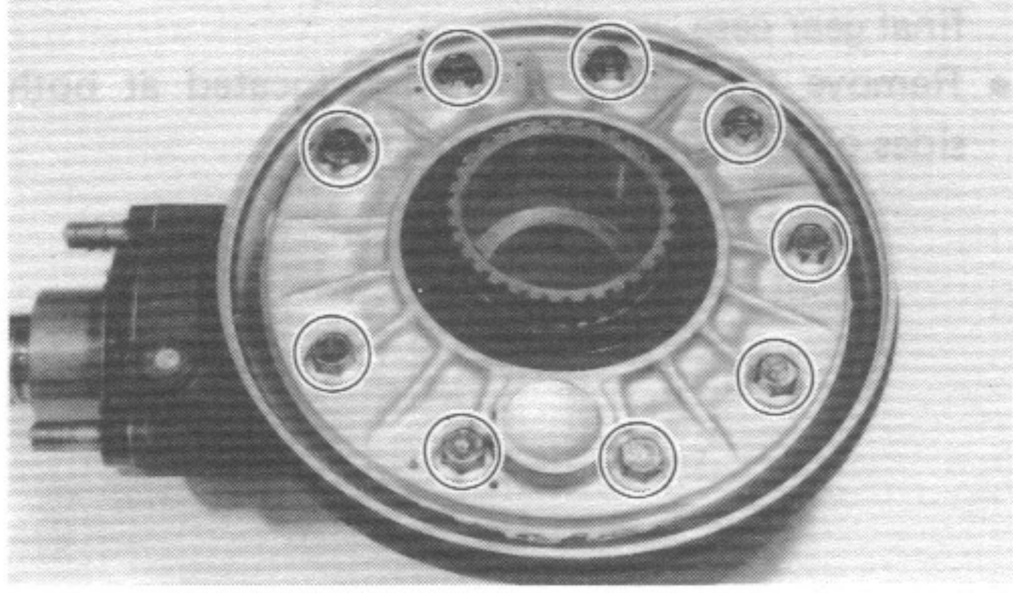
- Remove the rear wheel. (See page 9-25)
- Place an oil pan under the final gear case and remove the drian plug to drain out gear oil.
- Remove the final gear case from the swingarm by removing the three nuts.



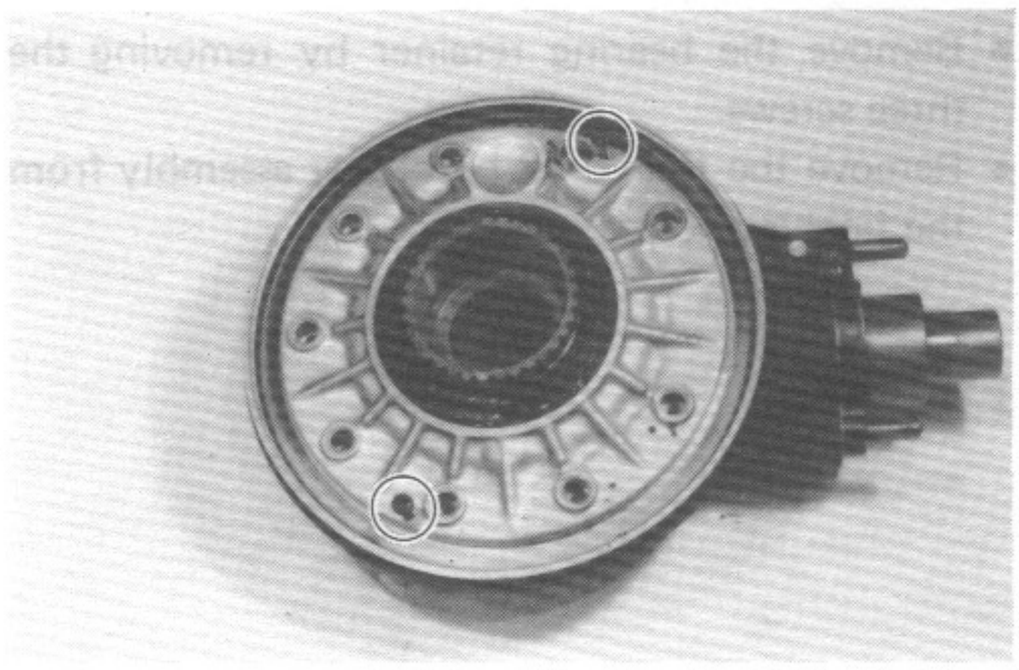


DRIVEN BEVEL GEAR

- Remove the final gear bearing case bolts.



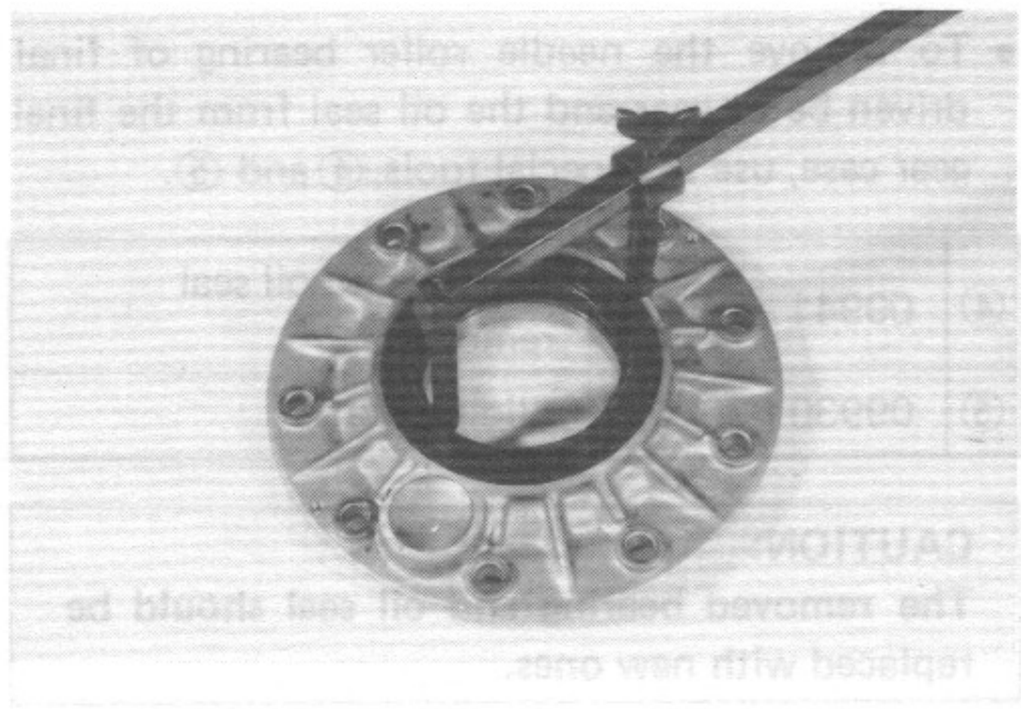
- To remove the final gear bearing case from the final gear case, use two 6 mm screws; screw them into the holes provided and draw the cover off evenly.



- Remove the oil seal from the final gear bearing case by using the special tool.

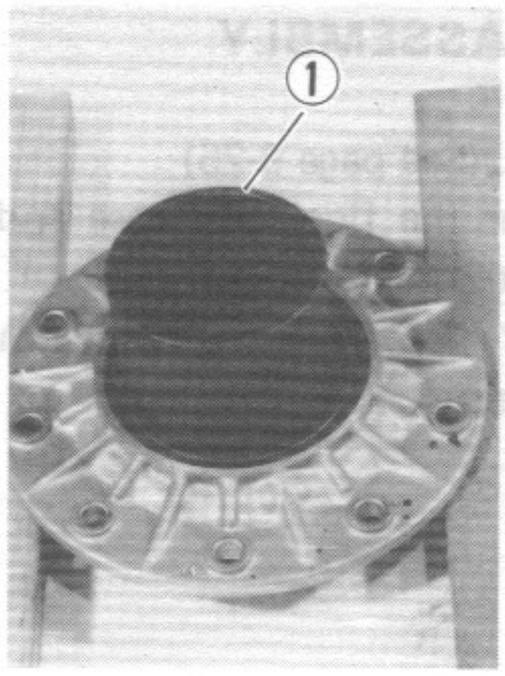
09913 - 50121	Oil seal remover

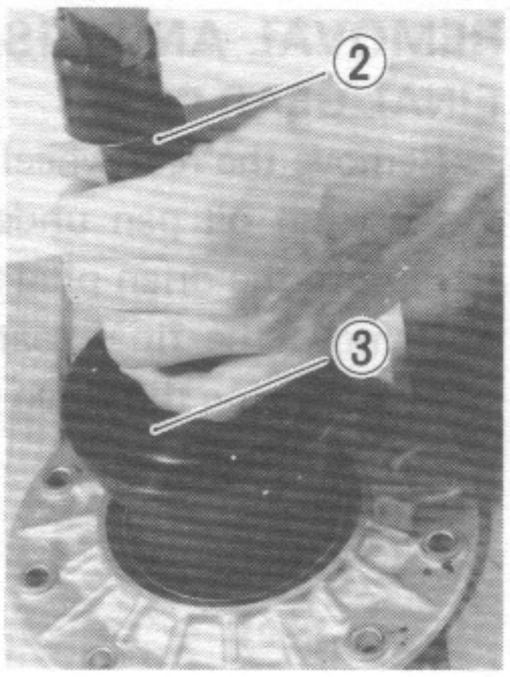
CAUTION:
The removed oil seal should be replaced with a new one.



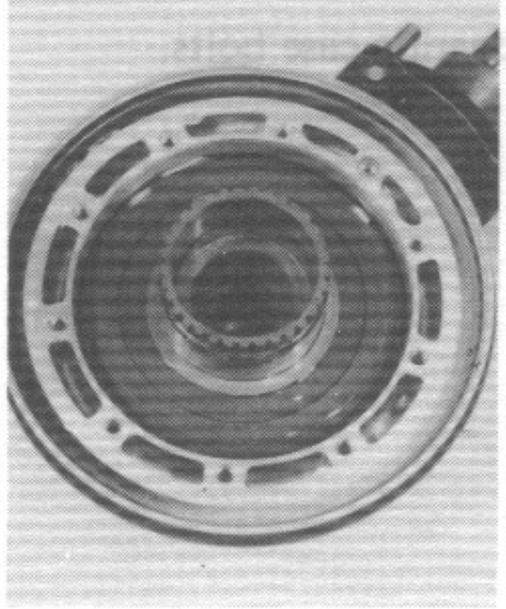
- Using the special tools, ①, ② and ③, remove the bearing plate with the bearing.

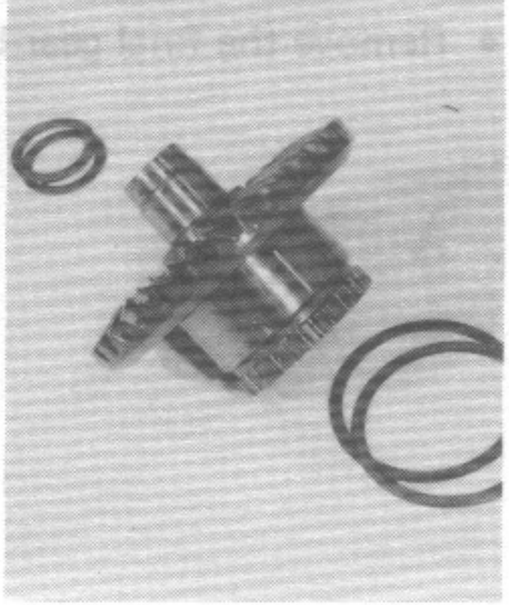
①	09924 - 74570	Final driven gear bearing installer and remover
②	09924 - 74510	Handle
③	09924 - 74520	Oil seal installer and remover



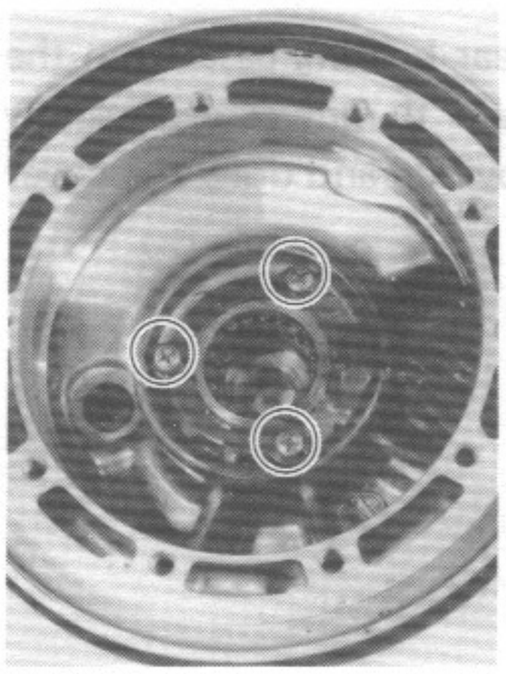


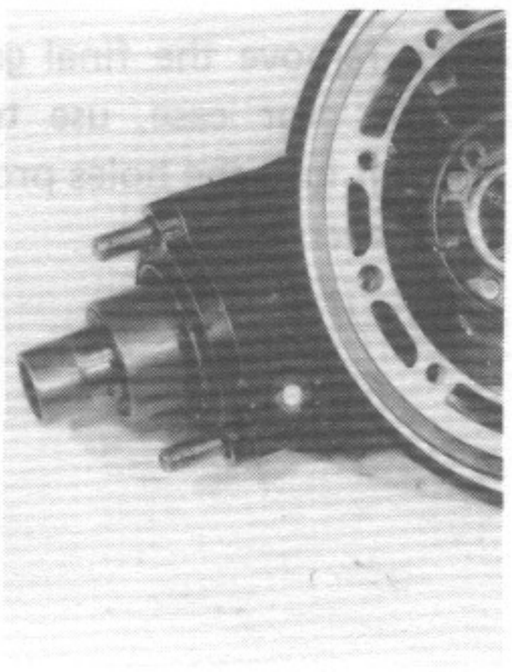
- Remove the final driven bevel gear from the final gear case.
- Remove the shims which are located at both sides of final driven bevel gear.





- Remove the bearing retainer by removing the three screws.
- Remove the final drive bevel gear assembly from the final gear case.

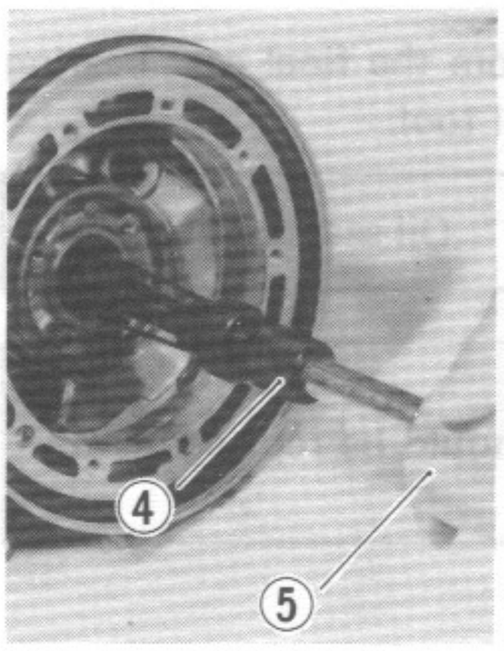


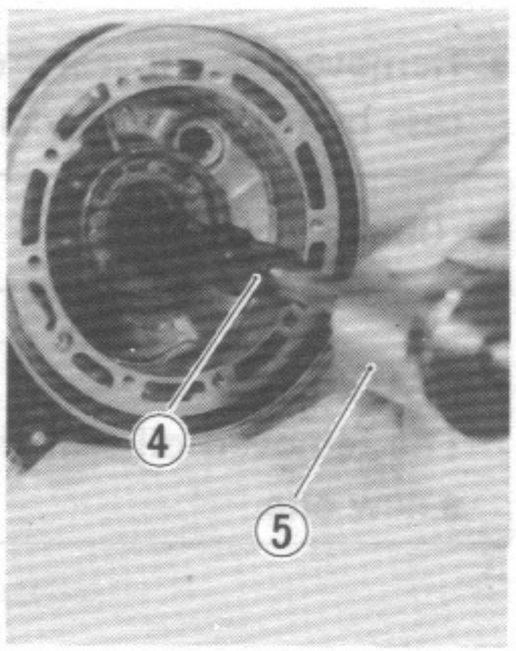


- To remove the needle roller bearing of final driven bevel gear and the oil seal from the final gear case, use the special tools, ④ and ⑤.

④	09941 - 64510	Bearing and oil seal remover
⑤	09930 - 30102	Sliding shaft

CAUTION:
The removed bearing and oil seal should be replaced with new ones.

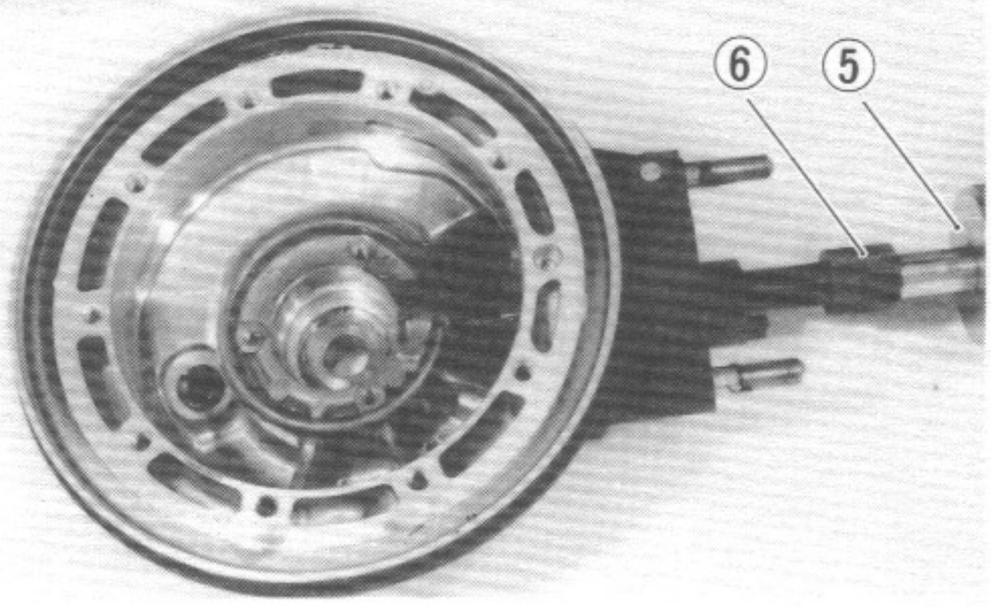




- To remove the pilot bearing of final drive bevel gear side, use the special tools, ⑤ and ⑥.

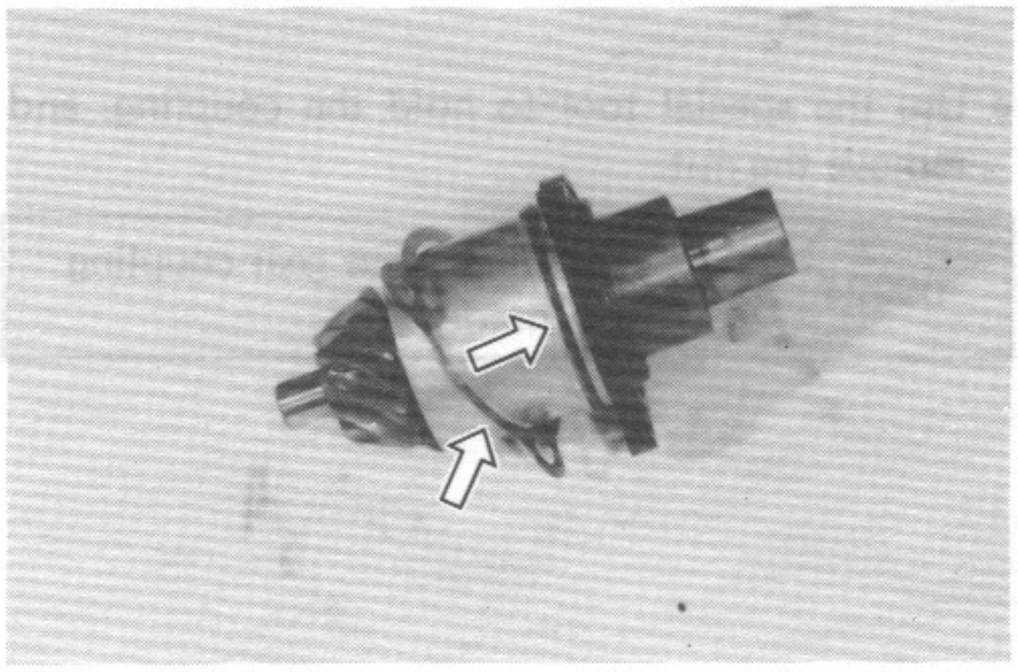
⑤	09930 - 30102	Sliding shaft
⑥	09923 - 74510	Bearing puller

CAUTION:
The removed bearing should be replaced with a new one.



DRIVE BEVEL GEAR

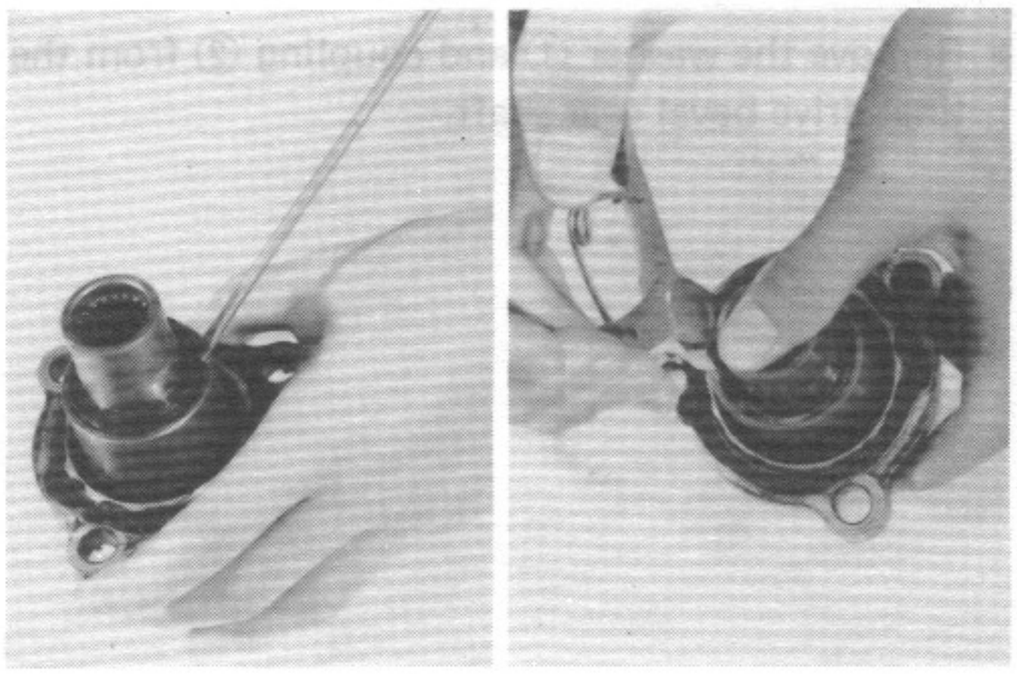
- Remove the O-ring and shims from the final drive bevel gear housing.



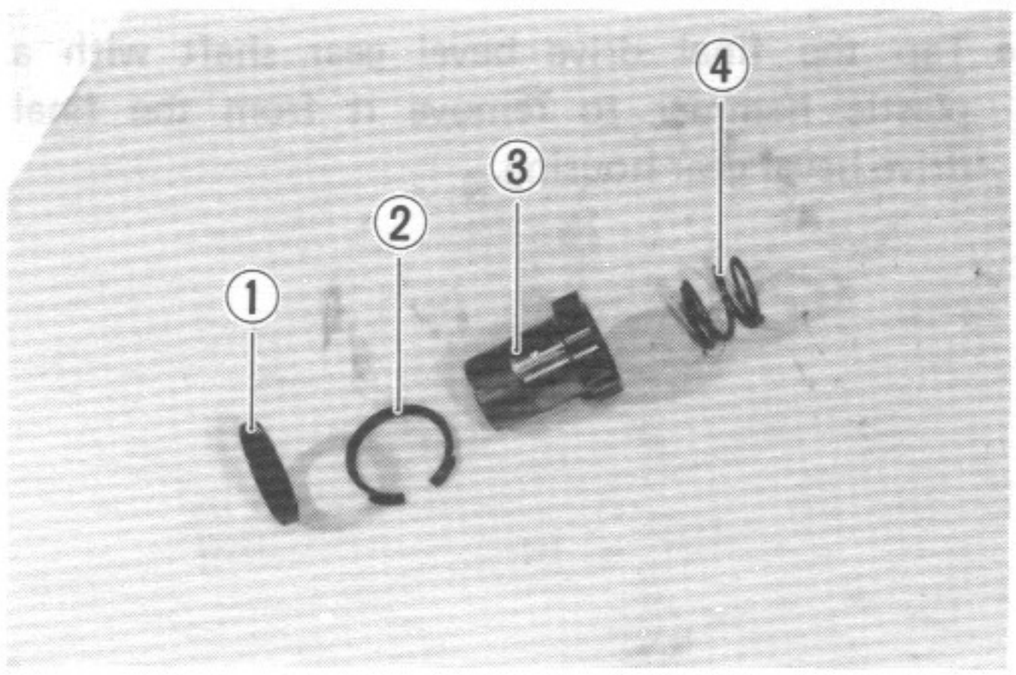
- Remove the oil seal ①, circlip ②, propeller shaft coupling ③ and spring ④ from the final drive bevel gear coupling.

09900 - 06108	Snap ring pliers

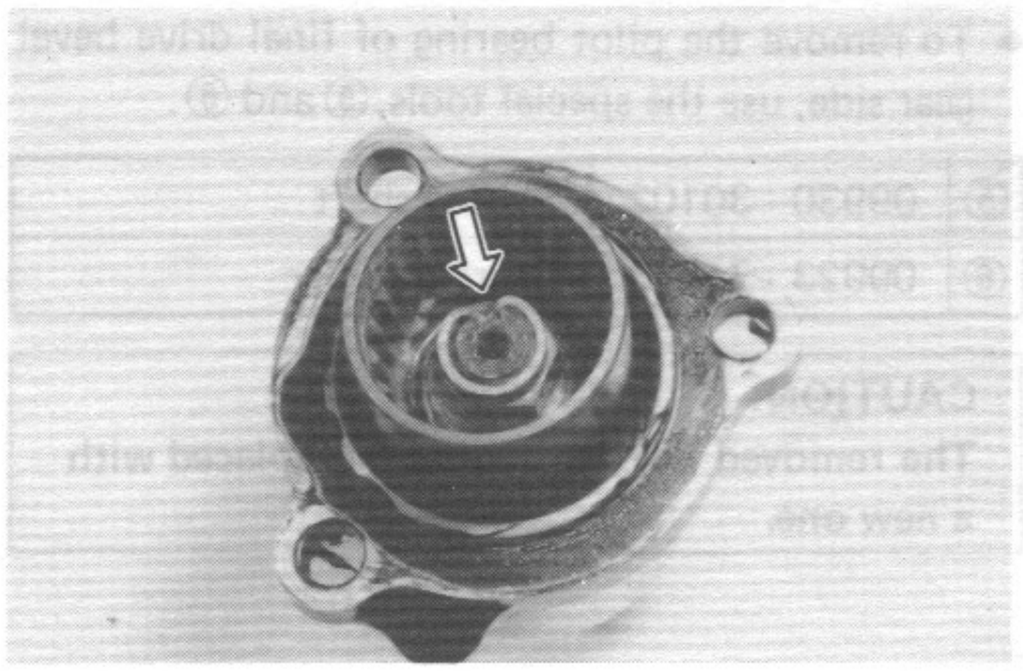
NOTE:
To remove the circlip ②, it will be necessary to push the propeller shaft coupling inwards to remove spring pressure from the circlip.



CAUTION:
The removed oil seal should be replaced with a new one.

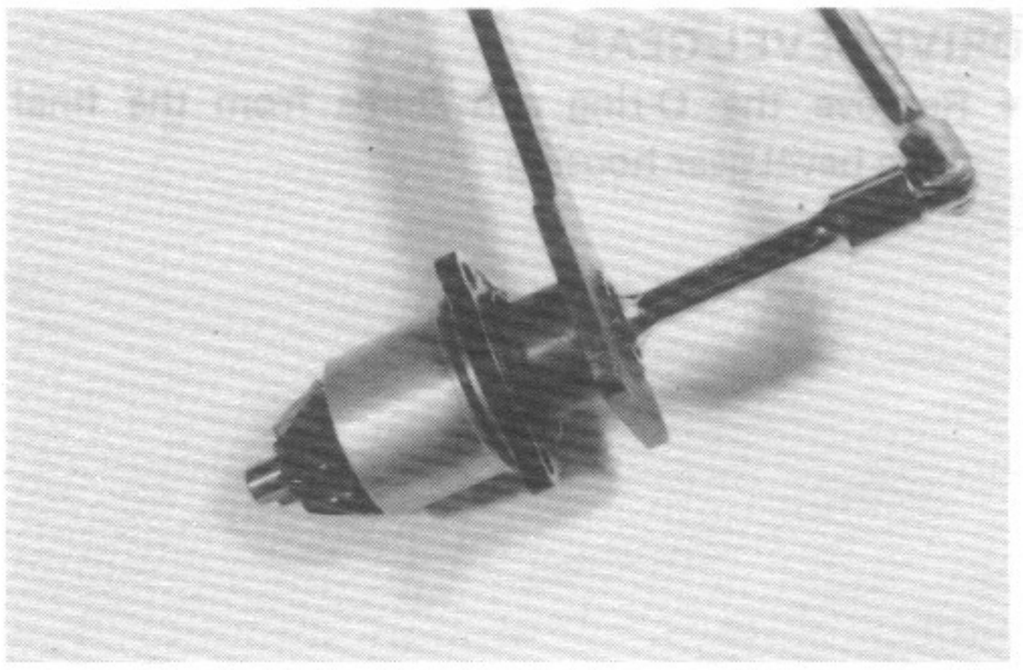


- Straighten the bent portion of the nut.

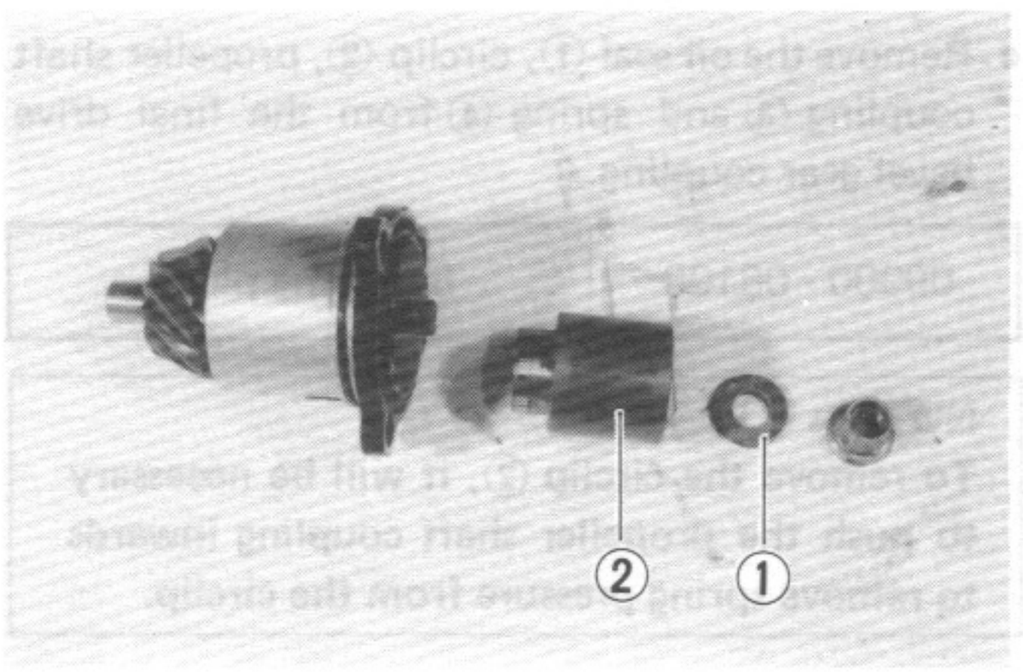


- Use the special tool to hold the coupling, and remove the nut.

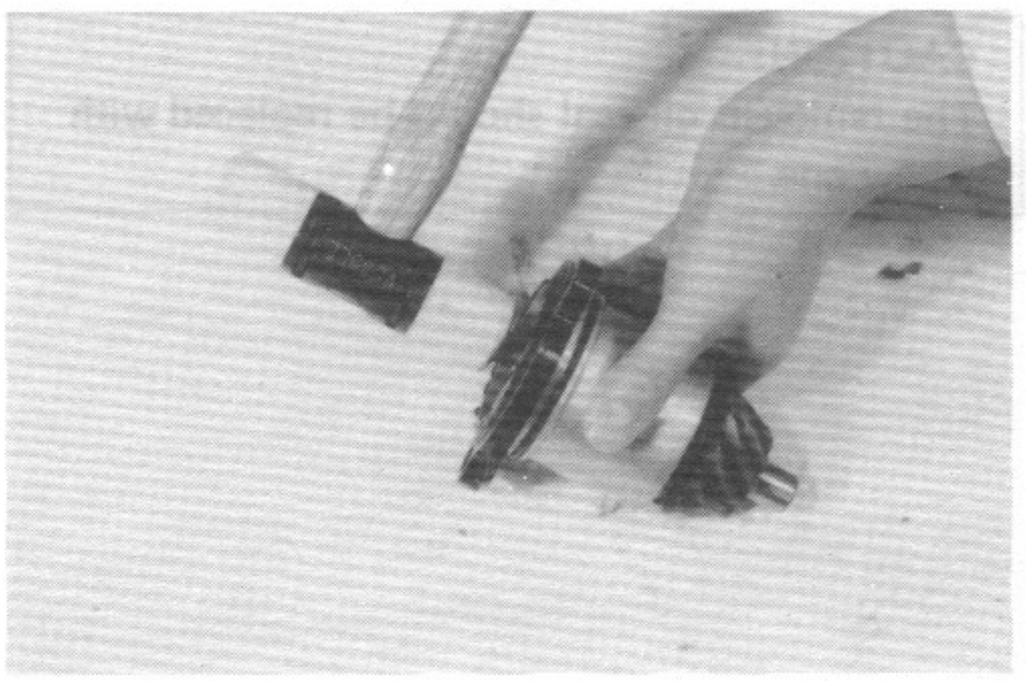
09924 - 64510	Final drive gear coupling holder



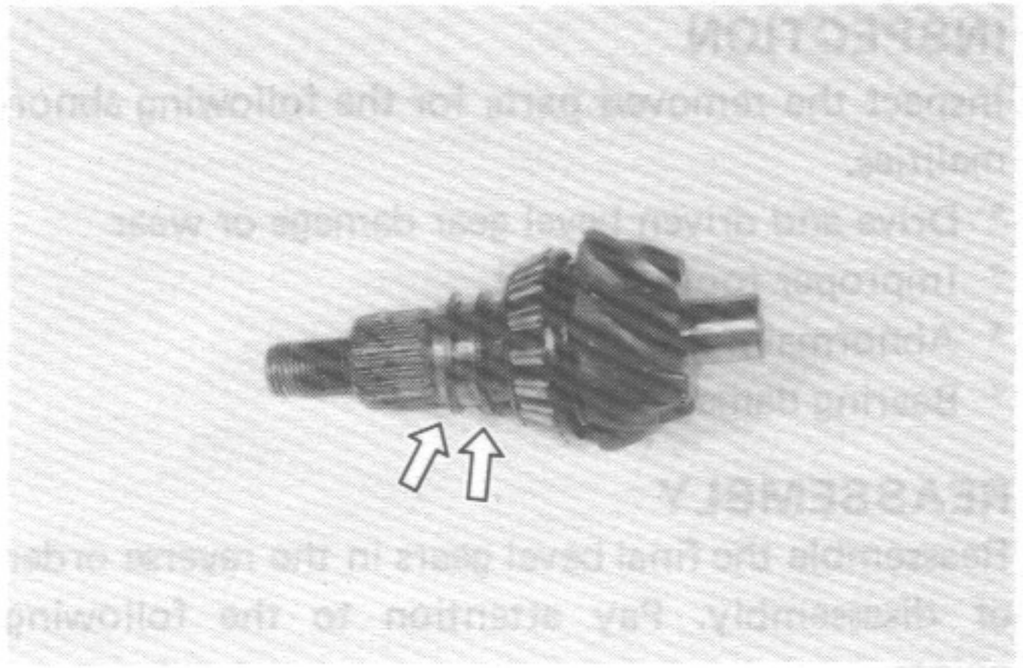
- Remove the washer ① and coupling ② from the final drive bevel gear shaft.



- Tap the final drive bevel gear shaft with a plastic hammer to remove it from the final drive bevel gear housing.



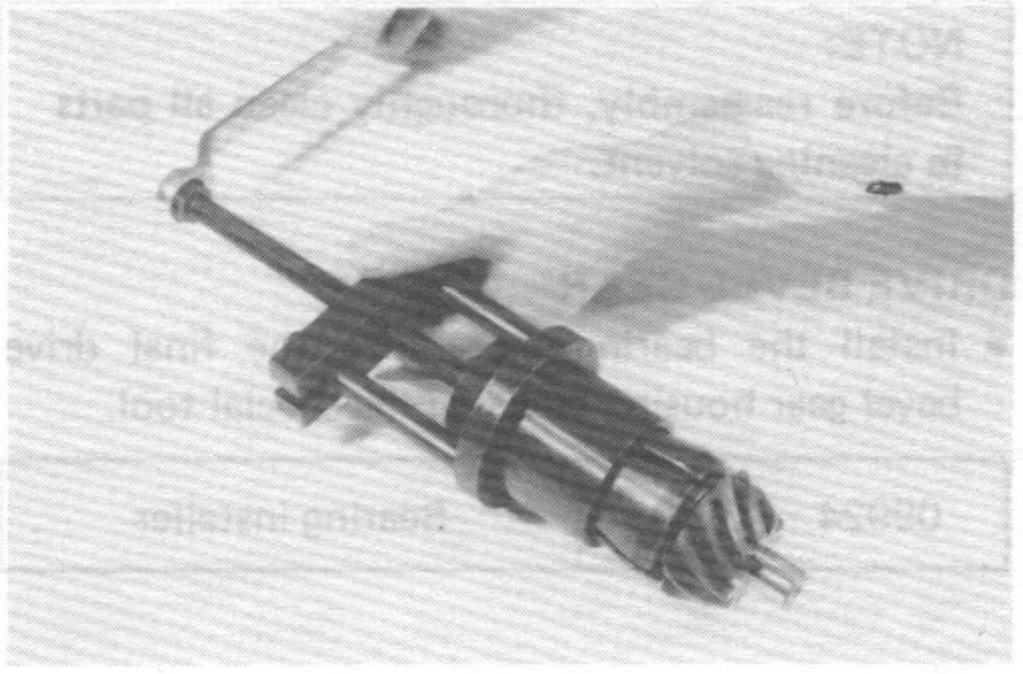
- Remove the shims and spacer from the final drive bevel gear shaft.



- Remove the bearing from the final drive bevel gear shaft by using the special tool.

09941 - 84510	Bearing race remover

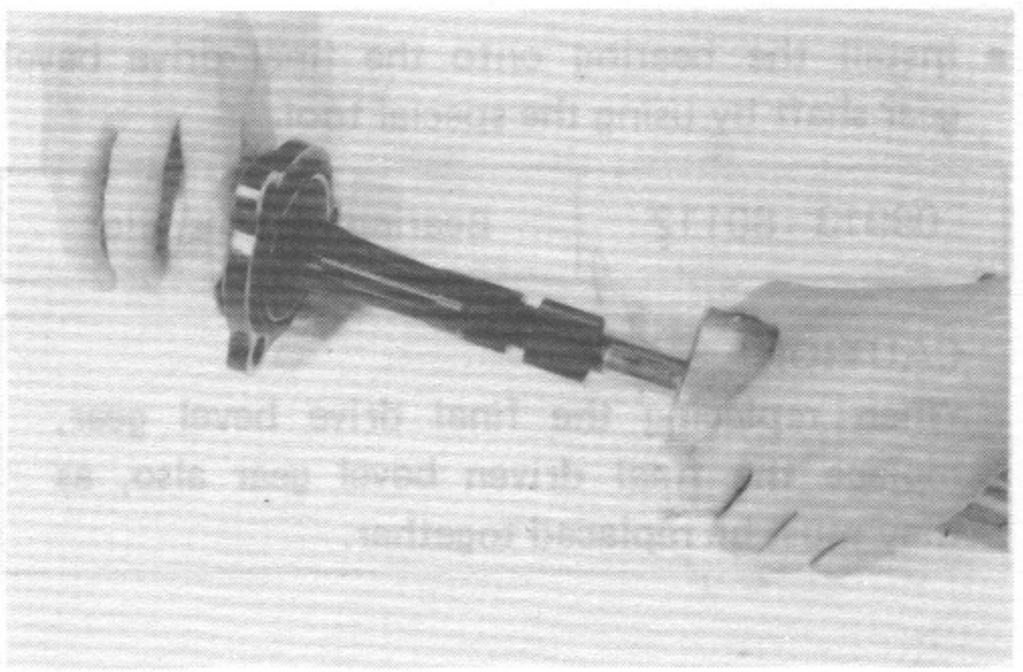
CAUTION:
The removed bearing should be replaced with a new one.



- Remove the oil seal by using the special tools, and then remove the bearing.

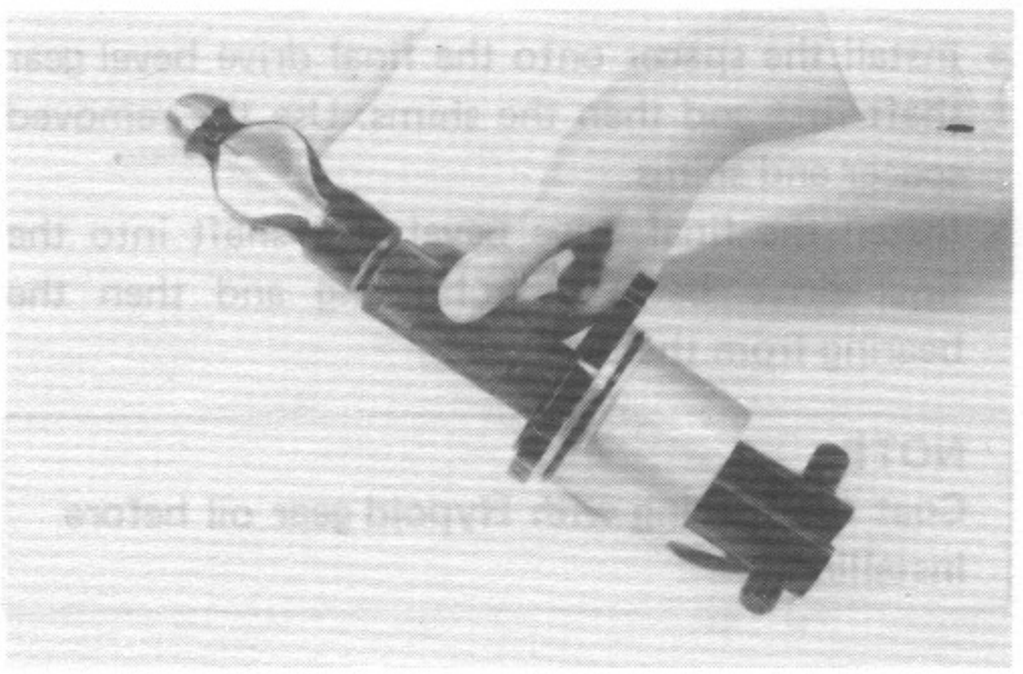
09941 - 64510	Bearing and oil seal remover
09930 - 30102	Sliding shaft

CAUTION:
The removed oil seal should be replaced with a new one.



- Remove the bearing races from the final drive bevel gear housing by using the special tools.

09941 - 54911	Bearing race remover
09913 - 80112	Bearing race installer



INSPECTION

Inspect the removed parts for the following abnormalities.

* Drive and driven bevel gear damage or wear
* Improper tooth contact
* Abnormal noise of bearings
* Bearing damage or wear

REASSEMBLY

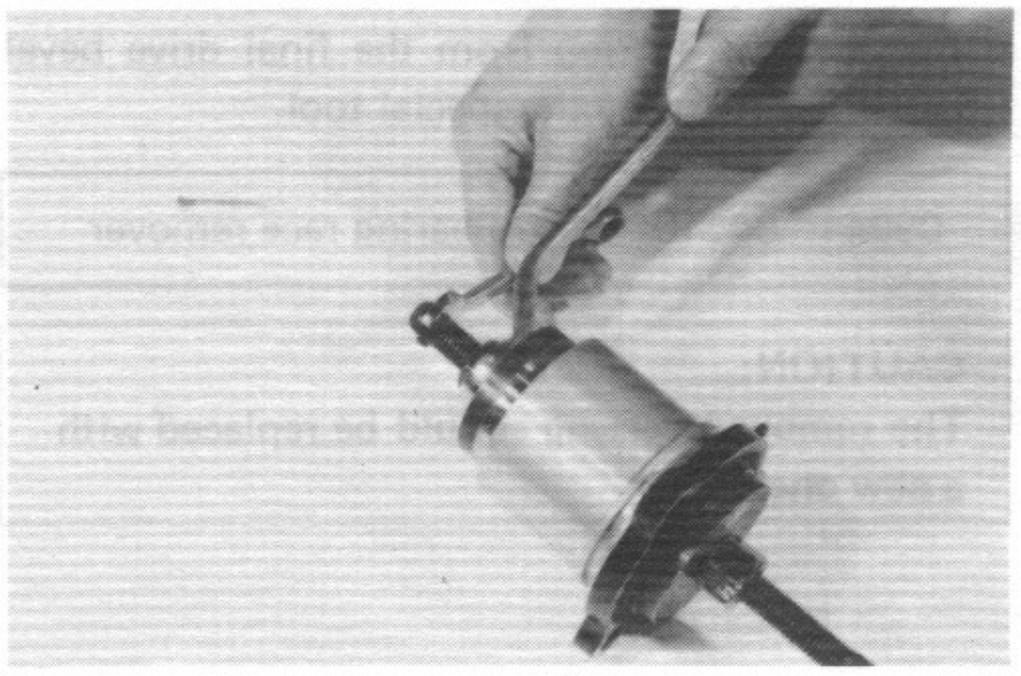
Reassemble the final bevel gears in the reverse order of disassembly. Pay attention to the following points.

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

DRIVE BEVEL GEAR

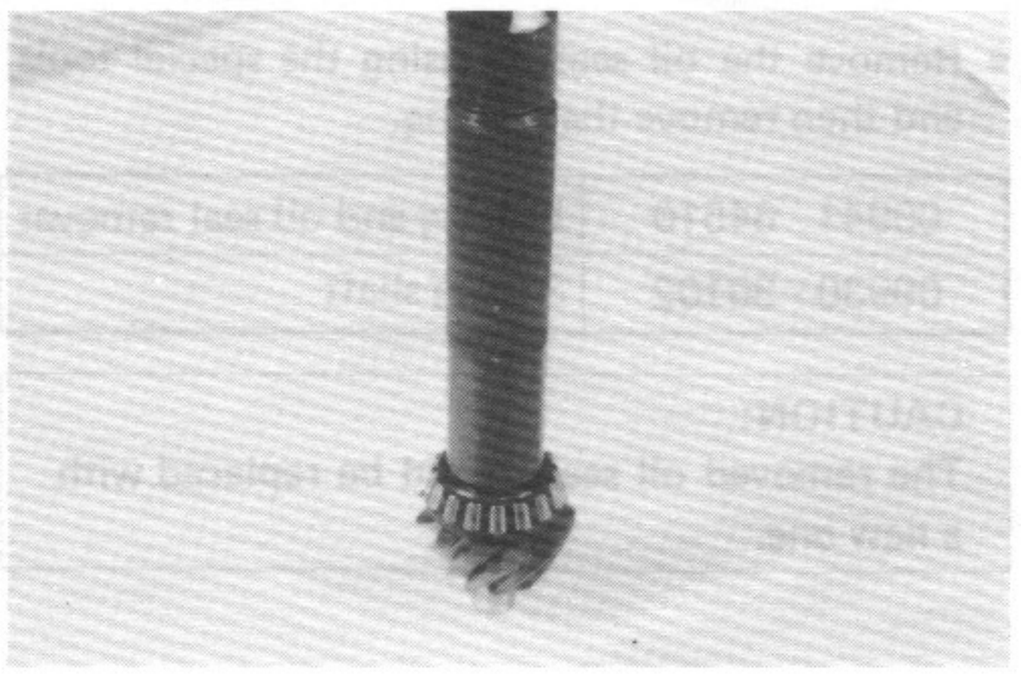
- Install the bearing races into the final drive bevel gear housing by using the special tool.

09924 - 84510	Bearing installer



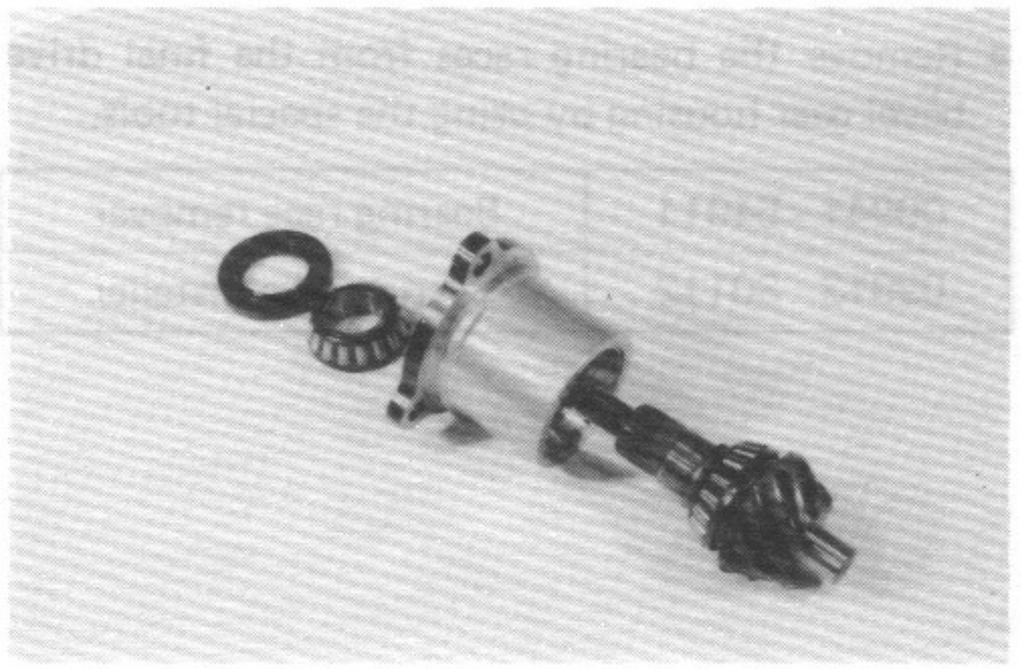
- Install the bearing onto the final drive bevel gear shaft by using the special tool.

09913 - 80112	Bearing race installer



CAUTION:
When replacing the final drive bevel gear, replace the final driven bevel gear also, as they must be replaced together.

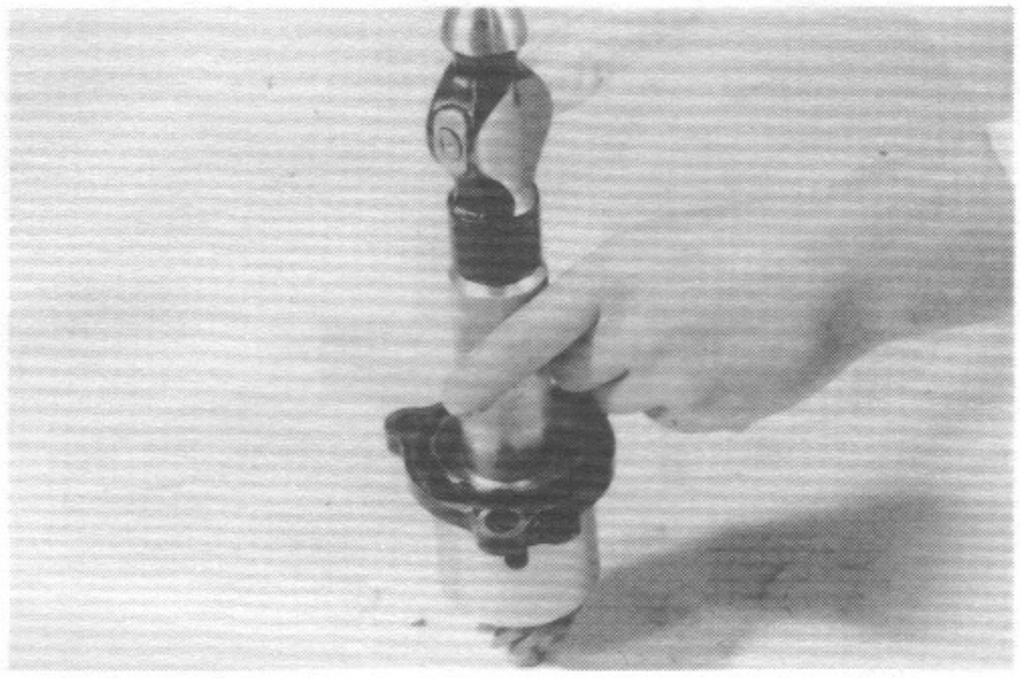
- Install the spacer onto the final drive bevel gear shaft first and then the shims. Use the removed spacer and shims.
- Install the final drive bevel gear shaft into the final drive bevel gear housing and then the bearing from the other side.



NOTE:
Coat the bearing with Hypoid gear oil before installing.

- Install the oil seal into the final drive bevel gear housing by using the special tool.

09913 - 70122	Bearing installer



- Apply grease to the lip of oil seal.

99000 - 25030	SUZUKI super grease "A"

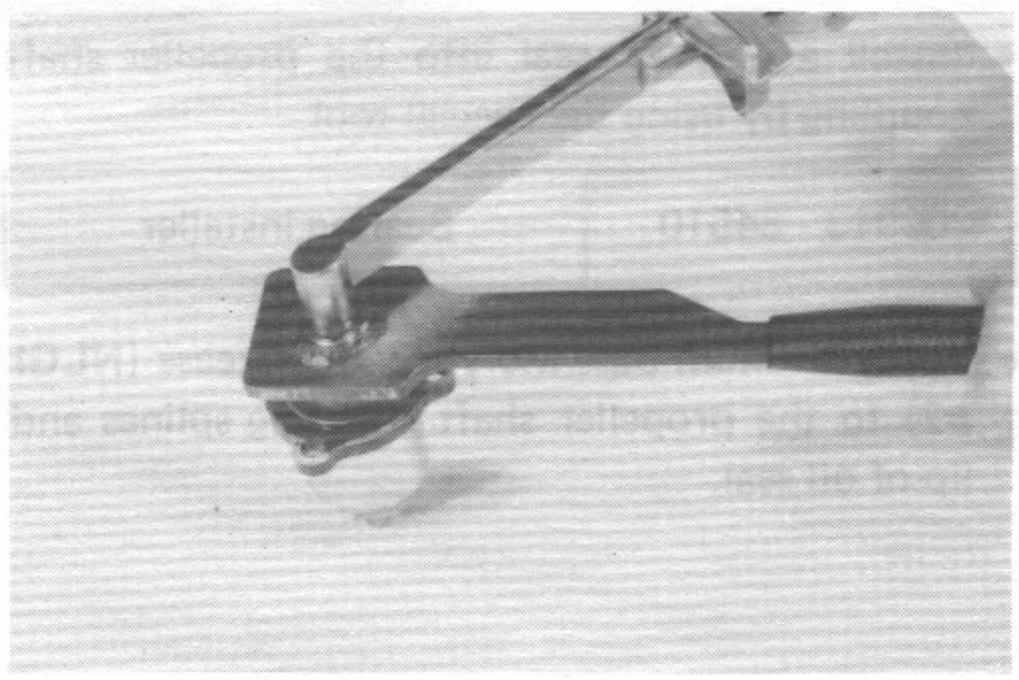
- Install the final drive coupling, washer and nut.

CAUTION:
Always use a new nut.

- Tighten the nut to the specified torque by using the special tool and torque wrench.

Tightening torque	90 – 110 N·m (9.0 – 11.0 kg-m) (65.0 – 79.5 lb-ft)

09924 - 64510	Final drive gear coupling holder



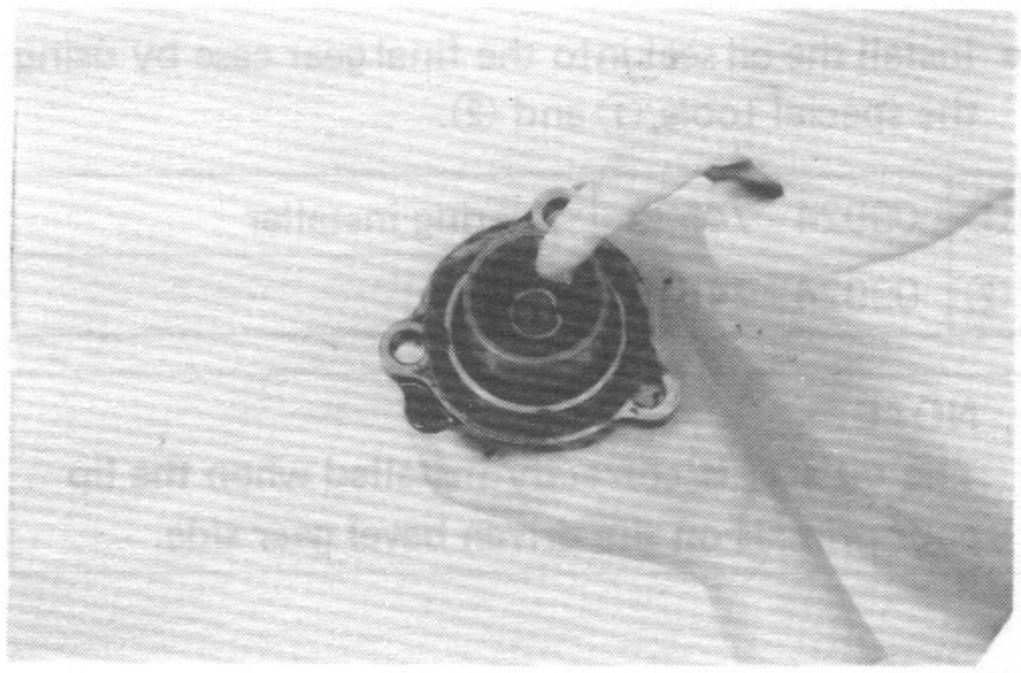
** **"BEARING PRE-LOAD ADJUSTMENT" is necessary by referring to page 4-31.**

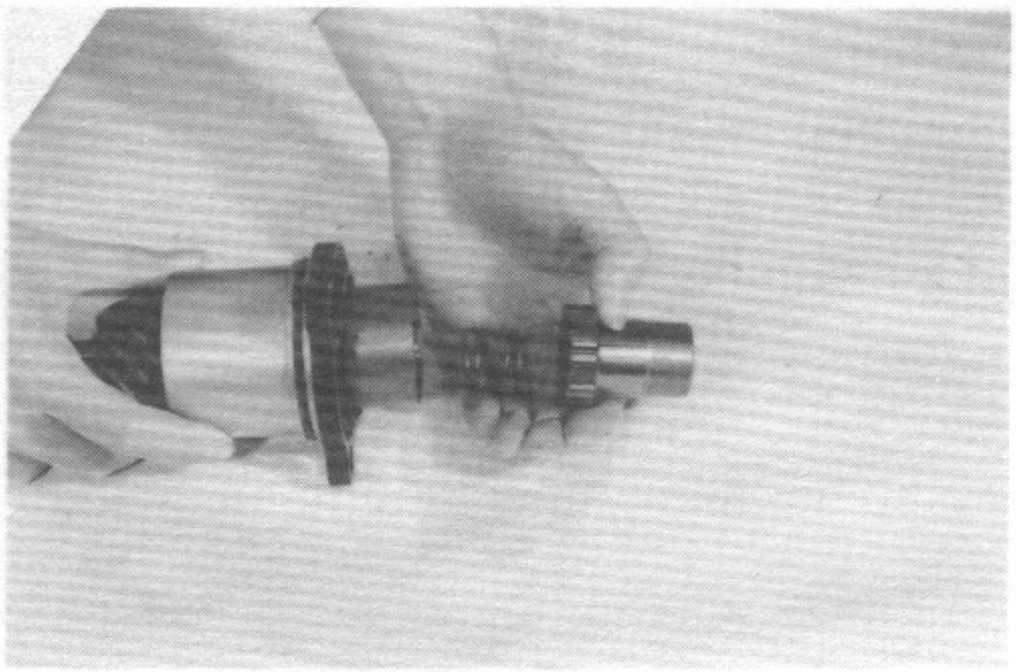
99104 - 32030	Thread lock super "1363A"

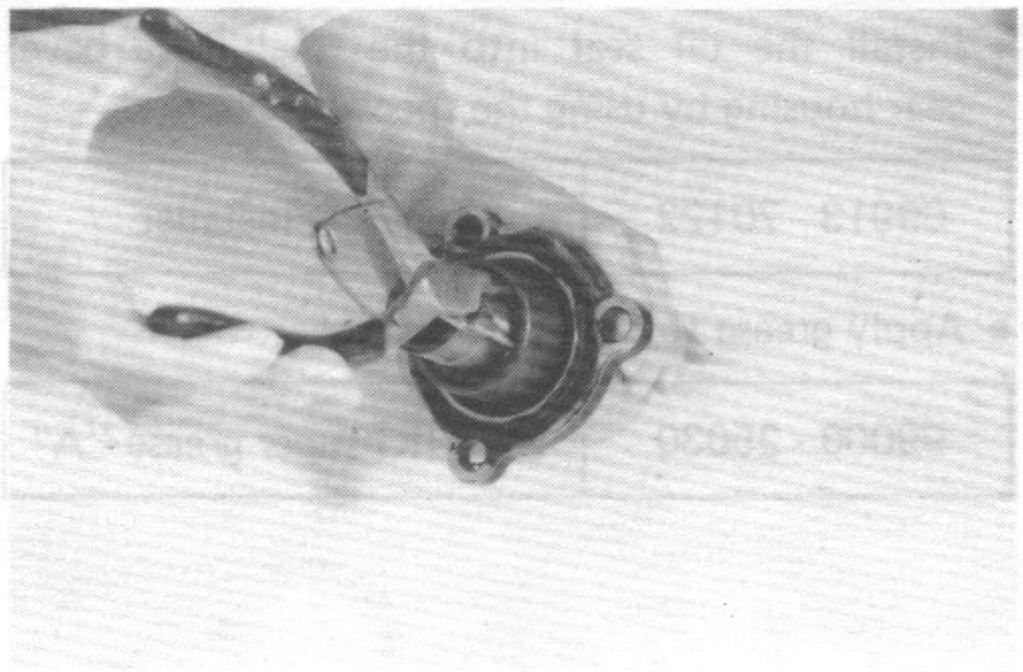
- After the bearing pre-load has been adjusted to the specification, remove the nut and apply THREAD LOCK SUPER "1363A" to the nut and tighten it to the specified torque.
- Bend the collar of the nut over into the notch in the final drive bevel gear shaft.

- Liberally coat the final drive bevel gear coupling splines with Lithium Base Molybdenum Grease (NLGI # 2), and install the propeller shaft coupling spring and propeller shaft coupling.
- Push the coupling in against the spring and install the circlip by using the special tool.

09900 - 06108	Snap ring pliers



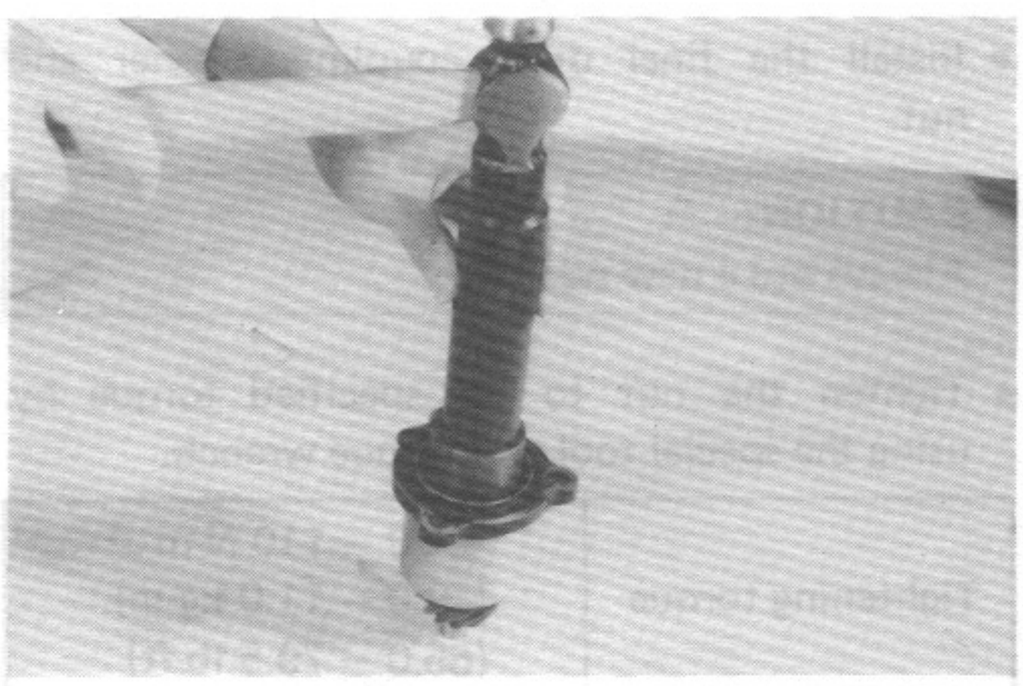




- Install a new oil seal into the propeller shaft coupling by using the special tool.

09913 - 84510	Bearing installer

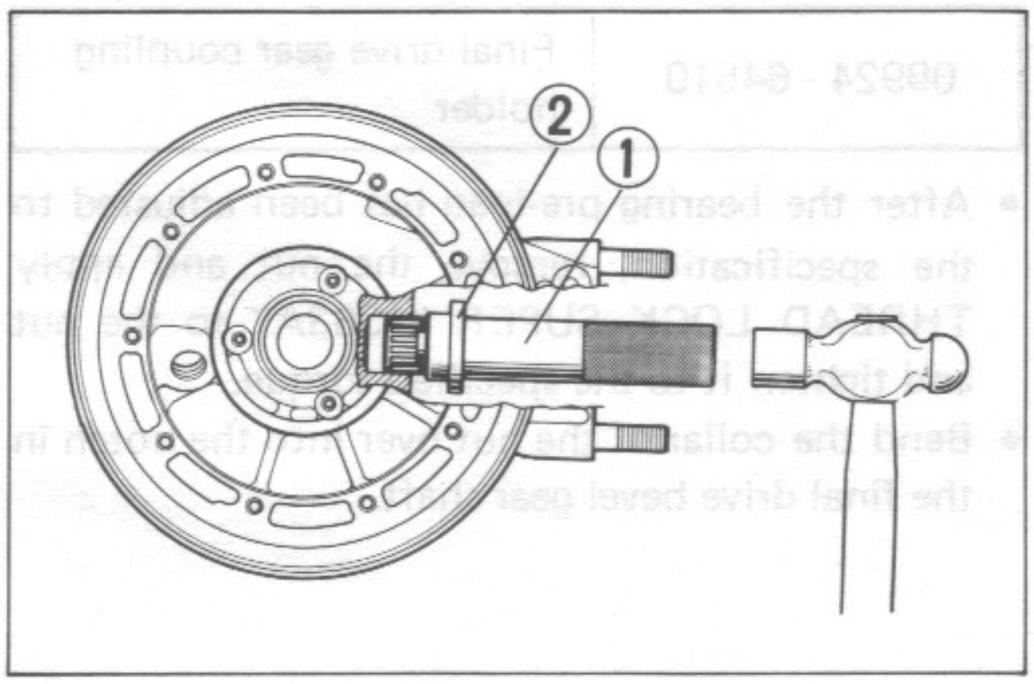
- Apply Lithium Base Molybdenum Grease (NLGI #2) to the propeller shaft coupling splines and lip of oil seal.



DRIVEN BEVEL GEAR

- Install the pilot bearing for the final drive bevel gear into the final gear case by using the special tools, ① and ②.

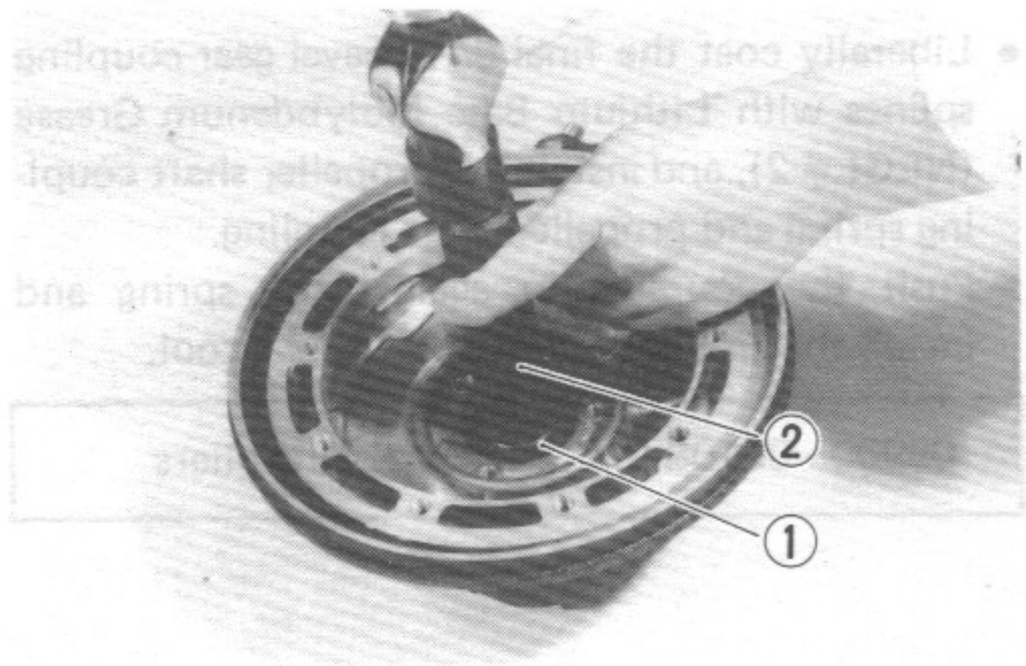
①	09924 - 74510	Bearing and oil seal installer
②	09924 - 74550	Oil seal installer



- Install the oil seal into the final gear case by using the special tools, ① and ②.

①	09924 - 74530	Bearing installer
②	09924 - 74510	Handle

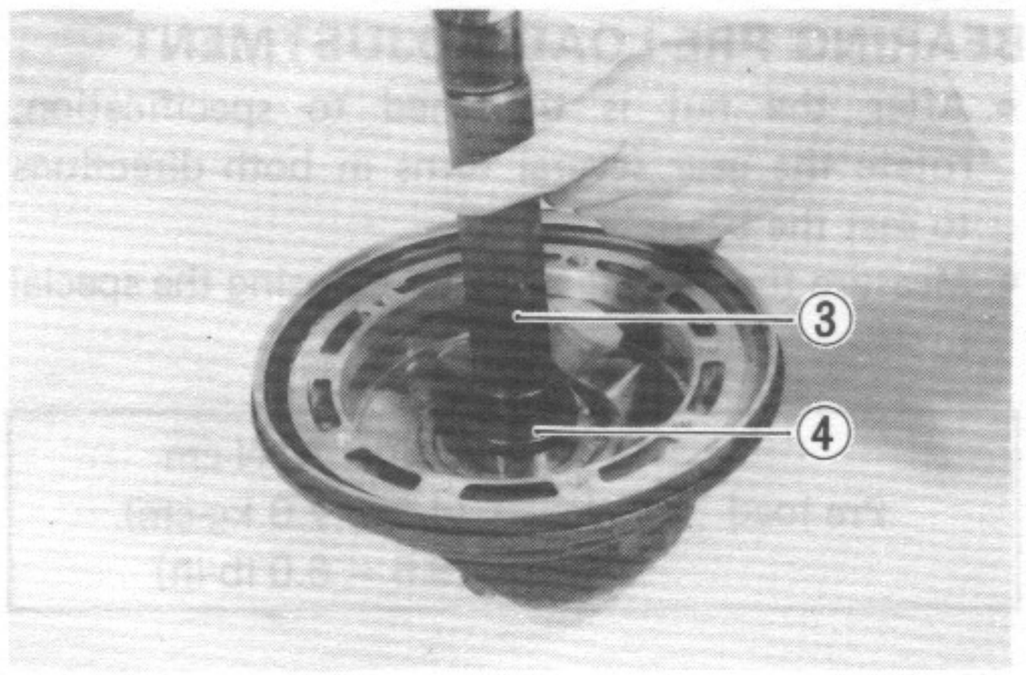
NOTE:
The oil seal is correctly installed when the lip and spring is on the driven bevel gear side.



- Use the special tools, ③ and ④, to install the needle bearing for the driven bevel gear.

CAUTION:
The bearing case has a stamped mark on its one end, which must face inside.

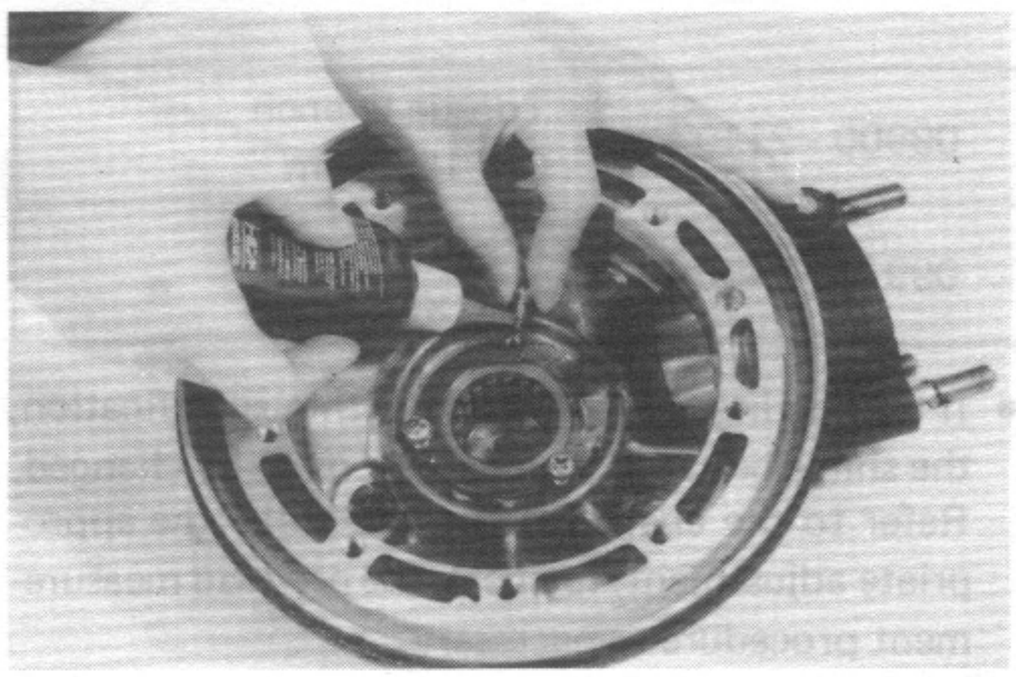
③	09924 - 74510	Handle
④	09924 - 74550	Oil seal installer



- Install the bearing retainer plate. Use THREAD LOCK SUPER "1363A" on the screws, and tighten to the specification.

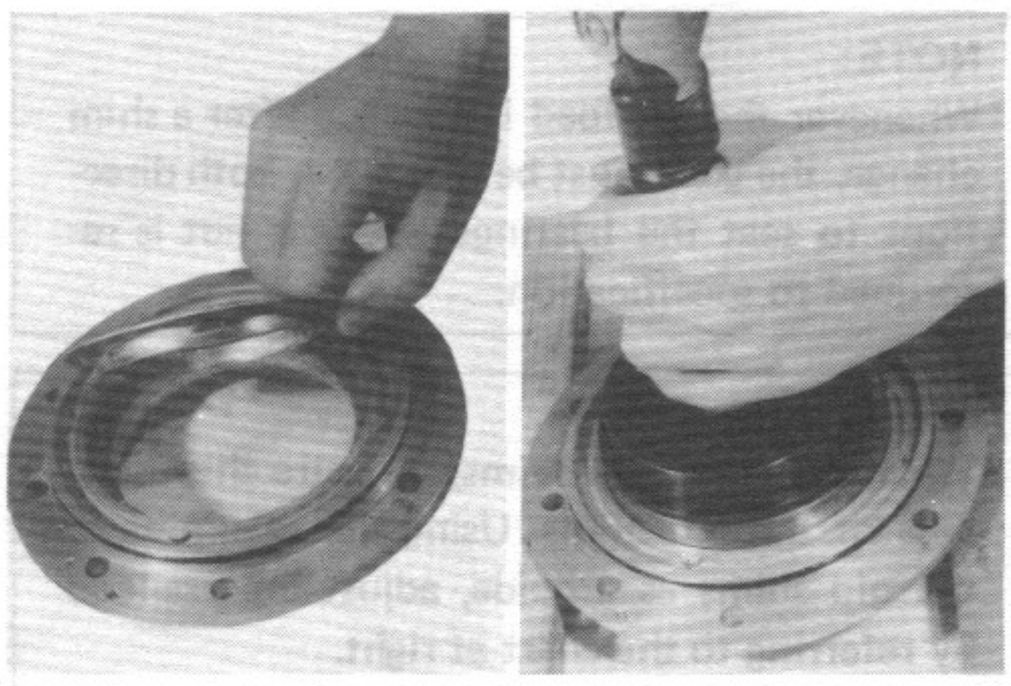
99104 - 32030	Thread lock super "1363A"

Tightening torque	8 – 10 N·m (0.8 – 1.0 kg-m) (6.0 – 7.0 lb-ft)



- After installing the bearing plate into the final gear bearing case, install the bearing by using the special tools.

09924 - 74510	Handle
09924 - 74520	Oil seal installer and remover

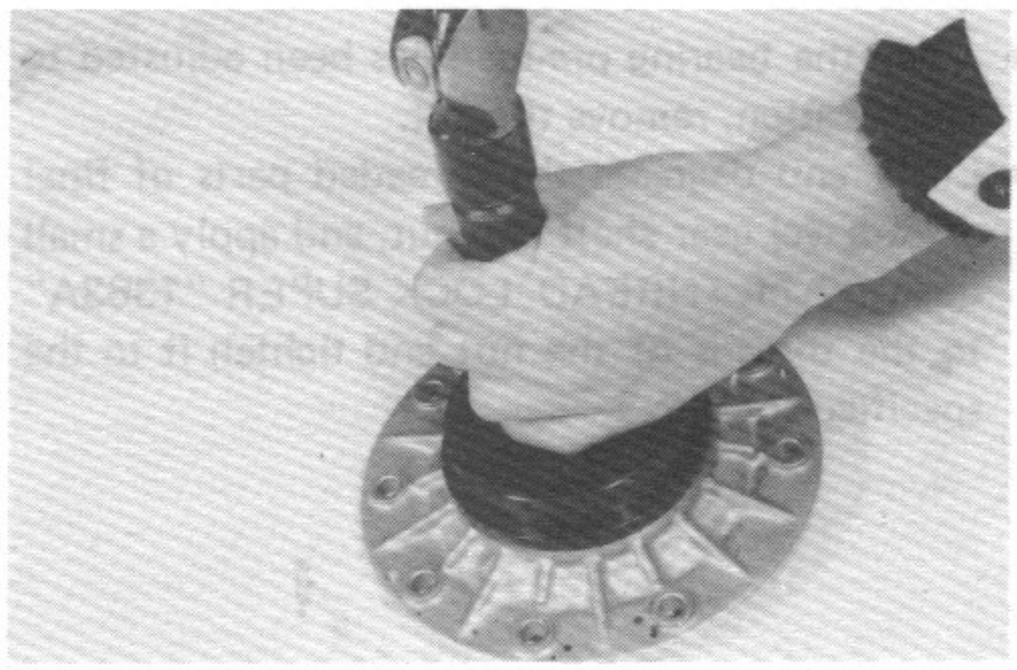


- Install a new oil seal into the final gear bearing case by using the special tools.
- Apply grease to the lip of oil seal.

NOTE:
Lip spring of seal goes toward final driven bevel gear.

09924 - 74510	Handle
09924 - 74520	Oil seal installer and remover

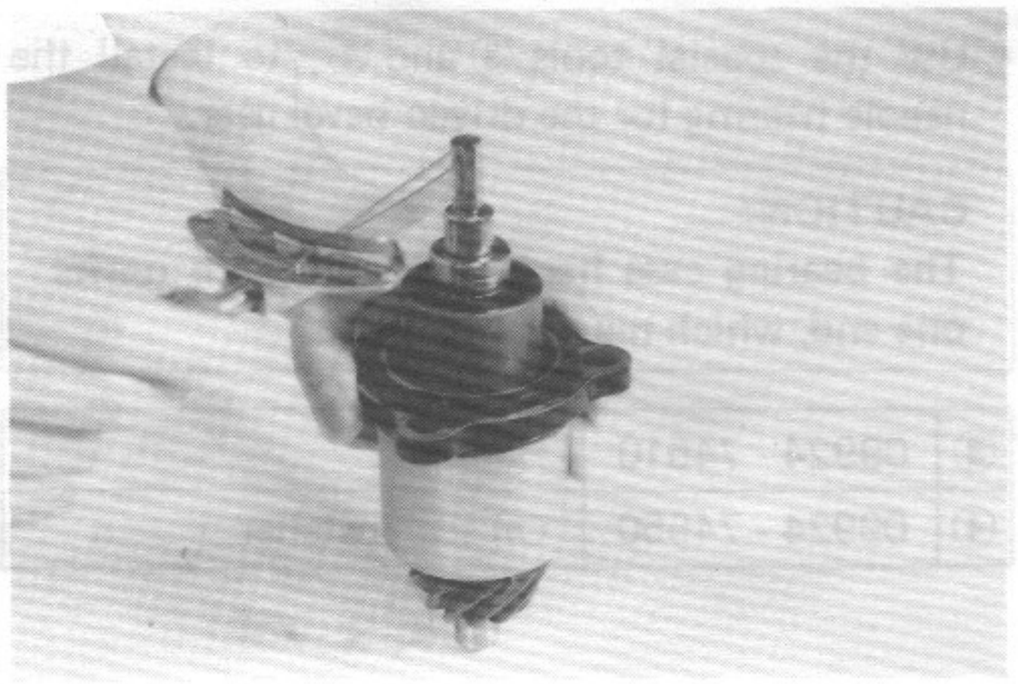
99000 - 25030	SUZUKI super grease "A"



BEARING PRE-LOAD ADJUSTMENT

- After the nut is tightened to specification, rotate the gear several turns in both directions to seat the bearings.
- Measure the bearing pre-load by using the special tools.

Pre-load	40 – 70 N·cm (4.0 – 7.0 kg-cm) (3.5 – 6.0 lb-in)



09900 - 21107	Torque wrench 0 – 15 kg-cm
09915 - 24550	Adapter socket 12.7 x 6.3 mm

- If the bearing pre-load is not within specification, the shims between the bearings must be changed. Refer to the chart at right and make the appropriate adjustment, re-check the pre-load measurement procedure as necessary.

NOTE:
Whenever the pre-load is checked after a shim change, the gear must be rotated in both directions to seat the bearings after the nut is re-torqued to specification.

NOTE:
When changing the shims, measure the thickness of the old shims. Using the thickness of the old shims as a guide, adjust the pre-load by referring to the chart at right.

- After the bearing pre-load has been adjusted to specification, remove the nut.
- Clean and degrease the threaded parts of final drive bevel gear shaft and nut, and apply a small quantity of THREAD LOCK SUPER "1363A" to the threads of the nut and tighten it to the specified torque.

Preload	Adjustment by shim
Under 40 N·cm (4.0 kg-cm) (3.5 lb-in)	Decrease shim thickness
40 – 70 N·cm (4.0 – 7.0 kg-cm) (3.5 – 6.0 lb-in)	Correct
Over 70 N·cm (7.0 kg-cm) (6.0 lb-in)	Increase shim thickness

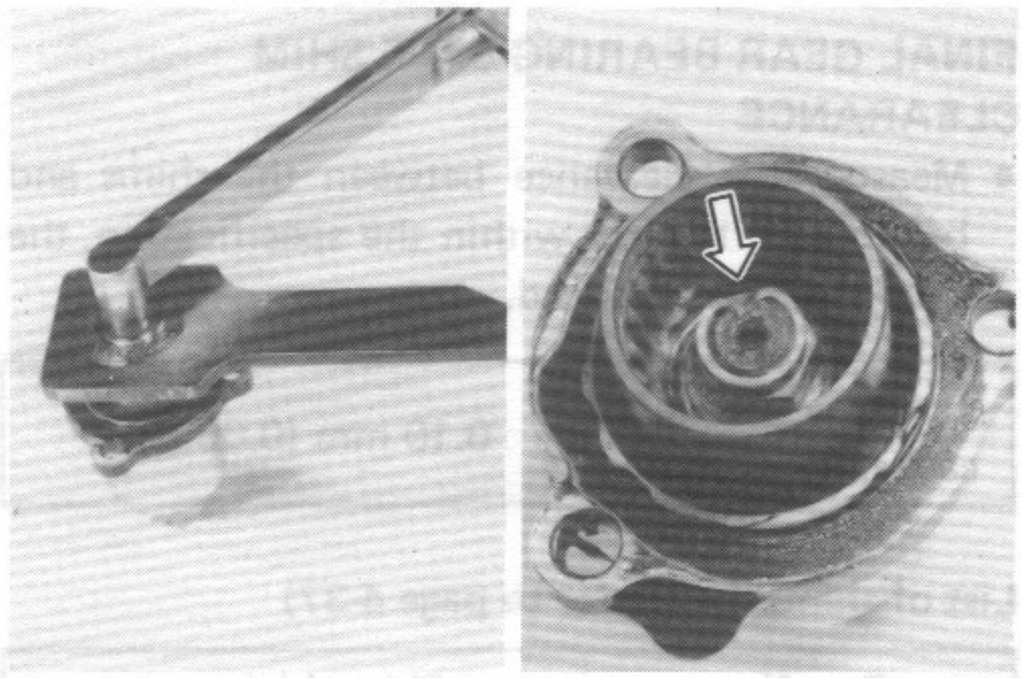
List of shims Ⓐ (Refer to page 4-37)

Part No.	Shim thickness
09181 - 25006	1.60 mm
09181 - 25007	1.62 mm
09181 - 25008	1.64 mm
09181 - 25009	1.66 mm
09181 - 25010	1.68 mm
09181 - 25011	1.70 mm
09181 - 25012	1.80 mm
09181 - 25013	1.90 mm
09181 - 25014	2.00 mm

99104 - 32030	Thread lock super "1363A"

Tightening torque	90 – 110 N·m (9.0 – 11.0 kg-m) (65.0 – 79.5 lb-ft)

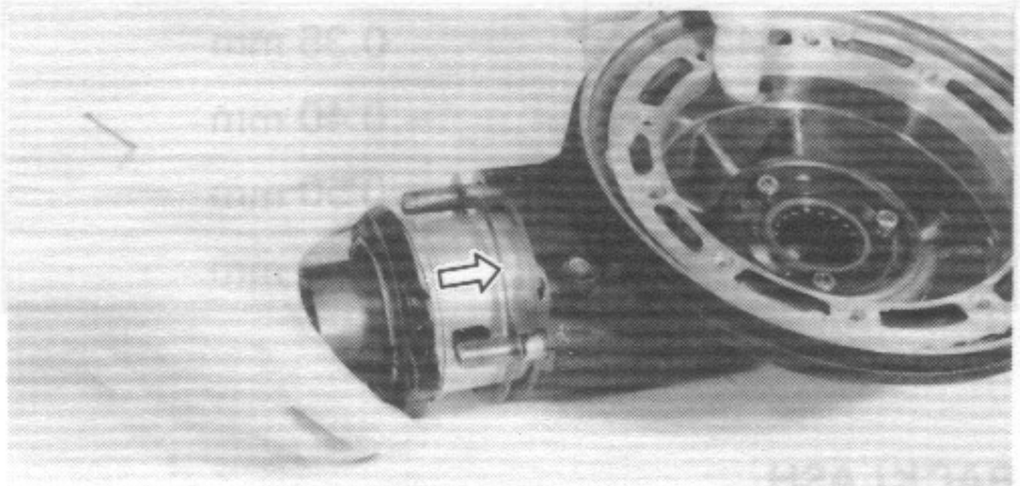
- Bend the collar of the nut over into the notch in the final drive bevel gear shaft.



FINAL GEAR SHIM ADJUSTMENT

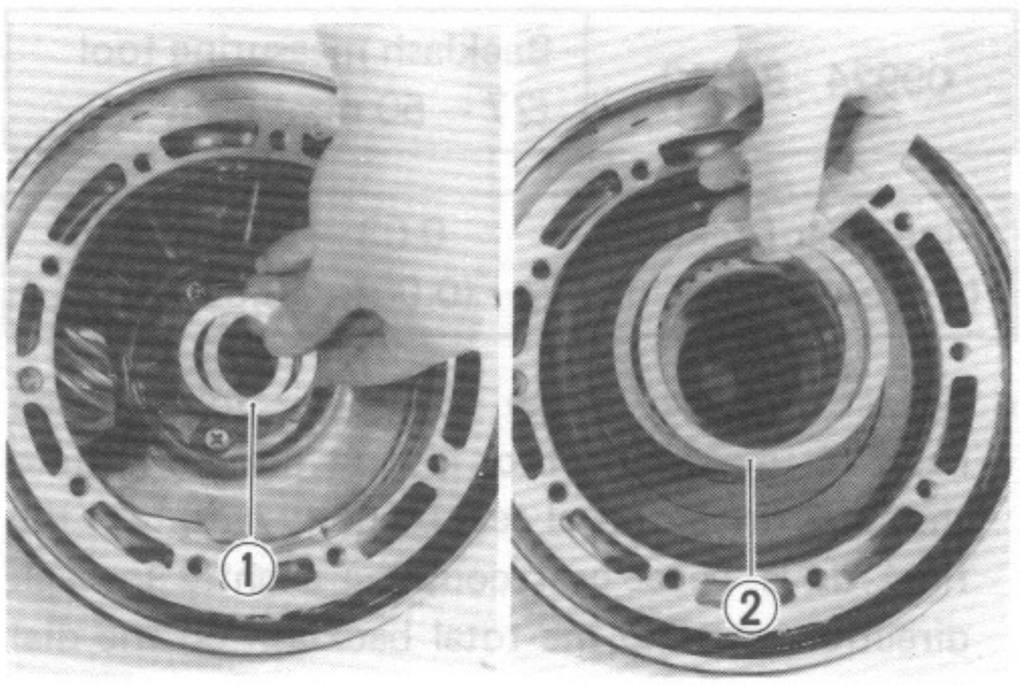
- Install the final drive bevel gear shims removed during disassembly onto the final drive bevel gear housing, and then install the final drive bevel gear assembly into the final gear case.

NOTE:
Do not install the gear housing O-ring at this point. O-ring is installed after backlash and tooth contact are correct.



- Install the final driven bevel gear shims, ① and ②, removed during disassembly on the needle bearing and final driven bevel gear, and then install the final gear bearing case on the final gear case.

NOTE:
Do not install the bearing case O-ring at this point. O-ring is installed after backlash and tooth contact are correct.



- Tighten the gear housing nuts and bearing case bolts to the specified torque.

Tightening torque

Final drive bevel gear housing nut	35 – 45 N·m (3.5 – 4.5 kg-m) (25.5 – 32.5 lb-ft)
Final gear bearing case bolt	20 – 26 N·m (2.0 – 2.6 kg-m) (14.5 – 19.0 lb-ft)

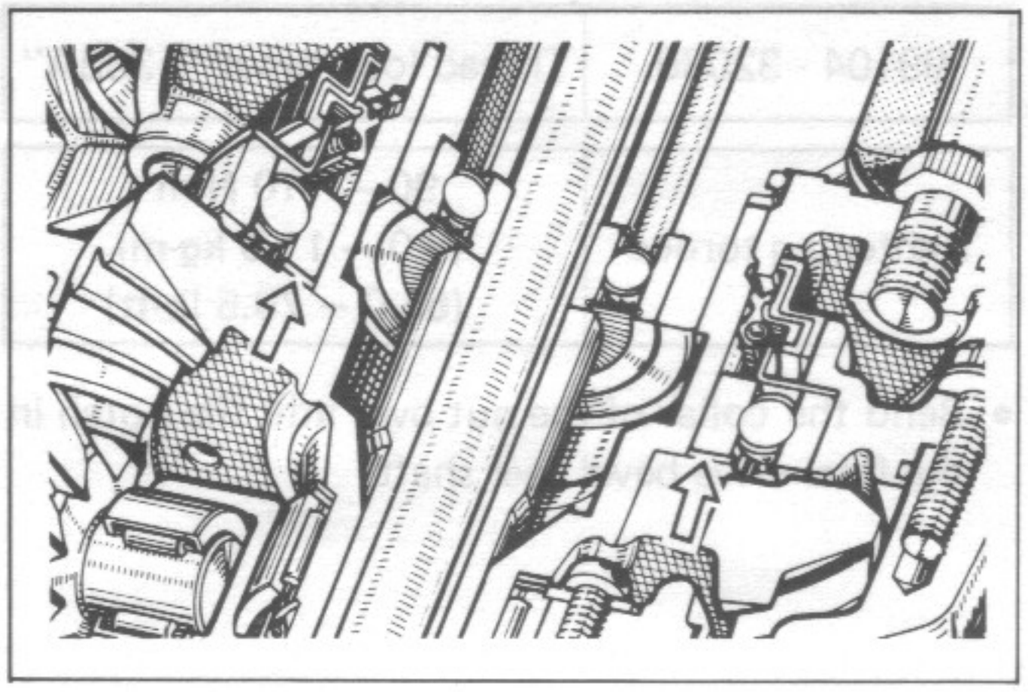
FINAL GEAR BEARING CASE SHIM CLEARANCE

- Measure the clearance between the shims and bearing. If it is not within the specification, the shims must be changed.

Final gear bearing case shim clearance	0.10 mm (0.004 in)

List of shims Ⓓ (Refer to page 4-37)

Part No.	Shim thickness
27327 - 34200	0.35 mm
27327 - 34210	0.40 mm
27327 - 34220	0.50 mm
27327 - 34230	0.60 mm



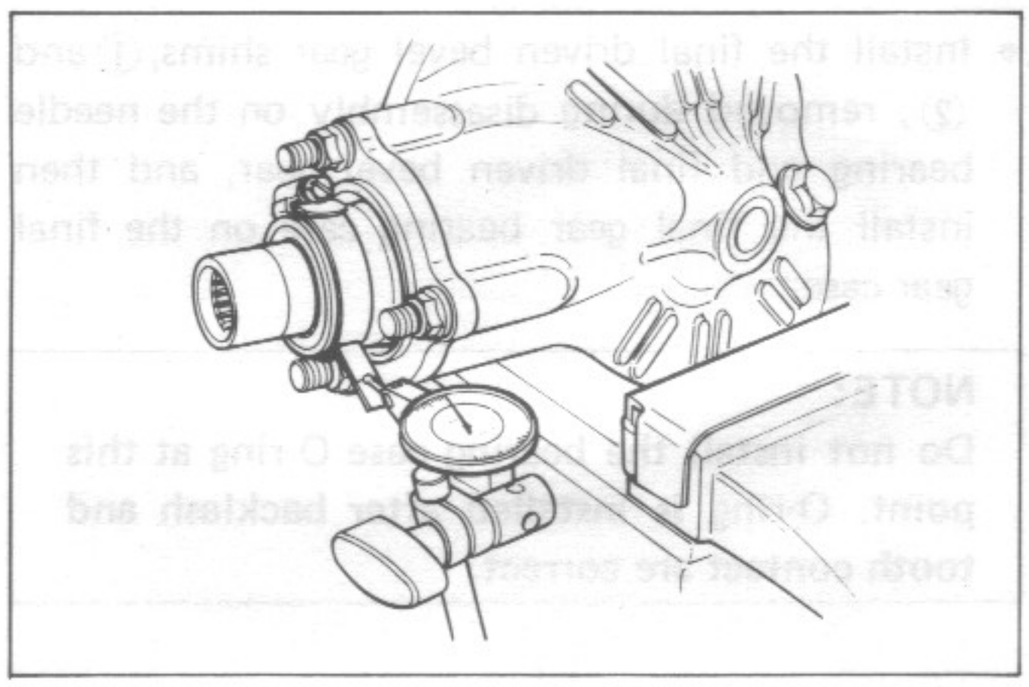
BACKLASH

- Install the backlash measuring tool on the drive bevel gear coupling, and set-up a dial gauge as shown in Fig.

09924 - 34510	Backlash measuring tool (27 – 50 mm)

Final gear backlash (Drive side)	0.03 – 0.64 mm (0.001 – 0.025 in)

- Adjust the dial gauge so that it touches the backlash measuring tool arm at the mark; hold the final driven bevel gear securely, and turn the final drive bevel gear coupling slightly in each direction, reading the total backlash on the dial gauge.



NOTE:
If the backlash is not within specification, adjust the shim thickness as follows:

- Remove shims from final gear bearing case and final gear case, and measure total thickness.
- In order not to change the clearance between final driven bevel gear and bearing, the total thickness of the shims installed after a change is made must equal the original total thickness of shims.
- If backlash is too large:
  a) Install a thinner shim pack Ⓒ between final driven bevel gear and final gear case.
  b) Increase thickness of shims Ⓓ between final driven bevel gear and bearing by an amount equal to decrease above.
- If backlash is too small:
  a) Install a thicker shim pack Ⓒ between final driven bevel gear and final gear case.
  b) Decrease thickness of shims Ⓓ between final driven gear and bearing by an amount equal to increase above.

EXAMPLE:

Ⓒ Final gear to case shims;

1.35 mm + 1.05 mm = 2.40 mm

Ⓓ Final gear to bearing shims;

0.50 mm + 0.40 mm = 0.90 mm

Original total measurement = 3.30 mm

Backlash too large:

Ⓒ Final gear to case shims;

1.25 mm + 1.10 mm = 2.35 mm

Ⓓ Final gear to bearing shims;

0.60 mm + 0.35 mm = 0.95 mm

Total thickness = 3.30 mm

Backlash too small:

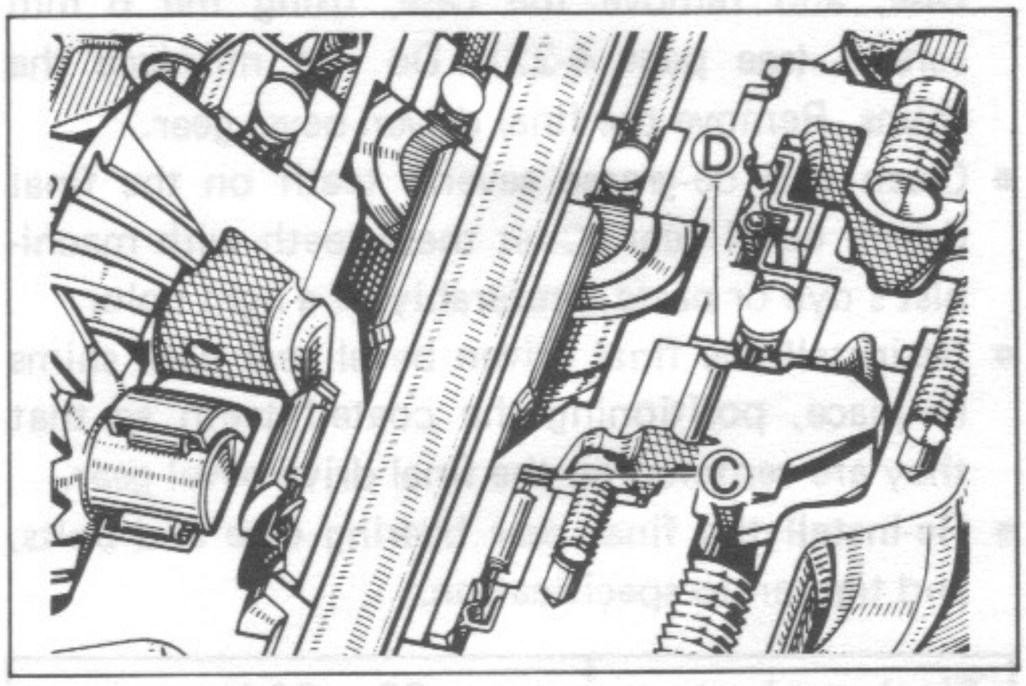
Ⓒ Final gear to case shims;

1.35 mm + 1.10 mm = 2.45 mm

Ⓓ Final gear to bearing shims;

0.50 mm + 0.35 mm = 0.85 mm

Total thickness = 3.30 mm



List of shims Ⓒ (Refer to page 4-37)

Part No.	Shim thickness
27326 - 34201	1.05 mm
27326 - 34211	1.10 mm
27326 - 34221	1.20 mm
27326 - 34231	1.25 mm
27326 - 34241	1.35 mm

List of shims Ⓓ (Refer to page 4-37)

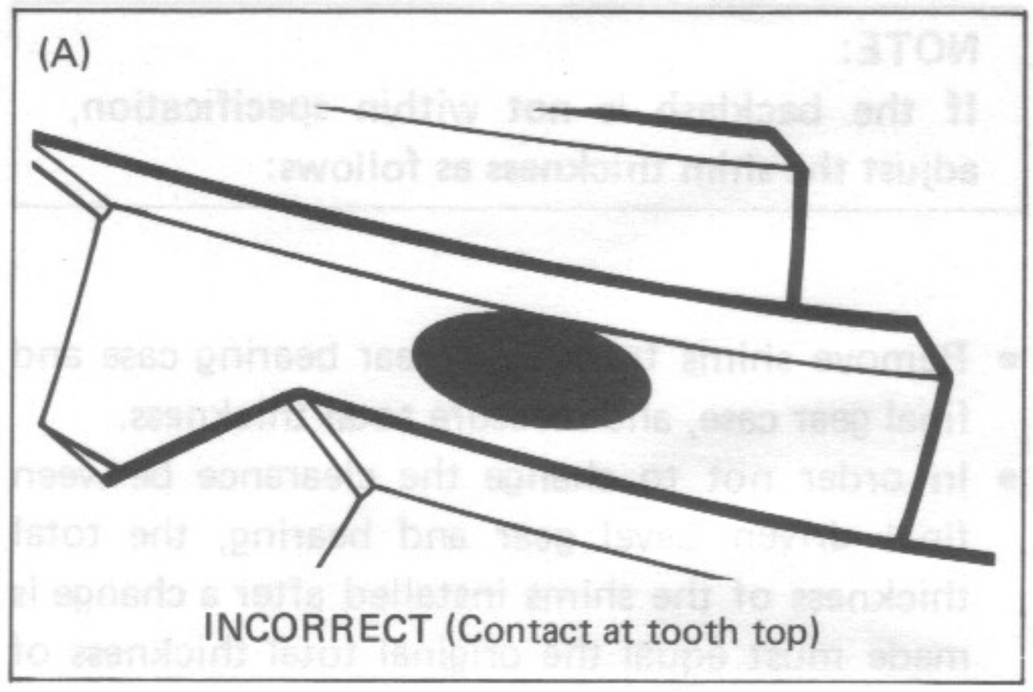
Part No.	Shim thickness
27327 - 34200	0.35 mm
27327 - 34210	0.40 mm
27327 - 34220	0.50 mm
27327 - 34230	0.60 mm

TOOTH CONTACT

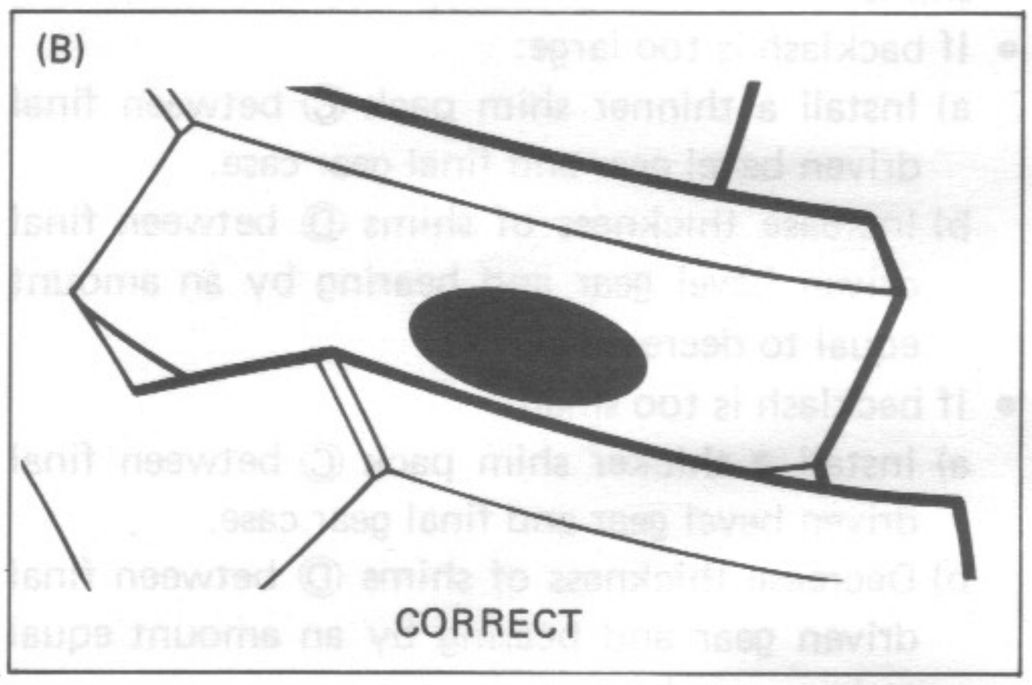
- After backlash adjustment is carried out, the tooth contact must be checked.
- Remove the 9 bolts from the final gear bearing case, and remove the case, using the 6 mm screws (see page 4-22). Do not misplace the shims. Remove the final driven bevel gear.
- Clean and de-grease several teeth on the final driven bevel gear. Coat these teeth with machinist's dye or paste, preferably of a light color.
- Re-install the final driven bevel gear with shims in place, positioning the coated teeth so that they are centered on the final drive bevel gear.
- Re-install the final gear bearing case and bolts, and tighten to specification.

Final gear bearing case bolt tightening torque	20 – 26 N·m (2.0 – 2.6 kg-m) (14.5 – 19.0 lb-ft)

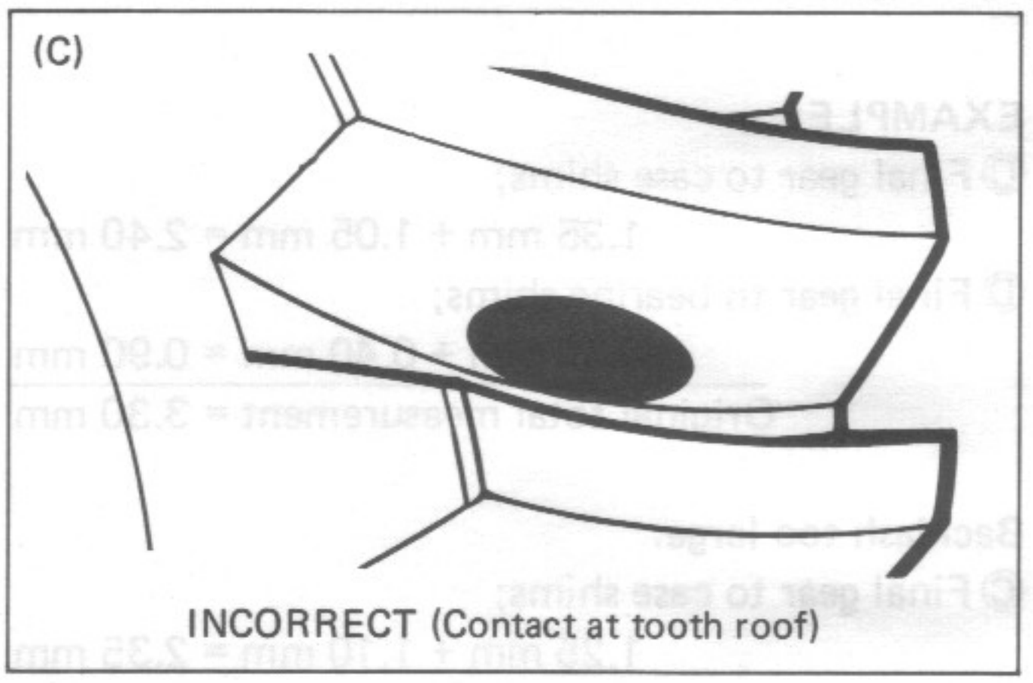
- Using a socket and handle on the final drive bevel gear coupling nut, rotate the final drive bevel gear several turns in each direction, while loading the final driven bevel gear. This will provide a contact pattern on the coated teeth of the driven bevel gear.
- Remove the final gear bearing case and final driven bevel gear, and inspect the coated teeth of the driven bevel gear. The contact patch should be as shown at right:
- If the tooth contact pattern is correct, as shown in (B), go to the Final Assembly sub-section.
- If the tooth contact pattern is incorrect, as shown in (A), a thinner shim is needed between the final drive bevel gear housing and final gear case.
- If the tooth contact pattern is incorrect, as shown in (C), a thicker shim is needed between the final drive bevel gear housing and final gear case.
- If the tooth contact pattern is incorrect for either reason, the appropriate shim must be installed, and the tooth contact pattern rechecked by repeating the tooth coating procedure above.



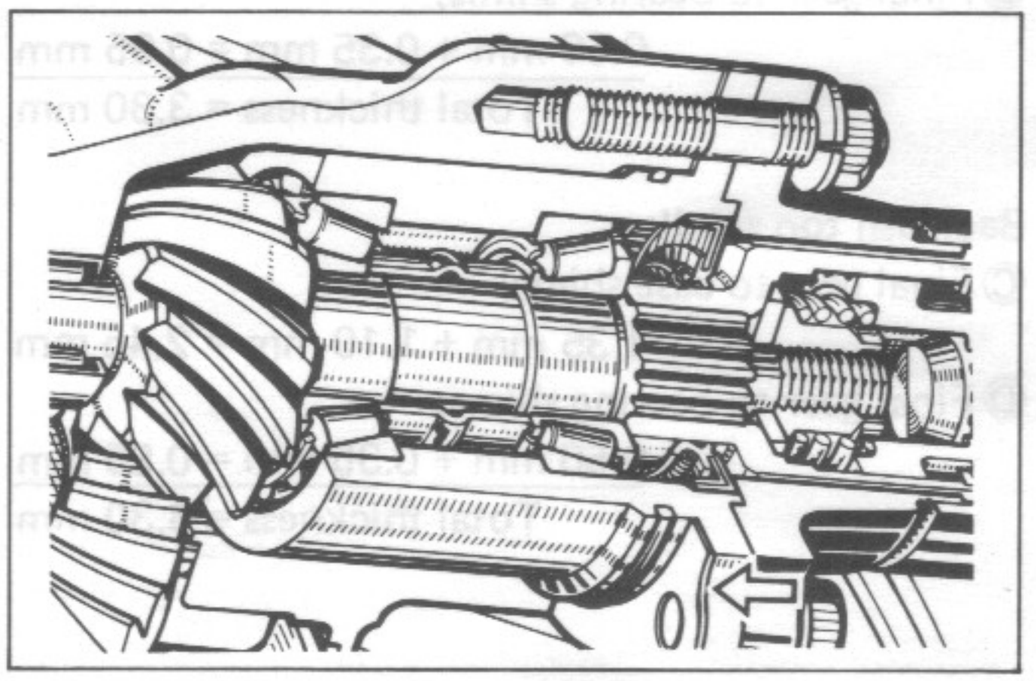
INCORRECT (Contact at tooth top)



CORRECT



INCORRECT (Contact at tooth roof)



NOTE:
If it is necessary to adjust the shim thickness between final drive bevel gear housing and final gear case, the final gear backlash may change, and should be re-checked according to the procedure outlined under the Backlash Measurement sub-section. Both adjustments may be needed until both backlash and tooth contact are correct.

List of shims Ⓑ (Refer to page 4-37)

Part No.	Shim thickness
27445 - 45100	0.15 mm
27445 - 45101	0.35 mm
27445 - 45102	0.30 mm
27445 - 45103	0.40 mm

FINAL ASSEMBLY AND REMOUNTING

- After adjusting the backlash, tooth contact and clearance between the bearing case and the bearing, remove the final gear bearing case and final drive bevel gear assembly from the final gear case.
- Clean off any machinist's dye or paste from the gear teeth, and lubricate the teeth with Hypoid gear oil.
- Install new O-rings to the final gear bearing case and final drive bevel gear housing. Coat the O-rings with grease.
- Install the final drive bevel gear assembly into the final gear case.
- Install the final gear bearing case to the final gear case and apply a small quantity of THREAD LOCK "1363C" to the 9 bolts and tighten them to the specified torque.

99104 - 32050	Thread lock "1363C"

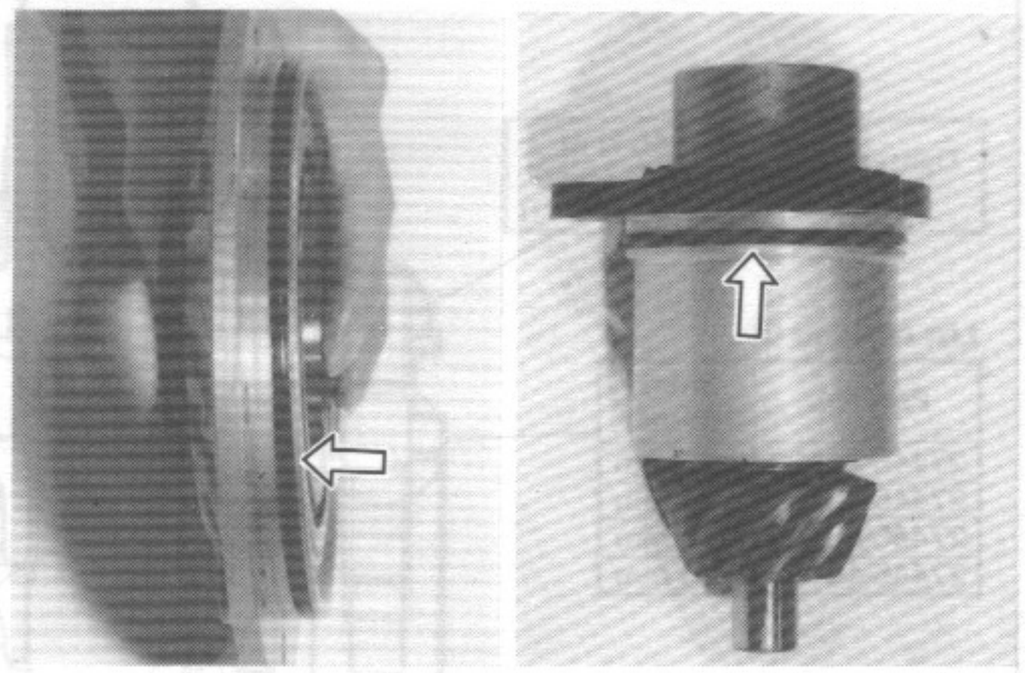
Tightening torque	20 – 26 N·m (2.0 – 2.6 kg-m) (14.5 – 19.0 lb-ft)

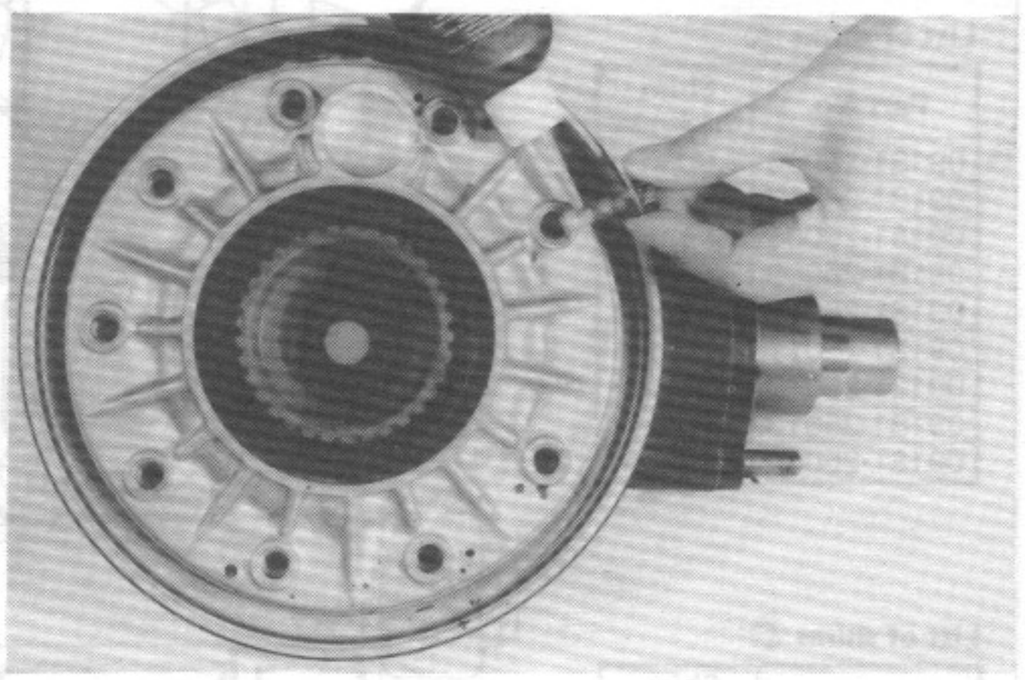
- Apply SUZUKI BOND NO. 1207B to the mating surface of swingarm and final gear case.

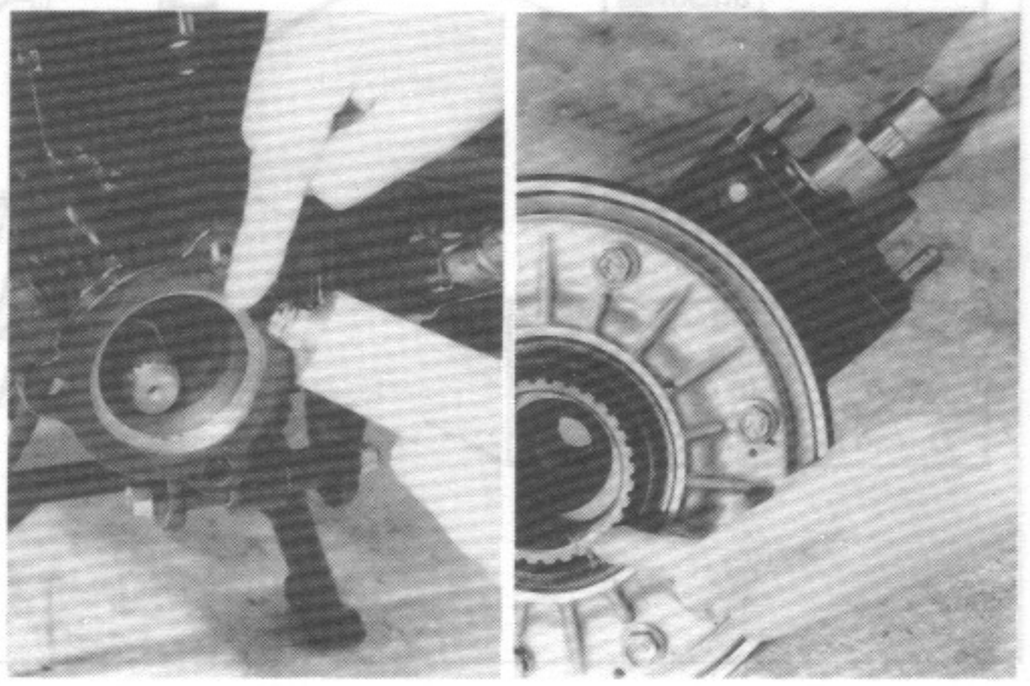
99104 - 31140	SUZUKI Bond No. 1207B

- Apply grease to the final driven bevel gear coupling.

99000 - 25030	SUZUKI super grease "A"



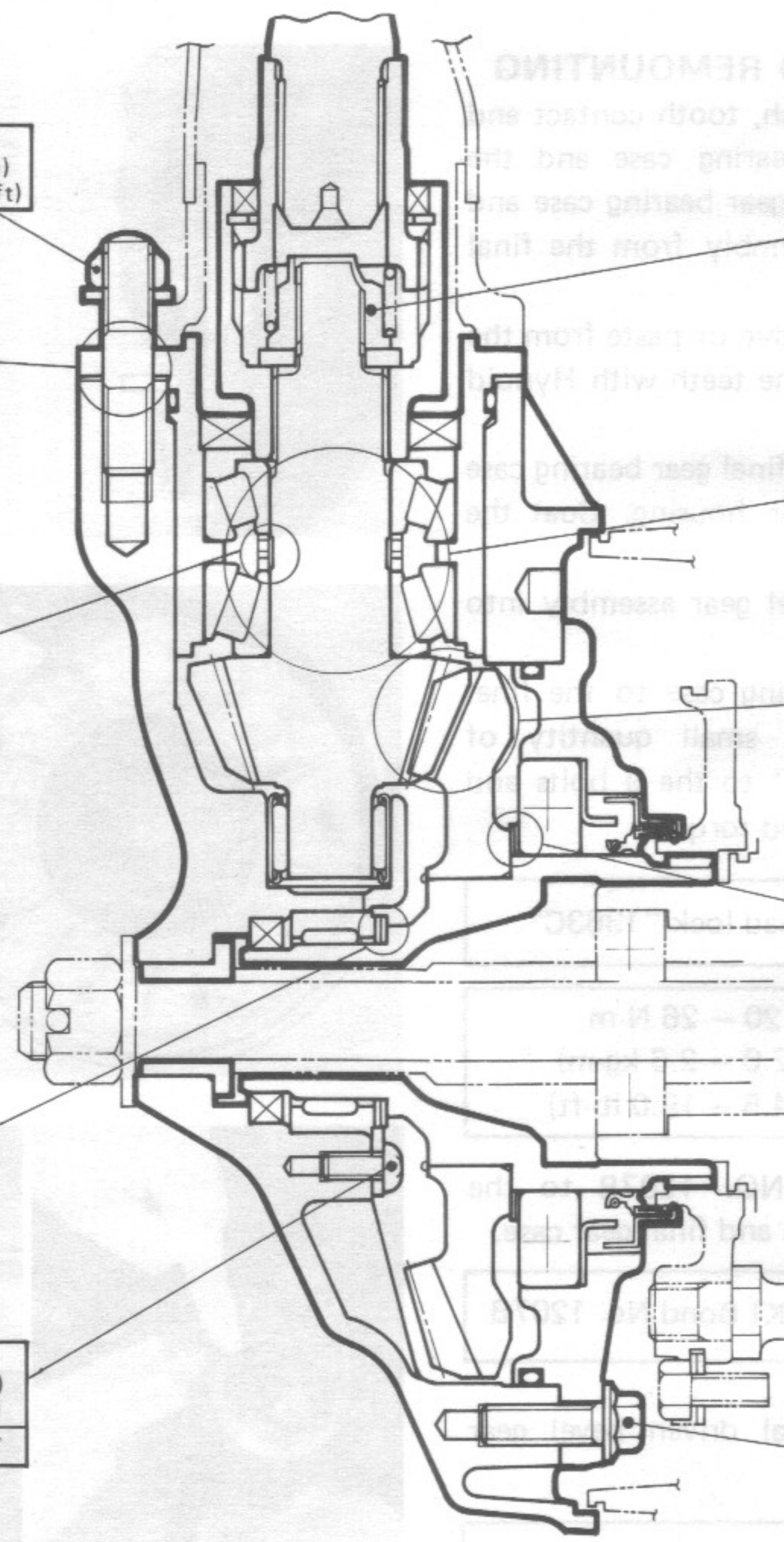




NOTE:
After remounting the final gear case, the following service procedures are necessary.

* Fill the final gear case with Hypoid gear oil.
  Specified capacity: 170 – 190 ml
  (5.7/6.0 – 6.4/6.7 US/Imp oz)
* Adjust the rear brake. (See page 2-12)

REASSEMBLY INFORMATION



Tightening torque	35–45 N·m (3.5–4.5 kg-m) (25.5–32.5 lb-ft)

List of shims Ⓑ

Part No.	Shim thickness
27445-45100	0.15 mm
27445-45101	0.35 mm
27445-45102	0.30 mm
27445-45103	0.40 mm

List of shims Ⓐ

Part No.	Shim thickness
09181-25006	1.60 mm
09181-25007	1.62 mm
09181-25008	1.64 mm
09181-25009	1.66 mm
09181-25010	1.68 mm
09181-25011	1.70 mm
09181-25012	1.80 mm
09181-25013	1.90 mm
09181-25014	2.00 mm

List of shims Ⓒ

Part No.	Shim thickness
27326-34201	1.05 mm
27326-34211	1.10 mm
27326-34221	1.20 mm
27326-34231	1.25 mm
27326-34241	1.35 mm

Tightening torque	8–10 N·m (0.8–1.0 kg-m) (6.0–7.0 lb-ft)
Thread lock super "1363A"	

Tightening torque	90–110 N·m (9.0–11.0 kg-m) (65.0–79.5 lb-ft)
Thread lock super "1363A"	

Bearing pre-load	40–70 N·cm (4.0–7.0 kg-cm) (3.5–6.0 lb-in)

Gear backlash	0.03–0.64 mm (0.0012–0.0252 in)

List of shims Ⓓ

Part No.	Shim thickness
27327-34200	0.35 mm
27327-34210	0.40 mm
27327-34220	0.50 mm
27327-34230	0.60 mm
Shim clearance	0.10 mm (0.004 in)

Tightening torque	20–26 N·m (2.0–2.6 kg-m) (14.5–19.0 lb-ft)
Thread lock "1363C"	

COOLING SYSTEM

CONTENTS

COOLING SYSTEM 5- 1
COOLING SOLUTION 5- 3
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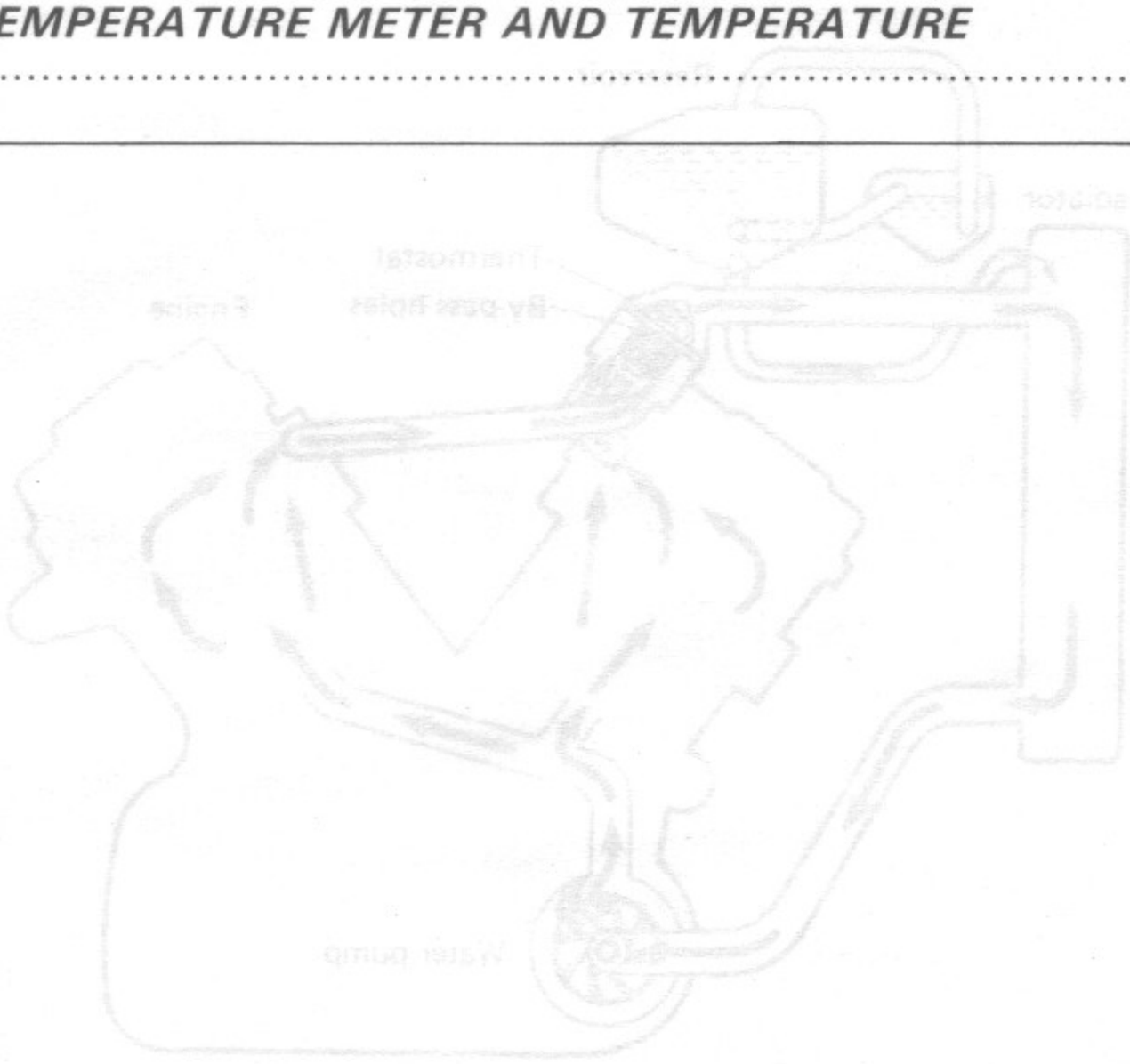
WATER PUMP 5- 8
THERMO-SWITCH AND FAN MOTOR RELAY 5-12
ENGINE THERMO-SWITCH 5-13
FAN MOTOR RELAY 5-13
FAN MOTOR 5-14
WATER TEMPERATURE METER AND TEMPERATURE GAUGE 5-14



COOLING SYSTEM

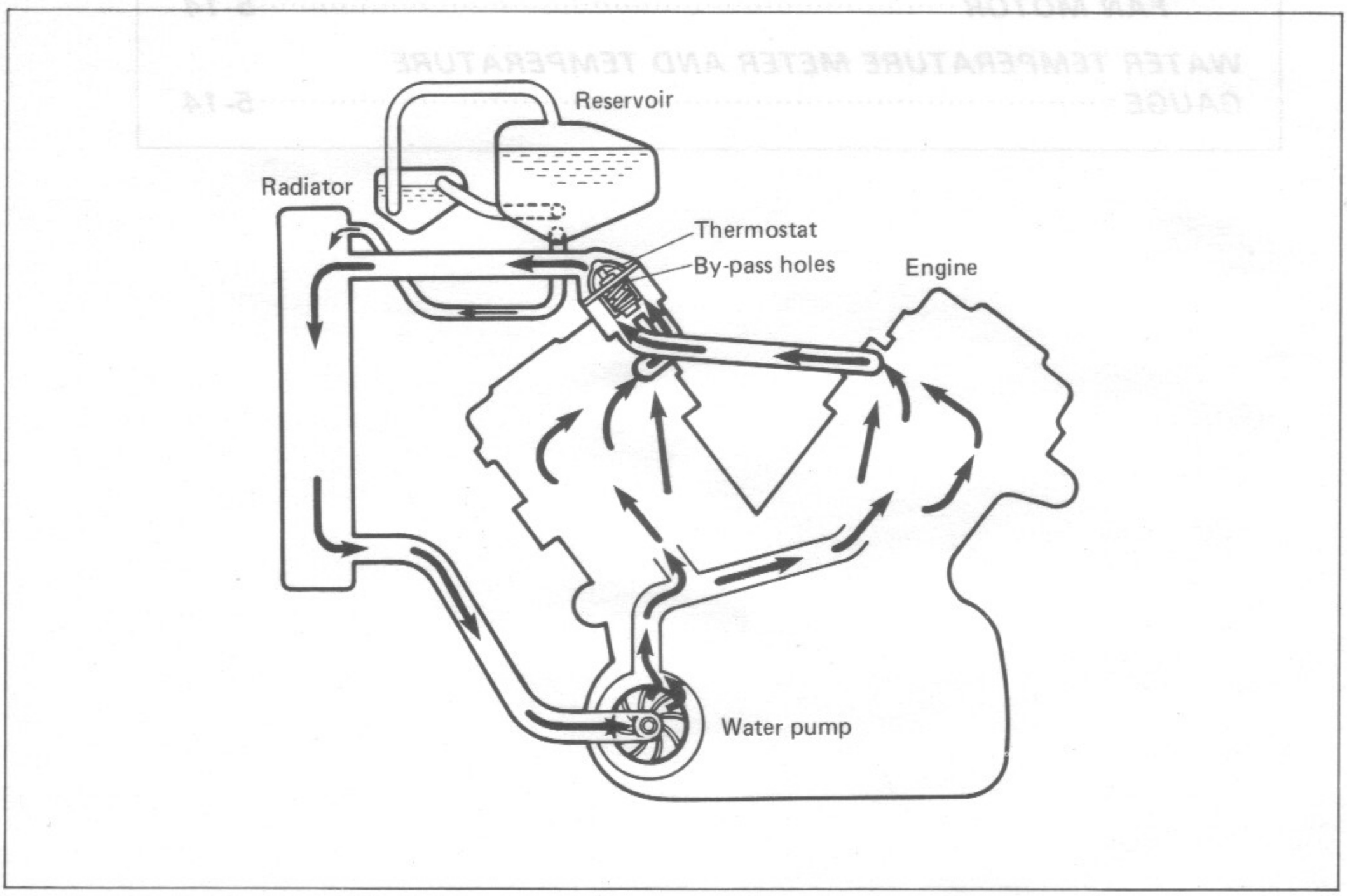
DESCRIPTION

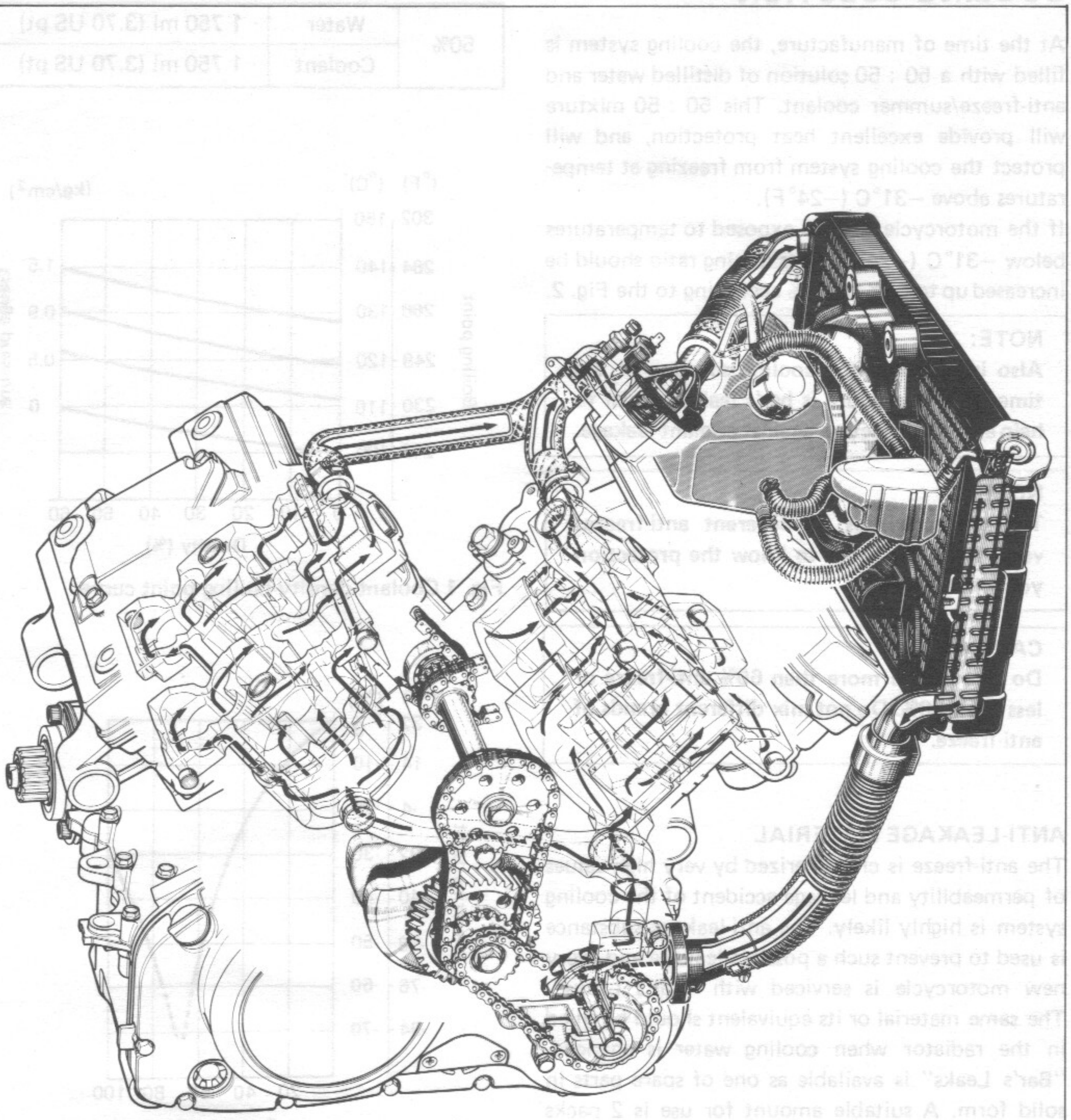
The engine is cooled by coolant set in forced recirculation through jackets formed in the cylinder and head, and through the radiator. For the water pump, a high-capacity centrifugal pump is used. The radiator is a tube-and-fin type made of aluminum material, which is characterized by lightness in weight and good heat dissipation.

The thermostat is of wax pellet type, complete with a valve as the means of temperature-dependent control over the flow of coolant through the radiator. The valve is actuated by the temperature-sensitive wax contained in the pellet.

Referring to the following illustration, the thermostat is in the closed condition, so that water recirculates through the route comprising pump, engine, by-pass holes of the thermostat and radiator in the regulated condition.

As the coolant temperature rises to 75°C and the thermostat valve unseats, the normal coolant flow is established. At about 90°C of coolant temperature, the thermostat becomes completely open and most of heat is released to the atmosphere through the radiator core.





COOLING SOLUTION

At the time of manufacture, the cooling system is filled with a 50 : 50 solution of distilled water and anti-freeze/summer coolant. This 50 : 50 mixture will provide excellent heat protection, and will protect the cooling system from freezing at temperatures above −31°C (−24°F).
If the motorcycle is to be exposed to temperatures below −31°C (−24°F), this mixing ratio should be increased up to 55% or 60% according to the Fig. 2.

NOTE:
Also included in the cooling solution at the time of manufacture is bar's leak material to help ensure protection against coolant leakage.

NOTE:
The characteristics of different anti-freezes vary. Read the label to know the protection you will have.

CAUTION:
Do not put in more than 60% anti-freeze or less than 50%. Do not mix different brands of anti-freeze.

ANTI-LEAKAGE MATERIAL

The anti-freeze is characterized by very high values of permeability and leakage accident of the cooling system is highly likely. The anti-leakage substance is used to prevent such a possible leakage and every new motorcycle is serviced with "Bar's Leaks". The same material or its equivalent should be filled in the radiator when cooling water is changed. "Bar's Leaks" is available as one of spare parts in solid form. A suitable amount for use is 2 packs per model and in the case of a liquid anti-leakage material available in the market, 60 – 70 ml (cc) (2.0 – 2.4 US oz) should be used.

50%	Water	1 750 ml (3.70 US pt)
	Coolant	1 750 ml (3.70 US pt)

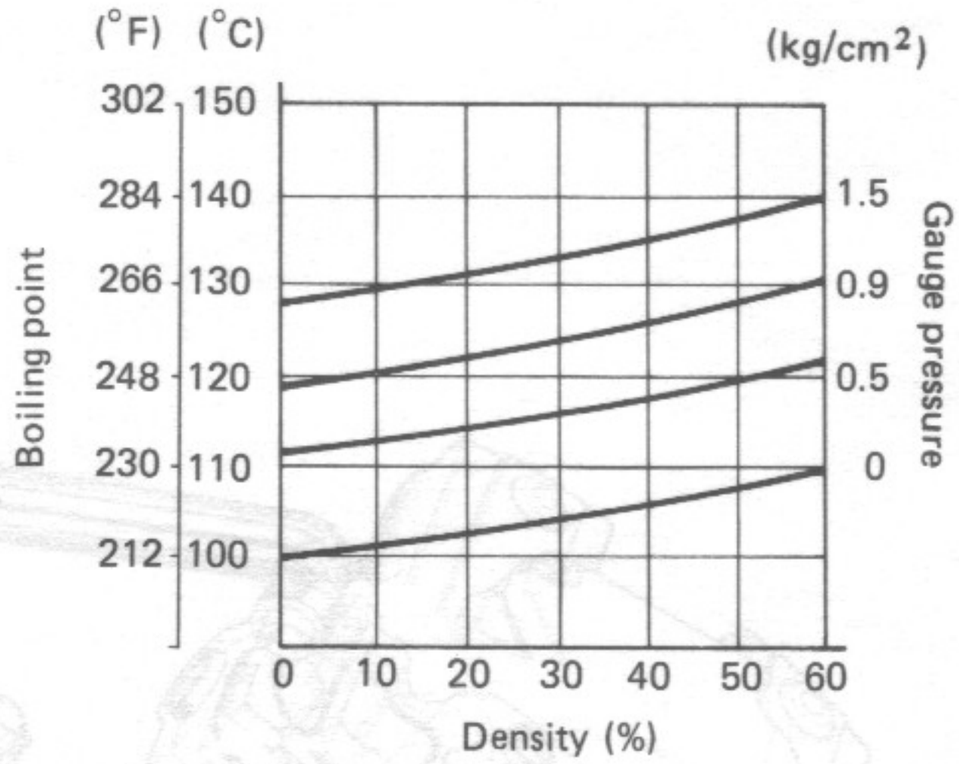


Fig. 1 Coolant density-boiling point curve.

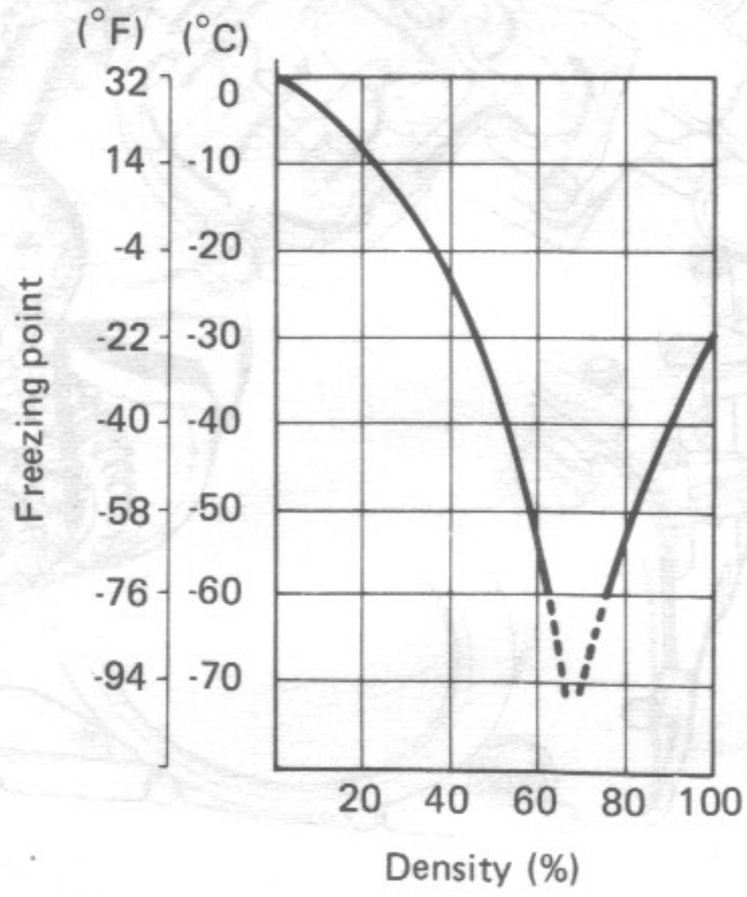


Fig. 2 Coolant density-freezing point curve.

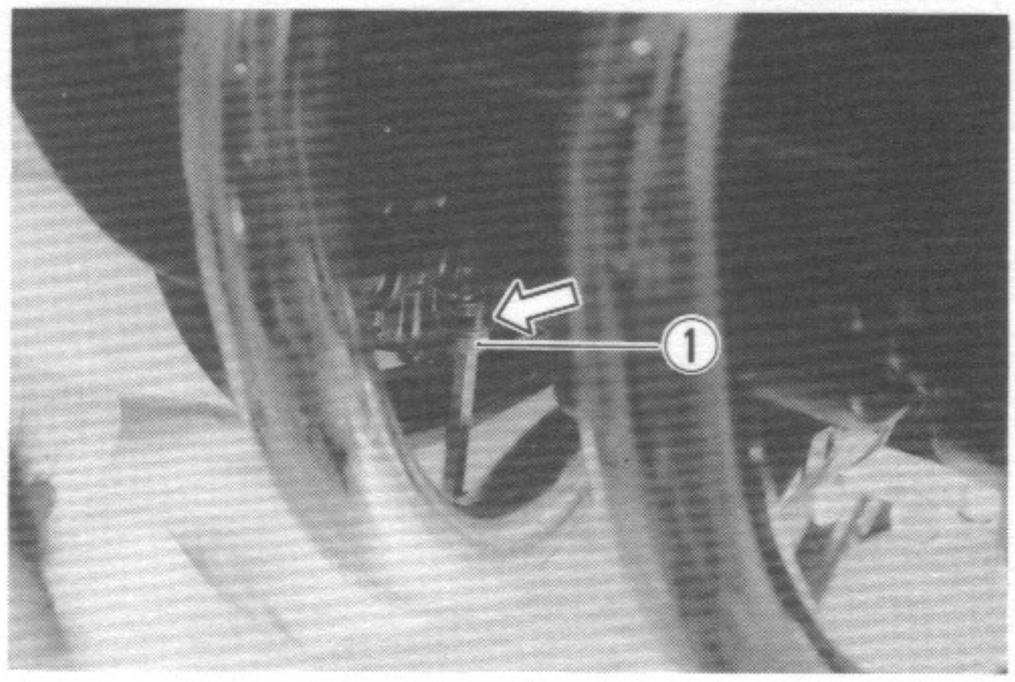
99000 - 24240	Bar's Leaks

CAUTION:
Anti-leakage material should not be added except the time of the renewal of cooling water.

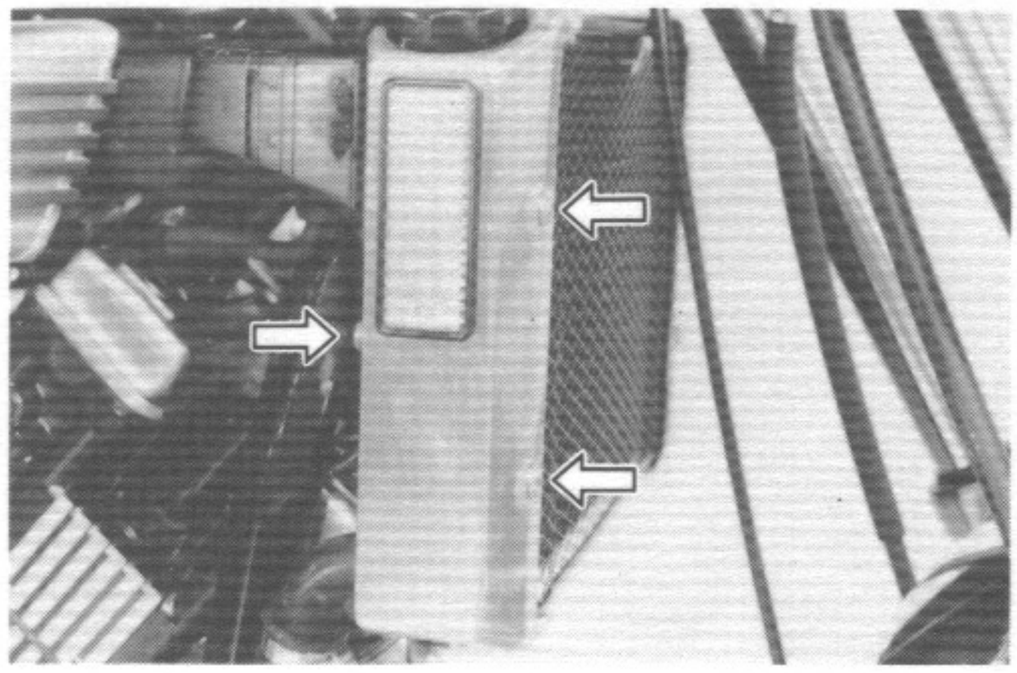
RADIATOR AND WATER HOSES

REMOVAL

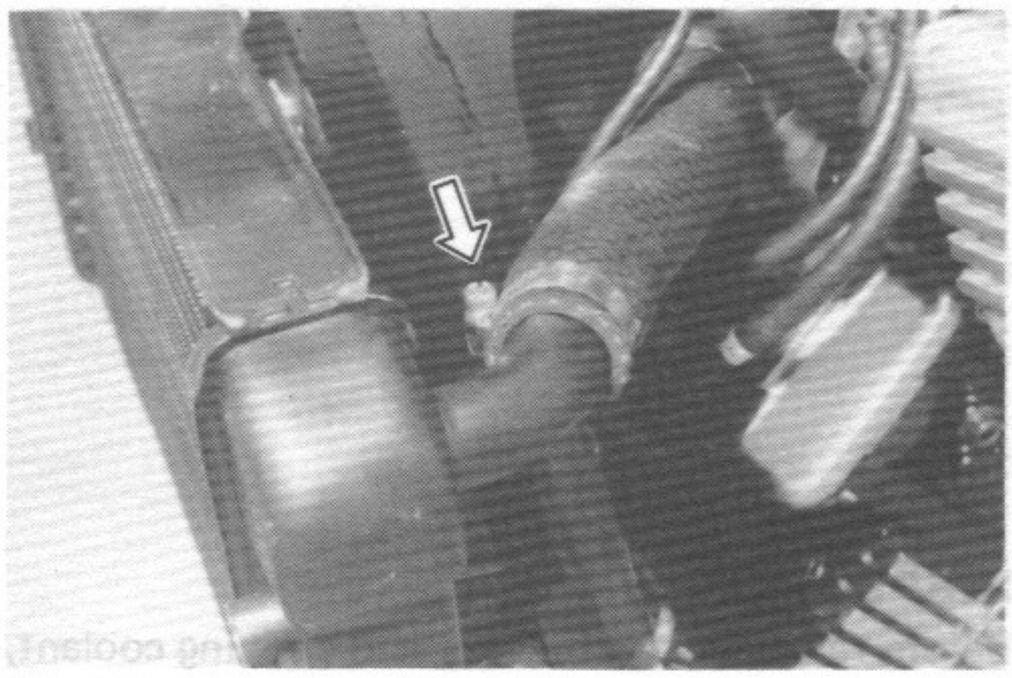
- Drain the coolant by removing drain plug ① or the other drain plug located on the water hose union. (See page 3-3)

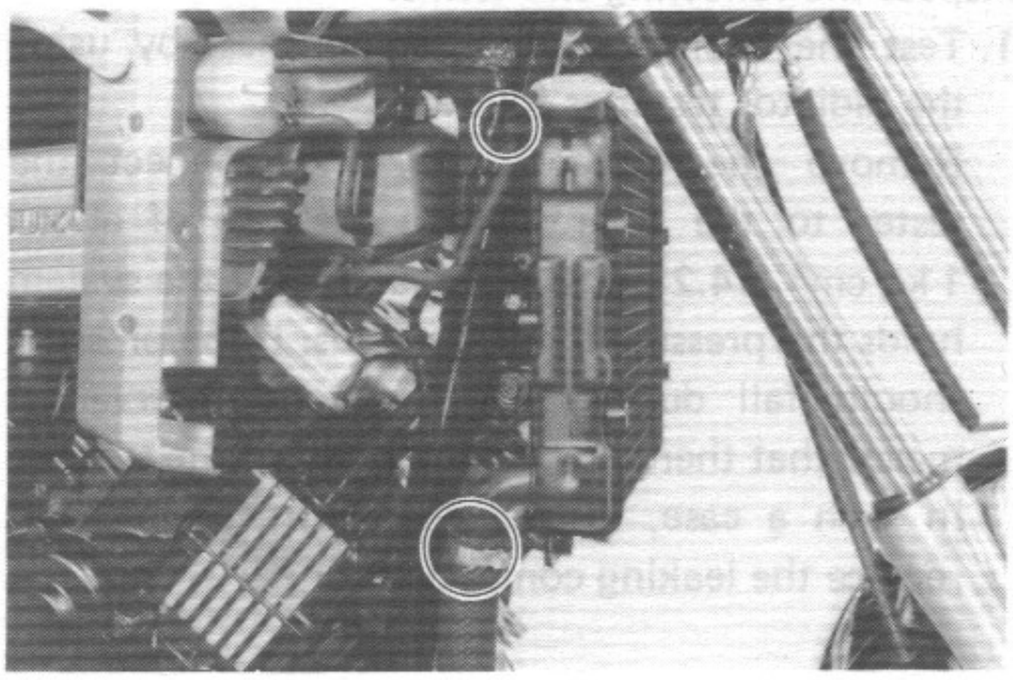


- Remove the right and left radiator covers.

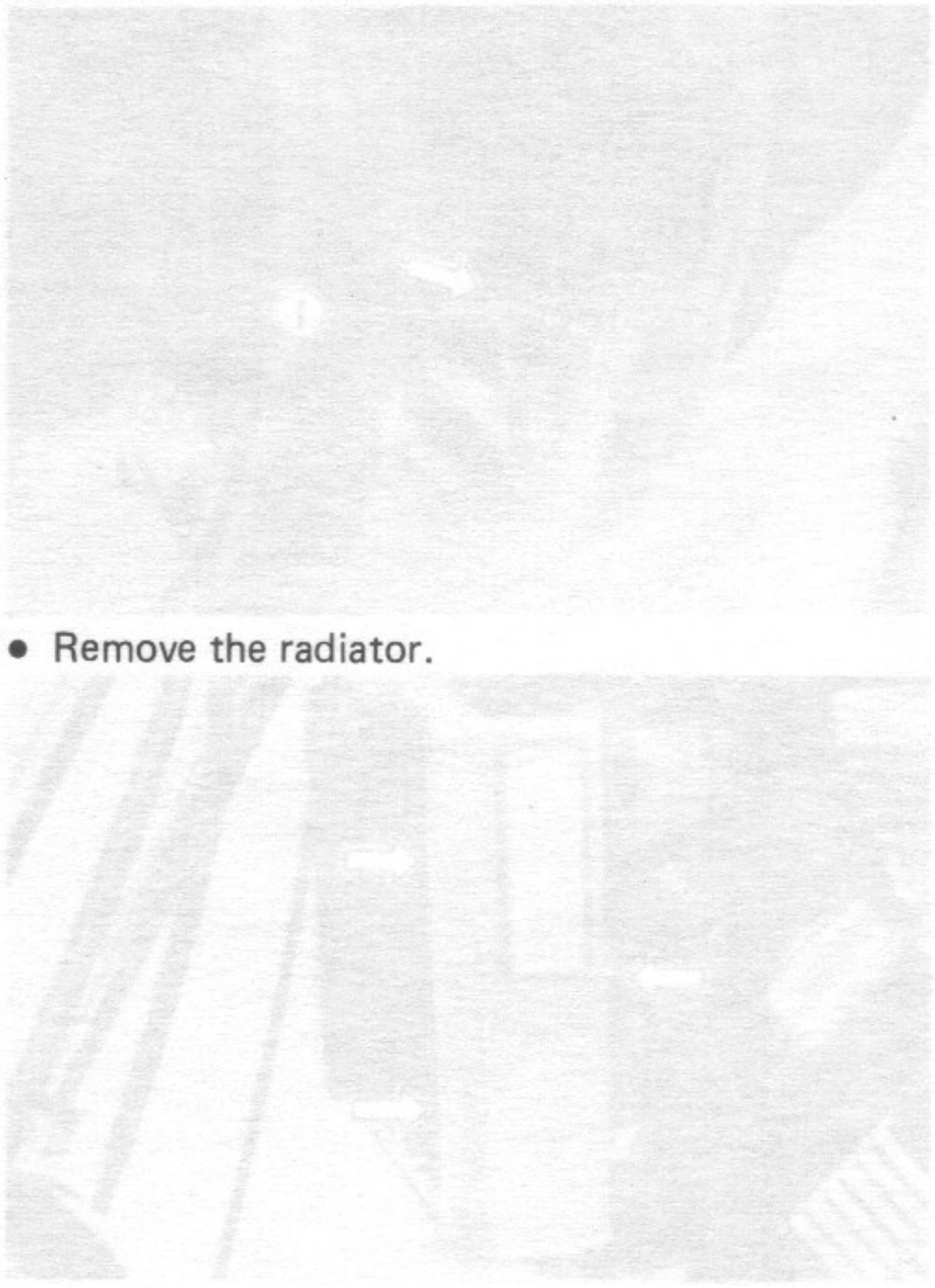


- Disconnect the radiator hoses.





- Loosen and remove the reservoir tank screws.

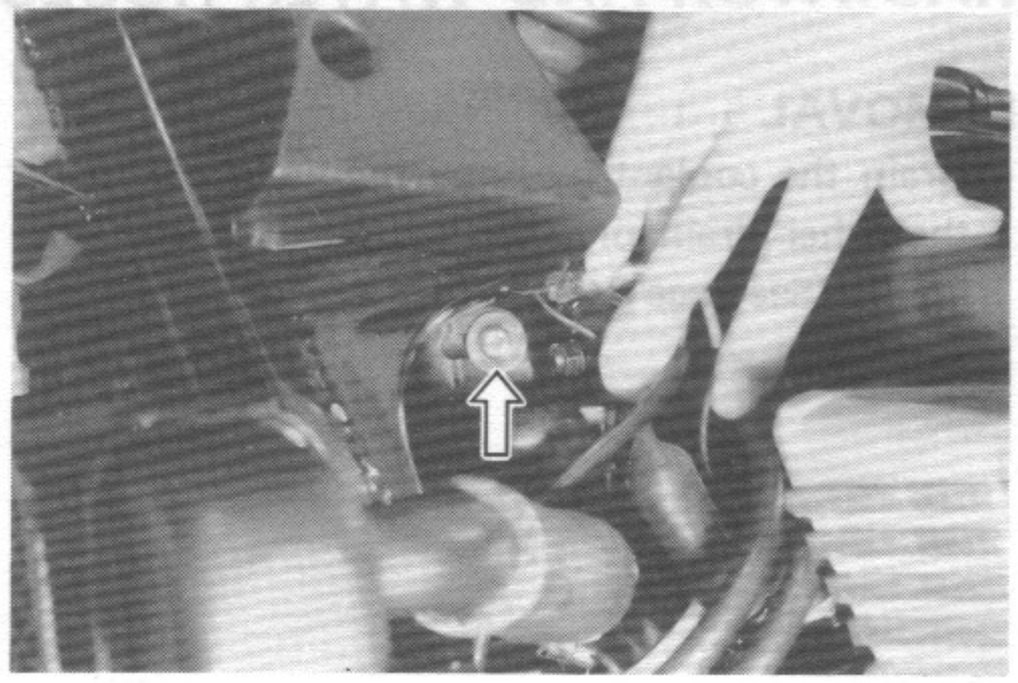


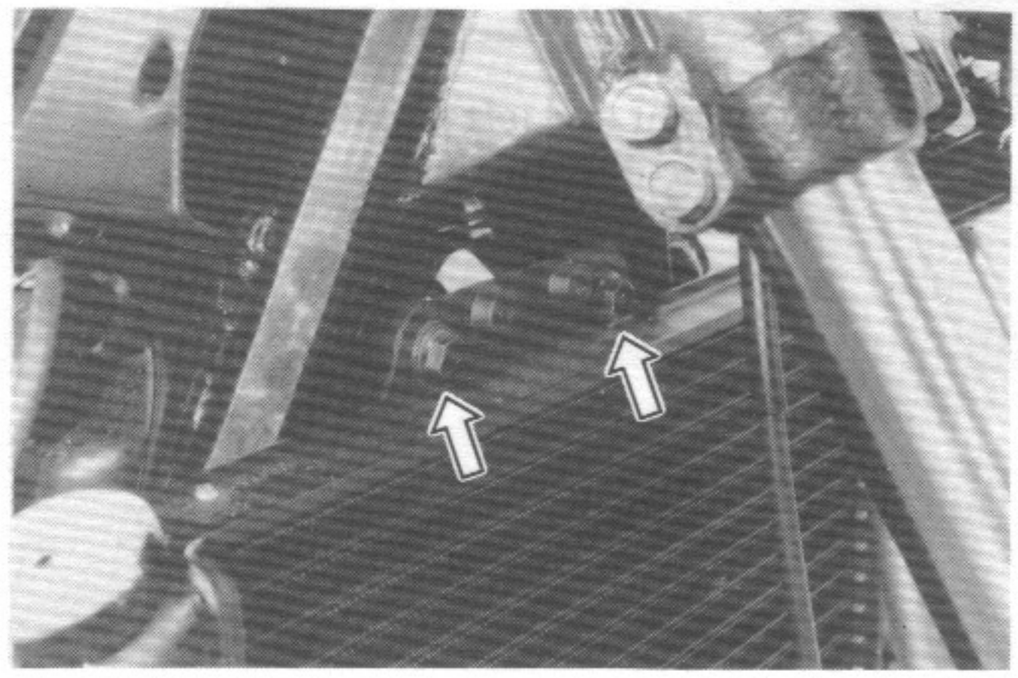
- Remove the radiator.

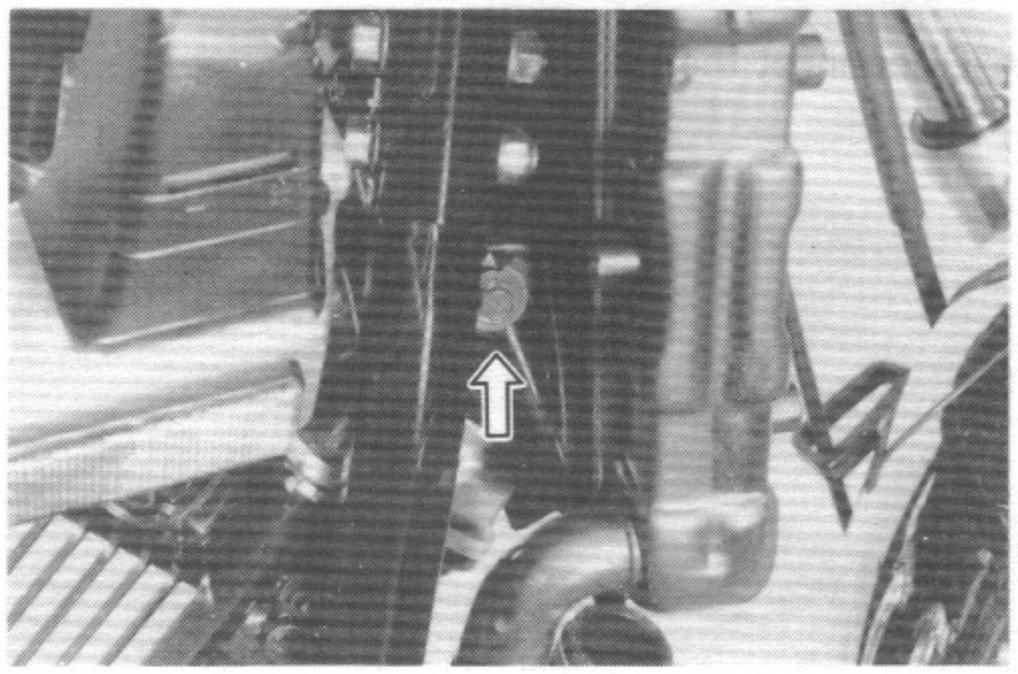
INSPECTION

Before removing the radiator and draining coolant, inspect the following two items.

1. Test the cooling system for tightness by using the radiator tester as follows:
   Remove the radiator cap, and connect the tester to the filler. Give a pressure of about 1 kg/cm² (14.2 psi, 100kPa) and see if the system holds this pressure for 10 seconds. If the pressure should fall during this 10-second interval, it means that there is a leaking point in the system. In such a case, inspect the entire system and replace the leaking component or part.

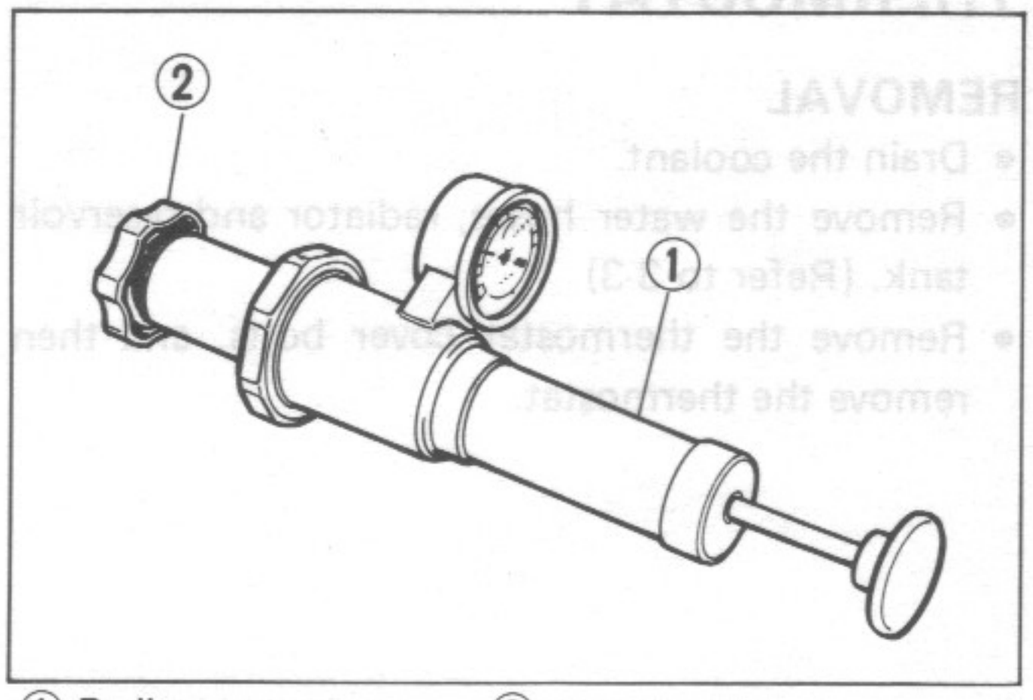






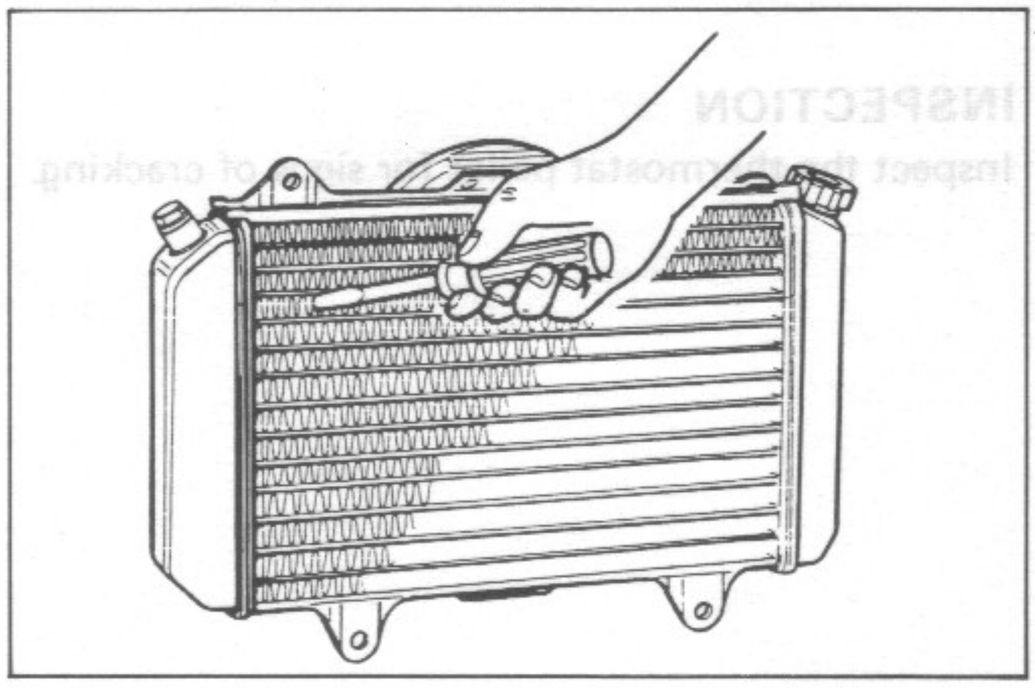
2. Test the radiator cap for relieving pressure by using the radiator tester in the following manner: Fit the cap to the tester, as shown, and build up pressure slowly by operating the tester. Make sure that the pressure build-up stops at 0.9 ± 0.15 kg/cm² and that, with the tester held standstill, the cap is capable of that pressure for at least 10 seconds. Replace the cap if it is found not to satisfy either of these two requirements.

Radiator cap valve release pressure	90 ± 15 kPa (0.90 ± 0.15 kg/cm²) (12.8 ± 2.1 psi)



① Radiator cap tester ② Radiator cap

3. Road dirt or trash stuck to the fins must be removed. Use of compressed air is recommended for this cleaning. Fins bent down or dented can be repaired by straightening them with the blade of a small screwdriver.
4. Any water hose found in a cracked condition or flattened must be replaced.

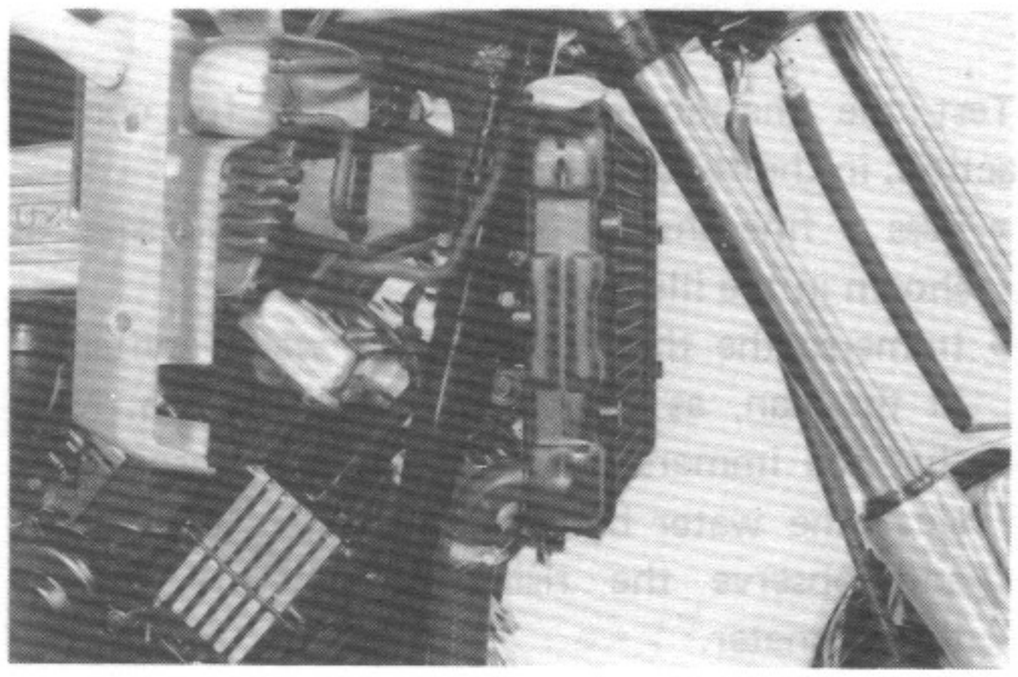


RADIATOR HOSE

Inspect for leakage from the radiator hose connecting (joint) section and from the radiator hose itself and for kinks in the radiator hose.

If any leakages from the radiator hose are detected, the radiator hose should be replaced.

Any leakages from the connecting (joint) section should be corrected by proper tightening.



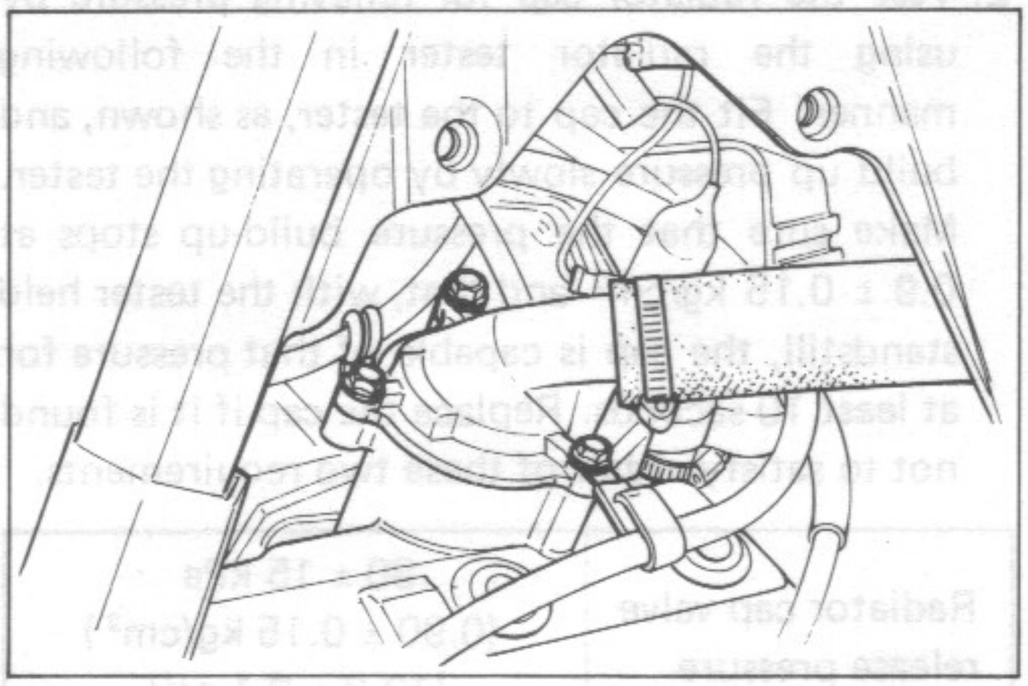
INSTALLATION

The radiator is to be installed in the reverse order of the removal procedure. After installing the radiator, be sure to add coolant: refer to page 2-8 for refilling information.

THERMOSTAT

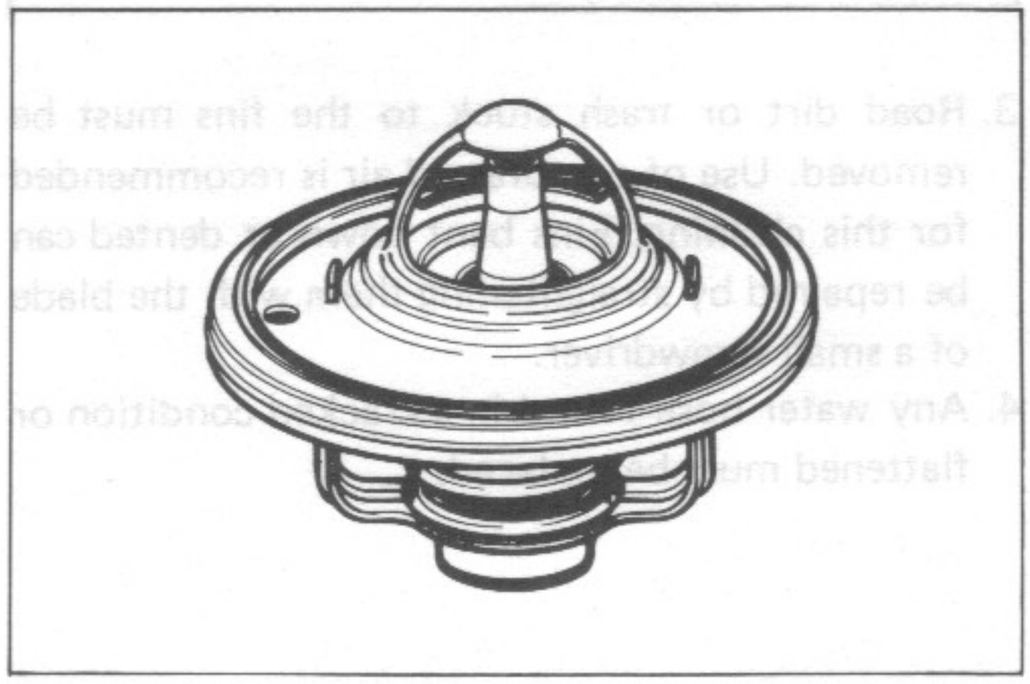
REMOVAL

- Drain the coolant.
- Remove the water hoses, radiator and reservoir tank. (Refer to 3-3)
- Remove the thermostat cover bolts, and then remove the thermostat.



INSPECTION

Inspect the thermostat pellet for signs of cracking.

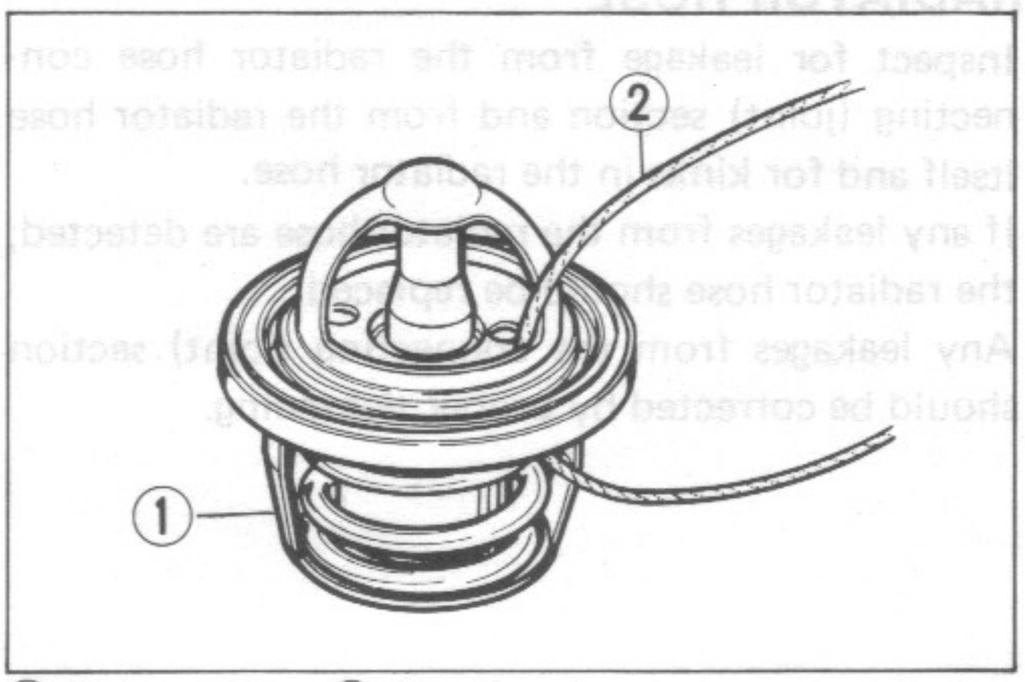


Test the thermostat at the bench for control action, in the following manner.

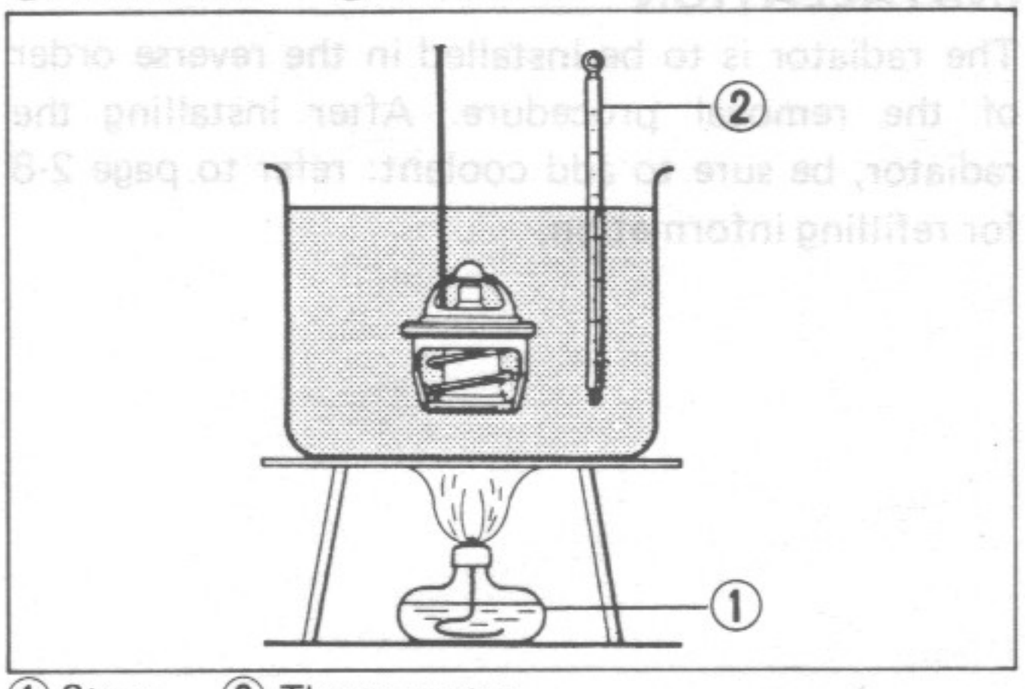
- Pass a fine thread between valve and seat, as shown in the illustration.
- Immerse the thermostat in the water contained in the pan, as shown in the illustration. Note that the immersed thermostat is in suspension. Heat the water by placing the pan on a stove and observe the rising temperature on the thermometer.
- Read the thermometer just when the thermostat drops to the bottom of the pan. This reading, which is the temperature level at which the thermostat valve begins to open, should be anywhere between 73.5° (164.3° F) and 76.5° C (169.7° F).

Thermostat valve opening temperature	75.0 ± 1.5° C (167 ± 2.7° F)

- Keep on heating the water to raise its temperature to and beyond 90° C (194° F)



① Thermostat ② Fine thread



① Stove ② Thermometer

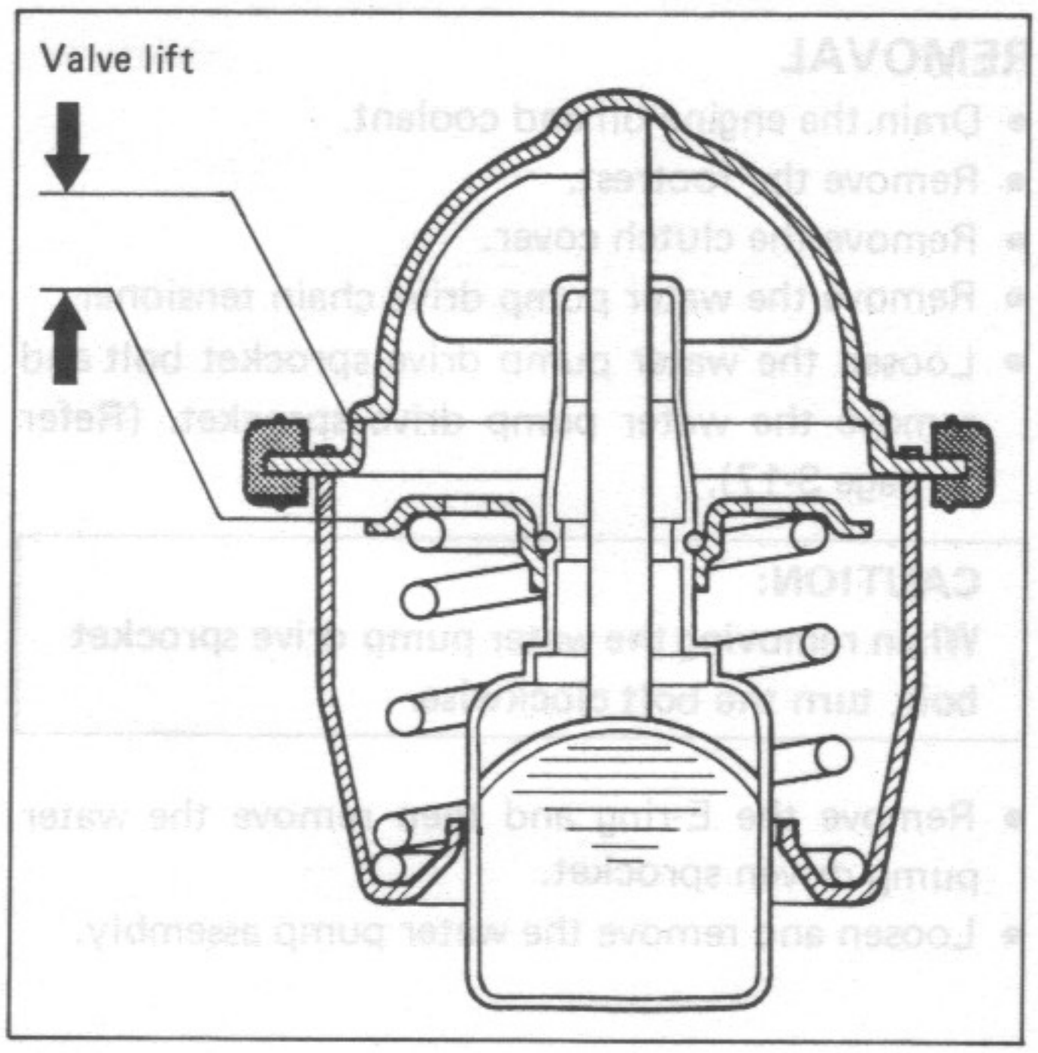
- Just when the water reaches 90°C (194°F), the thermostat valve should have lifted by at least 8.0 mm (0.3 in).

Thermostat valve lift	Over 8.0 mm at 90°C (0.3 in at 194°F)

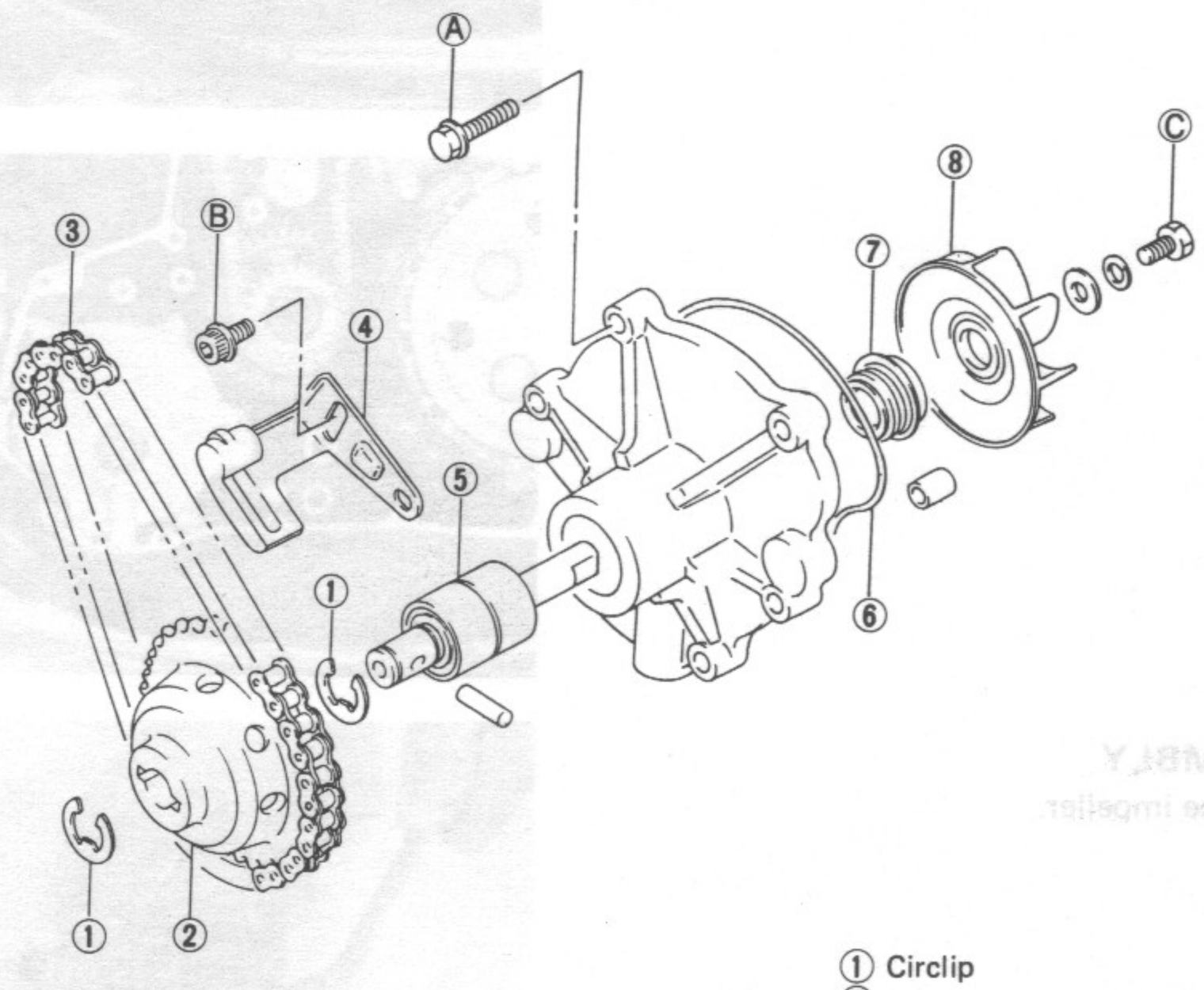
- A thermostat failing to satisfy either of the two requirements (start-to-open temperature and valve lift) must be replaced.

  Tighten the thermostat cover bolts to the specification.

Tightening torque	10 – 15 N·m (1.0 – 1.5 kg-m) (7.0 – 11.0 lb-ft)



WATER PUMP



Tightening torque

Item	N·m	kg-m	lb-ft
Ⓐ	7 – 11	0.7 – 1.1	5.0 – 8.0
Ⓑ	12 – 17	1.2 – 1.7	8.5 – 12.5
Ⓒ	7 – 9	0.7 – 0.9	5.0 – 6.5

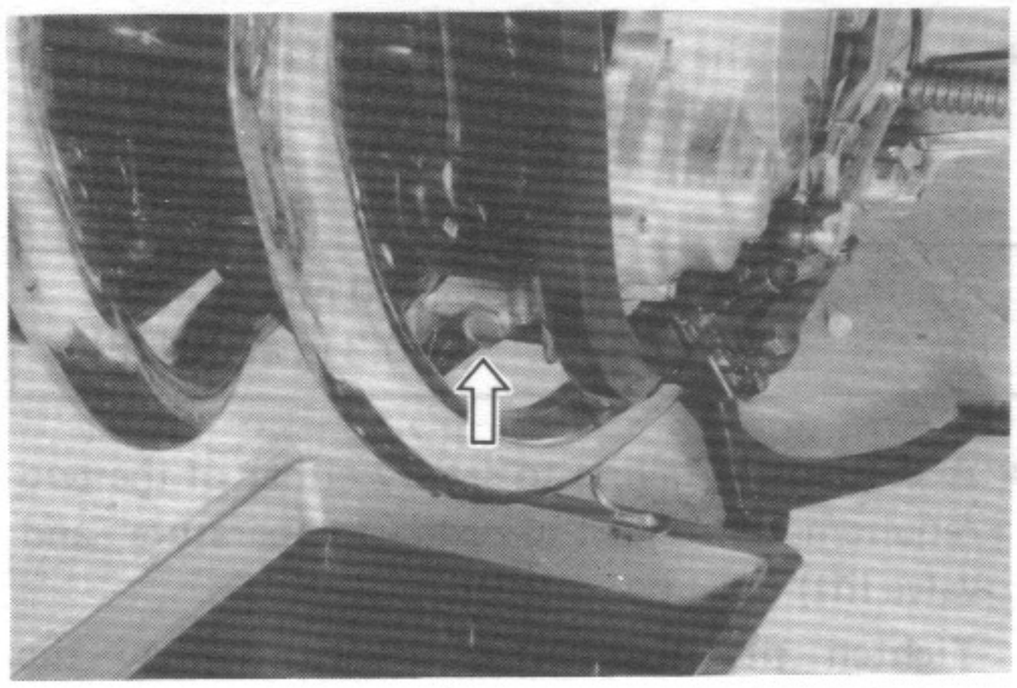
① Circlip
② Water pump driven sprocket
③ Chain
④ Water pump chain tensioner
⑤ Bearing
⑥ O-ring
⑦ Mechanical seal
⑧ Impeller

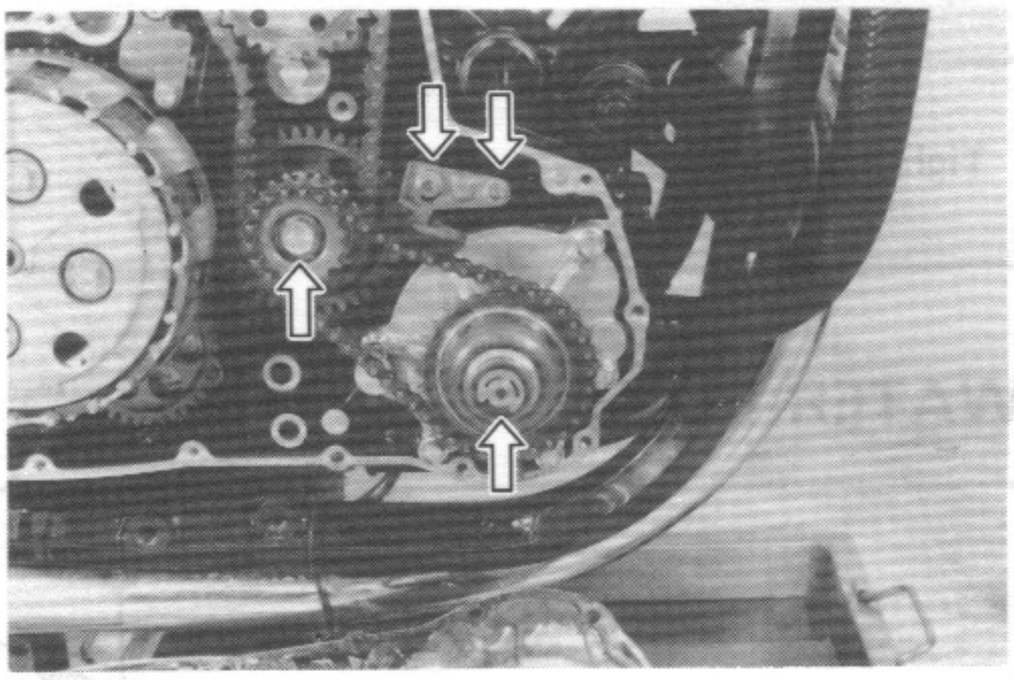
REMOVAL

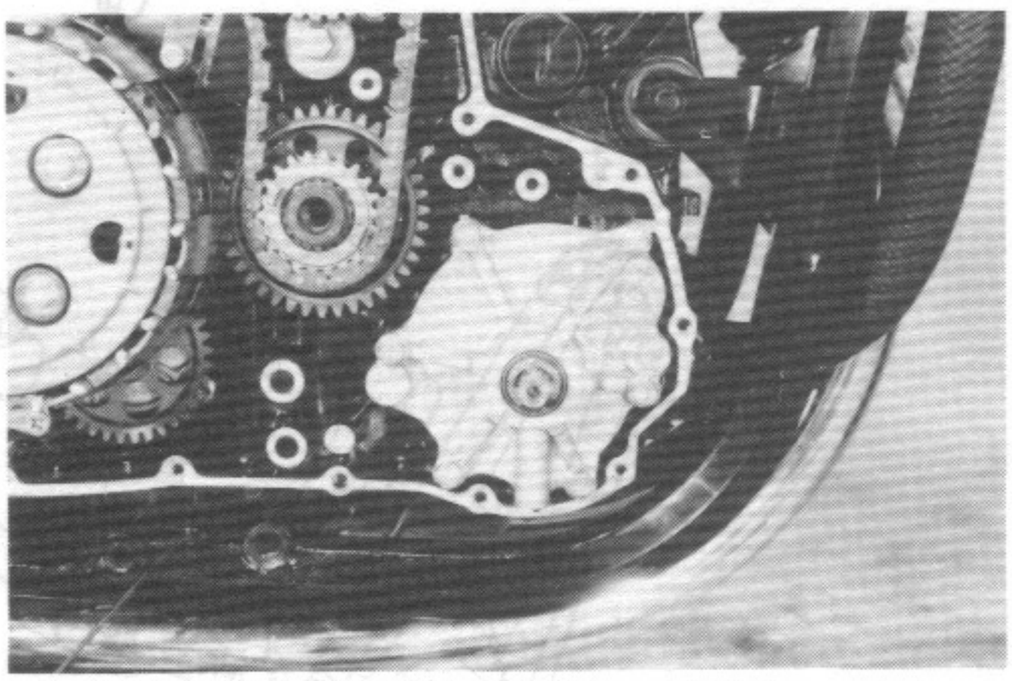
- Drain the engine oil and coolant.
- Remove the footrest.
- Remove the clutch cover.
- Remove the water pump drive chain tensioner.
- Loosen the water pump drive sprocket bolt and remove the water pump drive sprocket. (Refer to page 3-17).

CAUTION:
When removing the water pump drive sprocket bolt, turn the bolt clockwise.

- Remove the E-ring and then remove the water pump driven sprocket.
- Loosen and remove the water pump assembly.

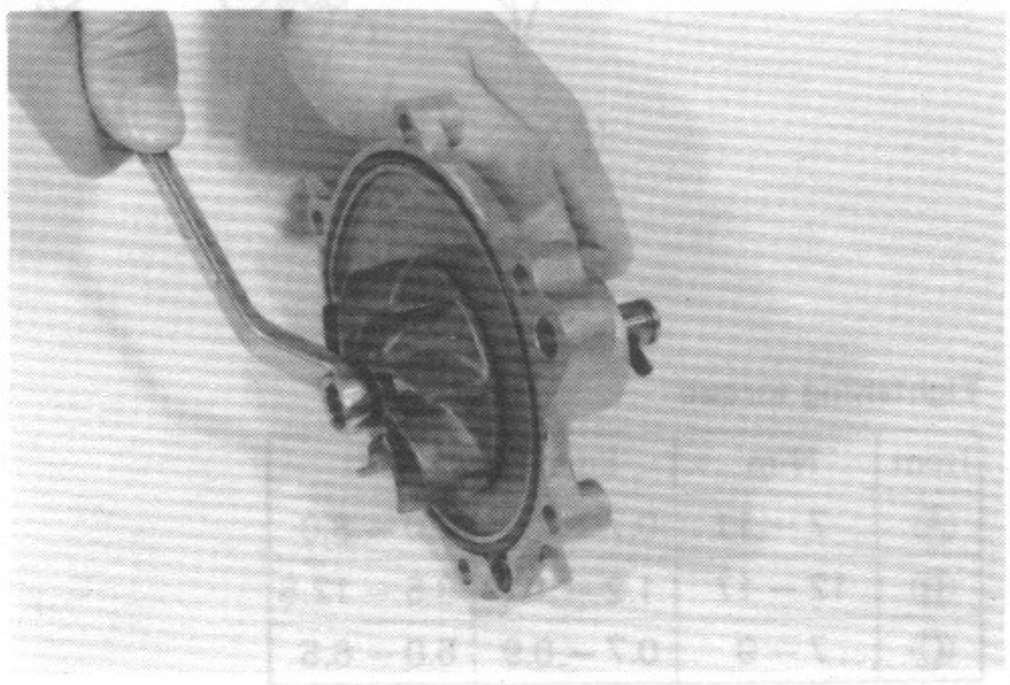




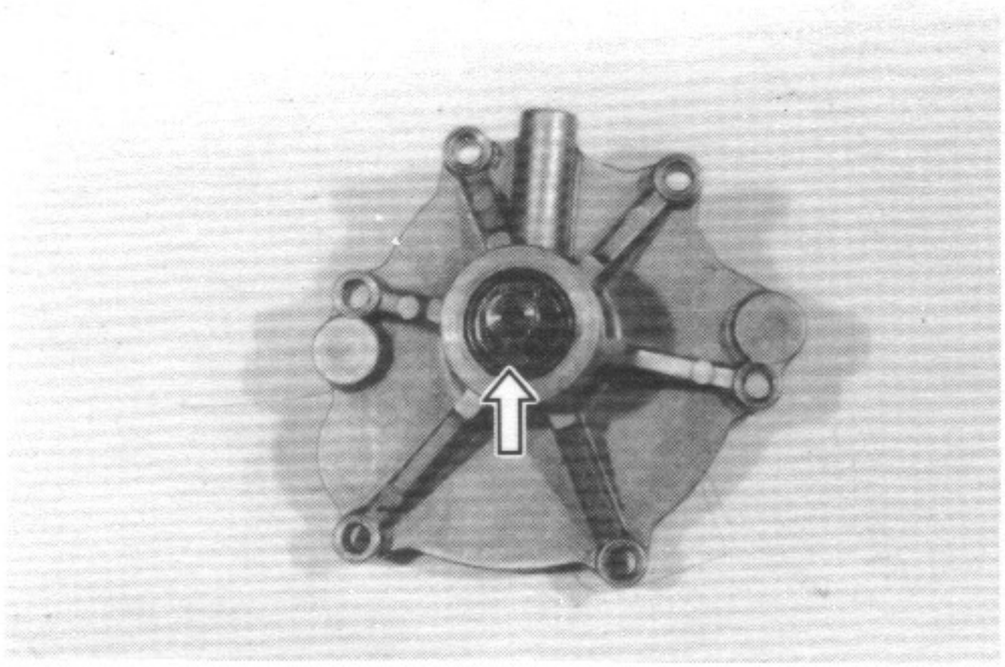


DISASSEMBLY

- Remove the impeller.

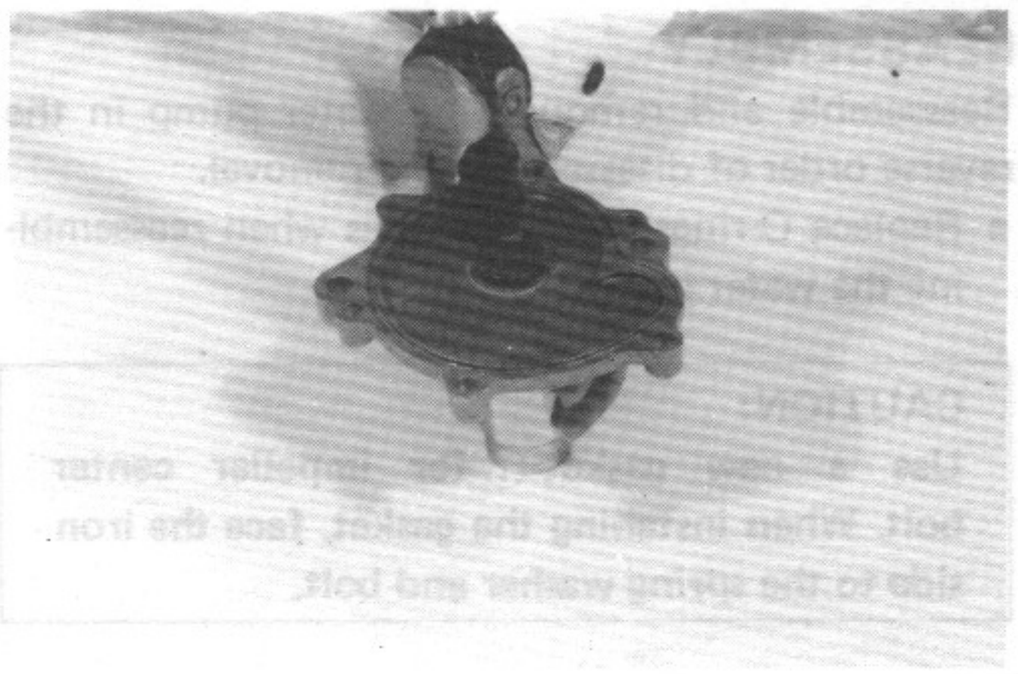


- Remove the E-ring.

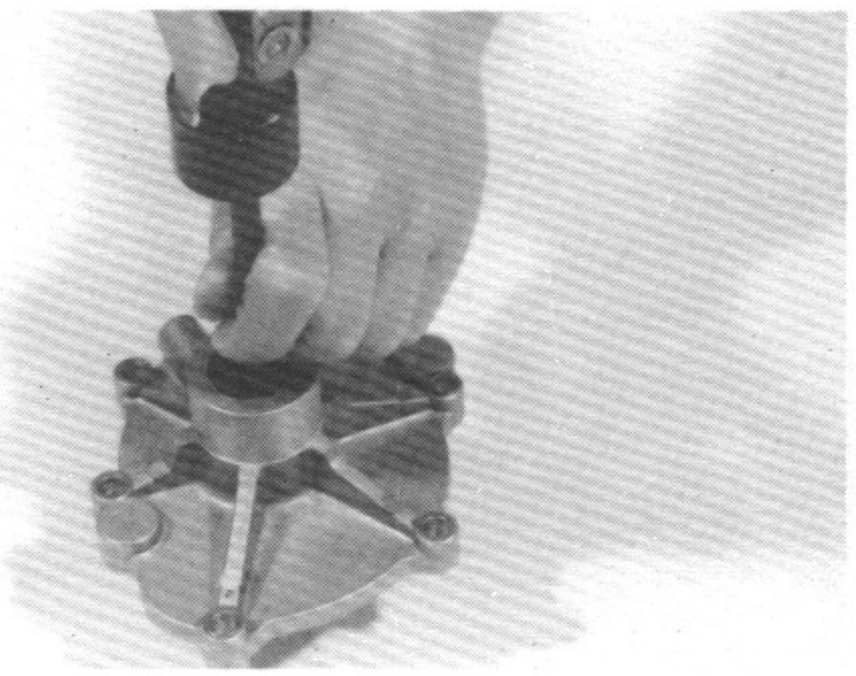


- Drive out the bearing to the water pump driven sprocket side.

NOTE:
The removed bearing and mechanical seal should be replaced with new ones.

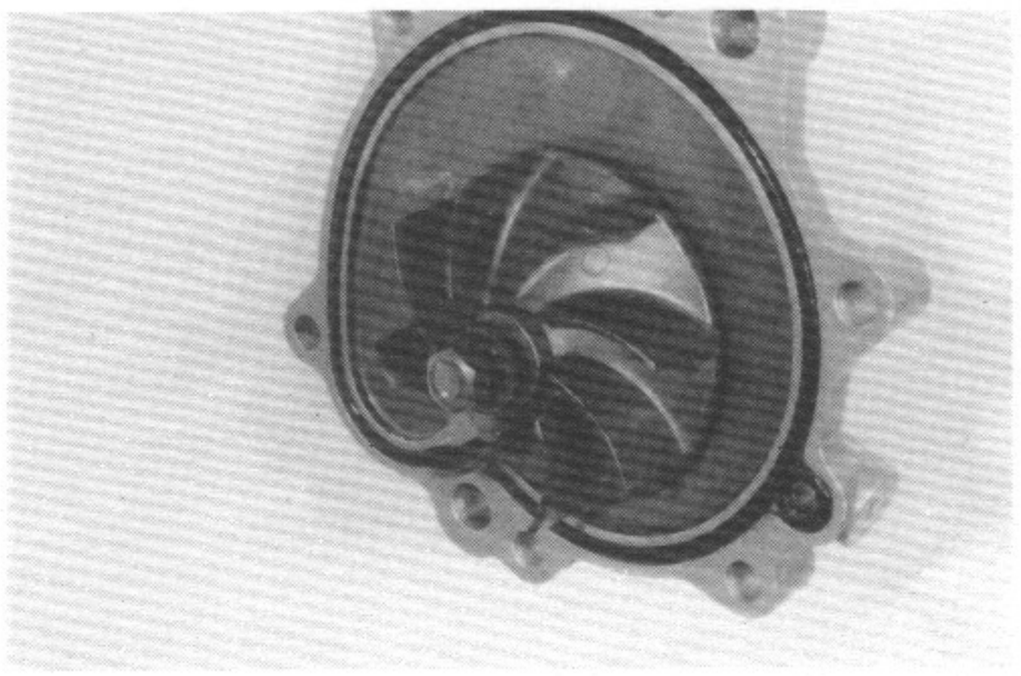


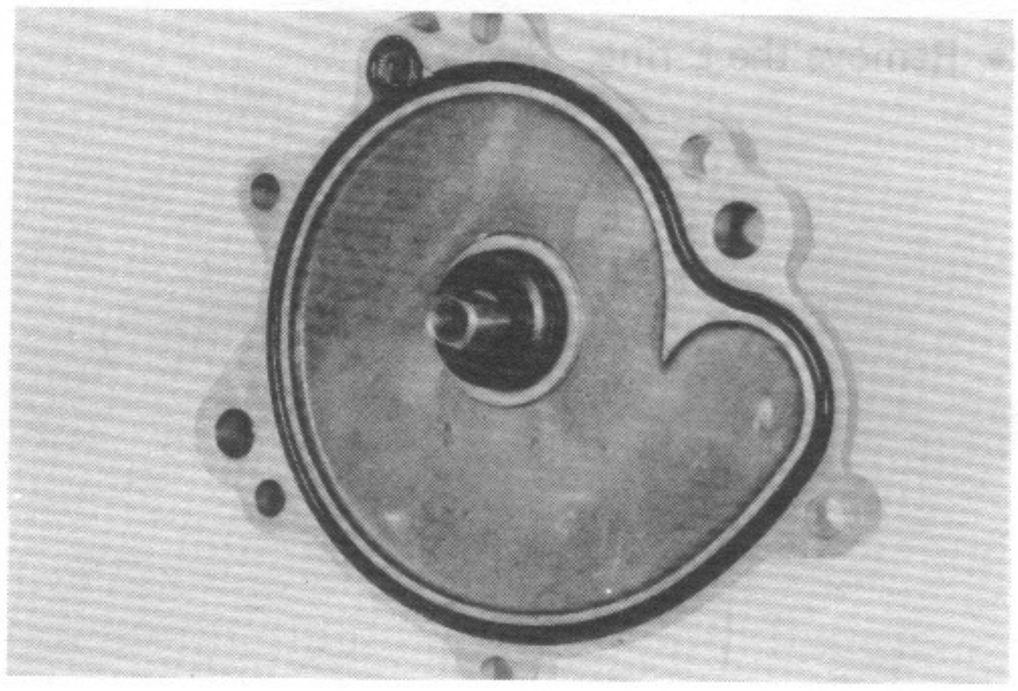
- Remove the mechanical seal by using a suitable drift.



INSPECTION

Visually inspect the mechanical seal, seal washer and oil seal.



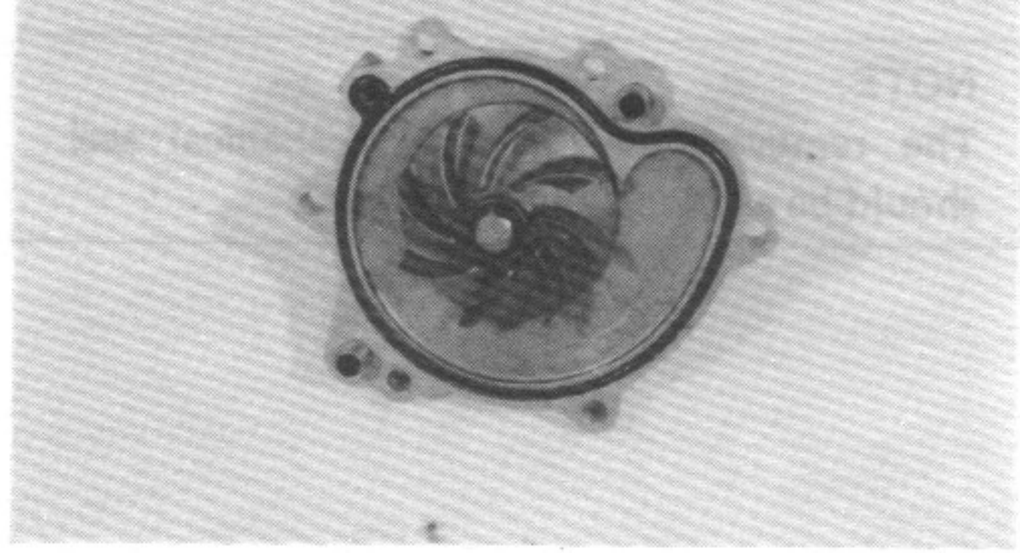


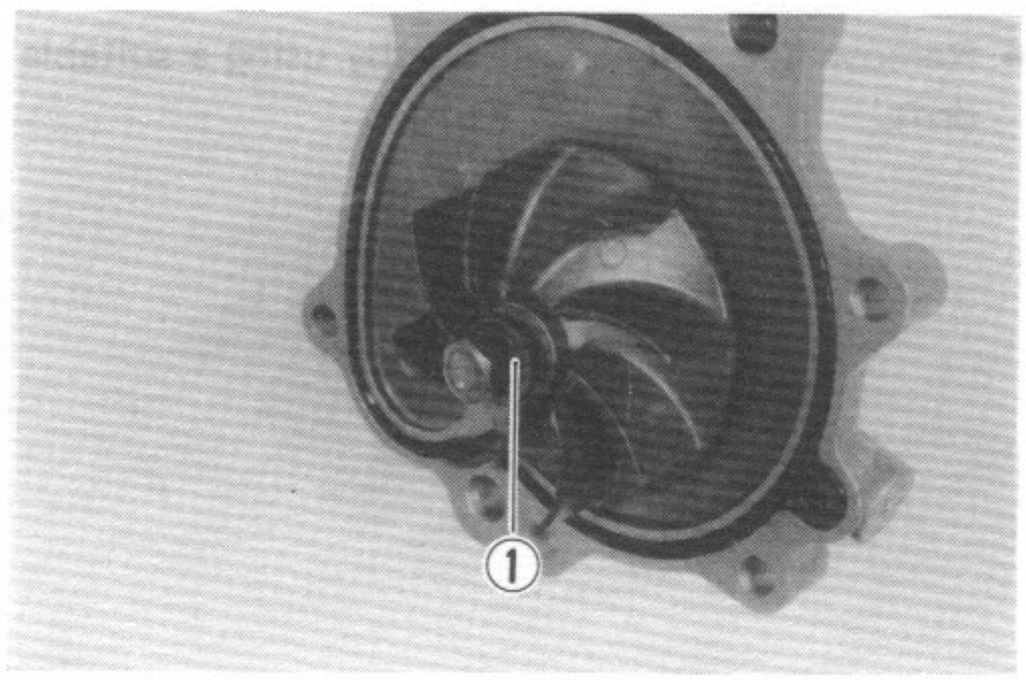
REASSEMBLY

Reassemble and remount the water pump in the reverse order of disassembly and removal.

- Replace O-rings with new ones when reassembling the water pump.

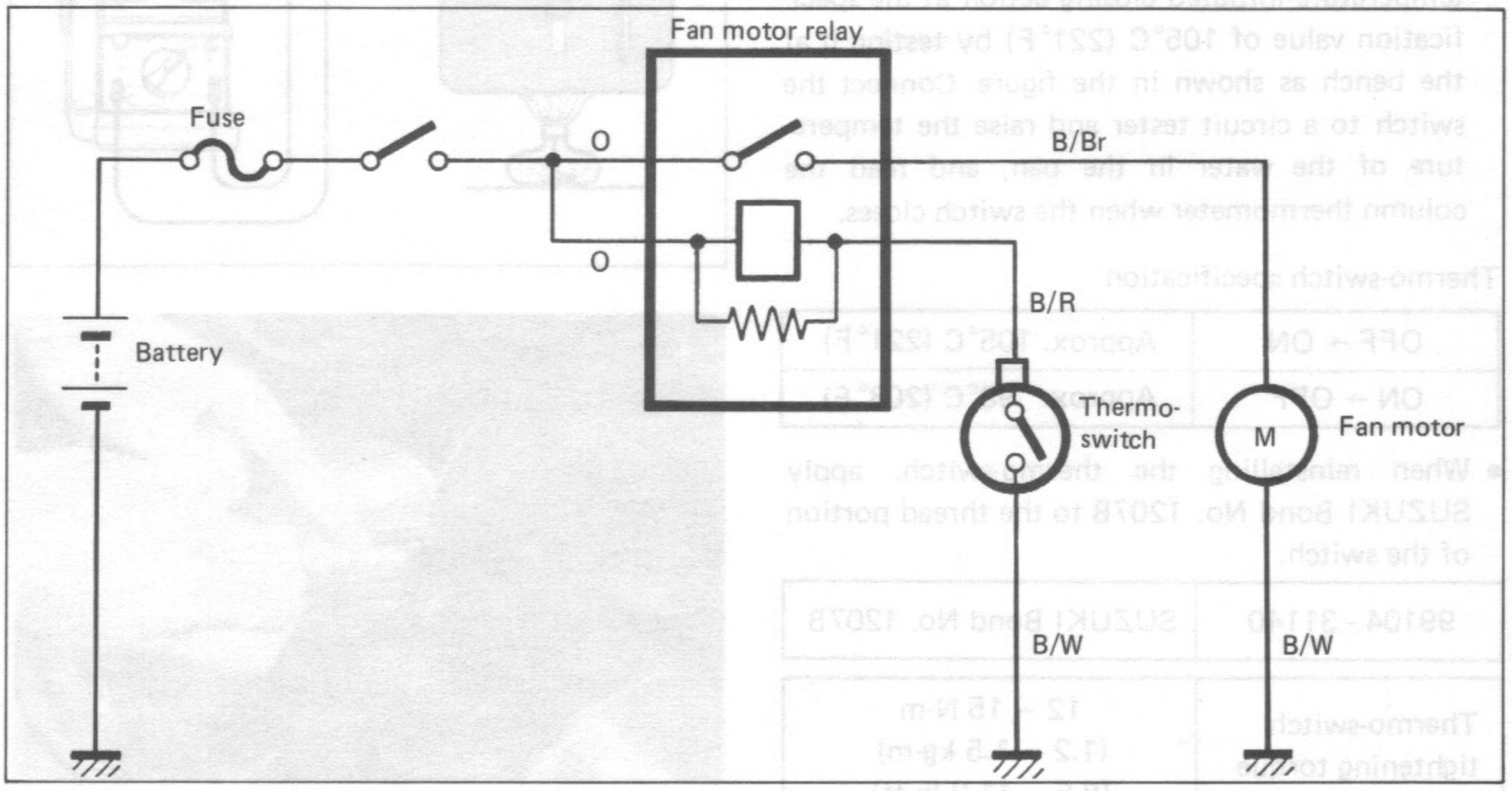
CAUTION:
Use a new gasket ① for impeller center bolt. When installing the gasket, face the iron side to the spring washer and bolt.





THERMO-SWITCH AND FAN MOTOR RELAY

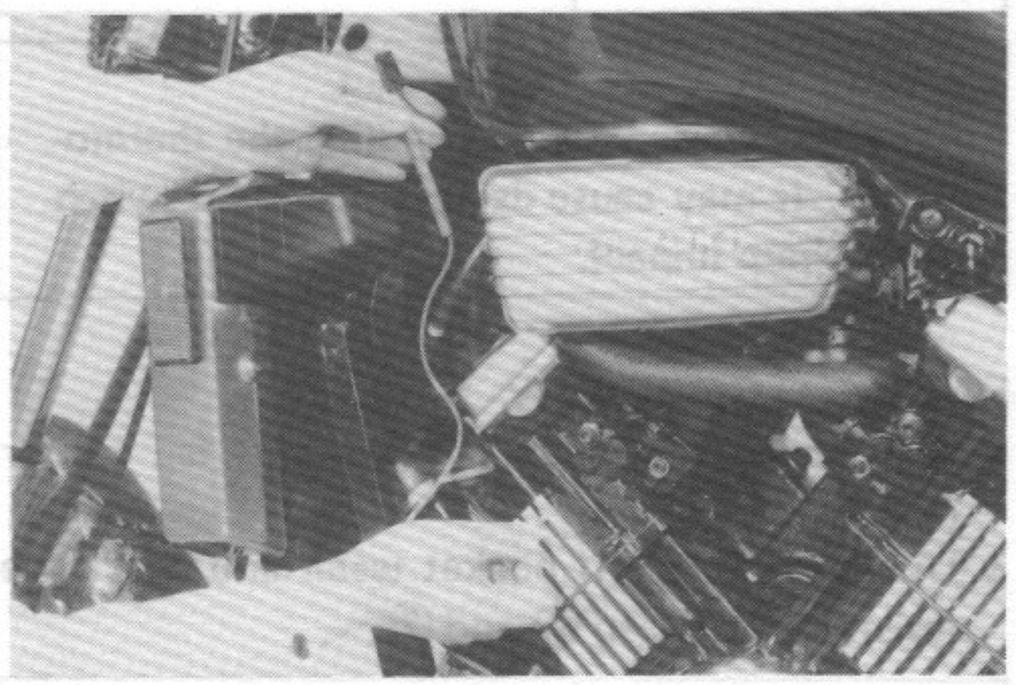
The cooling fan, being located behind the radiator, is secured to the radiator by four bolts. The fan drive motor is automatically controlled by the thermo-switch. This switch remains open when the temperature of coolant is low, but it closes at about 105°C of rising water temperature to set the fan in motion.



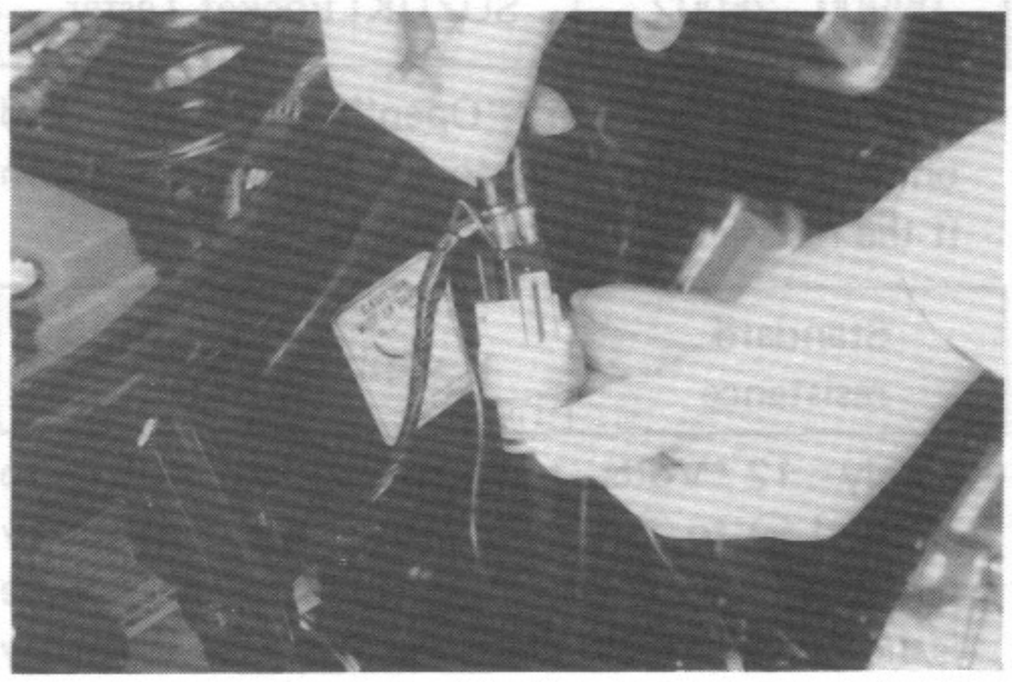
INSPECTION

Before inspecting the individual parts, check the following items.

- Disconnect the thermo-switch lead wire and connect the jumper lead between lead wire from the main wiring harness and the engine ground.
- When turning the ignition switch ON, the electric fan should be in motion. If the electric fan is not turning, proceed the following step.

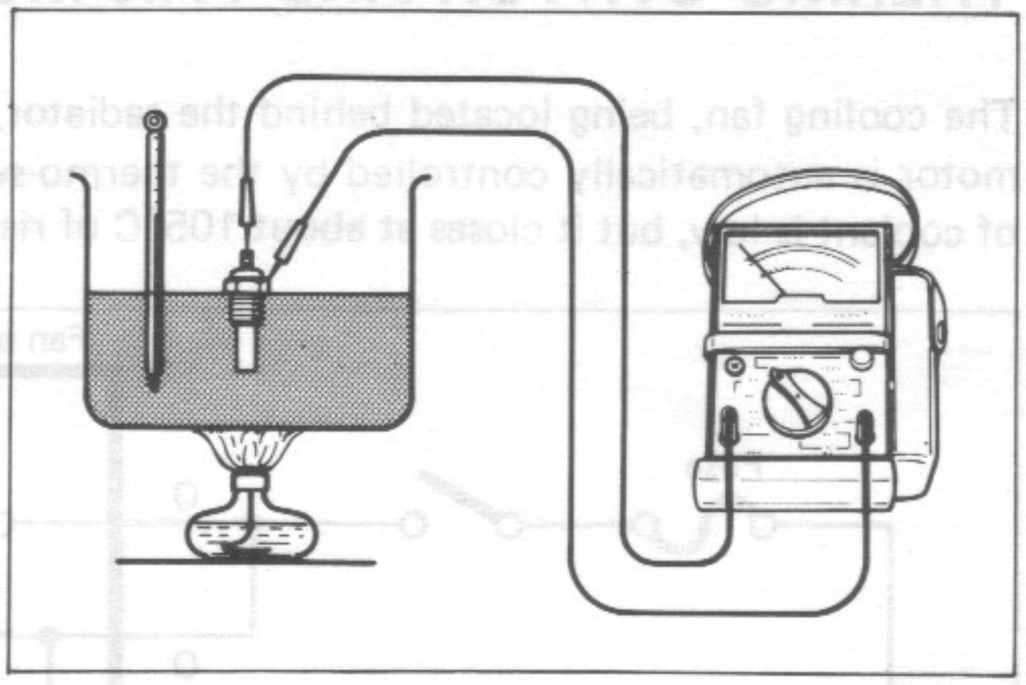


- Using jumper wire, connect the two terminals of the fan motor relay Orange lead wire and B/Br lead wire.
- If the electric fan is not turning, inspect the individual parts.



ENGINE THERMO-SWITCH

- Remove the engine thermo-switch from the thermostat cover.
- The thermo-switch must be checked for its temperature-initiated closing action at the specification value of 105°C (221°F) by testing it at the bench as shown in the figure. Connect the switch to a circuit tester and raise the temperature of the water in the pan, and read the column thermometer when the switch closes.



Thermo-switch specification

OFF → ON	Approx. 105°C (221°F)
ON → OFF	Approx. 98°C (208°F)

- When reinstalling the thermo-switch, apply SUZUKI Bond No. 1207B to the thread portion of the switch.

99104 - 31140	SUZUKI Bond No. 1207B

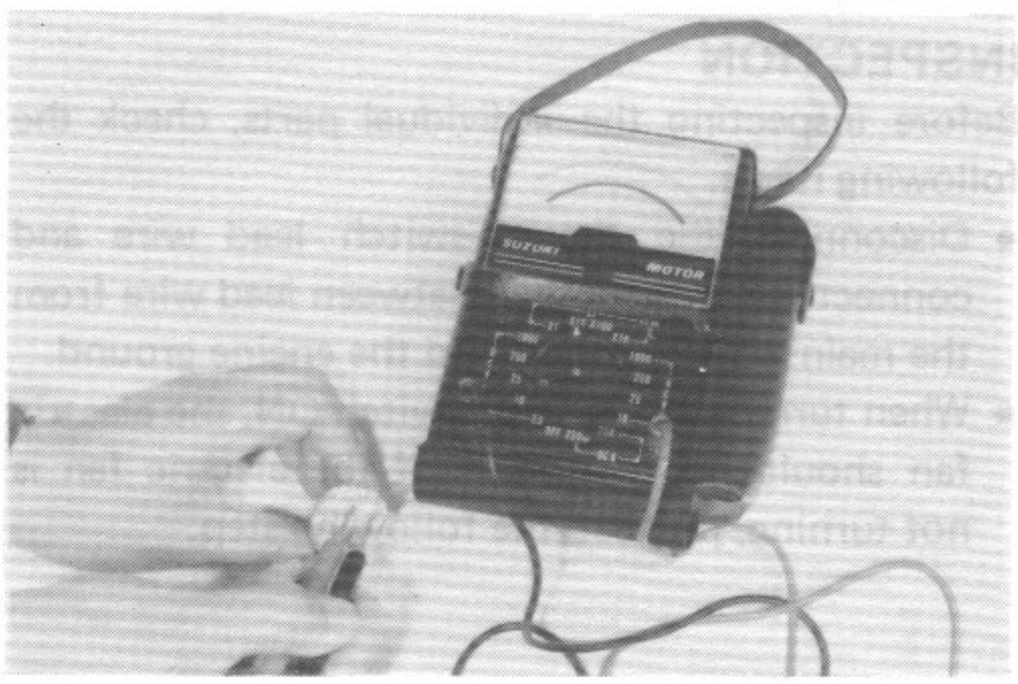
Thermo-switch tightening torque	12 – 15 N·m (1.2 – 1.5 kg-m) (8.5 – 11.0 lb-ft)

CAUTION:
Take special care when handling the thermo-switch. It may cause damage if thermo-switch gets a sharp impact.

FAN MOTOR RELAY

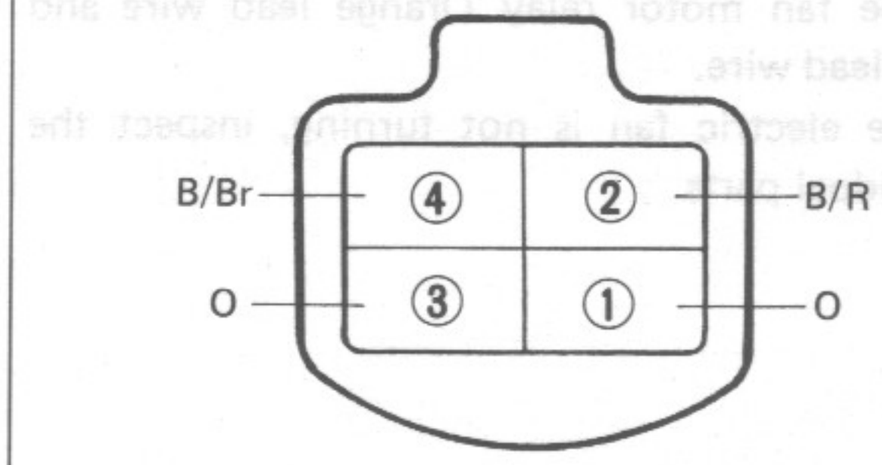
- Disconnect the coupler from the fan motor relay.
- Using the SUZUKI pocket tester and check the resistance between ① and ②.

09900 - 25002	SUZUKI Pocket Tester



- Check the coil for "Open", "Ground" and ohmic resistance. The coil is in good condition if the resistance is as follows.

Standard resistance	Approx. 70 Ω

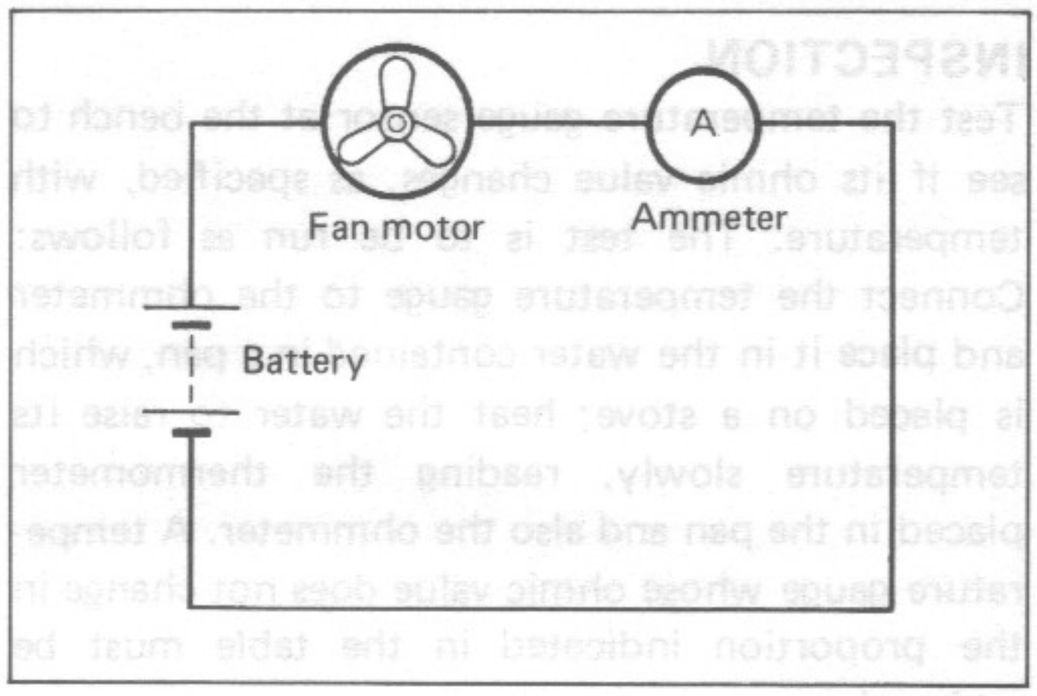


- Apply 12 Volts to ① and ② terminals, ⊕ to ① and ⊖ to ②, and check the continuity between ③ and ④ with pocket tester. If there is no continuity, replace the fan relay assembly with a new one.

FAN MOTOR

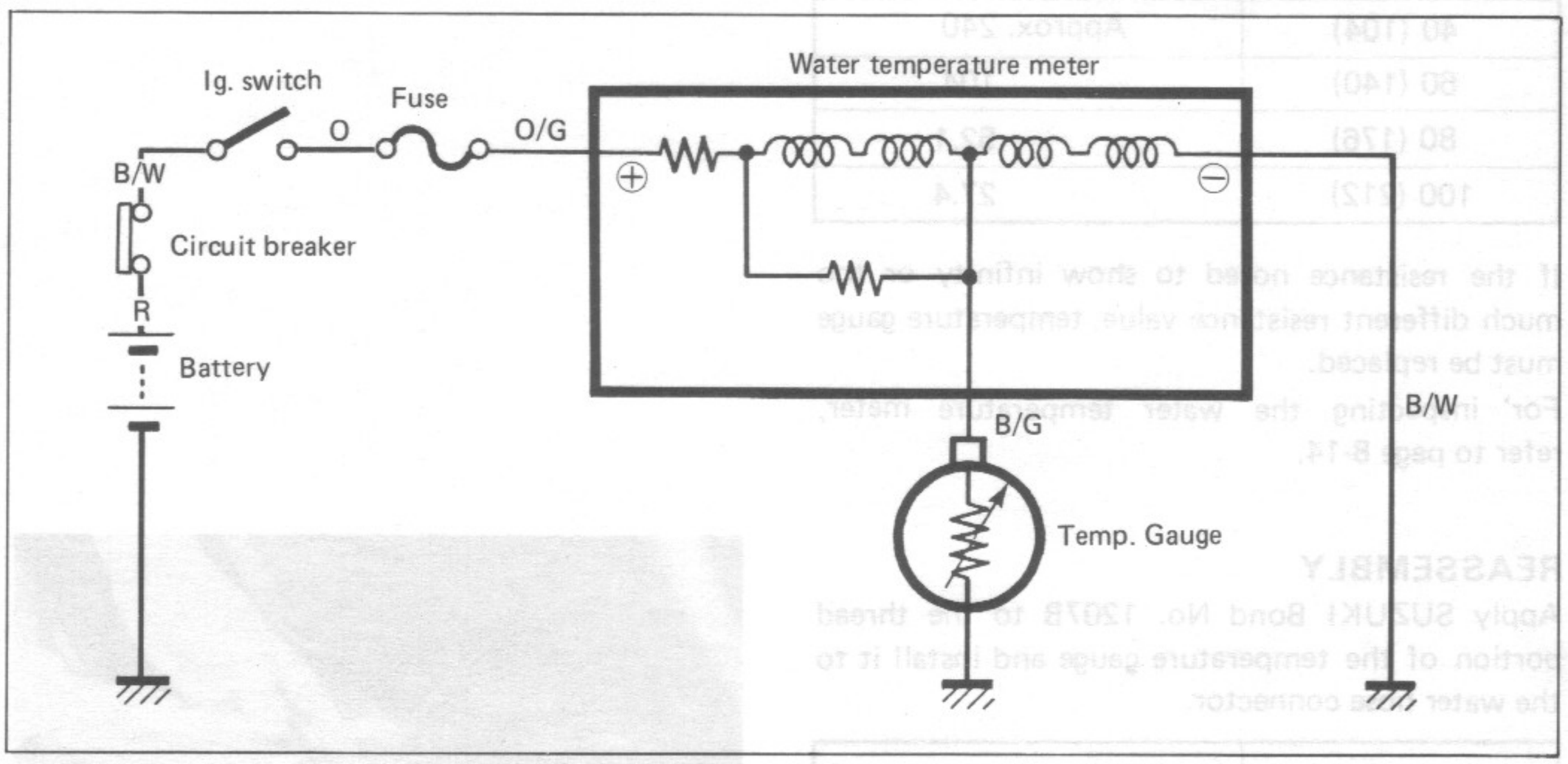
Test the cooling fan drive motor for load current with a voltmeter and an ammeter connected as shown in the illustration. The voltmeter is for making sure that the battery applies 12 volts to the motor. With the motor with electric motor fan running at full speed, the ammeter should be indicating not more than 5 amperes.

If the fan motor does not turn, replace the motor assembly with a new one.



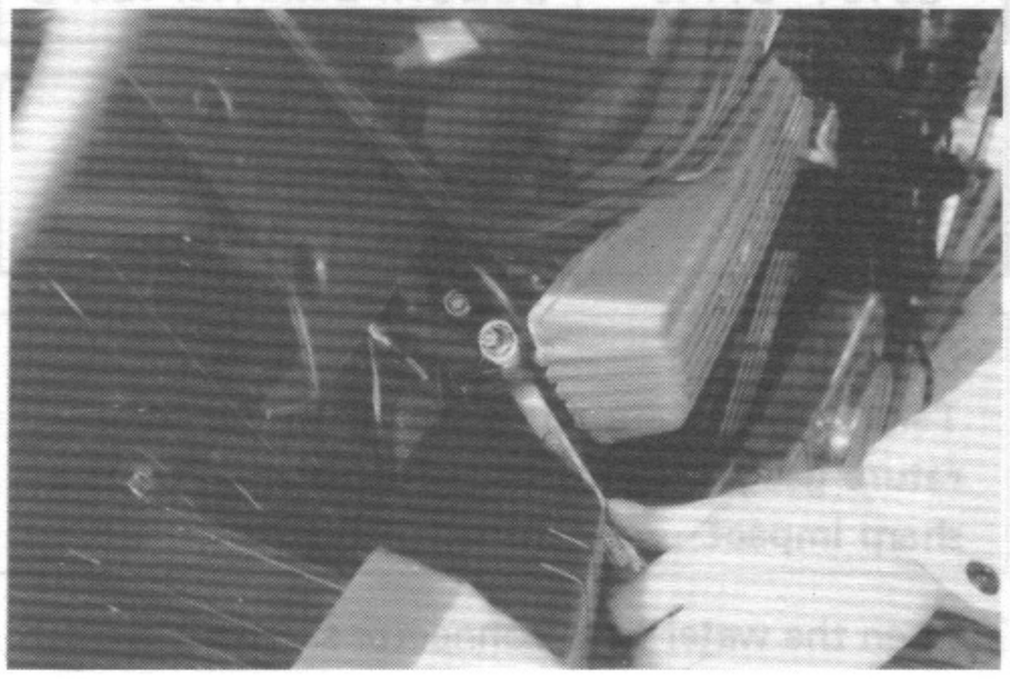
WATER TEMPERATURE METER AND TEMPERATURE GAUGE

The following circuit diagram shows the electrical wiring for the thermometer. The major components are temperature gauge in contact with coolant; and temperature indicator (water temperature meter).



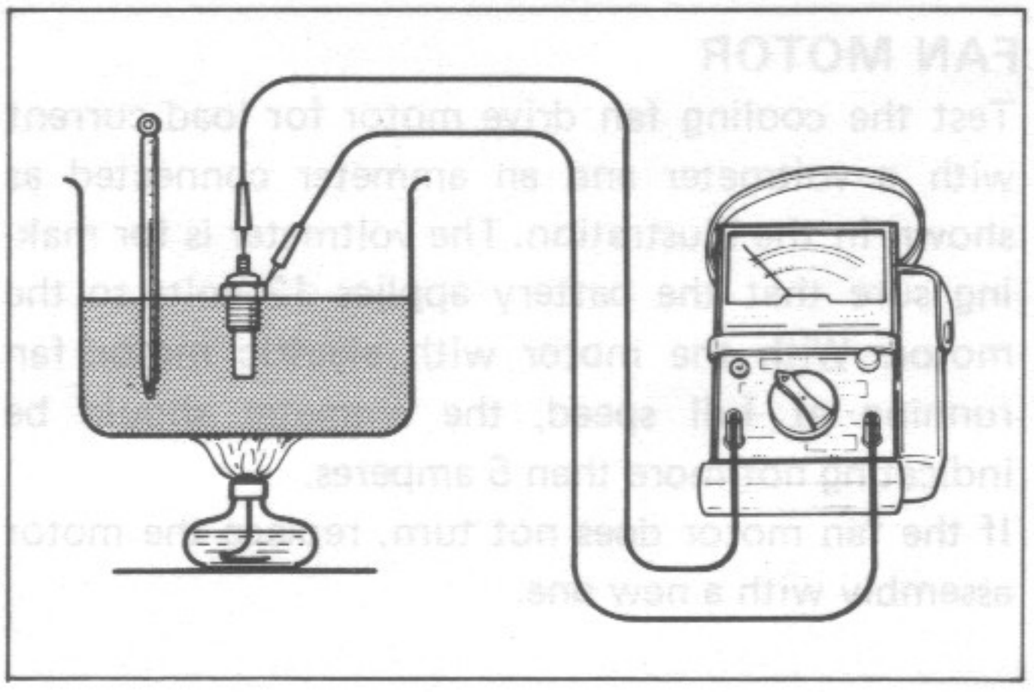
REMOVAL

Remove the temperature gauge after loosening the lock nut and disconnect the read wire.



INSPECTION

Test the temperature gauge sensor at the bench to see if its ohmic value changes, as specified, with temperature. The test is to be run as follows: Connect the temperature gauge to the ohmmeter and place it in the water contained in a pan, which is placed on a stove; heat the water to raise its temperature slowly, reading the thermometer placed in the pan and also the ohmmeter. A temperature gauge whose ohmic value does not change in the proportion indicated in the table must be replaced.



Temperature gauge specification

Water temp. °C (°F)	Standard resistance (Ω)
40 (104)	Approx. 240
60 (140)	104
80 (176)	52.1
100 (212)	27.4

If the resistance noted to show infinity or too much different resistance value, temperature gauge must be replaced.

For inspecting the water temperature meter, refer to page 8-14.

REASSEMBLY

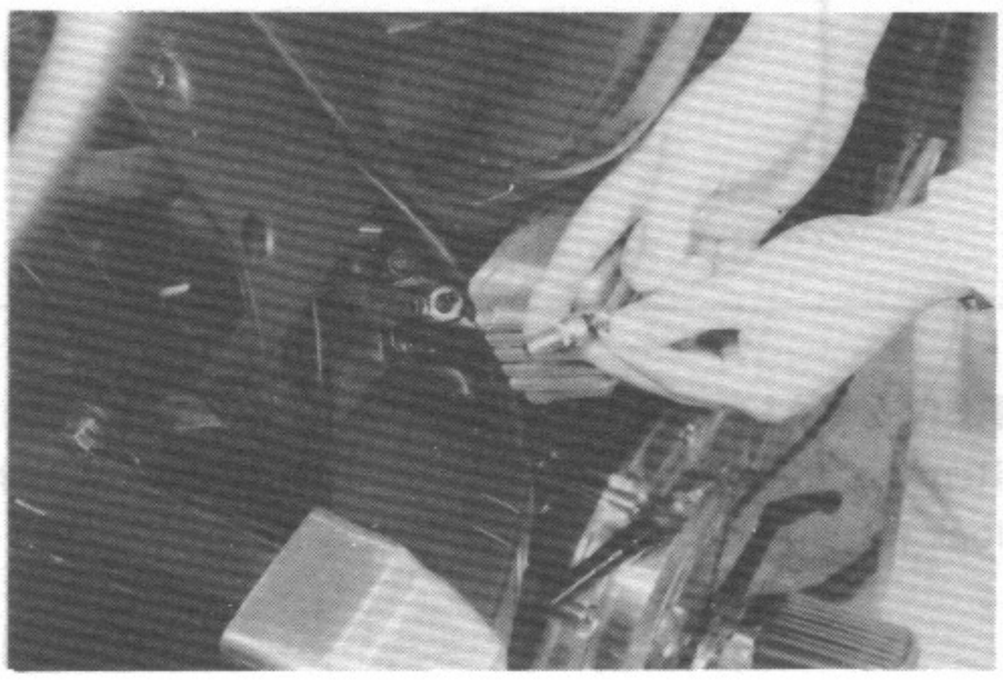
Apply SUZUKI Bond No. 1207B to the thread portion of the temperature gauge and install it to the water hose connector.

99104 - 31140	SUZUKI Bond No. 1207B

Tightening torque	12 – 18 N·m (1.2 – 1.8 kg-m) (8.5 – 13.0 lb-ft)

CAUTION:
Take special care when handling the temperature gauge. It may cause damage if it gets a sharp impact.

Tighten the water hose connector screws.



FUEL AND LUBRICATION SYSTEM

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FUEL PUMP 6- 3
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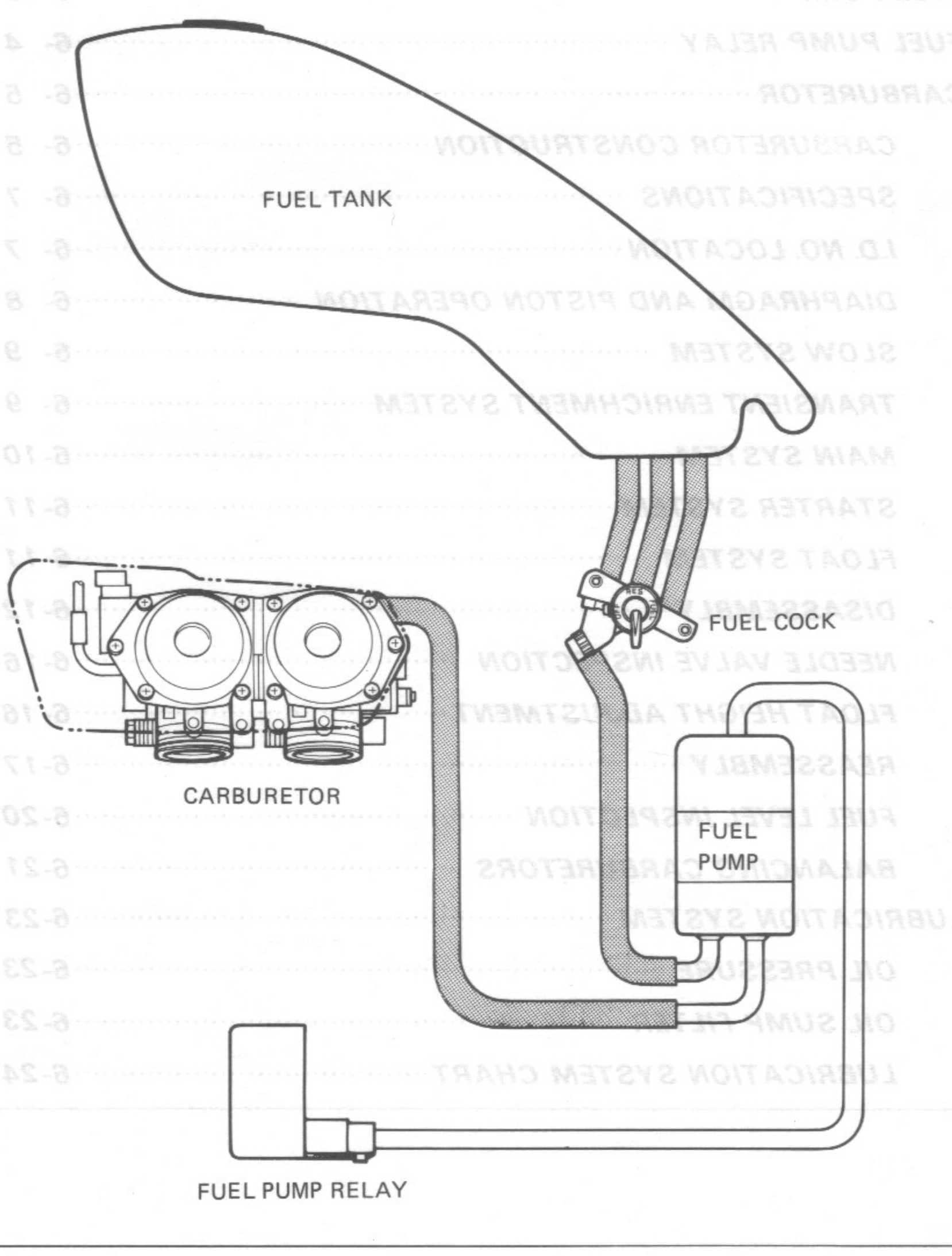
FUEL SYSTEM

As shown in the following figure, the fuel system is composed of the fuel tank, the fuel cock, the fuel pump, the fuel pump relay and the carburetor. The fuel pump relay operates according to ON-OFF of the primary current flowing to the ignition coils on the No. 1 and No. 3 side. The fuel pump is controlled by the fuel pump relay, and the electromagnetic force is used to deliver fuel to the carburetor.
The fuel sent under pressure by the fuel pump flows into the float chamber when the float of the carburetor has dropped and the needle valve is open. When the needle valve closes, the pressure of the fuel in the hose connecting the carburetor and the fuel pump increases, and when the set pressure is reached, the operation of the fuel pump is stopped by the fuel pressure to prevent excessive supply.



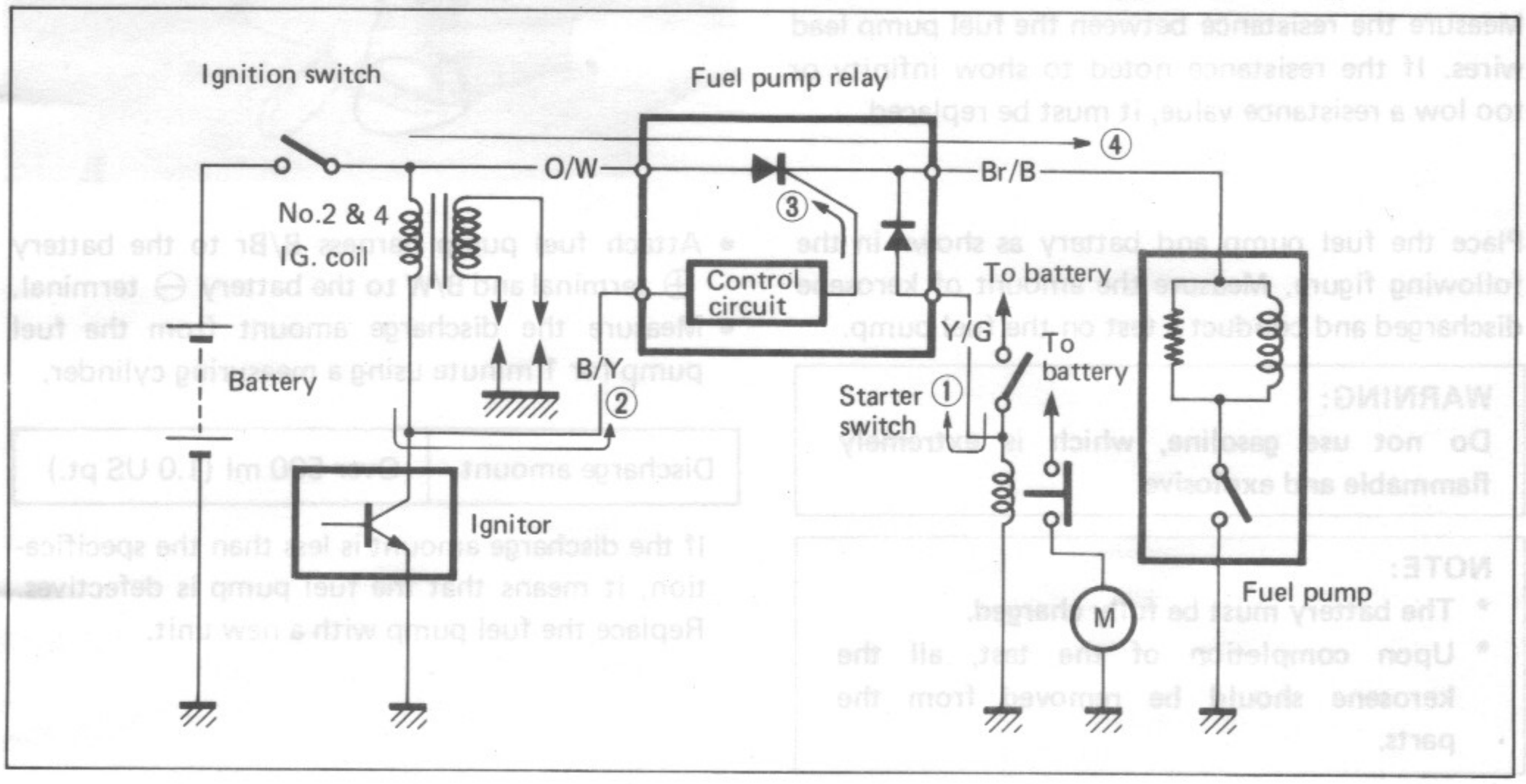
DESCRIPTION

Starting Engine:

In order to supplement fuel supply when starting the engine, by turning the starter switch ON, current ① is sent directly from the battery and passes through the fuel pump relay, thus operating the fuel pump.

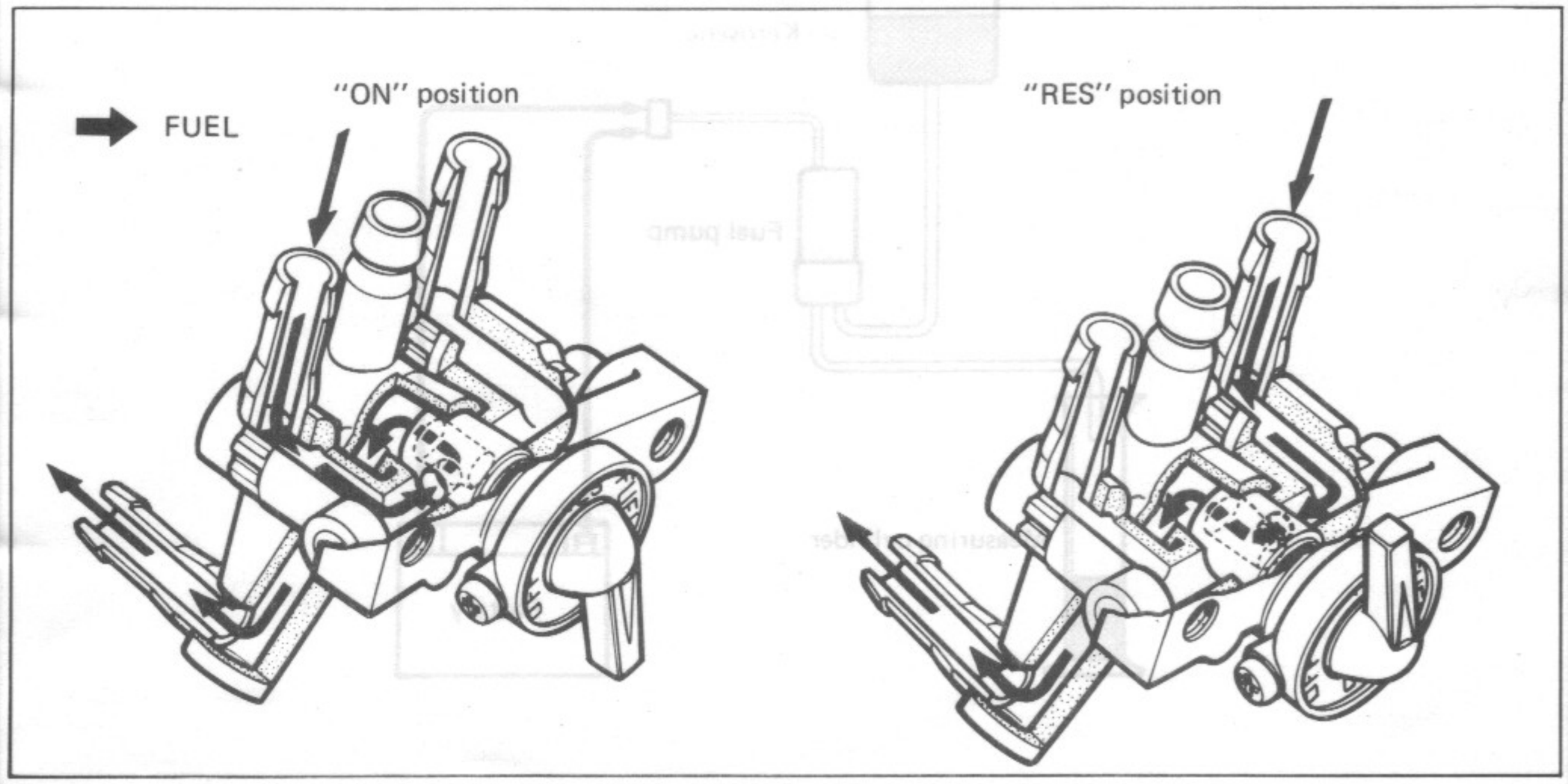
After start:

The current ② generated at coils 2 and 4 flows to the fuel pump relay's control circuit. The control circuit receives this current ② and sends signal ③ to the SCR, turning it ON. When the SCR turns ON, current ④ is sent from the battery through the fuel pump relay, thus operating the fuel pump.



FUEL COCK

A valve is provided at the top of the fuel cock lever and can switch over to "OFF", "ON" and "RES". With the valve "ON" (normal), the main passage opens. With the valve "OFF", both holes close.

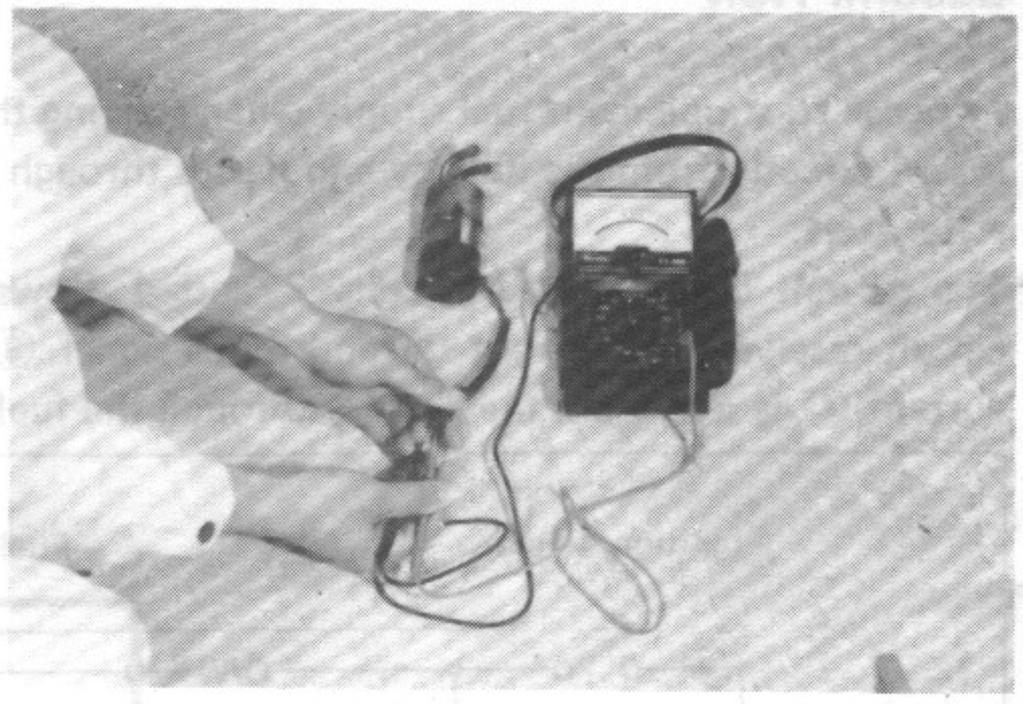


FUEL PUMP

09900 - 25002	Pocket tester

S.T.D. resistance	1 – 2 Ω

Measure the resistance between the fuel pump lead wires. If the resistance noted to show infinity or too low a resistance value, it must be replaced.



Place the fuel pump and battery as shown in the following figure. Measure the amount of kerosene discharged and conduct a test on the fuel pump.

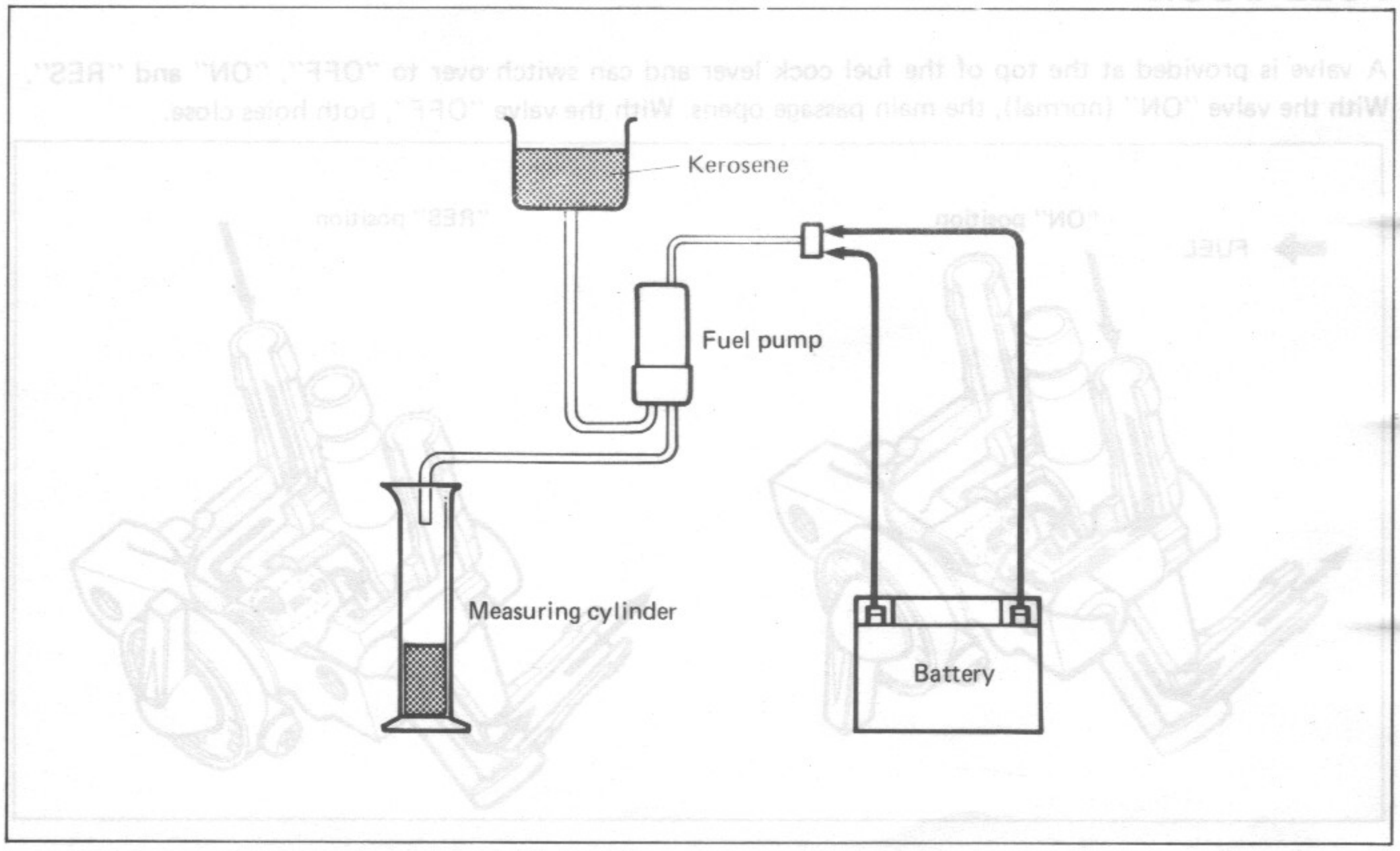
WARNING:
Do not use gasoline, which is extremely flammable and explosive.

NOTE:
* **The battery must be fully charged.**
* **Upon completion of the test, all the kerosene should be removed from the parts.**

- Attach fuel pump harness B/Br to the battery ⊕ terminal and B/W to the battery ⊖ terminal.
- Measure the discharge amount from the fuel pump for 1 minute using a measuring cylinder.

Discharge amount	Over 500 ml (1.0 US pt.)

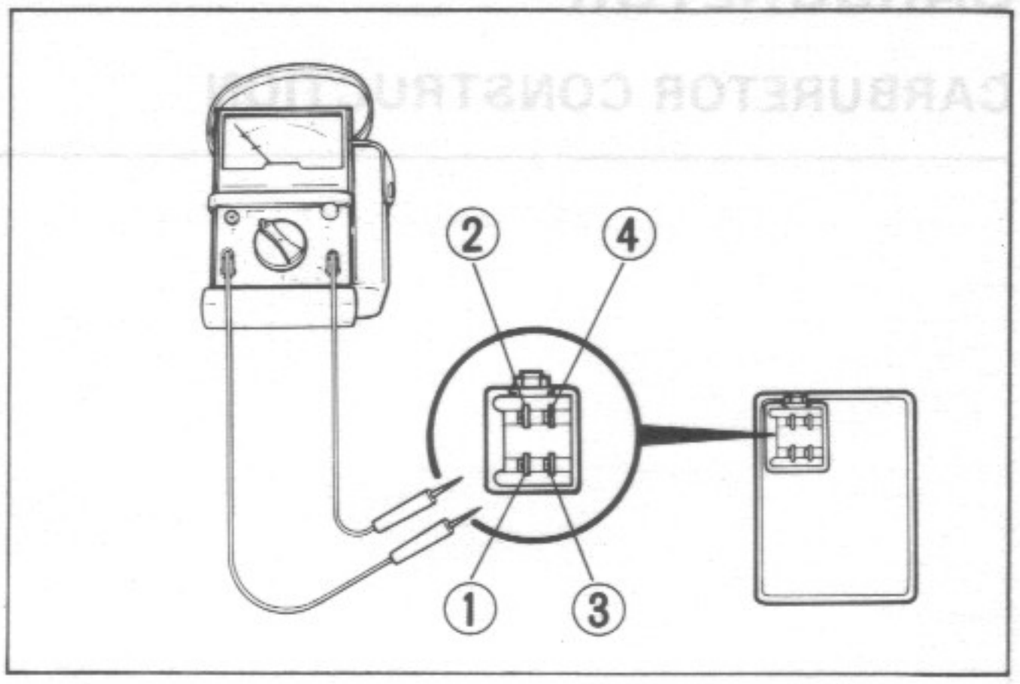
If the discharge amount is less than the specification, it means that the fuel pump is defectives. Replace the fuel pump with a new unit.



FUEL PUMP RELAY

- Using the SUZUKI pocket tester (x kΩ range), measure the resistance between the lead wires in the following table.
- If the resistance checked is incorrect, replace the fuel pump relay.

09900 - 25002	Pocket tester

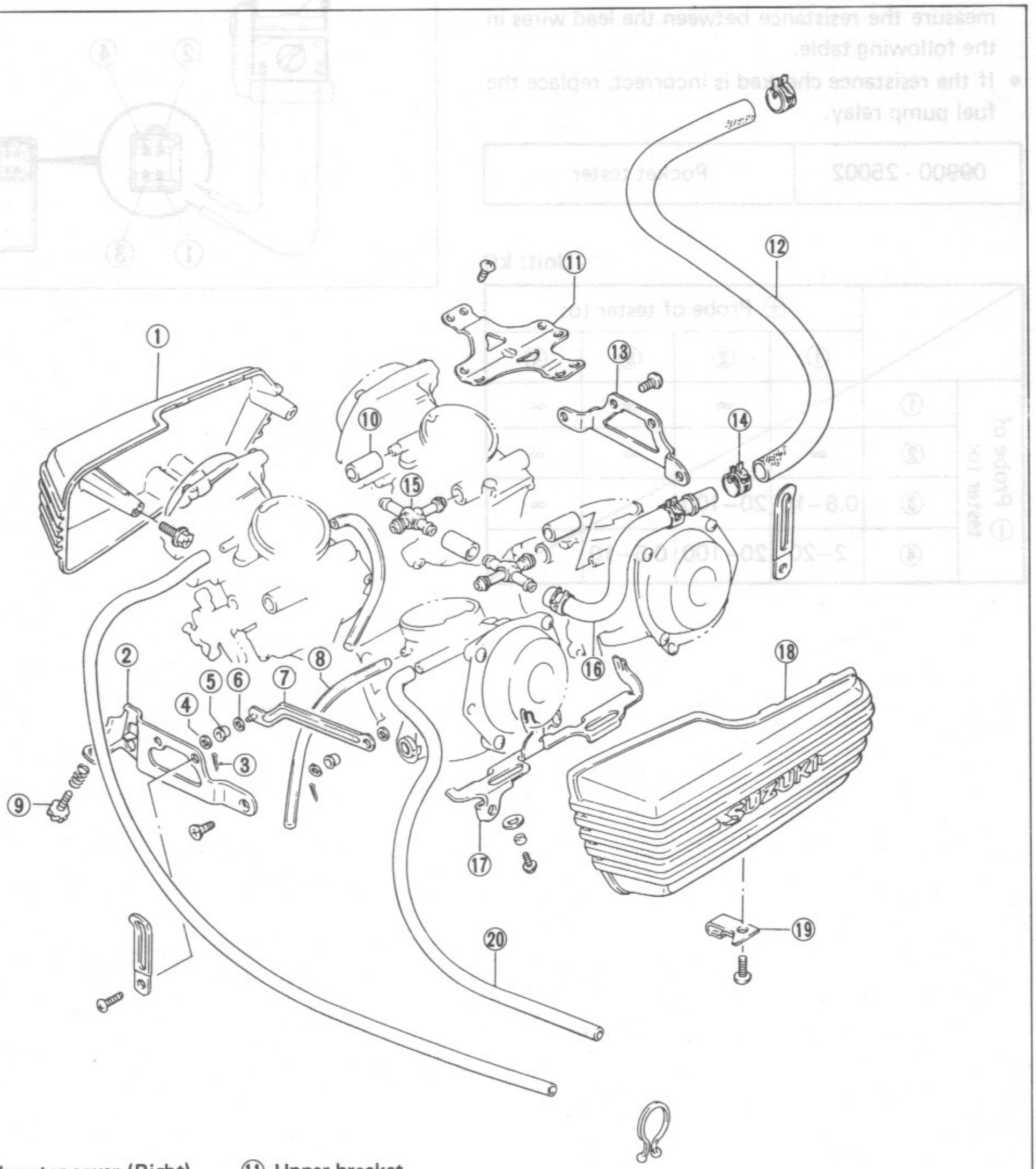


Unit: kΩ

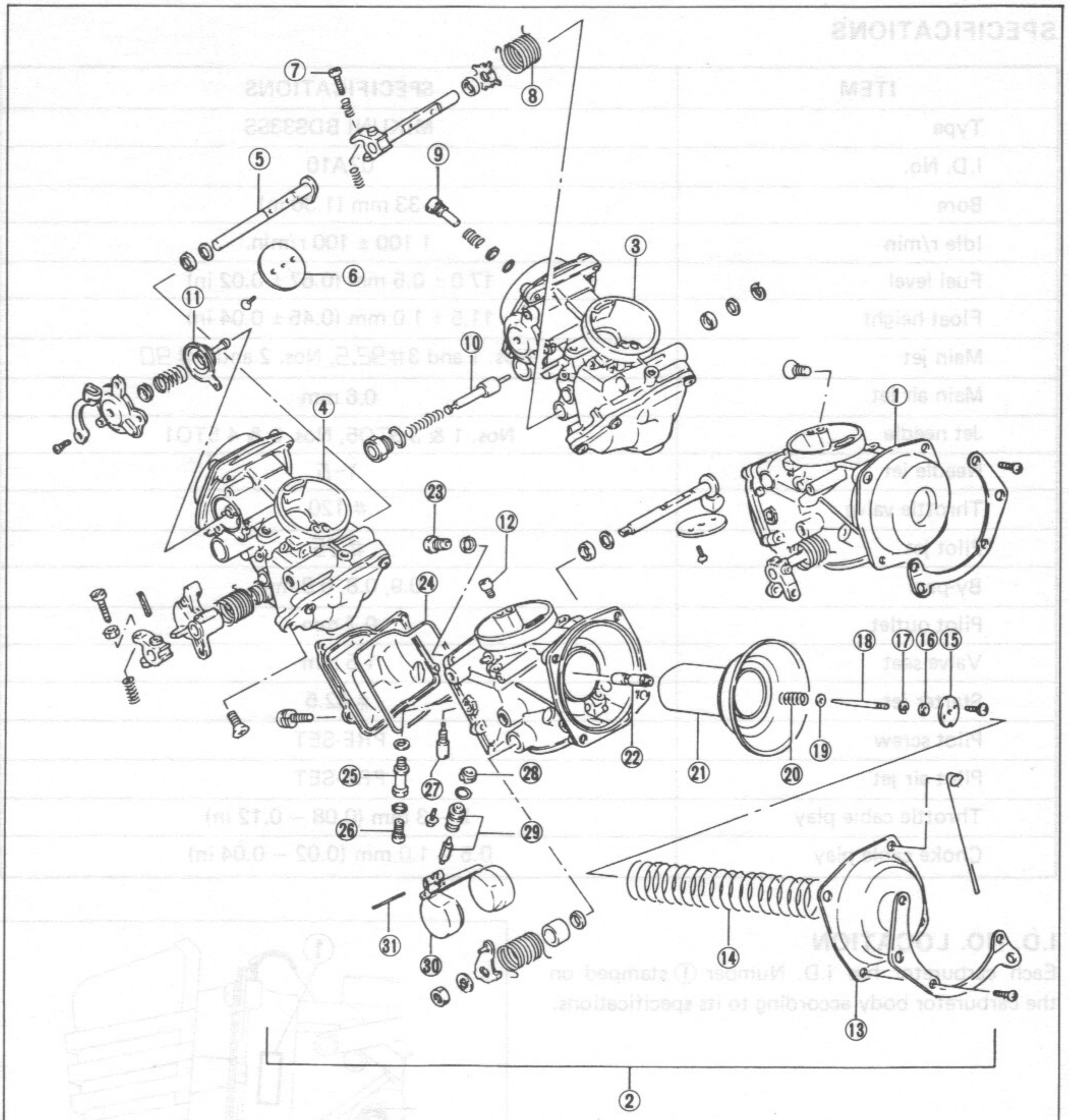
		⊕ Probe of tester to:			
		①	②	③	④
⊖ Probe of tester to:	①		∞	∞	∞
	②	∞		∞	∞
	③	0.5–10	20–100		∞
	④	2–20	20–100	0.5–10	

CARBURETOR

CARBURETOR CONSTRUCTION



① Carburetor cover (Right)
② Carburetor bracket (Front)
③ Cotter pin
④ Washer
⑤ Spacer
⑥ Washer
⑦ Throttle valve shaft link
⑧ Overflow pipe
⑨ Throttle stop screw
⑩ Breather connector hose
⑪ Upper bracket
⑫ Fuel hose (from fuel pump)
⑬ Carburetor bracket (Rear)
⑭ Fuel hose clamp
⑮ Fuel hose connector
⑯ Fuel hose
⑰ Starter cable bracket
⑱ Carburetor cover (Left)
⑲ Starter cable holder
⑳ Carburetor breather pipe



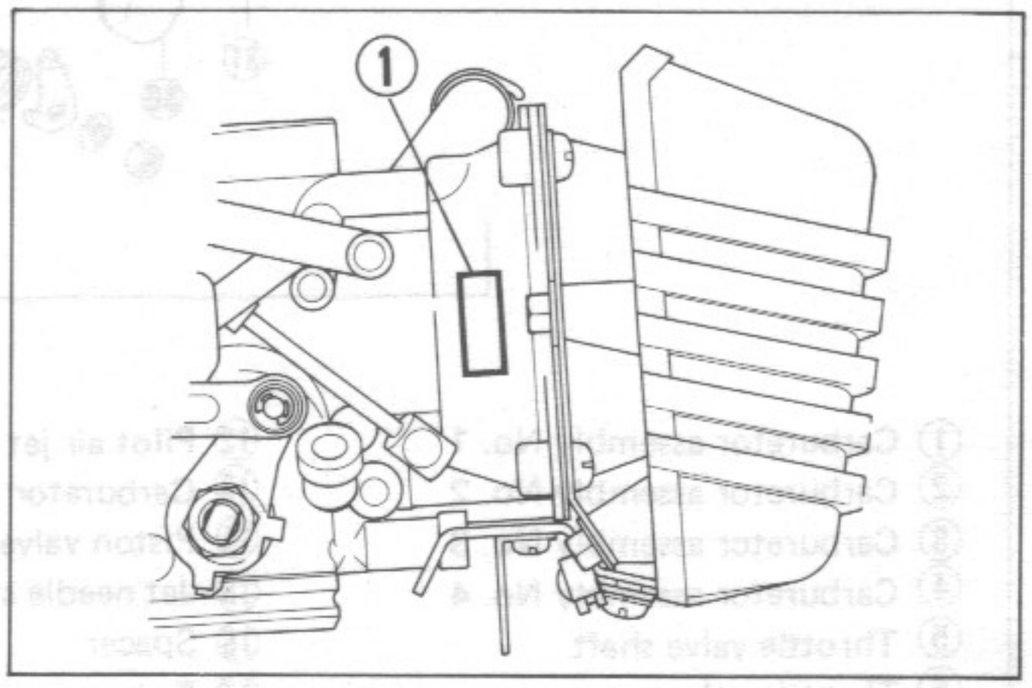
① Carburetor assembly No. 1
② Carburetor assembly No. 2
③ Carburetor assembly No. 3
④ Carburetor assembly No. 4
⑤ Throttle valve shaft
⑥ Throttle valve
⑦ Balance screw
⑧ Throttle valve return spring
⑨ Pilot screw
⑩ Starter plunger
⑪ Coasting valve
⑫ Pilot air jet
⑬ Carburetor top cap
⑭ Piston valve spring
⑮ Jet needle stopper plate
⑯ Spacer
⑰ E-ring
⑱ Jet needle
⑲ Washer
⑳ Spring
㉑ Piston valve
㉒ Needle jet
㉓ Needle jet stopper
㉔ Seal ring
㉕ Main jet holder
㉖ Main jet
㉗ Pilot jet
㉘ Filter
㉙ Needle valve
㉚ Float
㉛ Float arm pin

SPECIFICATIONS

ITEM	SPECIFICATIONS
Type	MIKUNI BDS33SS
I.D. No.	07A10
Bore	33 mm (1.30 in)
Idle r/min	1 100 ± 100 r/min.
Fuel level	17.0 ± 0.5 mm (0.67 ± 0.02 in)
Float height	11.5 ± 1.0 mm (0.45 ± 0.04 in)
Main jet	Nos. 1 and 3#92.5, Nos. 2 and 4#90
Main air jet	0.6 mm
Jet needle	Nos. 1 & 3 5TO5, Nos. 2 & 4 5TO1
Needle jet	Y-6
Throttle valve	# 120
Pilot jet	#25
By-pass	0.9, 0.8, 0.8 mm
Pilot outlet	0.7 mm
Valve seat	1.5 mm
Starter jet	# 32.5
Pilot screw	PRE-SET
Pilot air jet	PRE-SET
Throttle cable play	2 – 3 mm (0.08 – 0.12 in)
Choke cable play	0.5 – 1.0 mm (0.02 – 0.04 in)

I.D. NO. LOCATION

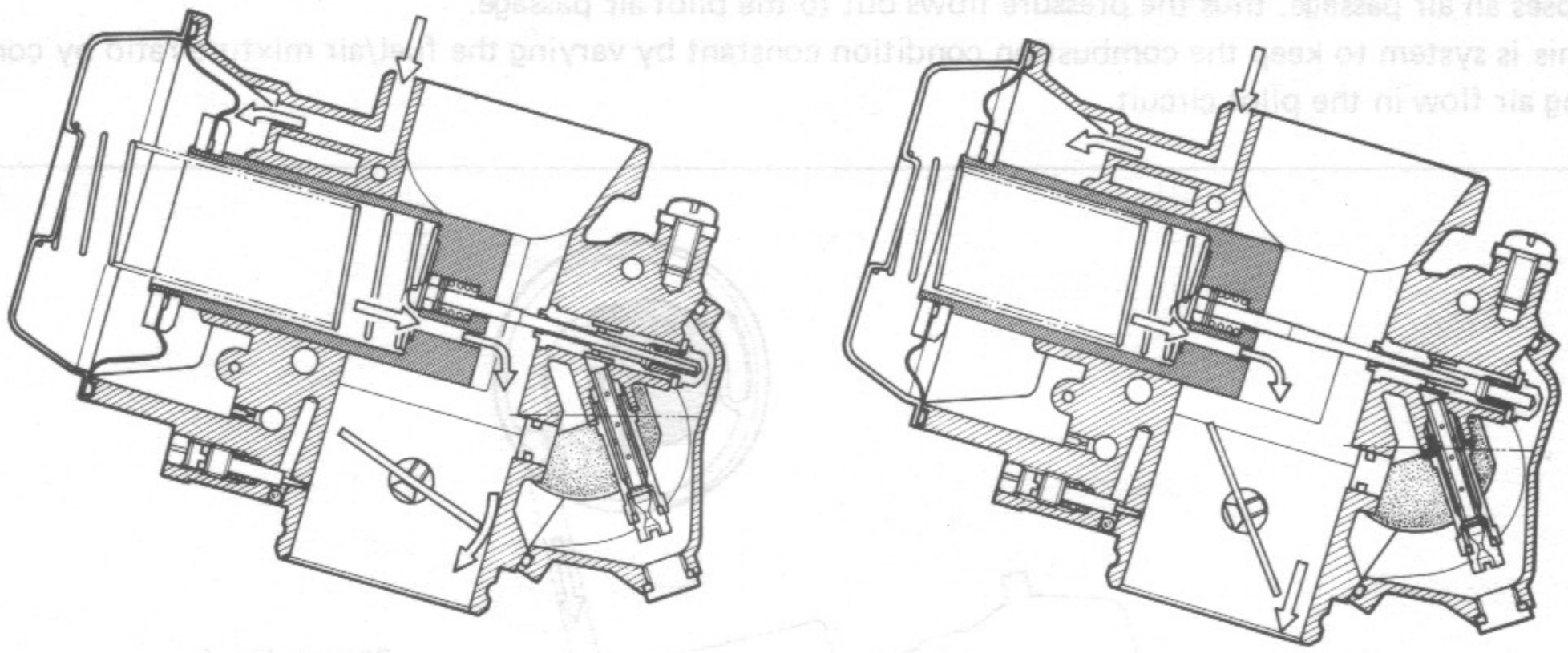
Each carburetor has I.D. Number ① stamped on the carburetor body according to its specifications.

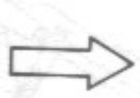


DIAPHRAGM AND PISTON OPERATION

The carburetor is of a variable-venturi type, whose venturi cross section area is increased or decreased automatically by the piston according to the vacuum present on the downstream side of the venturi. Vacuum is admitted into the diaphragm chamber through an orifice provided in the sliding shaft guide.

Rising vacuum controls the diaphragm movement, causing the piston to rise to increase the said area and thus prevent the air velocity from increasing. Thus, air velocity in the venturi passage is kept relatively constant for improved fuel automization and for securing an optimum ratio of fuel to air in the mixture.



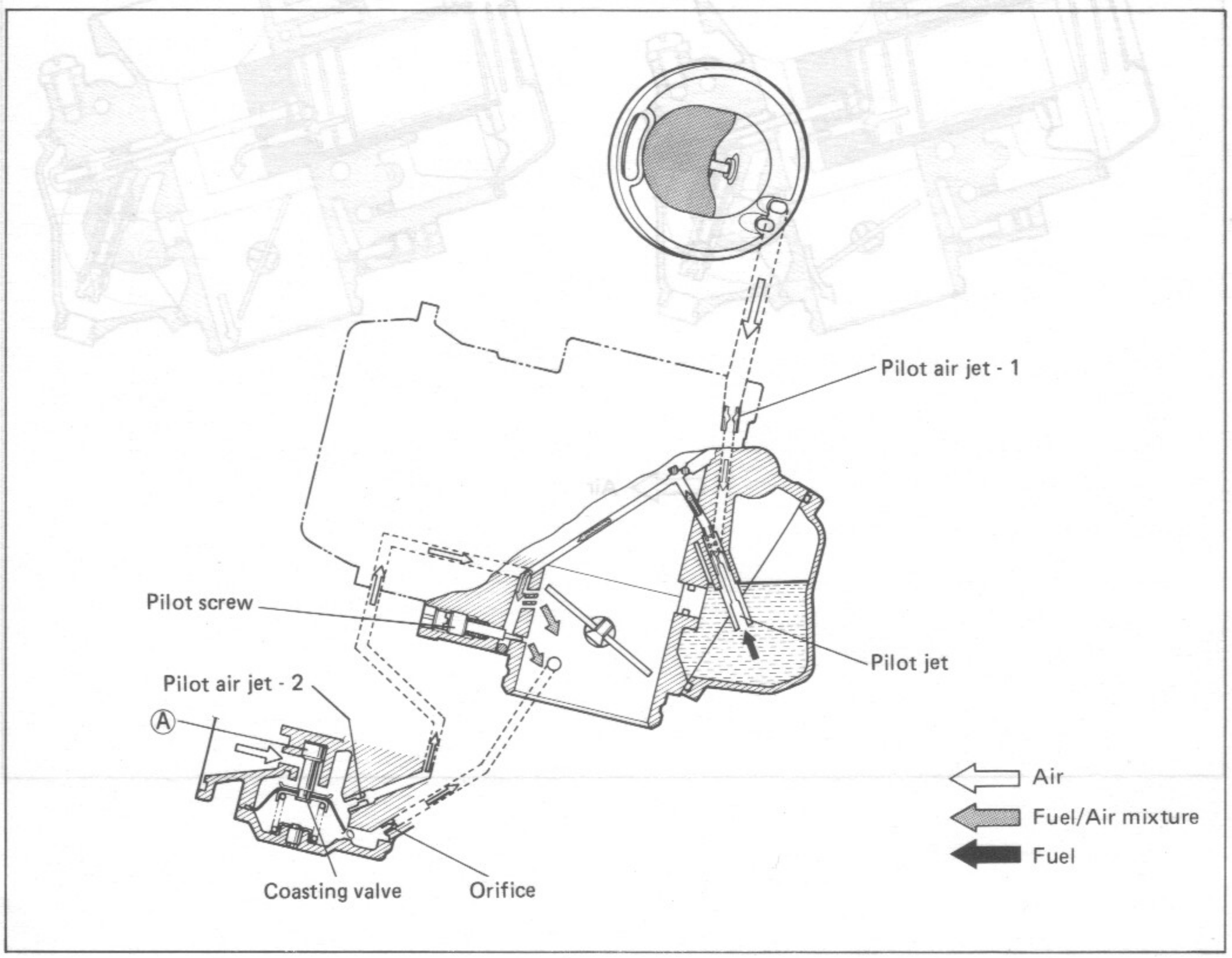


SLOW SYSTEM

This system supplies fuel during engine operation with throttle valve closed or slightly opened.
The fuel from the float chamber is first passed and metered by the pilot jet where it mixes with air coming in through pilot air jet.
This mixture, rich with fuel, then goes up through pilot pipe to pilot screw. A part of the mixture is discharged into the main bore out of by-pass ports. The remainder is then metered by pilot screw and sprayed out into the main bore through pilot outlet.

TRANSIENT ENRICHMENT SYSTEM

This transient enrichment system is a device which keeps fuel/air mixture ratio constant in order not to generate unstable combustion when the throttle grip is returned suddenly during high speed driving.
For normal operation, joining of the air from upper part of carburetor inlet side to pilot air passage obtains proper fuel/air mixture ratio. But if the throttle valve is suddenly closed, a large negative pressure generated on cylinder side is applied to a diaphragm. The valve Ⓐ which interlocks with the diaphragm closes an air passage, thus the pressure flows out to the pilot air passage.
This is system to keep the combustion condition constant by varying the fuel/air mixture ratio by controlling air flow in the pilot circuit.



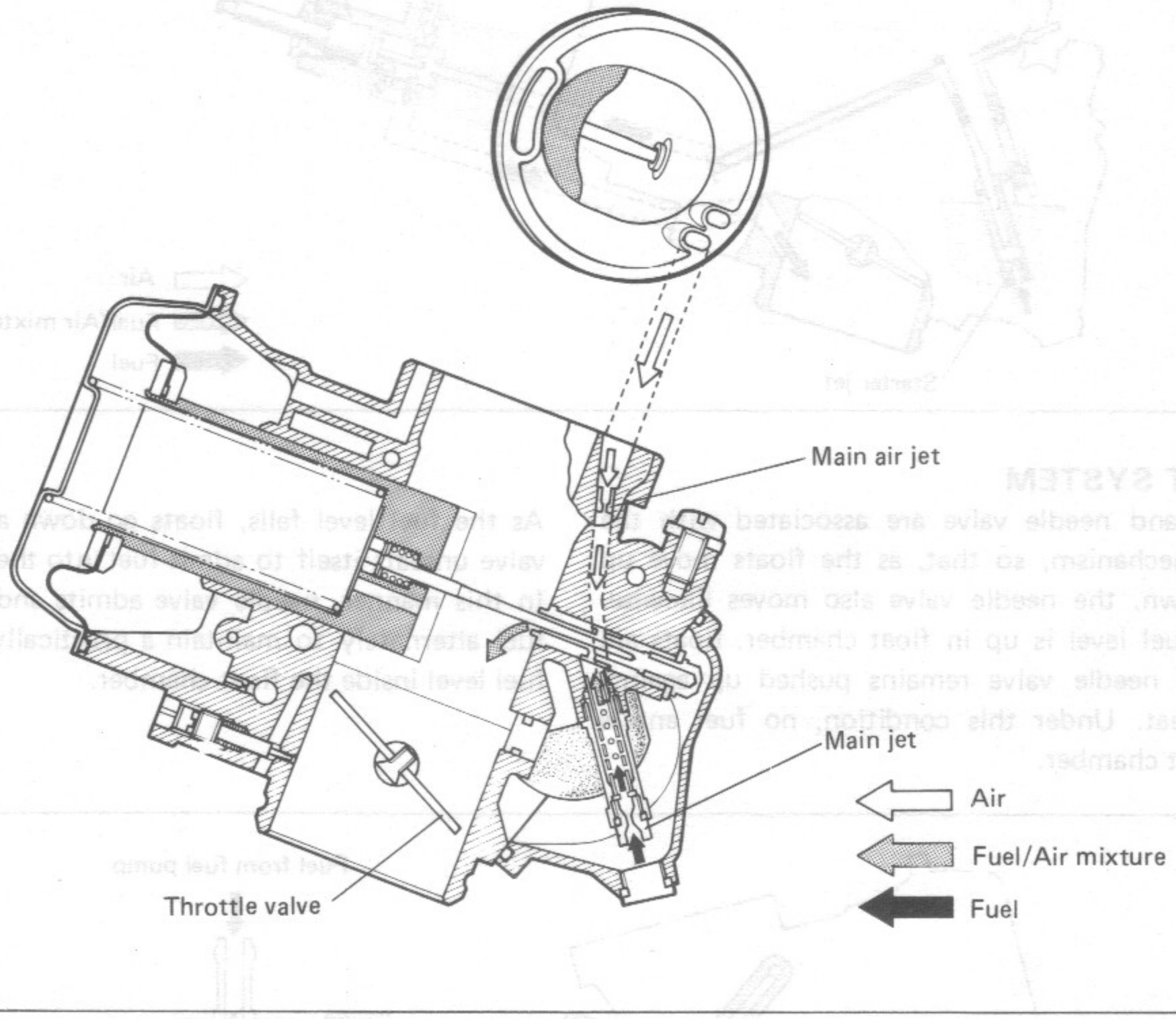
MAIN SYSTEM

As throttle valve is opened, engine speed raises, and this increases vacuum in the venturi. Consequently the piston valve moves upward.

Meanwhile, the fuel in float chamber is metered by main jet, and the metered fuel enters needle jet, in which it mixes with the air admitted through main air jet to form an emulsion.

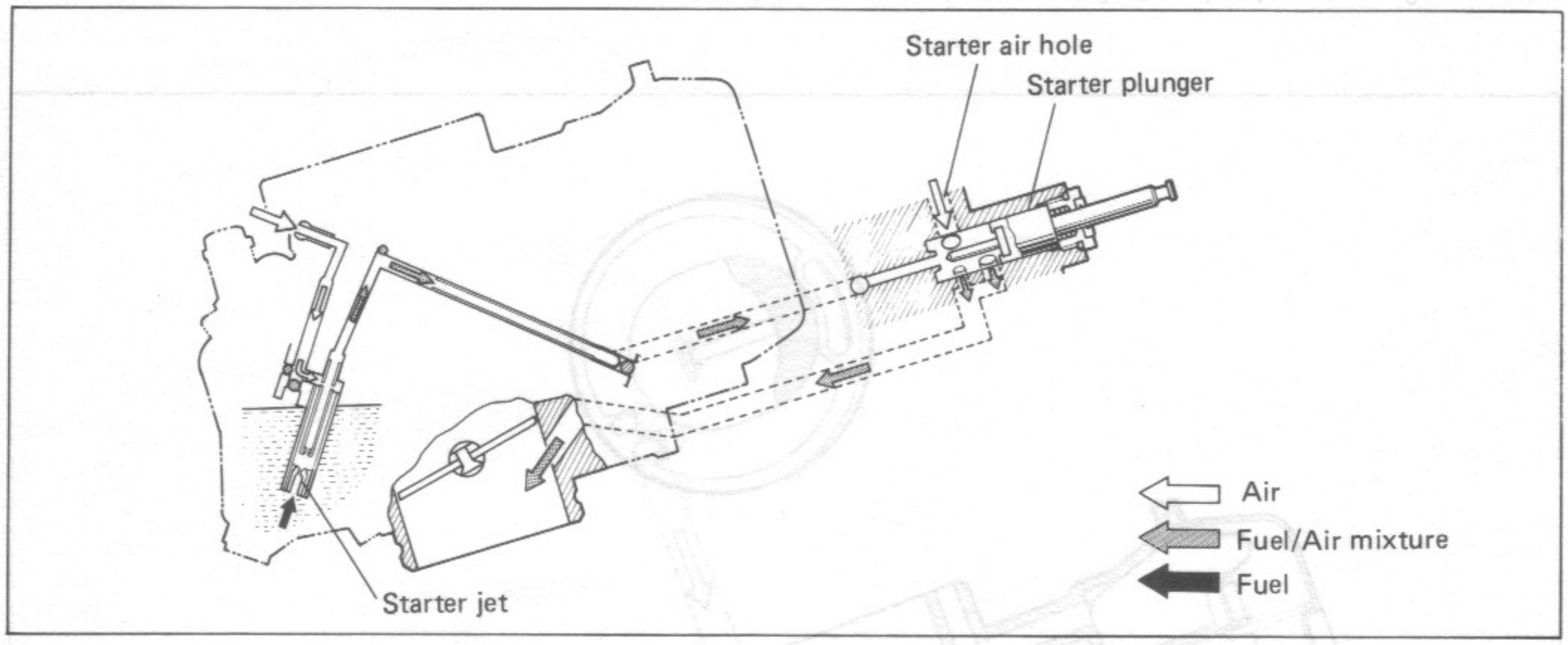
The emulsified fuel then passes through the clearance between needle jet and jet needle, and is discharged into the venturi, in which it meets main air stream being drawn by the engine.

Mixture proportioning is accomplished in needle jet; the clearance through which the emulsified fuel must flow is large or small, depending ultimately on throttle position.



STARTER SYSTEM

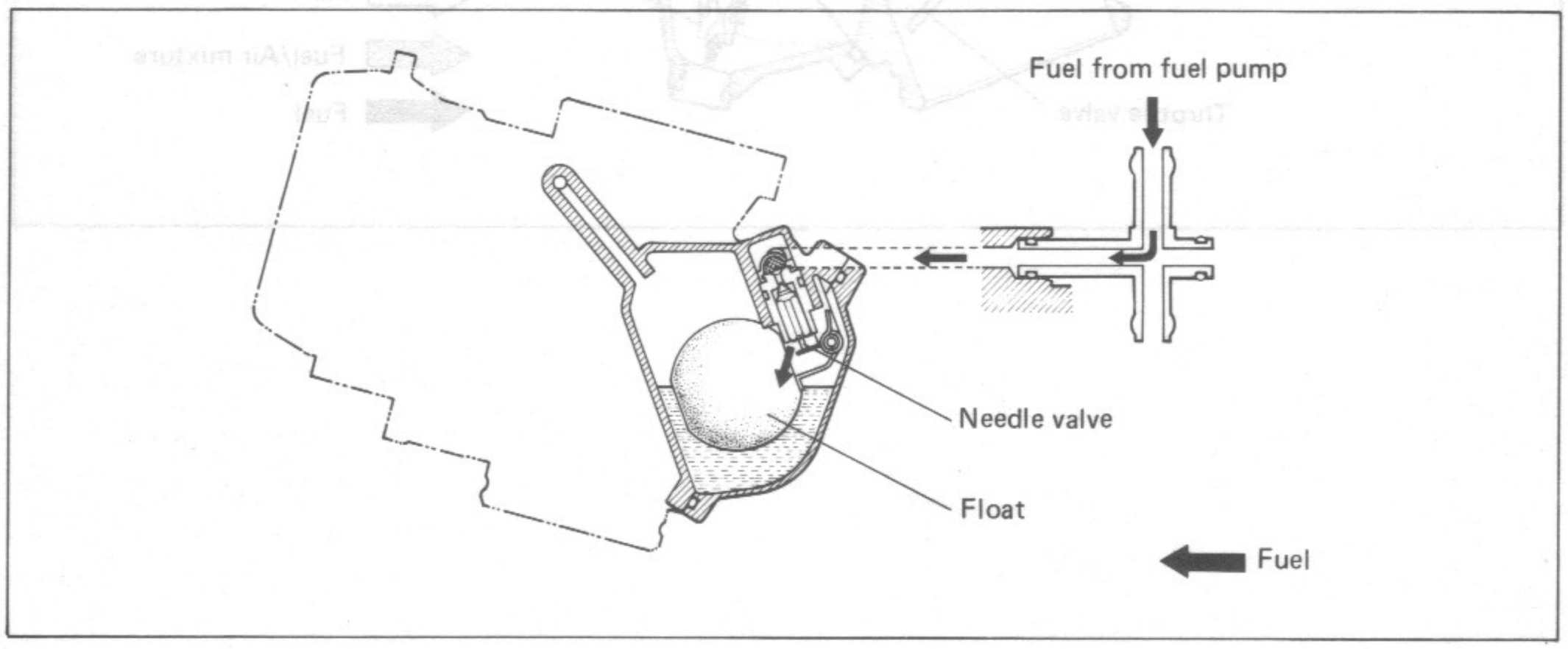
Turning the choke lever allows starting plunger to draw fuel into the starter circuit from the float chamber through starter jet.
Starter jet meters this fuel, which then flows into starter pipe and mixes with the air coming from the float chamber. The mixture, rich in fuel content, reaches starting plunger and mixes again with the air coming through a passage extending from behind the diaphragm.
The two successive mixings of fuel with air are such that a proper fuel/air mixture for starting is produced when the mixture is sprayed out through starter outlet into the main bore.



FLOAT SYSTEM

Floats and needle valve are associated with the same mechanism, so that, as the floats move up and down, the needle valve also moves likewise. When fuel level is up in float chamber, floats are up and needle valve remains pushed up against valve seat. Under this condition, no fuel enters the float chamber.

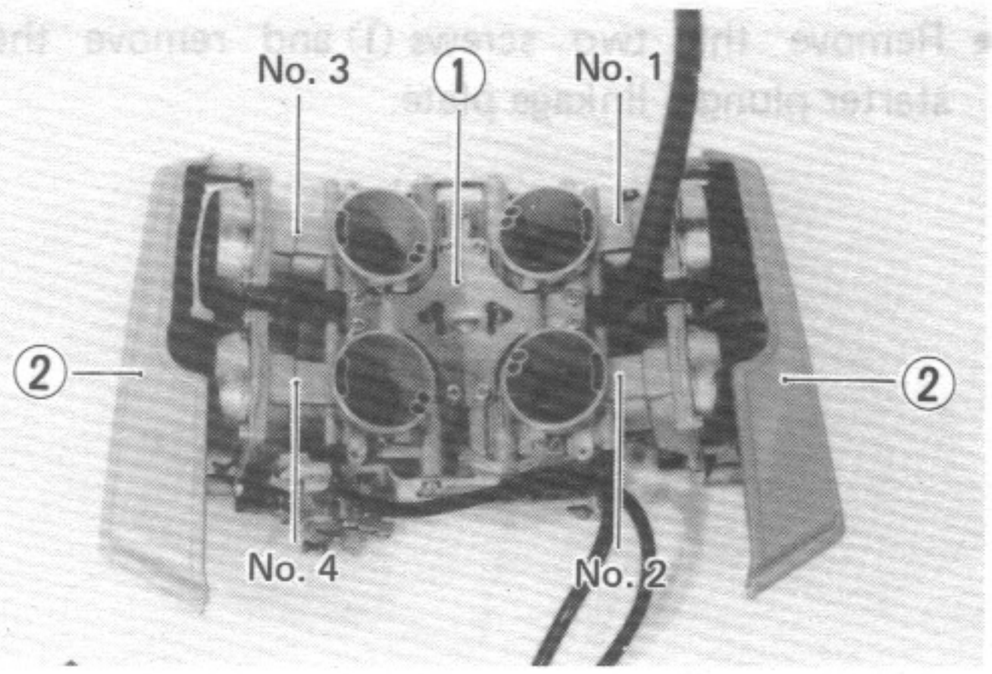
As the fuel level falls, floats go down and needle valve unseats itself to admit fuel into the chamber. In this manner, needle valve admits and shuts off fuel alternately to maintain a practically constant fuel level inside the float chamber.



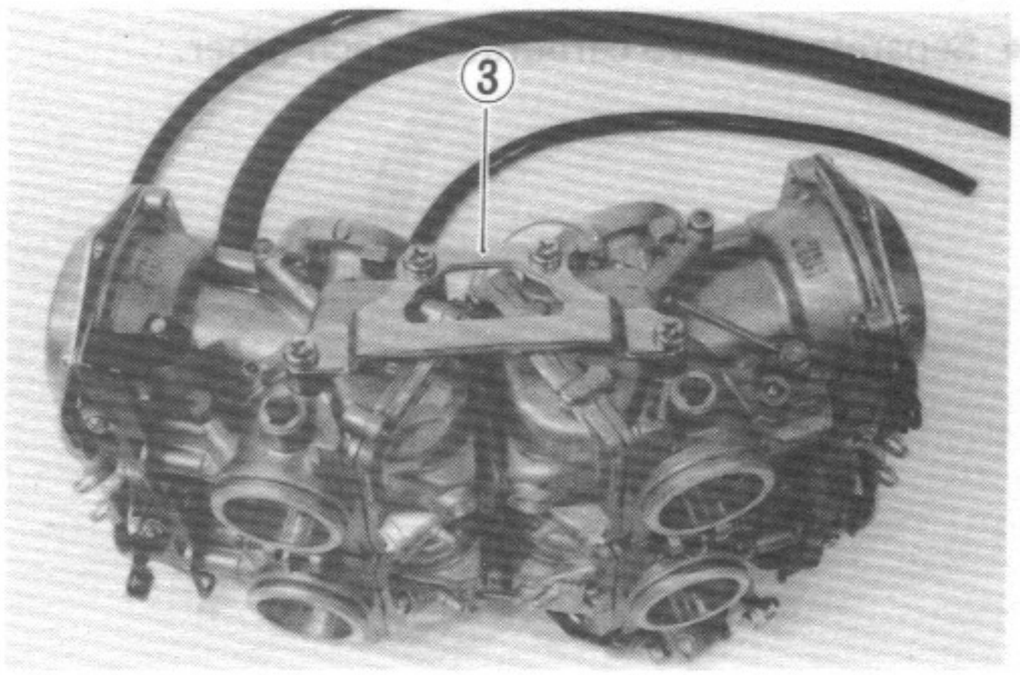
DISASSEMBLY

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

NOTE:
Once removing a carburetor cover ②, it is necessary to balance the four carburetors.

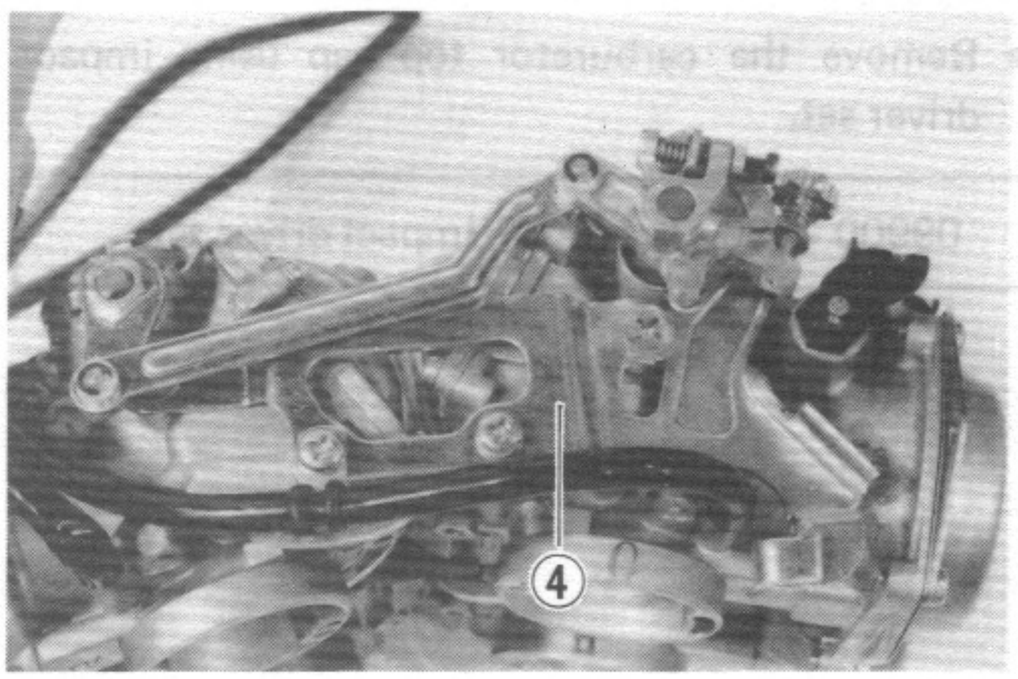


- Remove the carburetor set upper plate ① by unscrewing 8 screws.
- Remove both carburetor covers ② by unscrewing four screws.
- Loosen 4 tightening screws ③ of the rear plate.



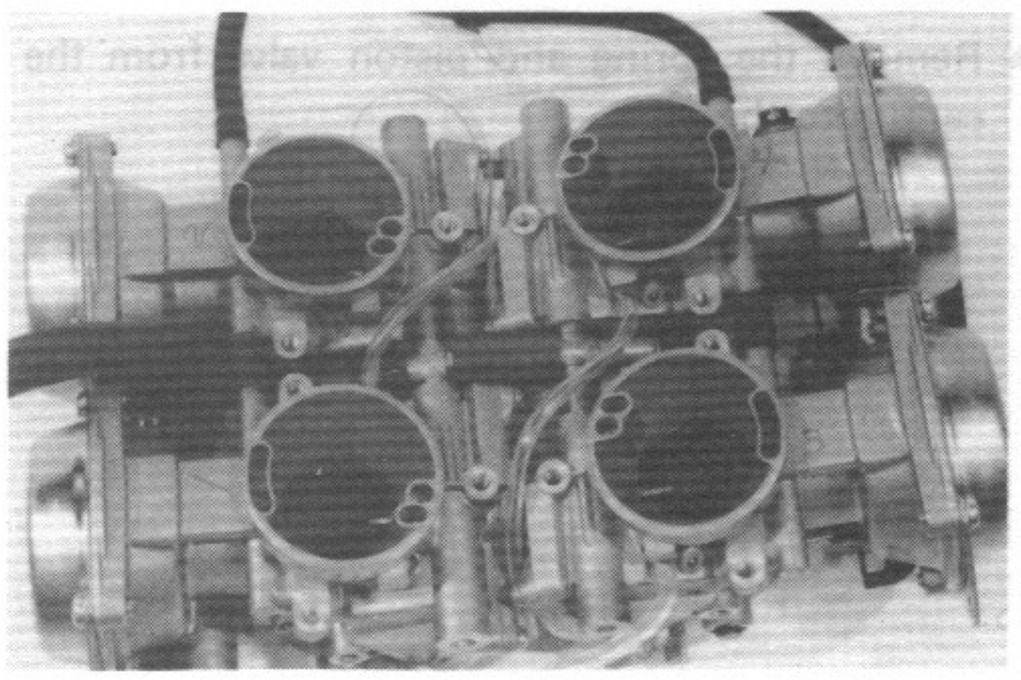
- Remove carburetor set front plate ④ by unscrewing 4 screws.
- Use impact driver set to prevent screw damage.

09900 - 09003	Impact driver set

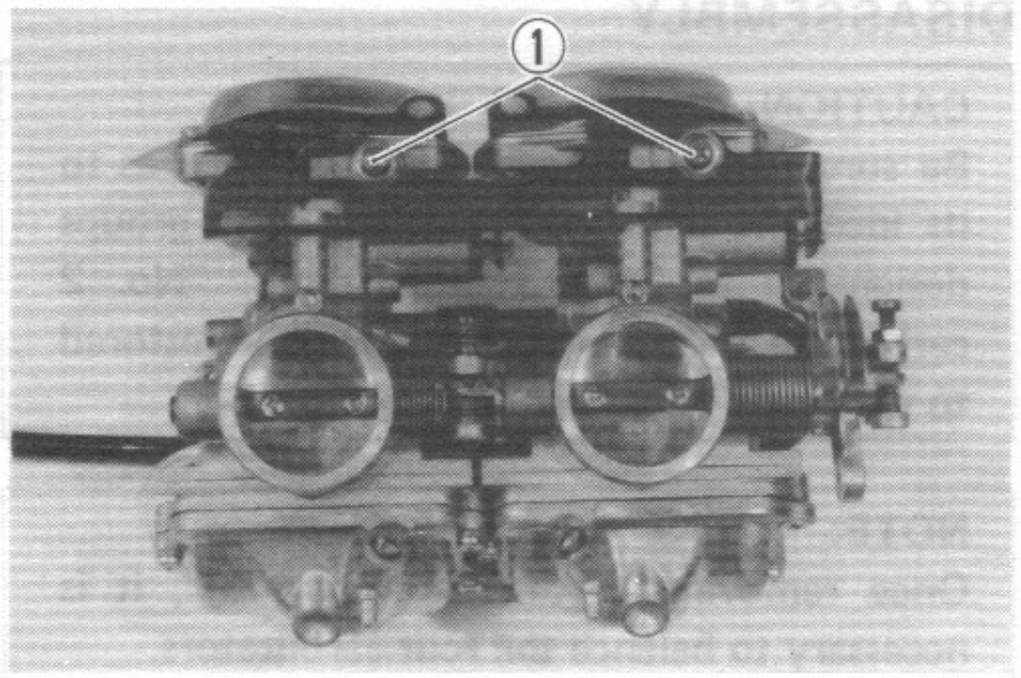


- Remove the E-ring and disconnect the throttle valve shaft linkage.

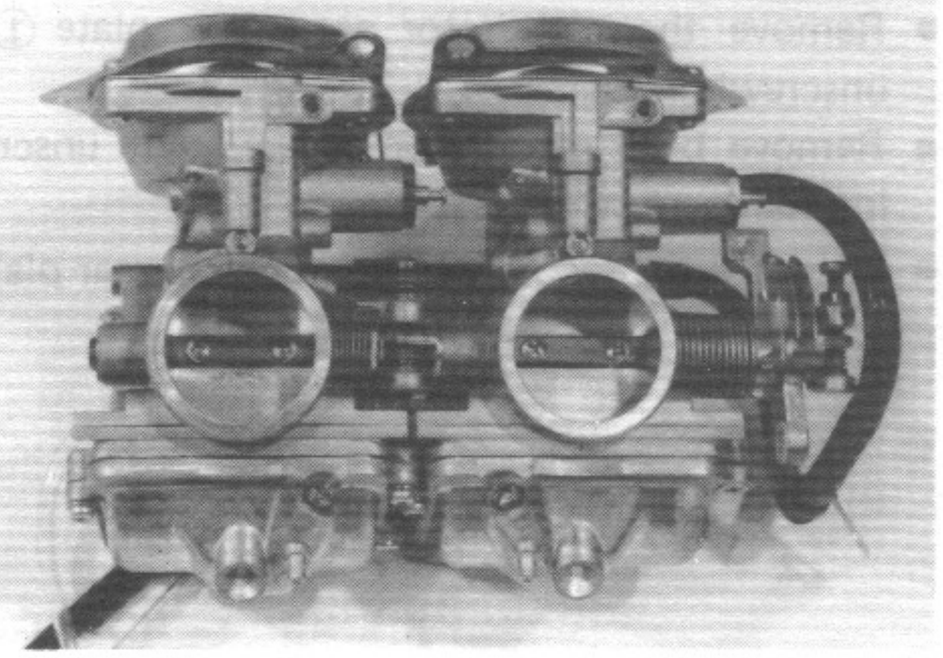
- Disconnect the fuel pipes and separate the pair of carburetors.



- Remove the two screws ① and remove the starter plunger linkage plate.

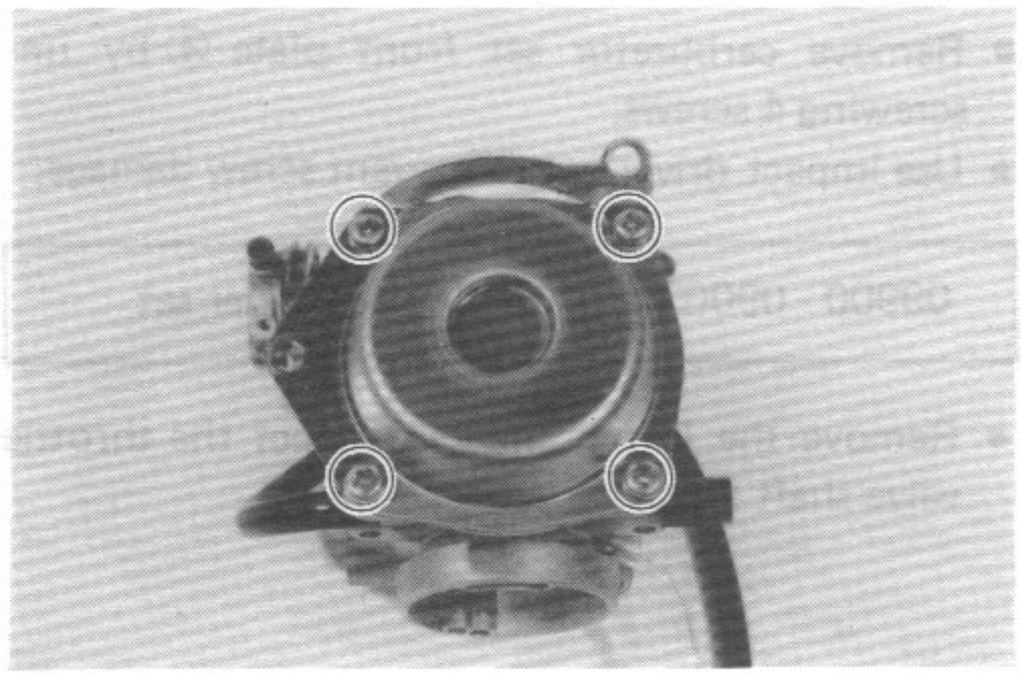


- Separate the two carburetors each other.

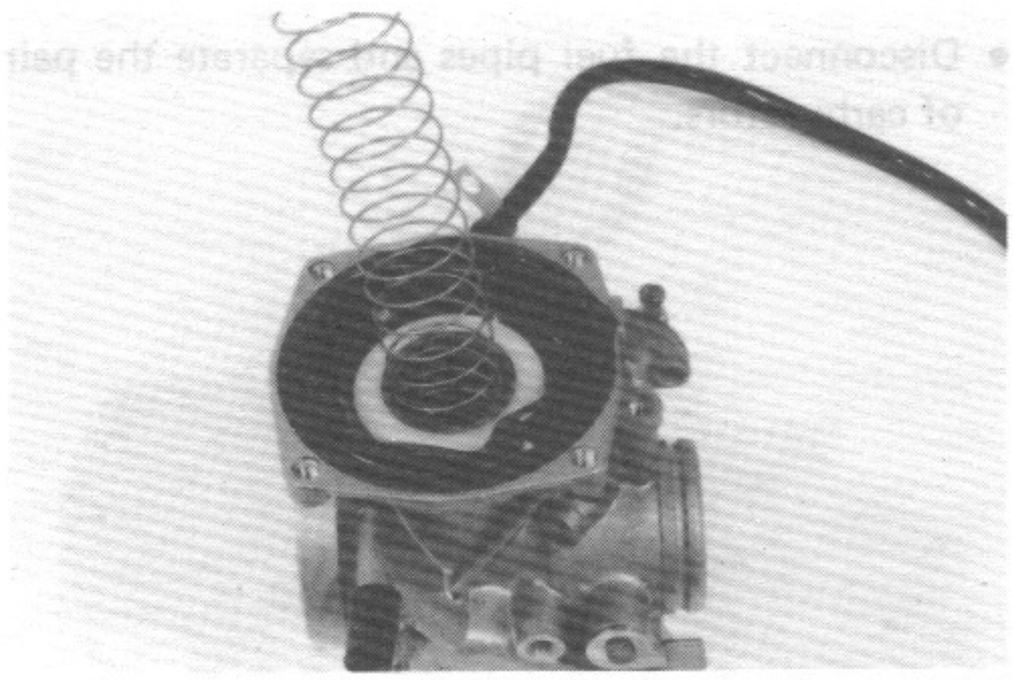


- Remove the carburetor top cap using impact driver set.

09900 - 09003	Impact driver set

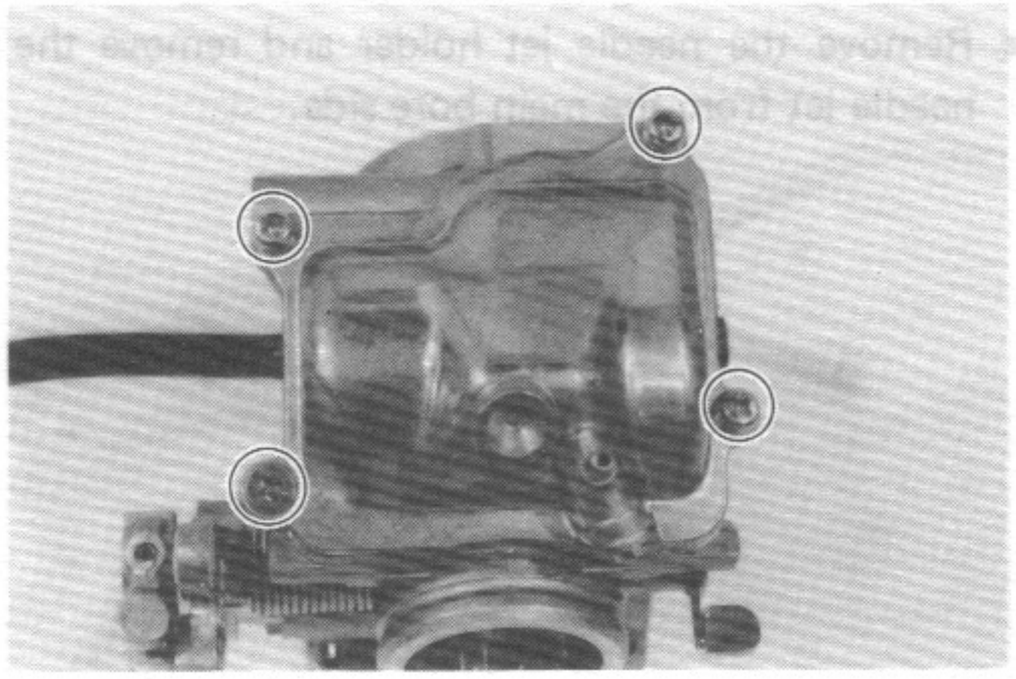


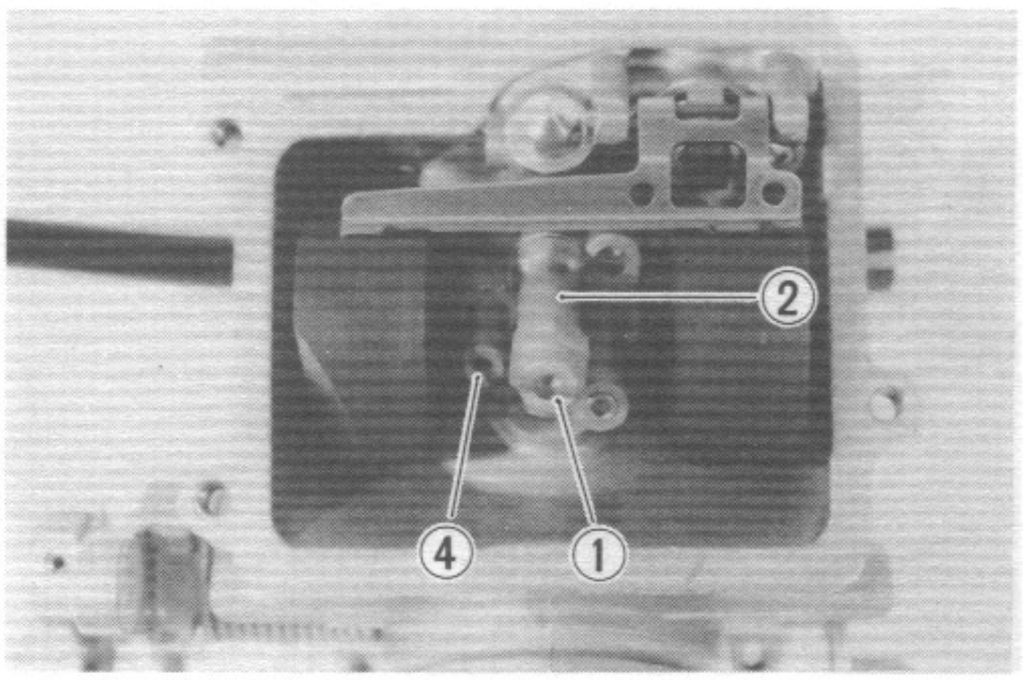
- Remove the spring and piston valve from the carburetor body.

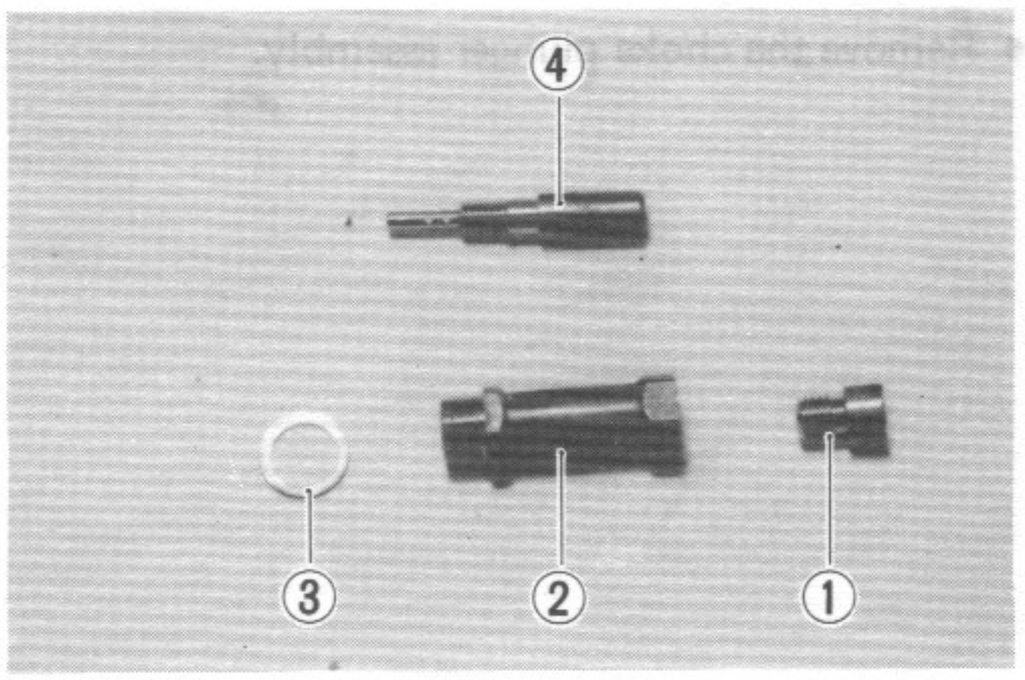


- Using the impact driver, remove the float chamber cap.
- Remove the main jet ①, main jet guide ②, gasket ③ and pilot jet ④.

NOTE:
When replacing the main jets, check their size and install them to the proper positions.

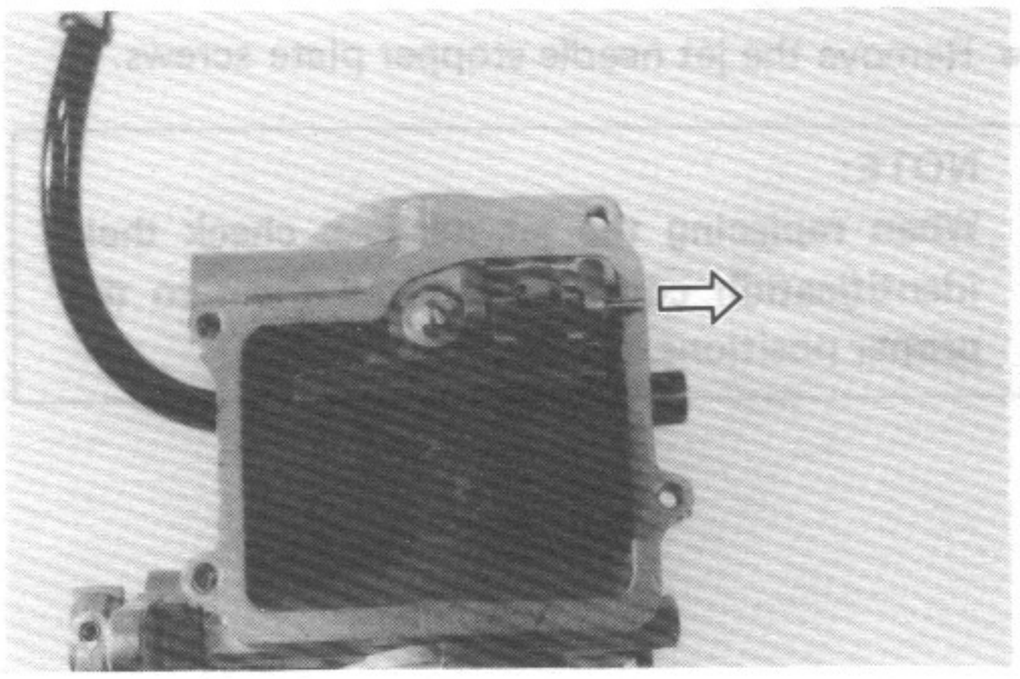




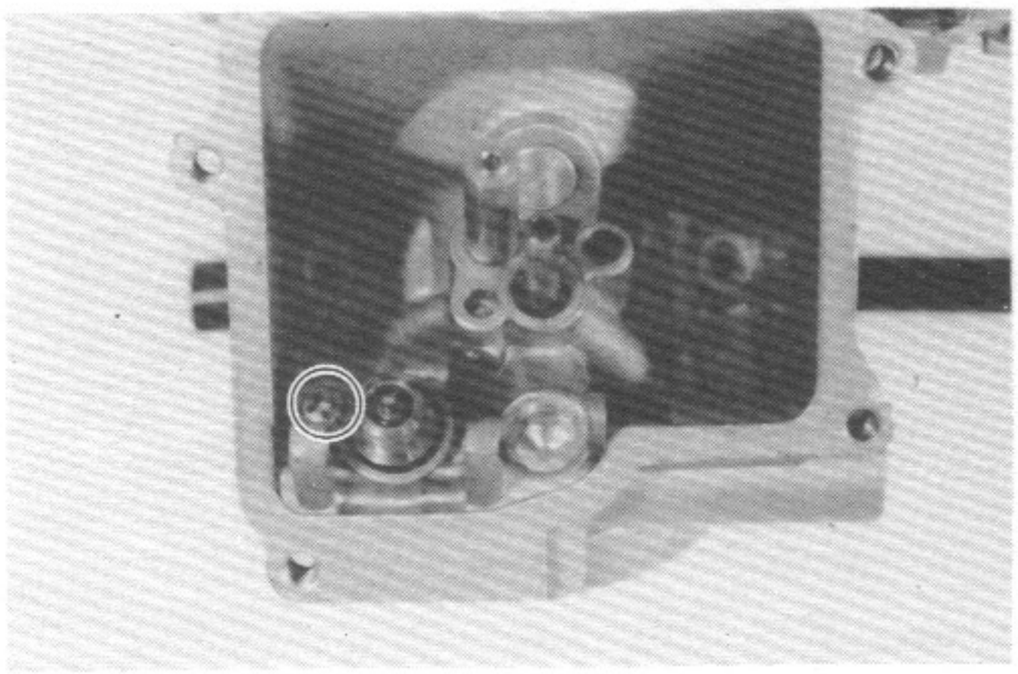


- Pull out the float pin and remove the float.

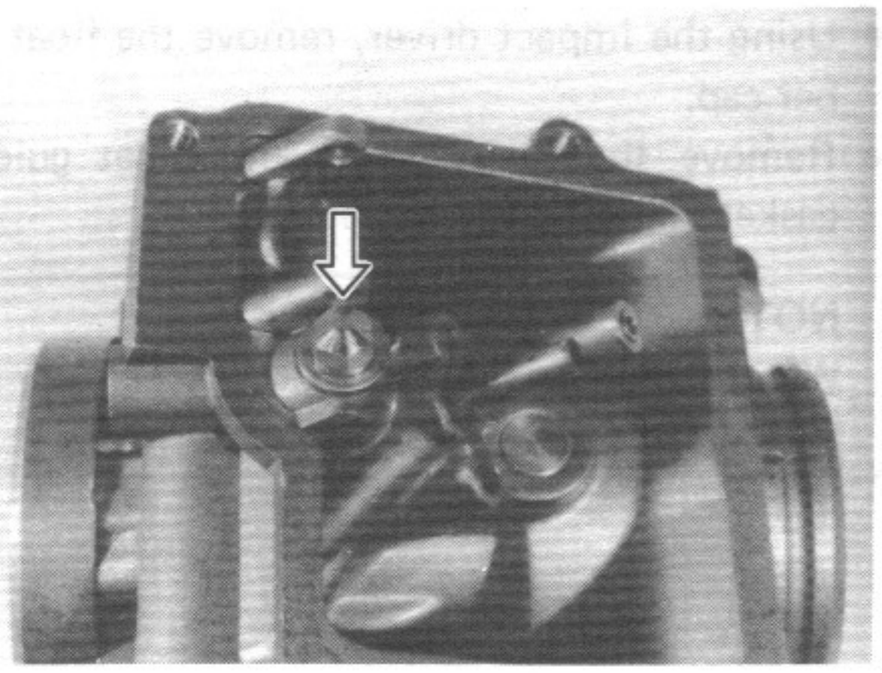
CAUTION:
When removing the float pin, be careful not to damage the carburetor body.



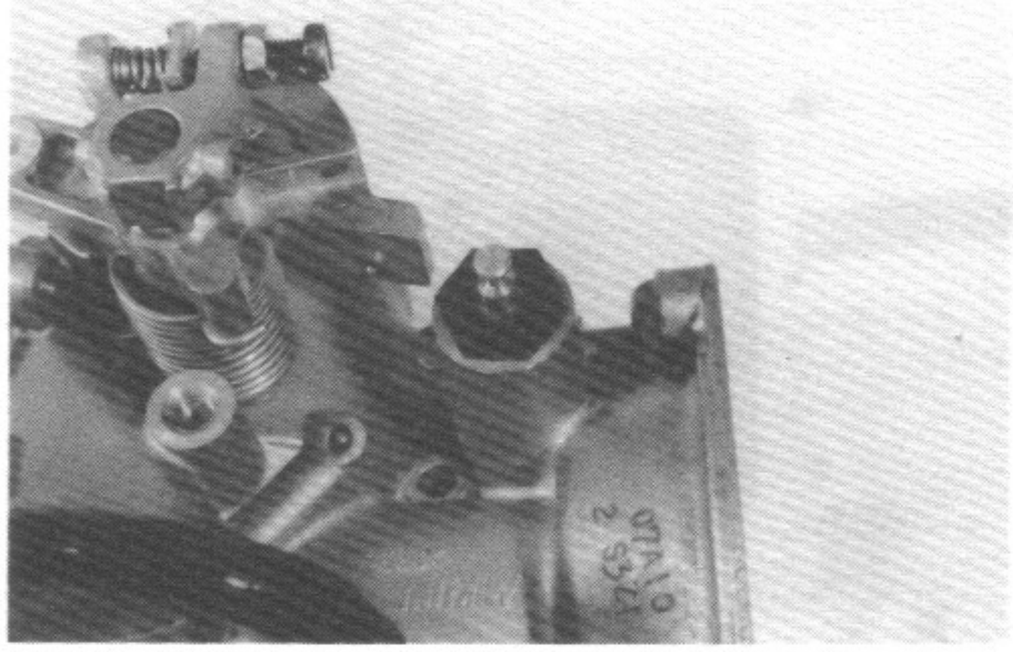
- Remove the needle valve stopper and needle valve.



- Remove the needle jet holder and remove the needle jet from the main bore side.

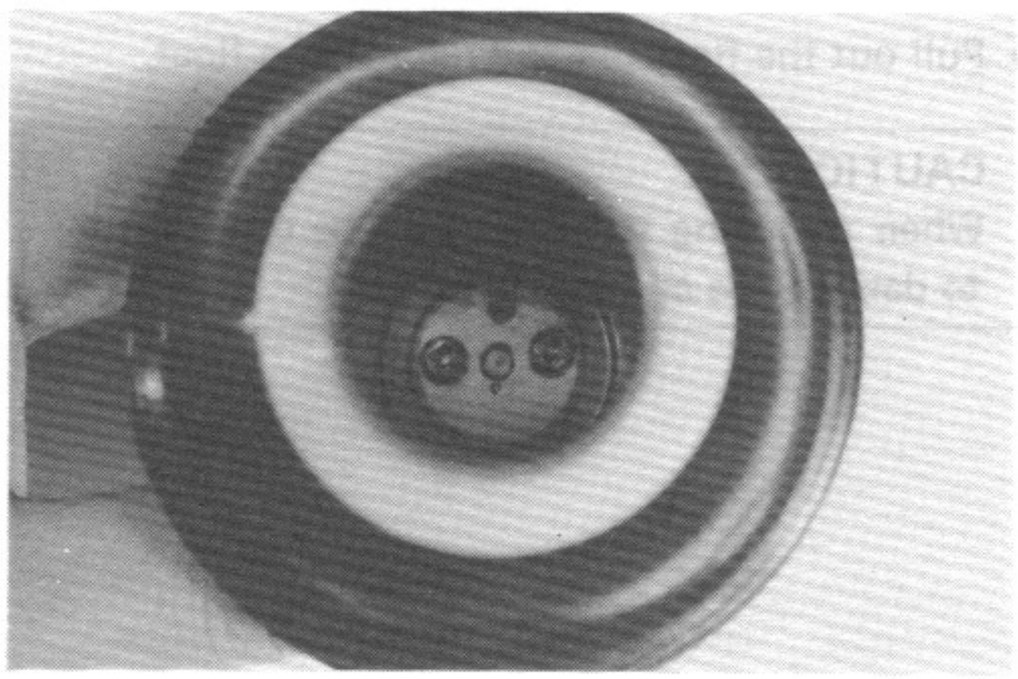


- Remove the choke plunger assembly.

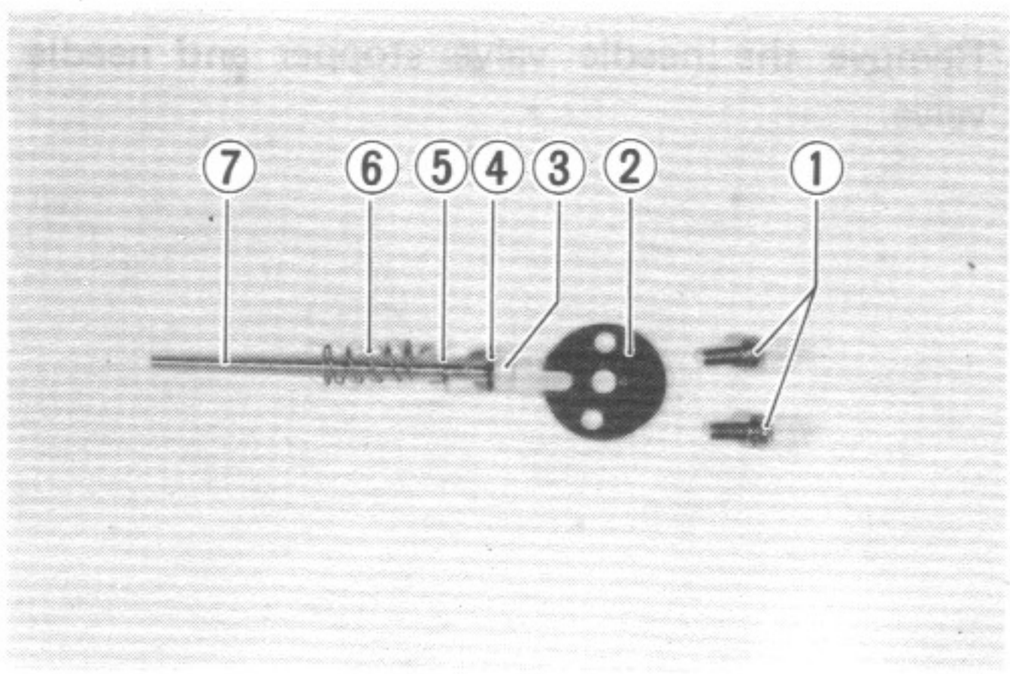


- Remove the jet needle stopper plate screws.

NOTE:
When replacing the jet needles, check their identification codes and install them to the proper positions.

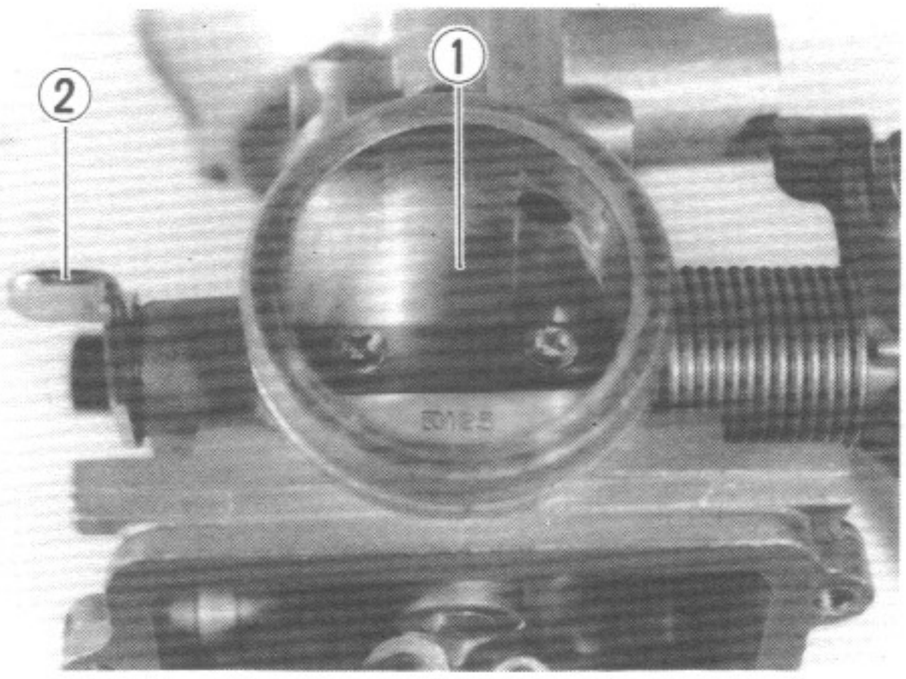


① Needle jet stopper screw
② Stopper plate
③ Spacer
④ E-ring
⑤ Washer
⑥ Spring
⑦ Jet needle



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

09900 - 09003	Impact driver set

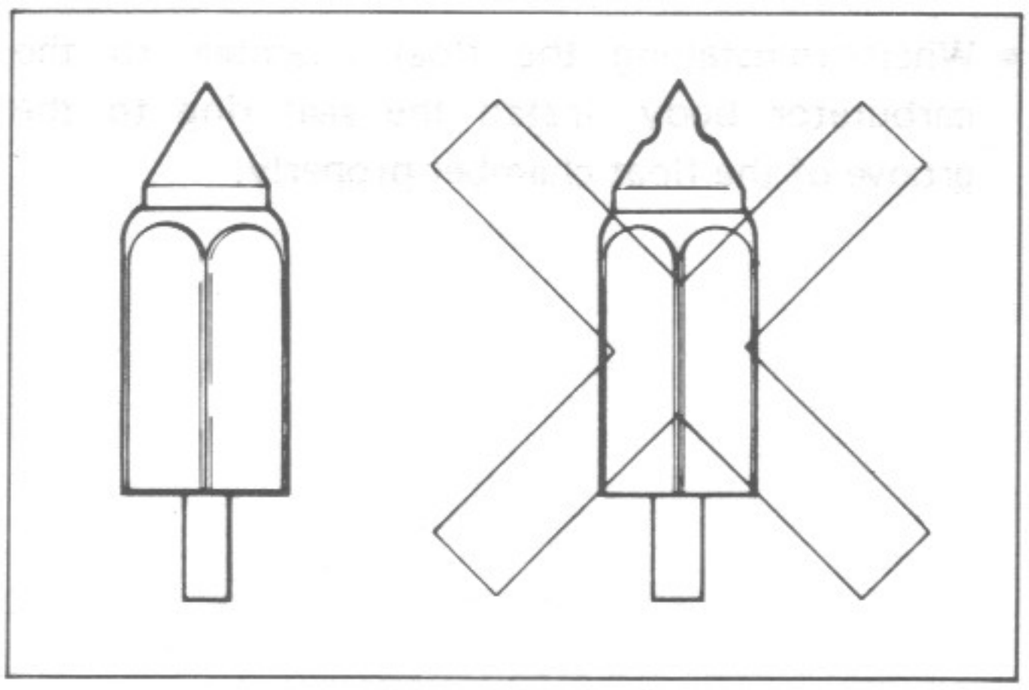


CAUTION:
These two screws are locked by punching its end. Once removing the screws, they will be damaged. When reinstalling the throttle valve, apply Thread lock "1363C" to these two screws.

- 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 and O-ring
  - * Diaphragm
  - * Gasket
  - * Throttle valve shaft oil seals
  - * Pilot outlet and by-pass holes
  - * Fuel pipe O-ring
  - * Fuel hose

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.

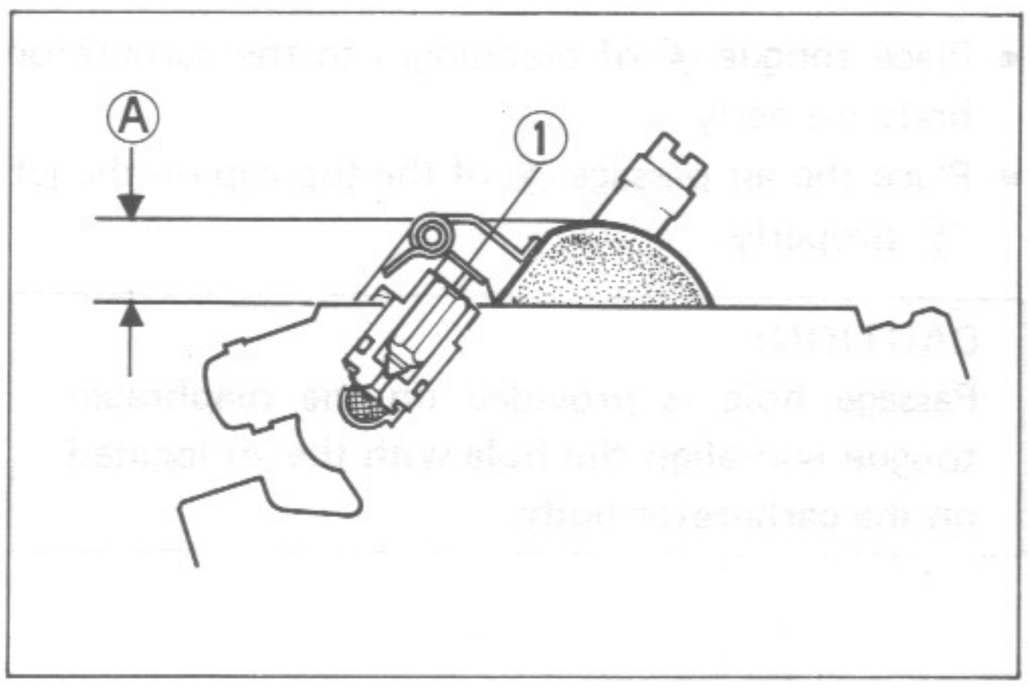


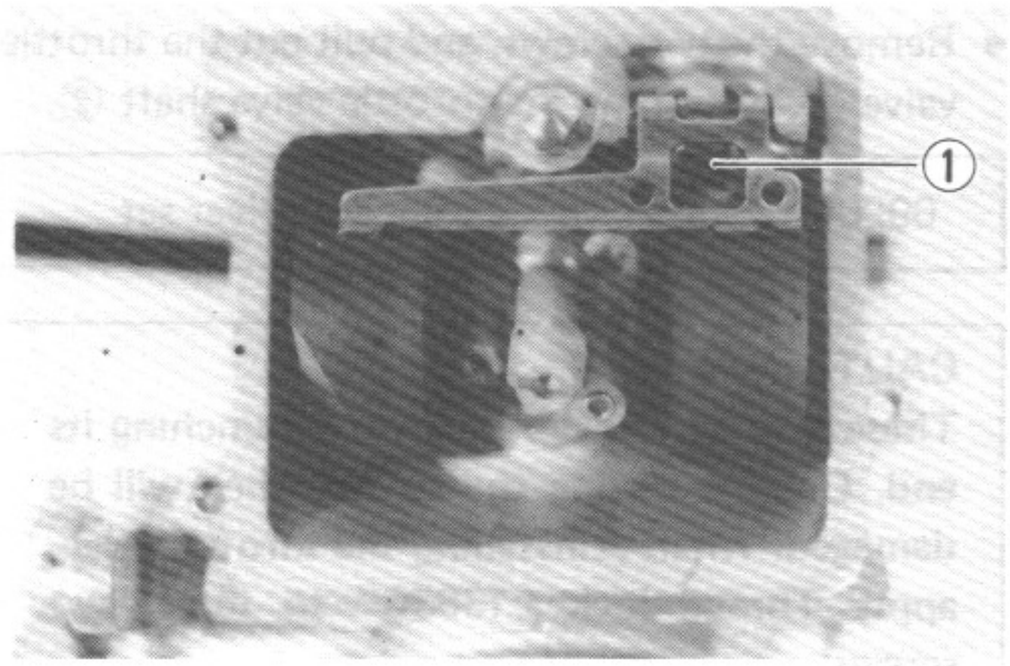
FLOAT HEIGHT ADJUSTMENT

To check the float height, invert the carburetor body, with the float arm kept free, measure the height Ⓐ while float arm is just in contact with needle valve by using calipers.
Bend the tongue ① as necessary to bring the height Ⓐ to this value.

Float height Ⓐ	11.5 ± 1.0 mm (0.45 ± 0.04 in)

09900 - 20101	Vernier calipers





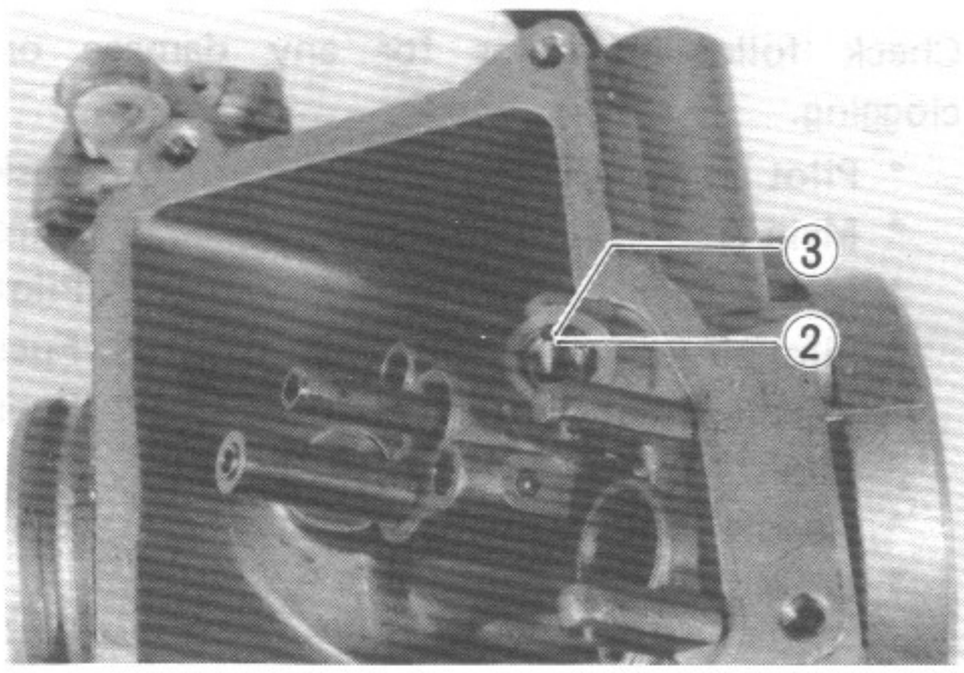
①: Float tongue

REASSEMBLY

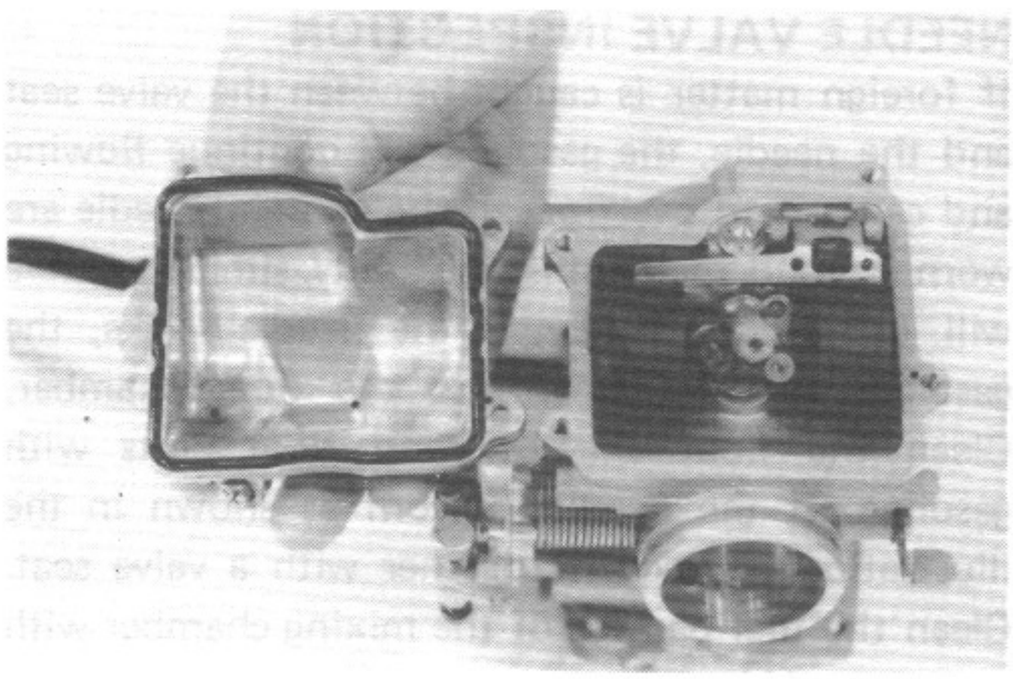
Reassemble the carburetor, in the reverse order of disassembly.

Pay attention to the following points.

- Align the groove ② of the needle jet with the pin ③ and replace it.

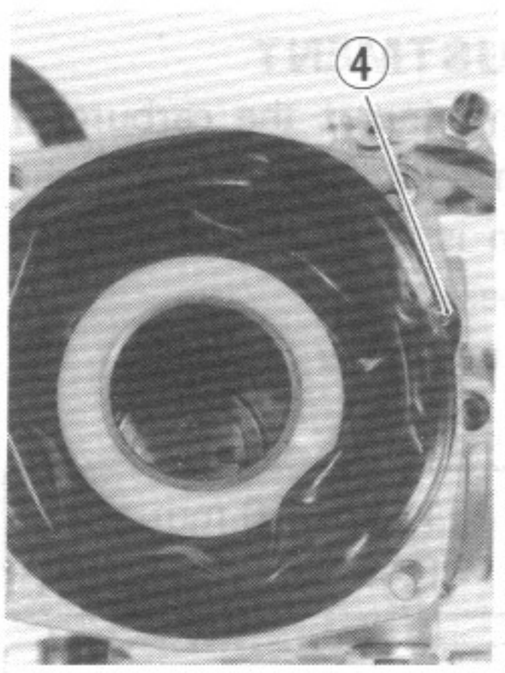


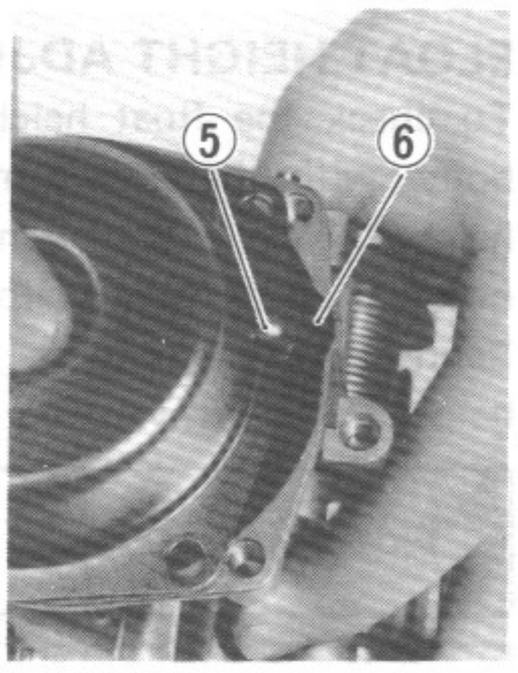
- When reinstalling the float chamber to the carburetor body, install the seal ring to the groove of the float chamber properly.



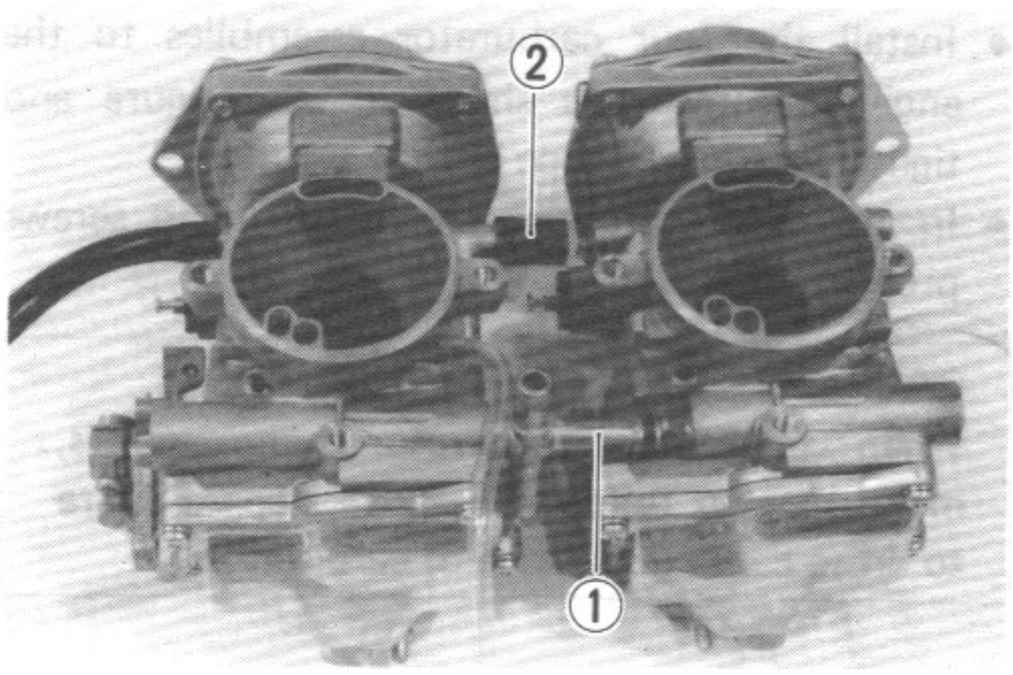
- Place tongue ④ of diaphragm to the carburetor body properly.
- Place the air passage ⑤ of the top cap on the jet ⑥ properly.

CAUTION:
Passage hole is provided on the diaphragm tongue and align the hole with the jet located on the carburetor body.

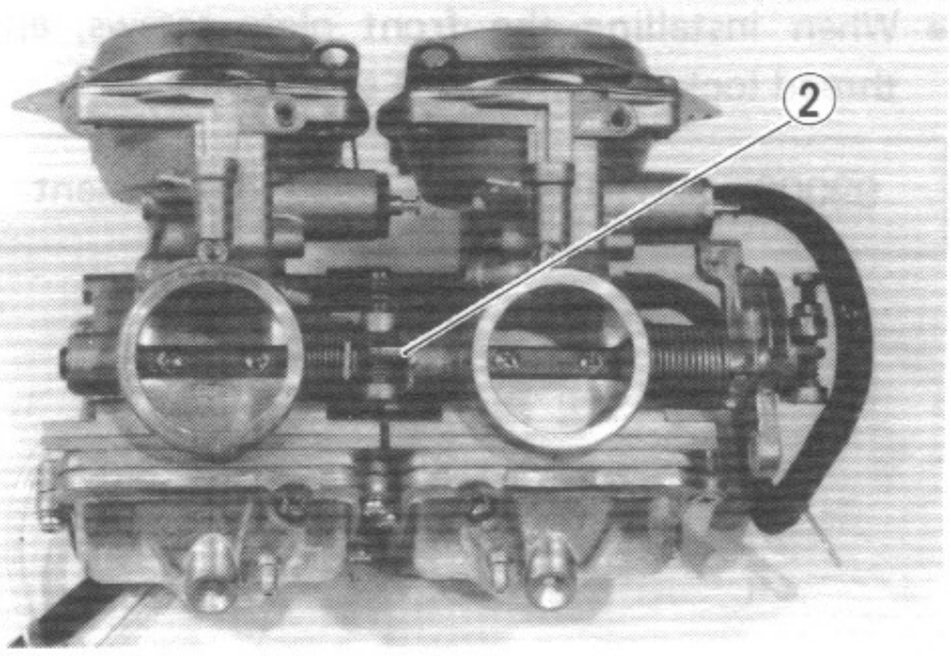




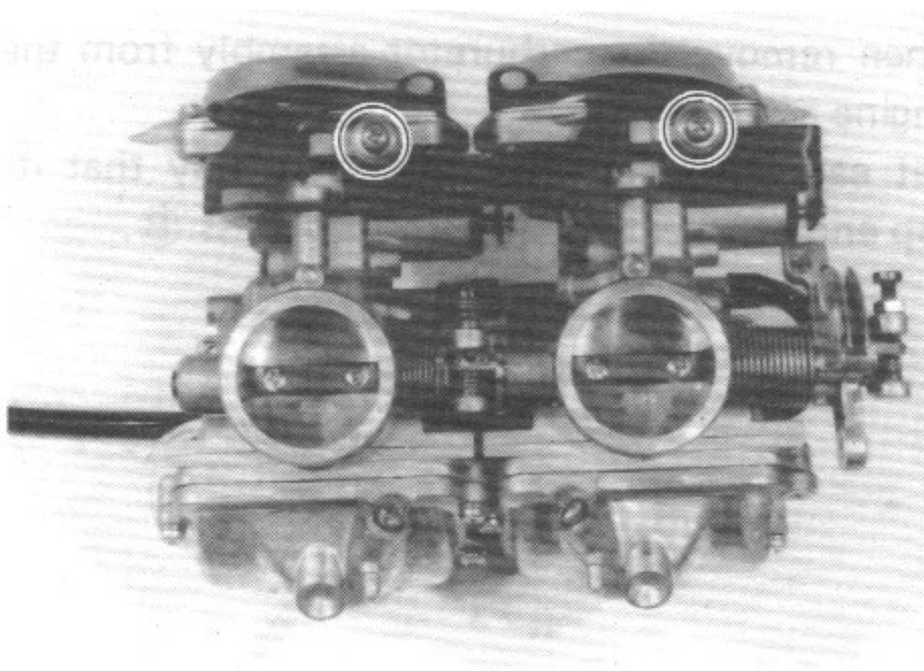
- When engaging the two carburetors, be sure to fix the fuel pipe ① and breather hose properly.



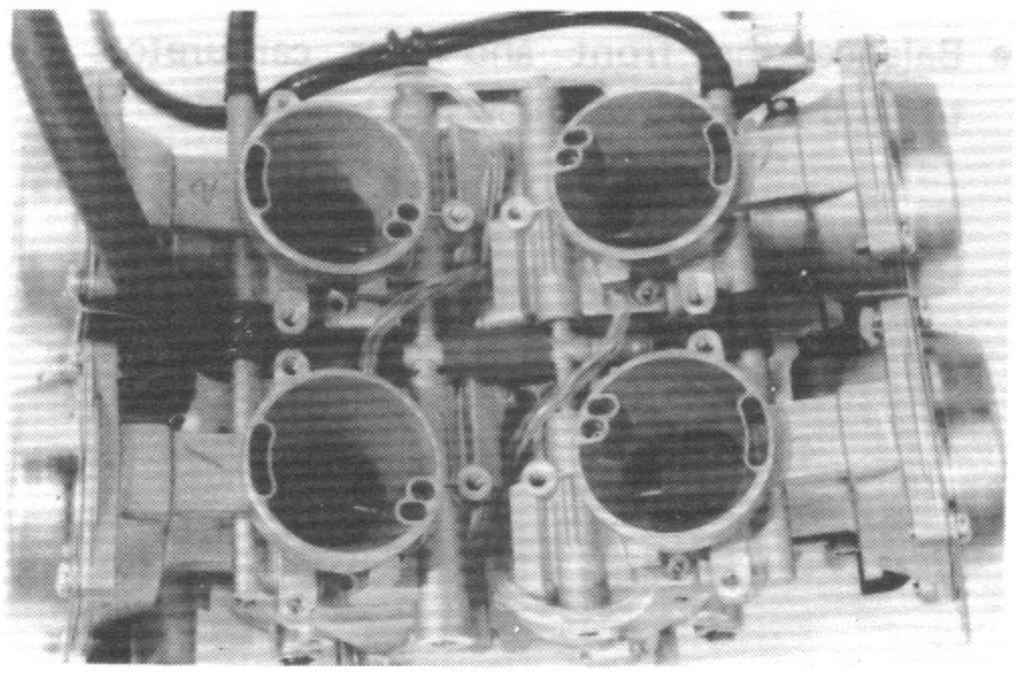
- Position the throttle valve control lever ② correctly.



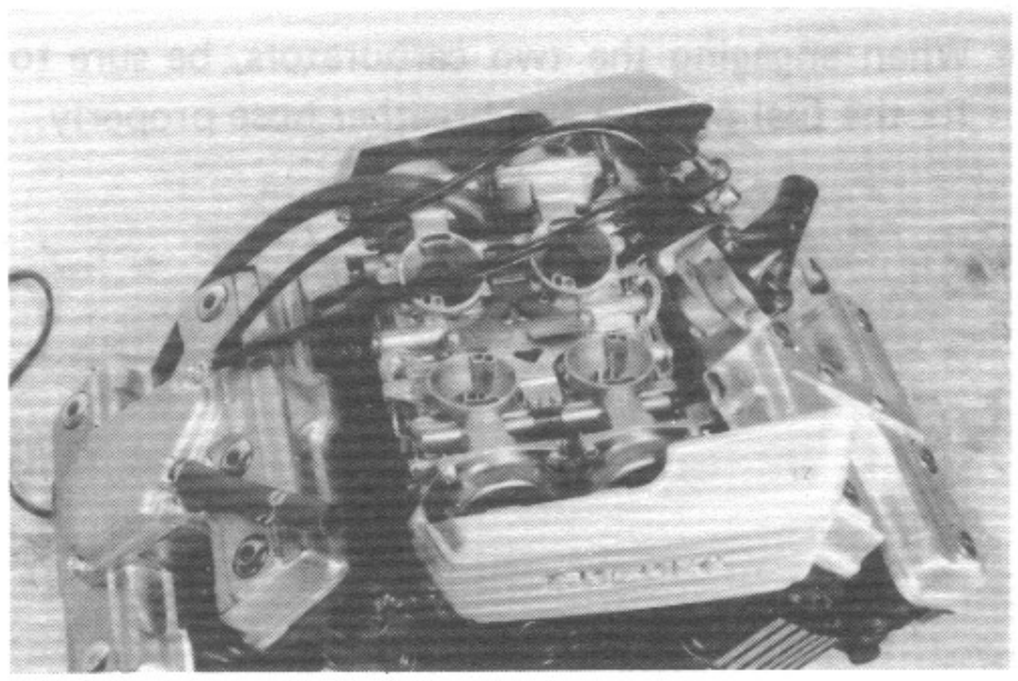
- Install the starter plunger plate with two screws.
- Apply a small amount of grease to the sliding parts.



- Properly route the fuel pipes and breather pipes and install all the plates to engage the four carburetors. Do not tighten plate screws completely at this stage.



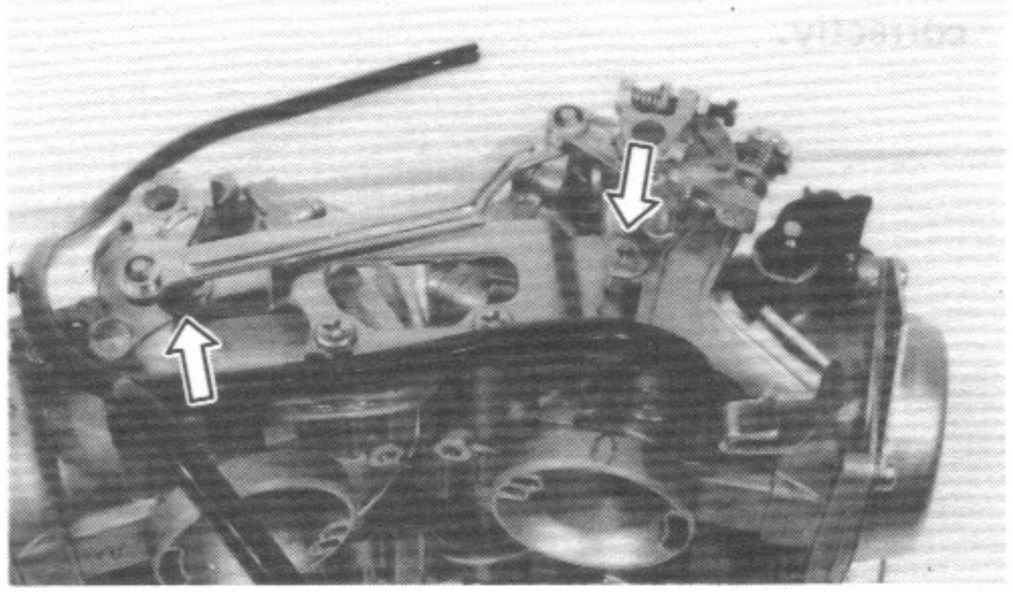
- Install the four carburetor assemblies to the engine assembly as shown in the figure and tighten the intake pipe clamps securely.
- In this condition tighten all the plate screws properly.



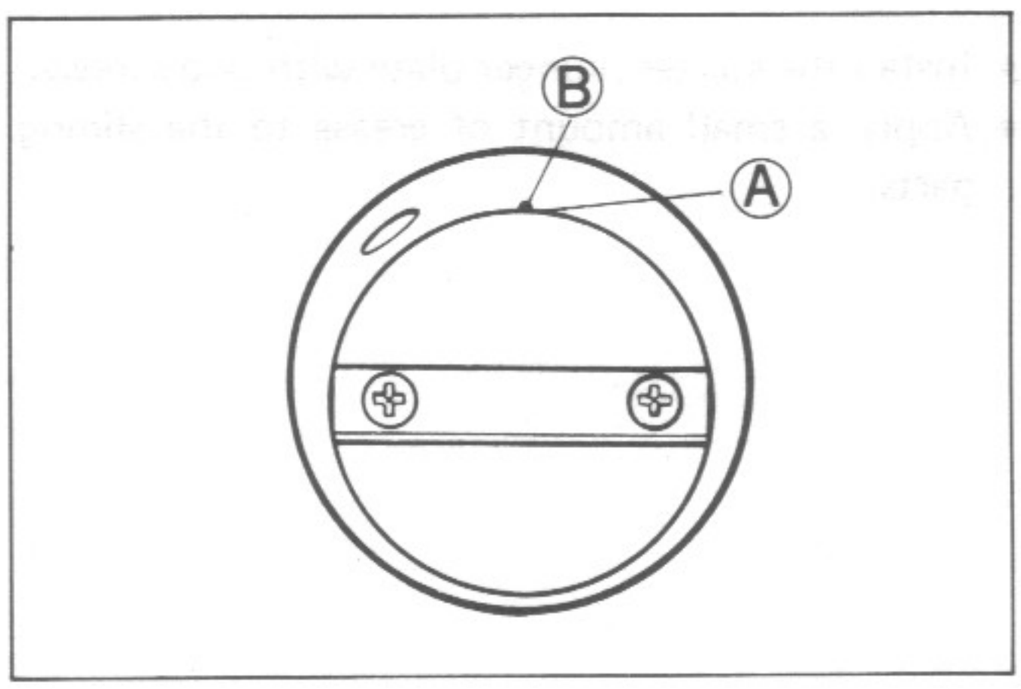
CAUTION:
When tightening carburetor plate screws, make sure to follow the above steps. Failure to do so cause imbalance of carburetors.

- When installing the front plate screws, apply thread lock cement to the screw thread.

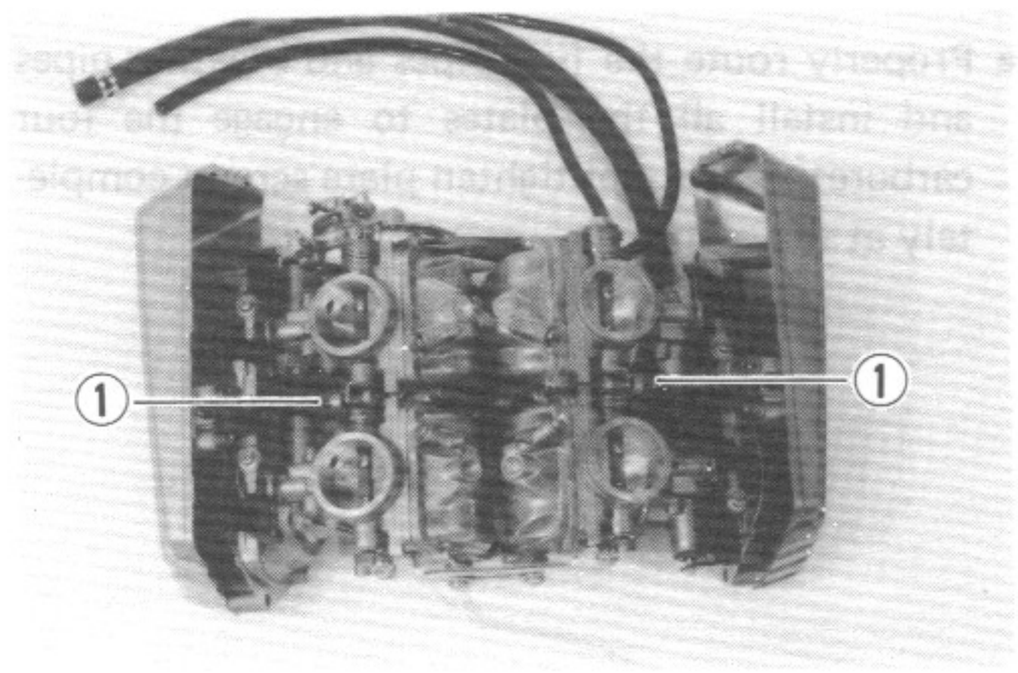
99000 - 32040	Thread lock cement



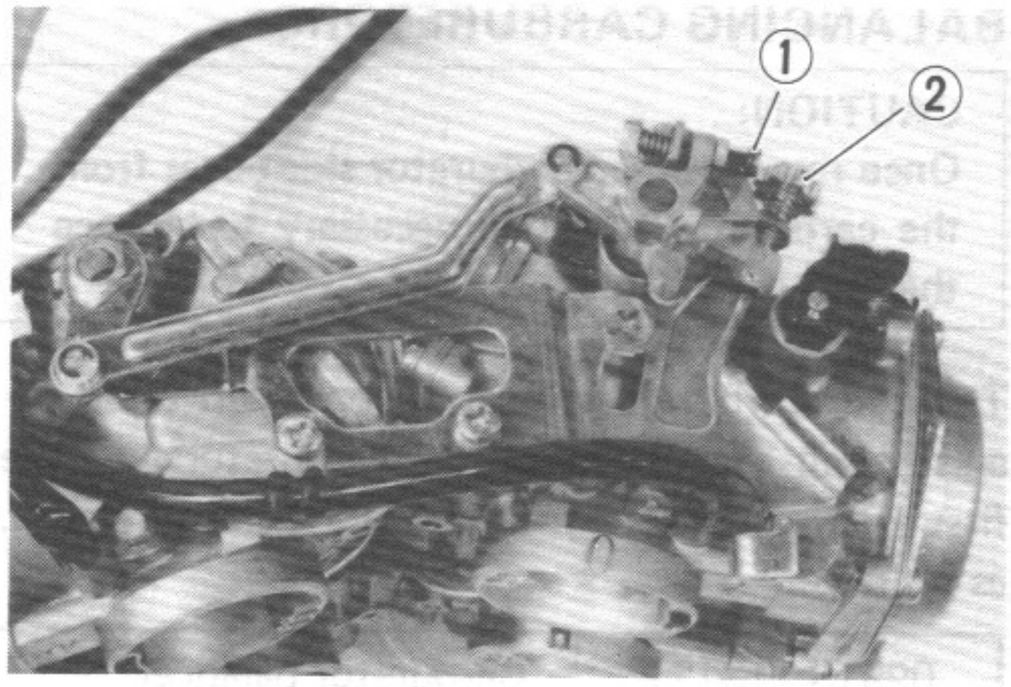
- Then remove the carburetor assembly from the engine assembly.
- Set each throttle valve in such a way that its top end Ⓐ meets the foremost bypass Ⓑ.



- Balance the front and rear carburetors by turning the balance screws ①.



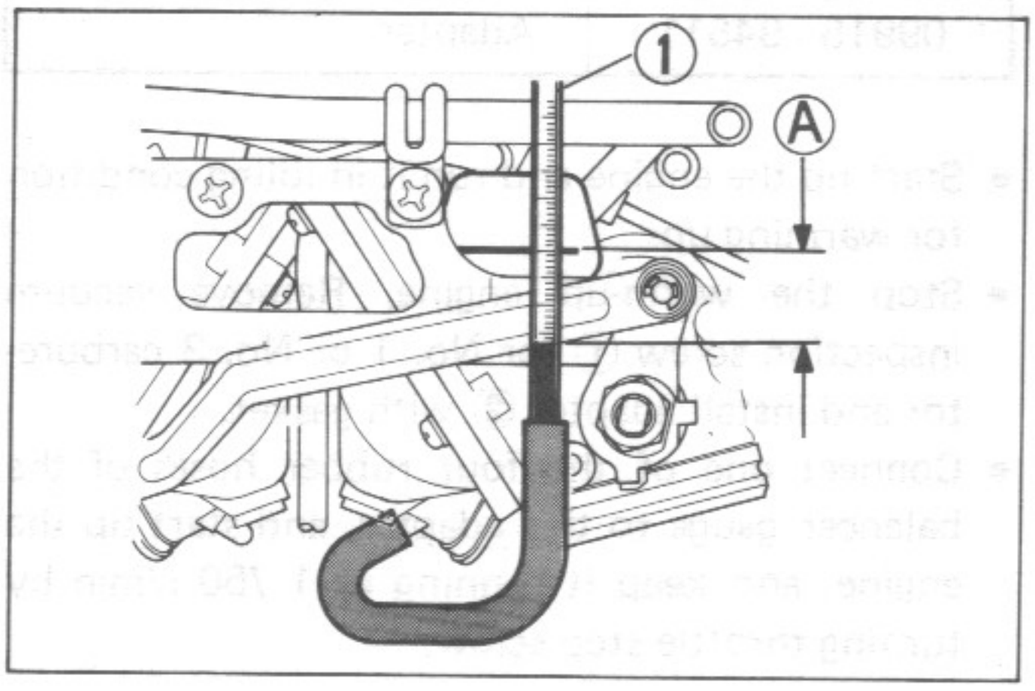
- Balance the right and left carburetors by turning the balance screw ① and throttle valve stop screw ②.
- After balancing all four carburetors tighten balance screw lock nuts securely.



FUEL LEVEL INSPECTION

- Install the fuel level gauge ① to the boss of the float chamber body and loosen the carburetor drain plug ②.

09913 - 10730	Fuel level gauge

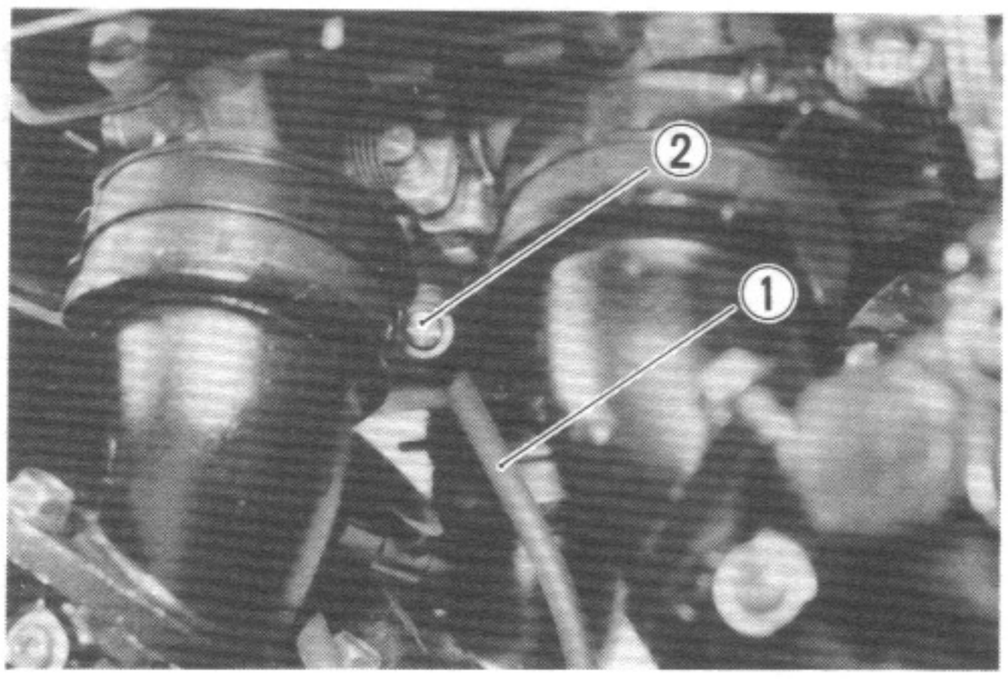


- Run the engine at the idling speed (1 000 – 1 200 r/min), and measure the distance Ⓐ with the middle line of the level gauge aligned with the index line of the carburetor body as shown in the figure. Ⓐ should be within the specified range.

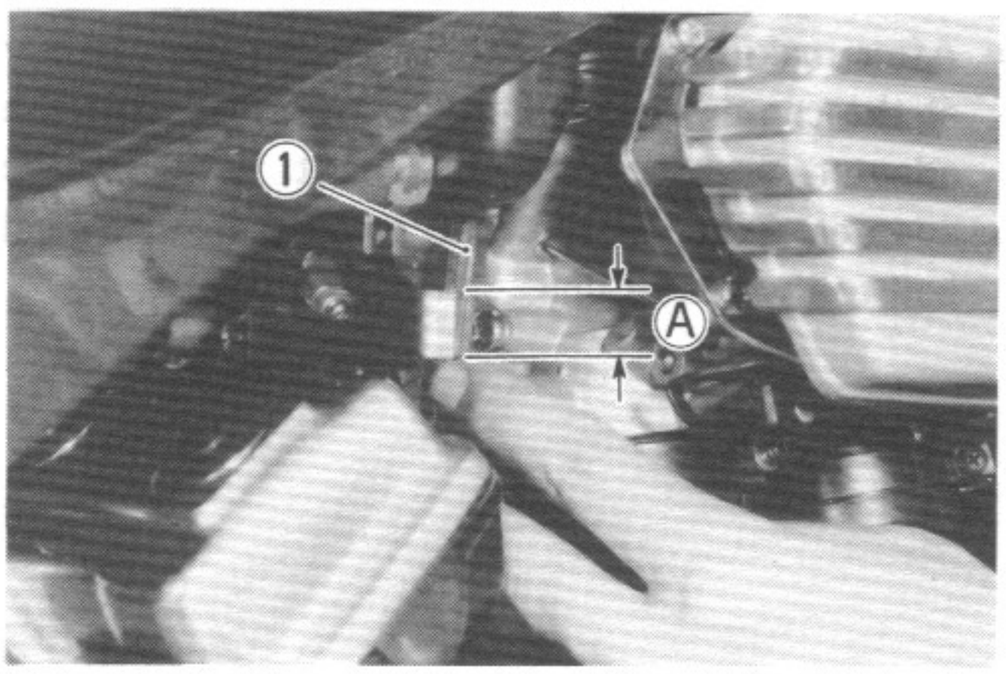
Distance Ⓐ	17.0 ± 0.5 mm (0.67 ± 0.02 in)

- Repeat the procedure on the other carburetors.

NOTE:
Fuel will not be supplied when the engine is stopped.



- If the fuel level is not within the above tolerance, remove the carburetor from the engine assembly and adjust the float height as shown in the page 6-16.

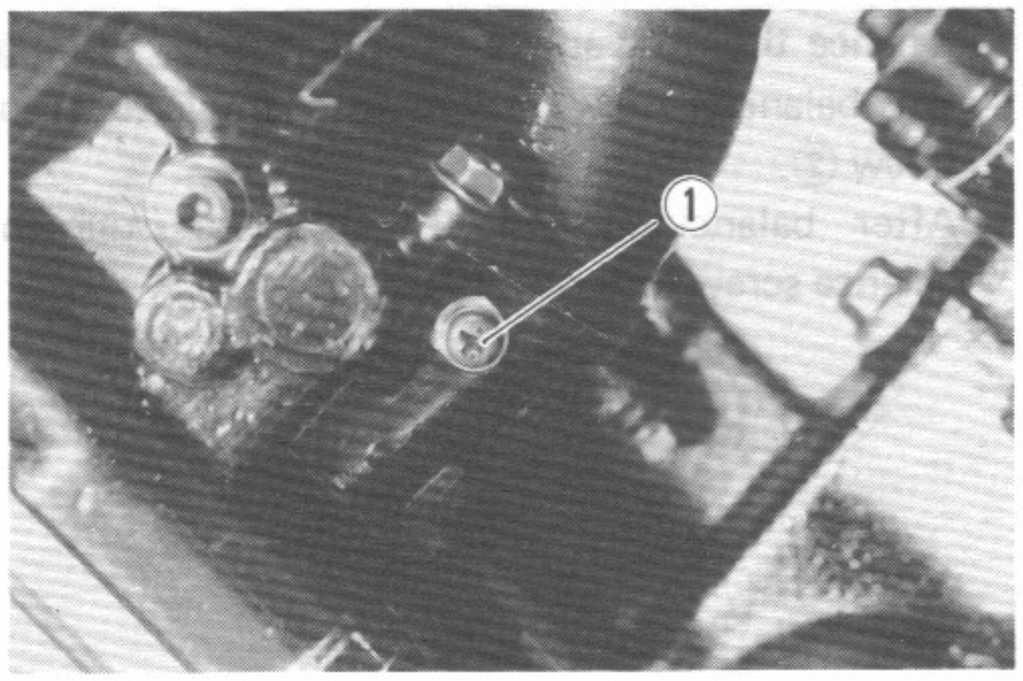


BALANCING CARBURETORS

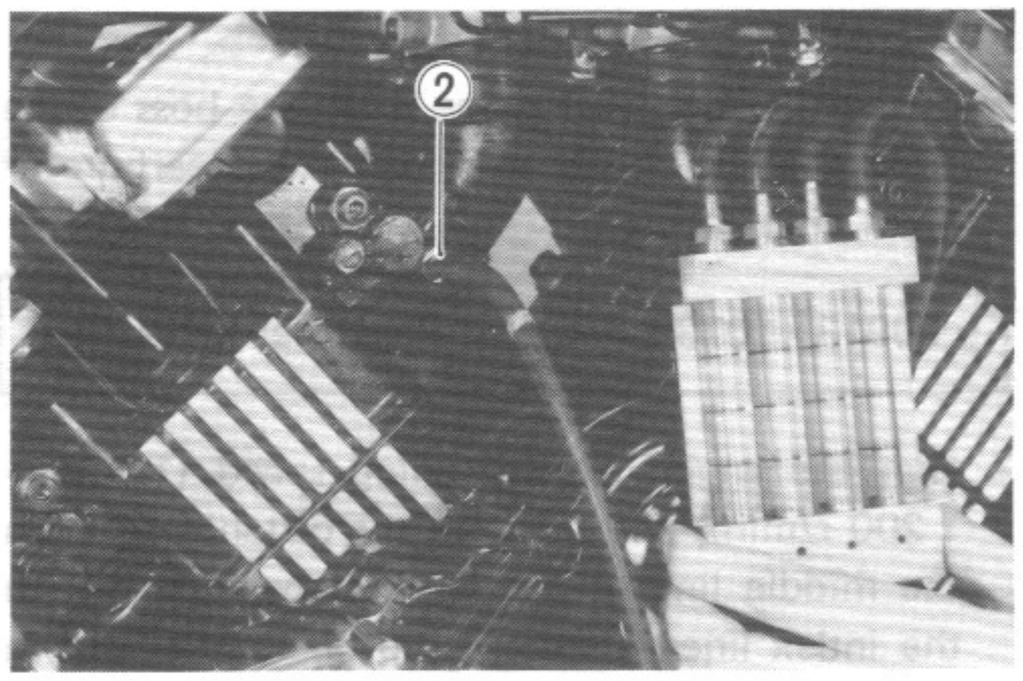
CAUTION:
Once removing the carburetor side cover from the carburetor top, it is necessary to balance the four carburetors.

The four carburetors must be balanced after disassembling the engine or the carburetors. As the first step, calibrate the carburetor balancer gauge, as follows:

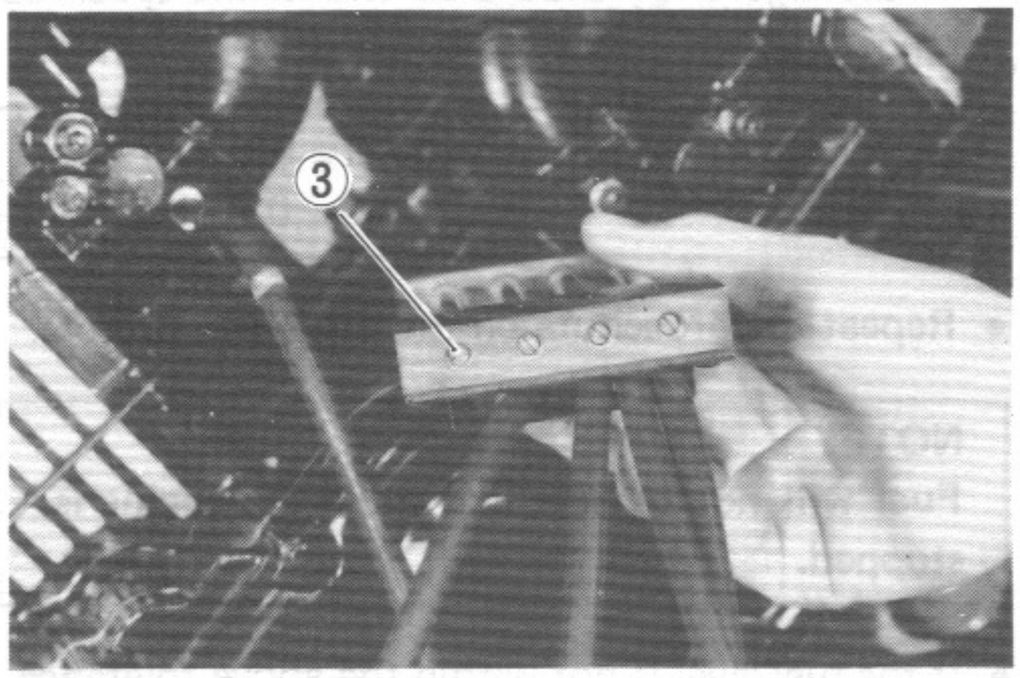
09913 - 13121	Carburetor balancer
09915 - 94511	Adapter



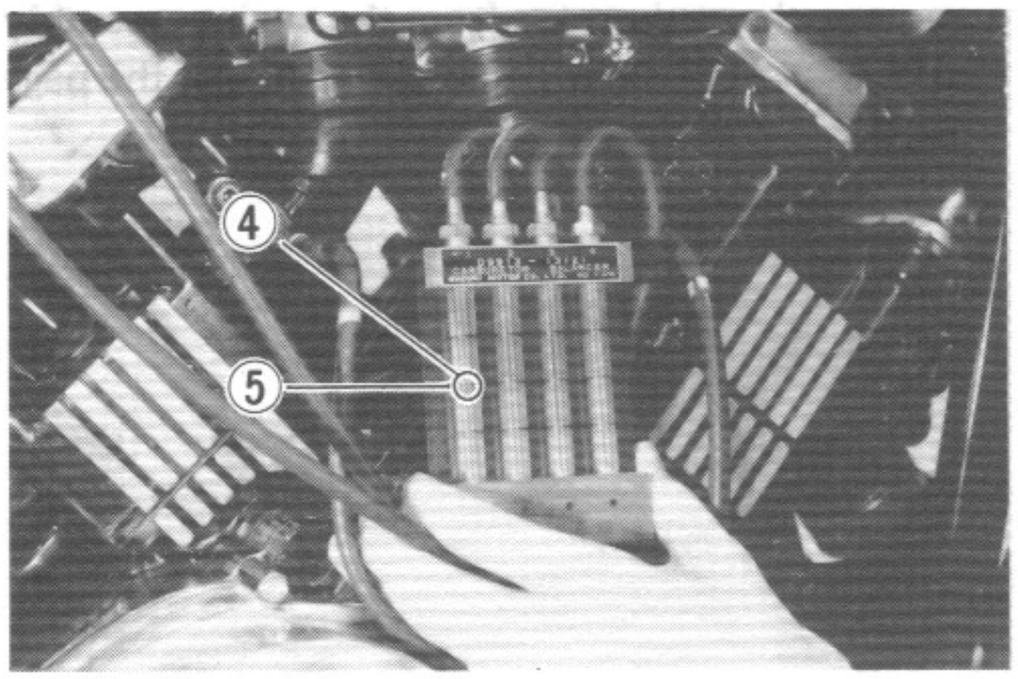
- Start up the engine and run it in idling condition for warming up.
- Stop the warm-up engine. Remove vacuum inspection screw ① for No. 1 or No. 3 carburetor and install adapter ② with gasket.
- Connect one of the four rubber hoses of the balancer gauge to this adapter, and start up the engine, and keep it running at 1 750 r/min by turning throttle stop screw.



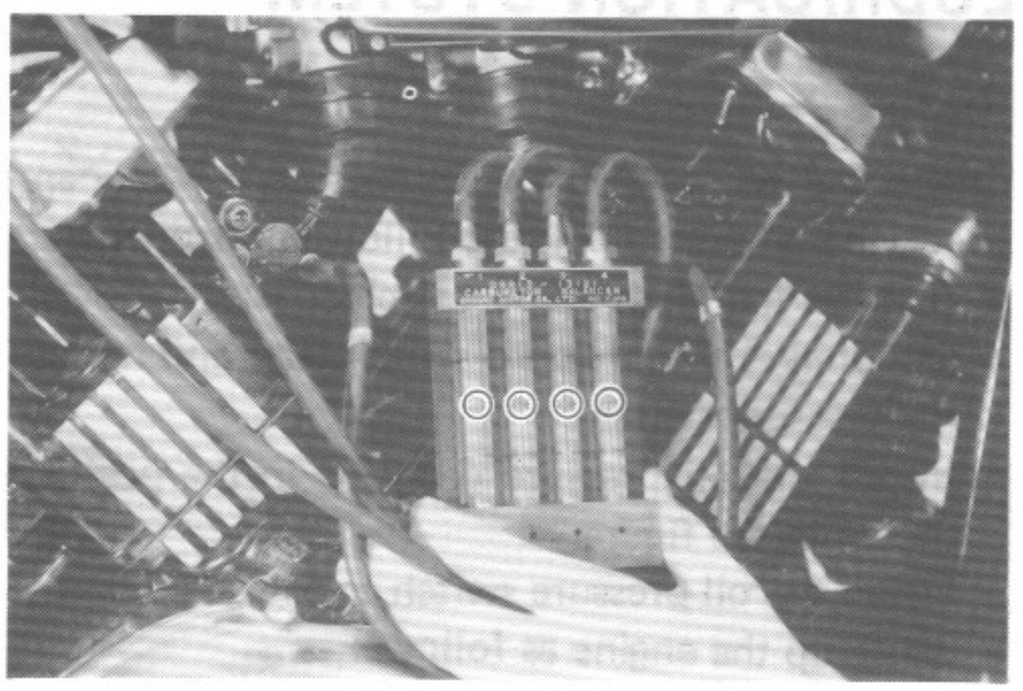
- Turn the air screw ③ of the gauge so that the vacuum acting on the tube of that hose will bring the steel ball ④ in the tube to the center line ⑤.



- After making sure that the steel ball stays steady at the center line, disconnect the hose from the adapter and connect the next hose to the adapter. Turn air screw to bring the other steel ball to the center line.

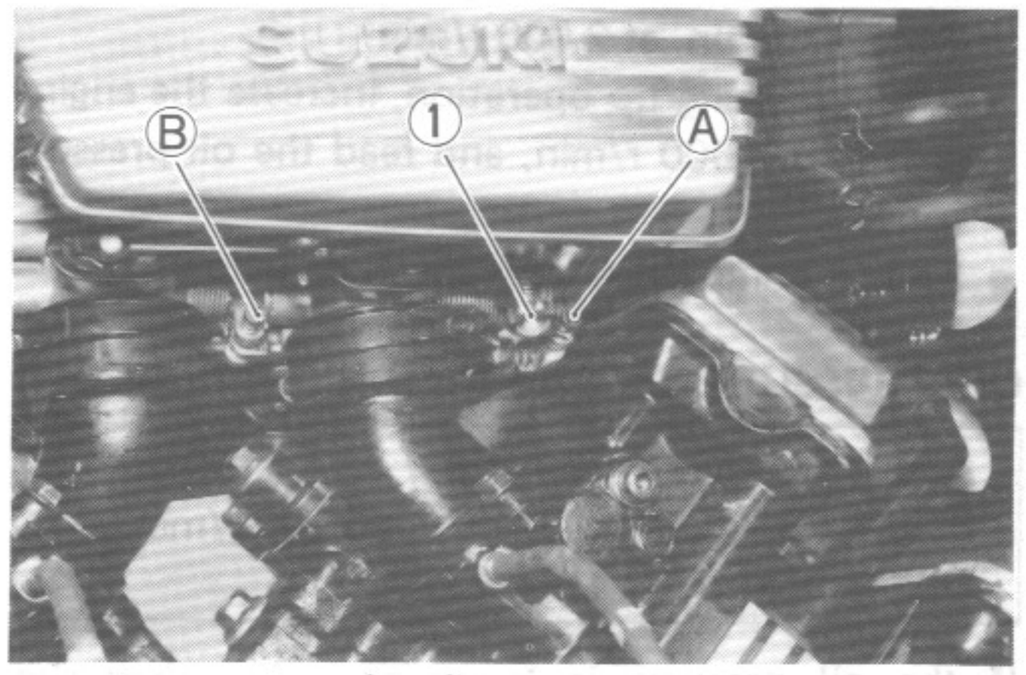


- Remove the vacuum inspection screws for the other carburetors, and install the other adapters.
- Have the four hoses, mentioned above, connected to the four adapters. Run the engine at steady 1 750 r/min and, under this running condition, see if the four steel balls stay equally at the center level line, as they should, to signify that the four carburetors are in balance: if not, loosen lock nut and turn throttle balance screw to adjust the throttle valve setting to bring its steel ball to the center level line.



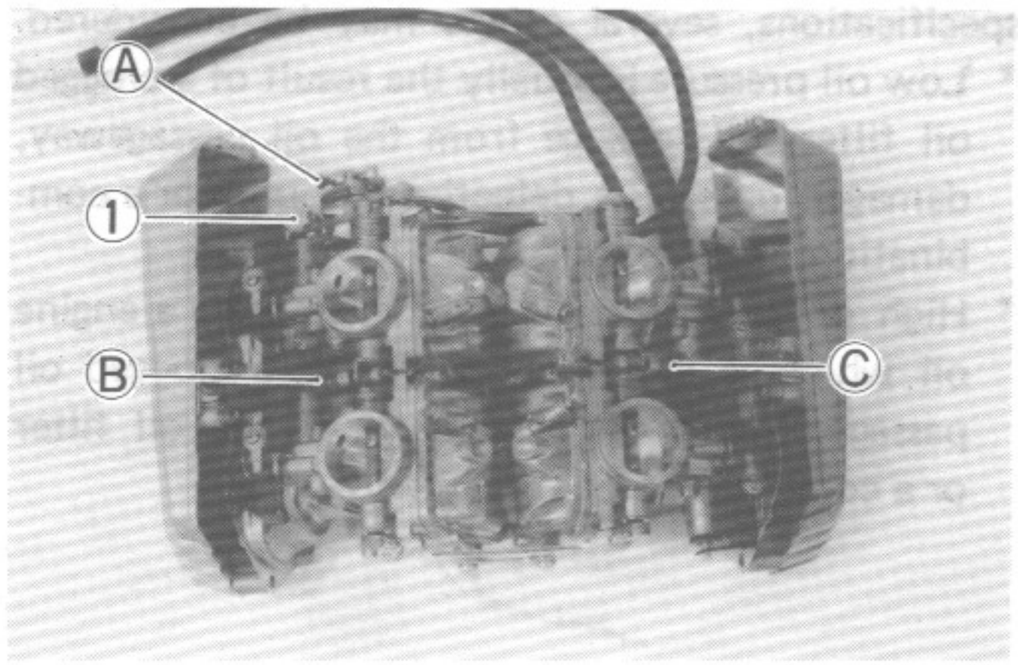
- Adjusting order:

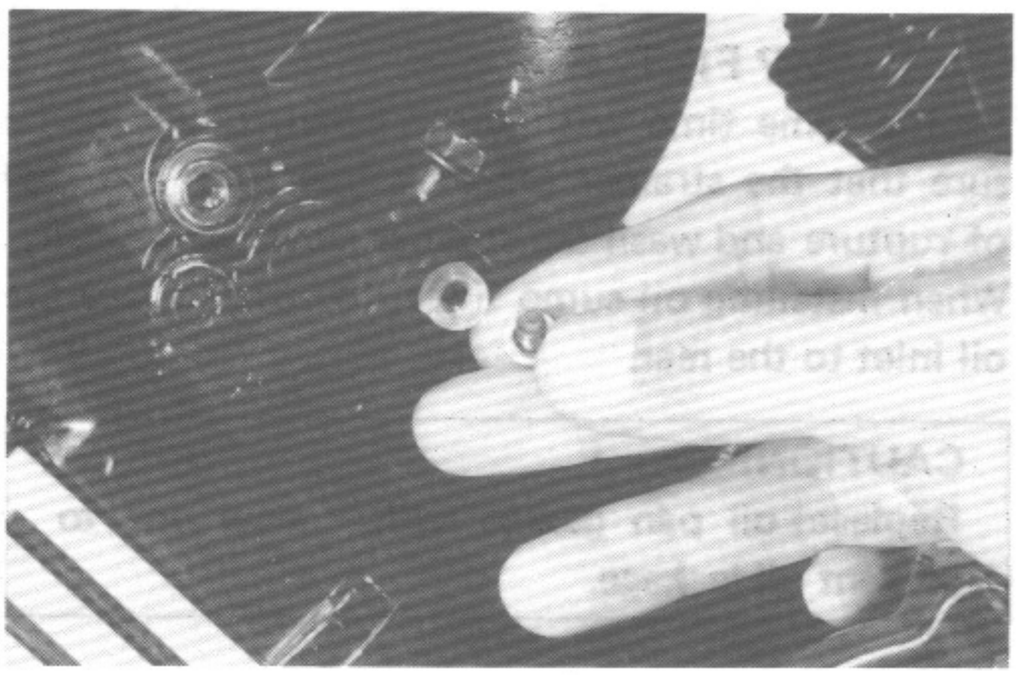
Ⓐ (For R (No. 4) and L (No. 2) carbs) → Ⓑ (for Nos. 3 & 4 carbs) → Ⓒ (Nos. 1 & 2 carbs)



Turning the balance screws will tend to change engine speed; if any change is noted, restore the speed to 1 750 r/min by turning the throttle stop screw ①.

- After balancing the carburetors, set its speed between 1 000 and 1 200 r/min by turning the throttle stop screw.
- Install the gasket to the vacuum inspection screw.



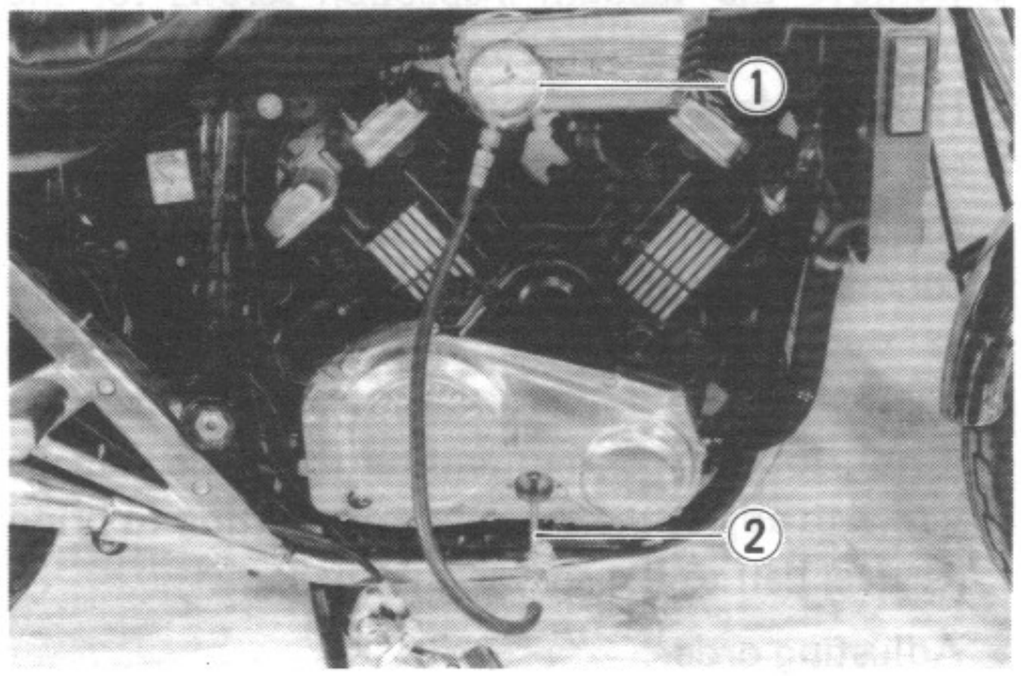


LUBRICATION SYSTEM

OIL PRESSURE

Check the oil level in the inspection window and check the oil pressure in the following manner.

- Remove the oil pressure switch cover.
- Disconnect the pressure switch lead and remove the pressure switch.
- Install the oil pressure gauge ① in the position shown in the figure.
- Install the oil pressure switch to the adapter ②.
- Warm up the engine as follows:
  Summer 10 min. at 2 000 r/min.
  Winter 20 min. at 2 000 r/min.
- After warming up operation, increase the engine speed to 3 000 r/min, and read the oil pressure gauge.
- The oil pump pressure is specified below:



OIL PRESSURE SPECIFICATION

Above 4.5 kg/cm² (64 psi) Below 7.5 kg/cm² (107 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.

CAUTION:
The recommended engine oil is, API classification SE or SF, 10W-40 motor oil.

09915 - 74510	Oil pressure gauge
09915 - 77330	Oil pressure gauge (meter)
09915 - 17410	Oil pressure gauge adapter

- Using pocket tester, inspect the oil pressure switch.
- If pocket tester shows OFF when the engine is running and tester shows ON when engine stops, the oil pressure switch is in good condition.
- When fitting the oil pressure switch, apply SUZUKI Bond No. 1207B to its thread lightly to prevent oil leakage.

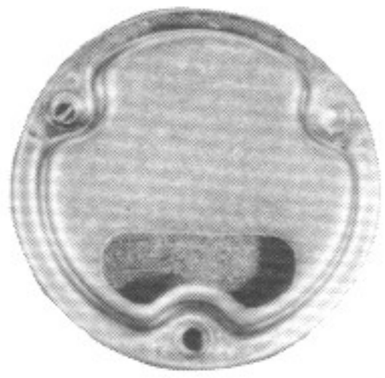
99104 - 31140	SUZUKI Bond No. 1207B

Tightening torque	13 – 17 N·m (1.3 – 1.7 kg-m) (9.5 – 12.5 lb-ft)

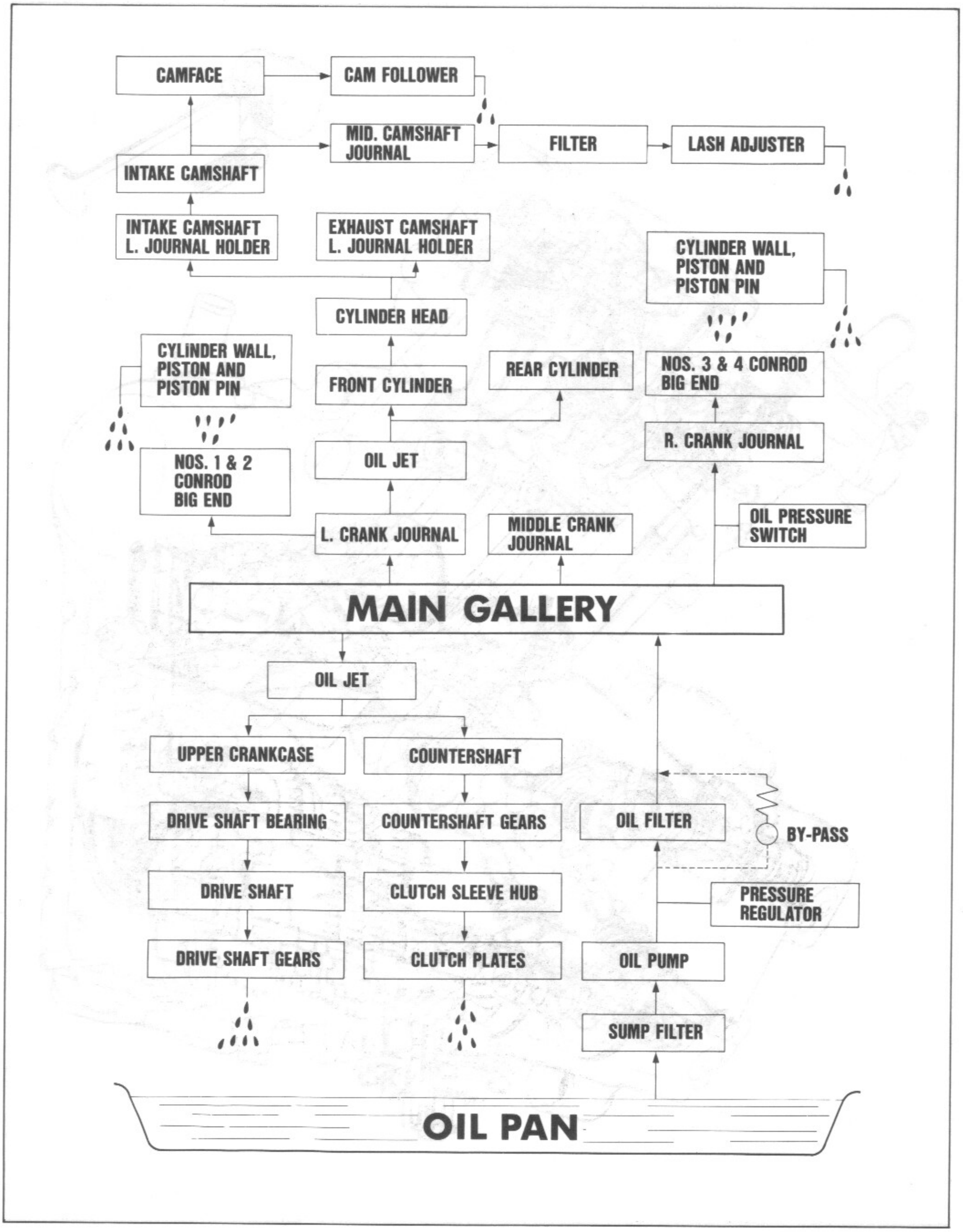
OIL SUMP FILTER

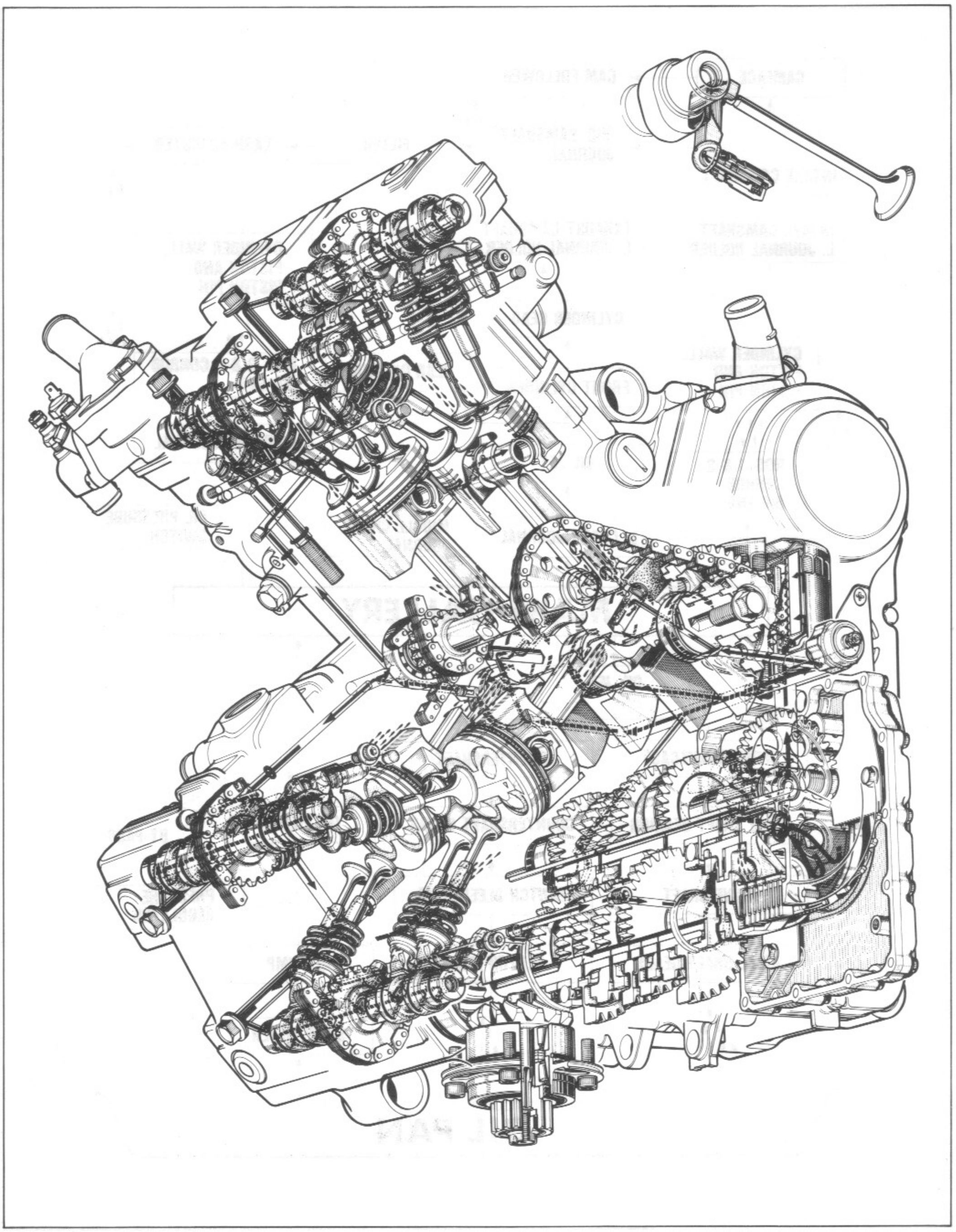
At the same time wash the oil pan. Check to be sure that the strainer screen is free from any sign of rupture and wash the strainer clean periodically. When installing oil sump filter, be sure to face the oil inlet to the rear.

CAUTION:
Replace oil pan gasket with a new one to prevent oil leakage.



LUBRICATION SYSTEM CHART





EMISSION CONTROL & REGULATIONS

CONTENTS

EMISSION REGULATIONS 7- 1

EMISSION CONTROL CARBURETOR COMPONENTS 7- 2

GENERAL EMISSION INFORMATION 7- 3

EMISSION REGULATIONS

On February 4, 1977, Federal Emission Regulations for motorcycles that may be licensable took effect. The regulations provided for a gradual, multi-step application of stricter emission limits beginning with all effected motorcycles manufactured after January 1, 1978, culminating with the present 1980 emission level restrictions. For the 1980 and succeeding years one set of emission limits will be in effect. They are as follows:

1980 EMISSION LIMITS

CATEGORIES	HYDROCARBONS (HC)	CARBON MONOXIDE
All motorcycles 50cc – Larger	5.0 Grams/Kilometer (8.0 Grams/Mile)	12 Grams/Kilometer (19.3 Grams/Mile)

Emission-controlled motorcycles which are subject to the emission regulations are those motorcycles which are equipped with a headlight, taillight, stop light and which have an engine displacement larger than 50 cc.

Suzuki Motor Company performed all the necessary testing and certification of emission-controlled models in strict compliance with the E.P.A. testing regulations. Suzuki motorcycle dealers are not required to either test or certify emission levels on any motorcycles as Suzuki Motor Company is legally responsible for the entire certification procedure.

E.P.A. regulations also provide fines for individuals who alter, render inoperative or improperly service emission-controlled motorcycles ranging up to $10,000.00 per motorcycle. It is essential that the individual servicing this emission-controlled motorcycle review thoroughly all the service procedures presented in this manual. Under no circumstances should the recommended service procedures be deviated from nor adjustments made which are not in accordance with the factory specifications or service procedures.

EMISSION CONTROL CARBURETOR COMPONENTS

GV700GL motorcycles are equipped with precision, manufactured carburetors for emission level control. These carburetors require special mixture control components and other precision adjustments to function properly.

There are several carburetor mixture control components in each carburetor assembly. Three (3) of these components are machined to much closer tolerances than standard machined carburetor jets. These three (3) particular jets – MAIN JET, NEEDLE JET, PILOT JET – must not be replaced by standard jets. To aid in identifying these three (3) jets a different design of letter and number are used. If replacement of these close tolerance jets becomes necessary, be sure to replace them with the same type close tolerance jets marked as in the examples shown below.

The jet needle is also of special manufacture. Only one clip position is provided on the jet needle. If replacement becomes necessary the jet needle may only be replaced with an equivalent performing replacement component. Suzuki recommends that Genuine Suzuki Parts be utilized whenever possible for the best possible performance and durability.

Conventional Figures Used on Standard Tolerance Jet Components	1 2 3 4 5 6 7 8 9 0
Emission Type Figures Used On Close Tolerance Jet Components	1 2 3 4 5 6 7 8 9 0

The carburetor specification for the emission-controlled GV700GL are as follows.

Carburetor I.D. No.	Main Jet	Needle Jet	Jet Needle	Pilot Jet	Pilot Screw
07A10	Nos. 1 & 3 #92.5 Nos. 2 & 4 #90	Y-6	Nos. 1 & 3 5TO5 Nos. 2 & 4 5TO1	#25	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, interferring with, improper replacement, or resetting of any of the carburetor components may adversely affect carburetor performance and cause the motorcycle to exceed the exhaust emission level limits. If 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.

GENERAL EMISSION INFORMATION

There are three different types of regulated exhaust emissions. They are:

Hydrocarbons (HC)
Carbon Monoxide (CO)
Oxides of Nitrogen (NOx)

Automobiles must meet specific emission standards for all three of these pollutants. Motorcycles must only meet the requirements for the following:

Hydrocarbons (HC)
Carbon Monoxide (CO)

HC exhaust emissions are basically unburned fuel vapors which have passed through the engine and escaped the combustion process.

CO exhaust emissions are formed during an incomplete combustion cycle as a result of a rich air/fuel mixture. The only way that CO can be produced is by the combustion cycle.

Total NOx emissions from all motorcycles is considered negligible. The EPA states that total NOx emission from motorcycles by 1990 will only amount to approximately 0.5%. NOx is formed during the combustion process at high combustion chamber temperatures.

CARBON MONOXIDE

Carbon monoxide is a product of an incomplete combustion cycle. CO is measured in grams per mile or kilometer and also in percentage (%).

The most common cause of CO is rich carburetion. As the mixture is richened excessively, the CO amount increases proportionately. Engine oil is also a hydrocarbon, so engine problems which lead to oil burning increase carbon monoxide.

CARBURETION MALFUNCTION

1. Air Cleaner – Dirty or over oiled.
2. Idle Mixture – Adjusted incorrectly.
3. Idle Speed – Too high or low.
4. Fuel Level – Sticking float, leaking needle, incorrect setting
5. Choke – Leaking or linkage sticking.
6. Synchronization – Improper balance on multi cylinders.

ENGINE MALFUNCTION

1. Valve Seals – Leaking or torn.
2. Valve Guide – Worn and leaking excess oil.
3. Gaskets – Leaking oil into combustion chamber.

HYDROCARBONS

Hydrocarbons are unburnt gasoline vapors and can be measured in two different ways. The first is to measure the weight of the pollutants over a specific distance such as grams per mile or grams per kilometer. The second method is to measure the concentration of HC in the exhaust gas in parts per million (PPM).

The most common cause of high HC emissions are ignition system problems. If the ignition system fails to ignite the fuel mixture properly, then raw gasoline vapors will pass through the engine into the exhaust system. Listed are the most common ignition problems which occur and which can affect HC emission output.

IGNITION SYSTEM MALFUNCTIONS

1. Spark Plugs – Fouled, dirty, improper type or improperly gapped.
2. Ignition Timing – Advanced or Retarded.
3. Timing Advance – Too fast or too slow an advance rate.
4. Battery – Low charge or faulty.

Carburetion can also lead to high HC emissions if the mixture is either excessively rich or excessively lean.

MIXTURE-RELATED MALFUNCTIONS

1. Air Cleaner – Dirty, over oiled or torn.
2. Jets – Clogged, restricted or incorrect size.
3. Float Level – Level too low (lean) or too high (rich).
4. Choke – Leaking choke plunger or sticking linkage.
5. Air Leaks – Intake manifolds, engine gaskets and other sealing surfaces.
6. Synchronization – Unbalanced on multi-cylinder machines.
7. Exhaust System – Restricted flow or improper exhaust system.

Engine wear or damage can also cause high HC emissions.

1. Rings – Low compression, leakage into crankcase.
2. Valves – Improper adjustment, bent stem or burnt.
3. Gaskets – Leaking, loss of compression.
4. Crank Seals – Leaking.
5. Oil Consumption – Worn valve guides, worn rings, clogged crankcase breather.
6. Oil – Improper engine oil.

ELECTRICAL SYSTEM

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SWITCHES 8-17
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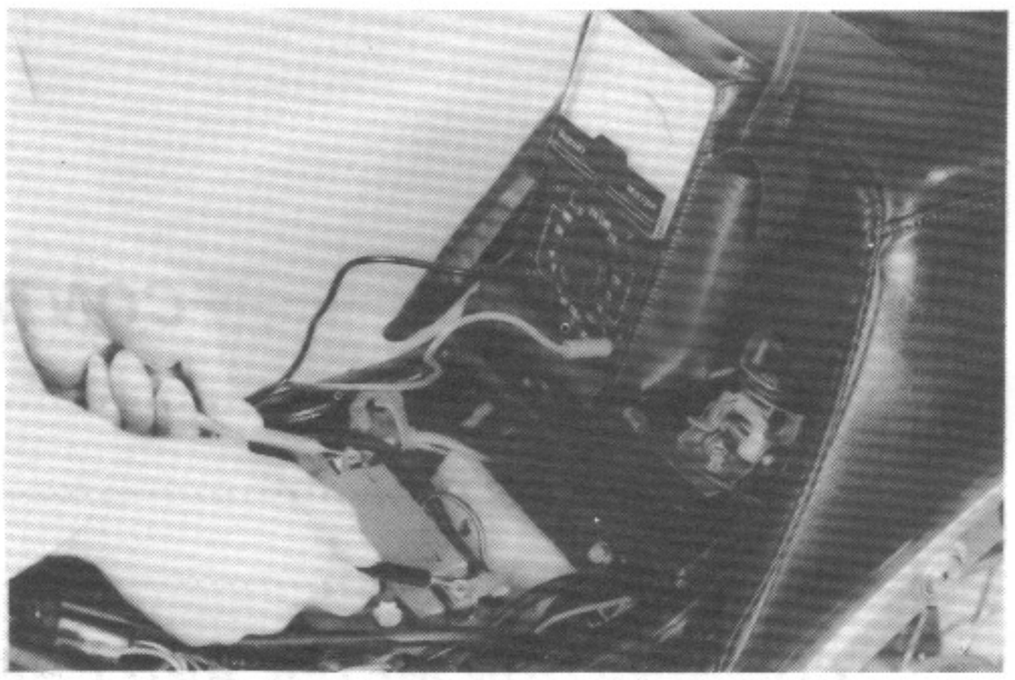
CHARGING SYSTEM

INSPECTION

CHARGING OUTPUT CHECK

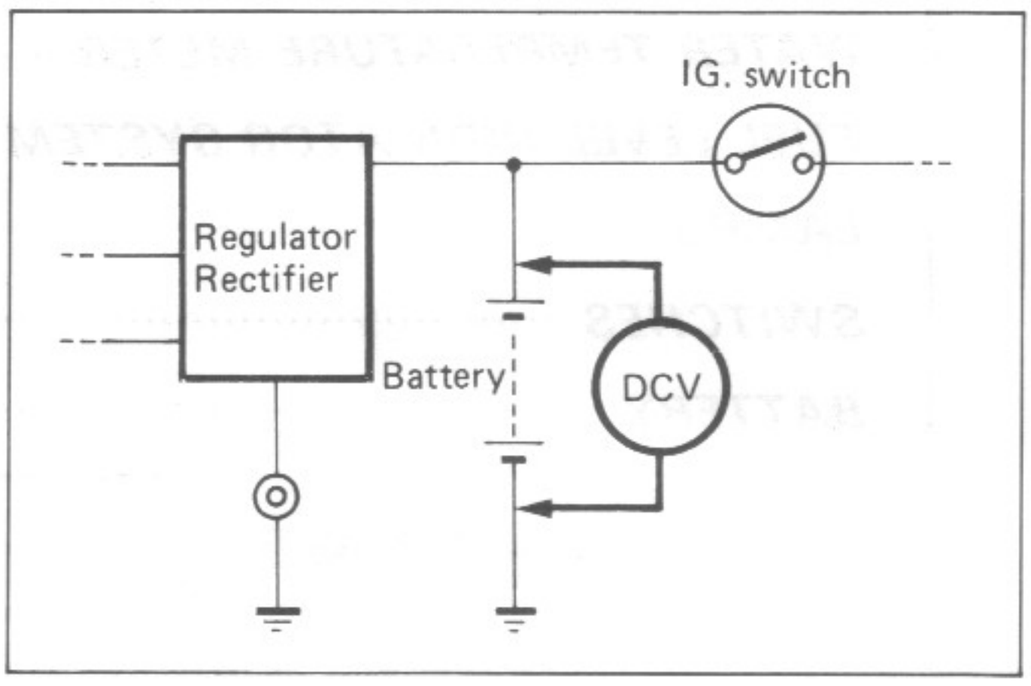
- Remove the seat.
- Start the engine and keep it running at 5 000 r/min with lighting switch turned ON and dimmer switch turned HI position.
- Using the pocket tester, measure the DC voltage between the battery terminal ⊕ and ⊖.
  If the tester reads under 14V or over 15V, check the AC generator no-load performance and regulator/rectifier.



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

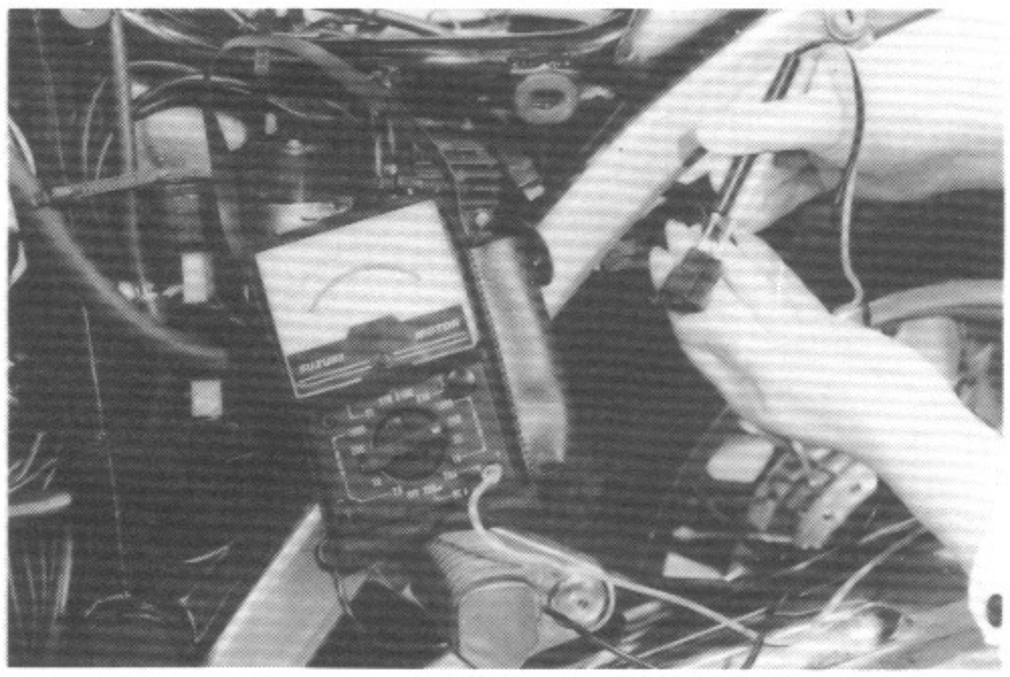
STD charging output	14 – 15V (DC) at 5 000 r/min

09900 - 25002	Pocket tester



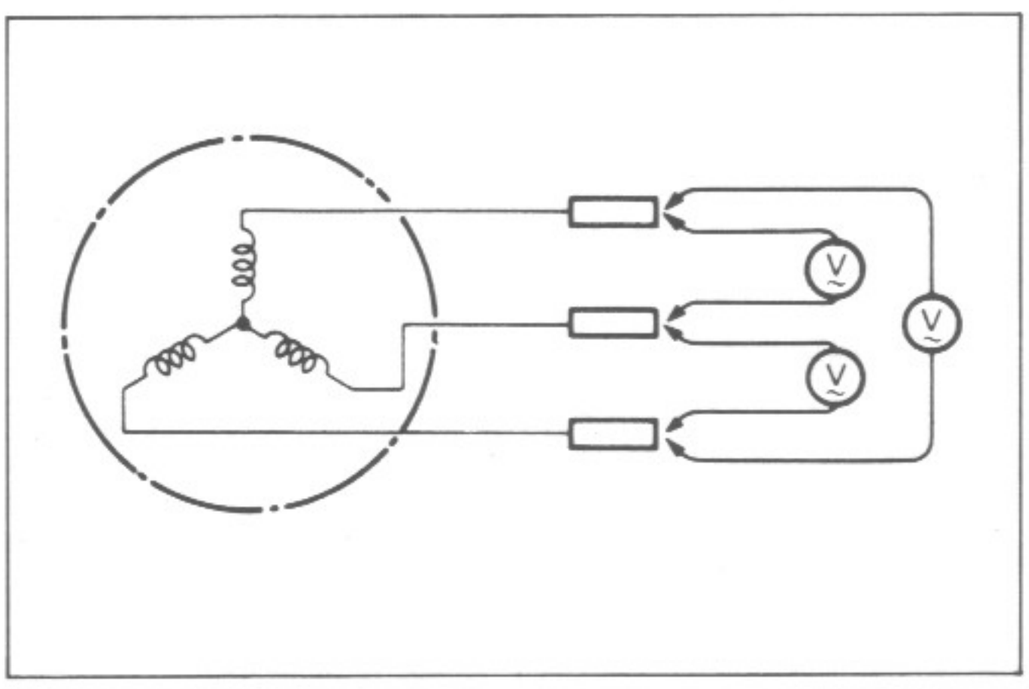
AC GENERATOR NO-LOAD PERFORMANCE

- Remove the seat and left frame cover.
- Disconnect the AC generator lead wire coupler.
- 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 65V, the AC generator is faulty.



STD No-load performance	More than 65V (AC) at 5 000 r/min

09900 - 25002	Pocket tester

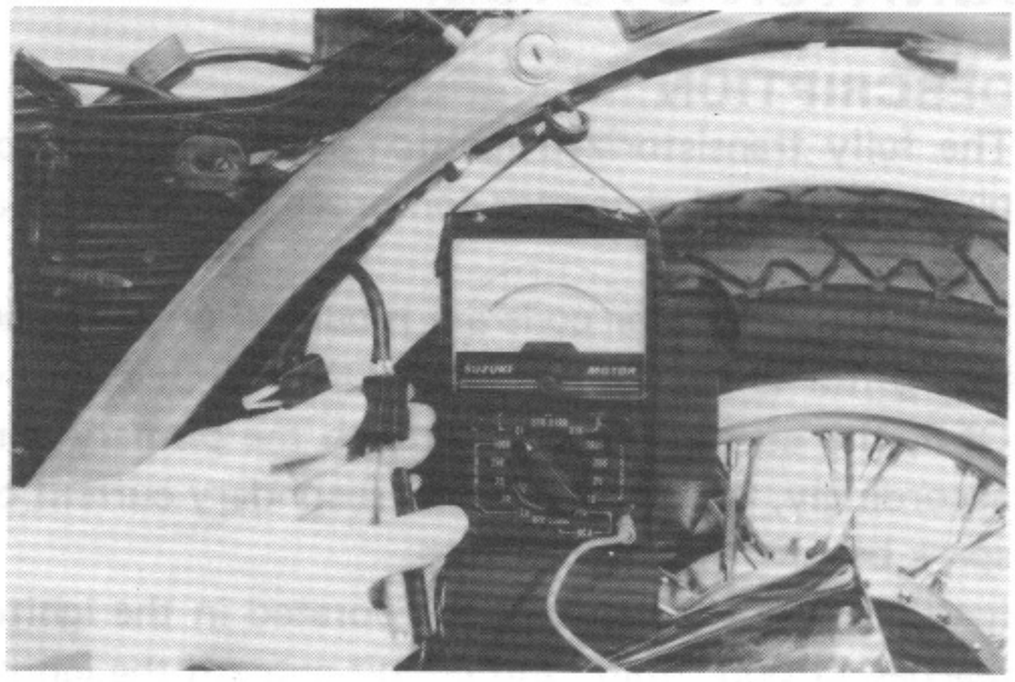


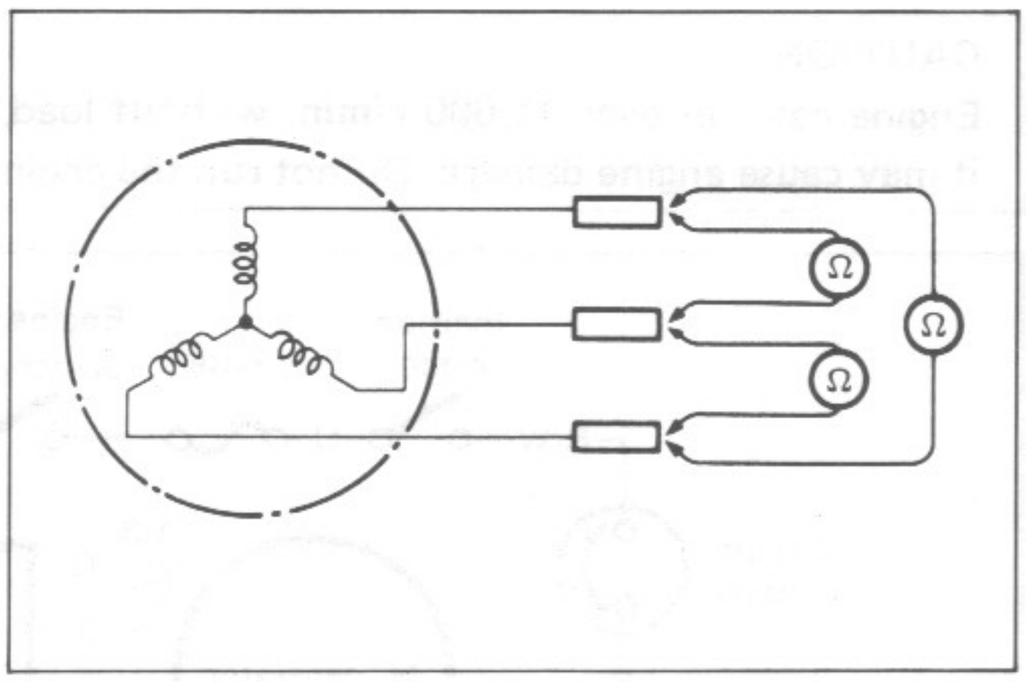
AC GENERATOR CONTINUITY CHECK

- 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

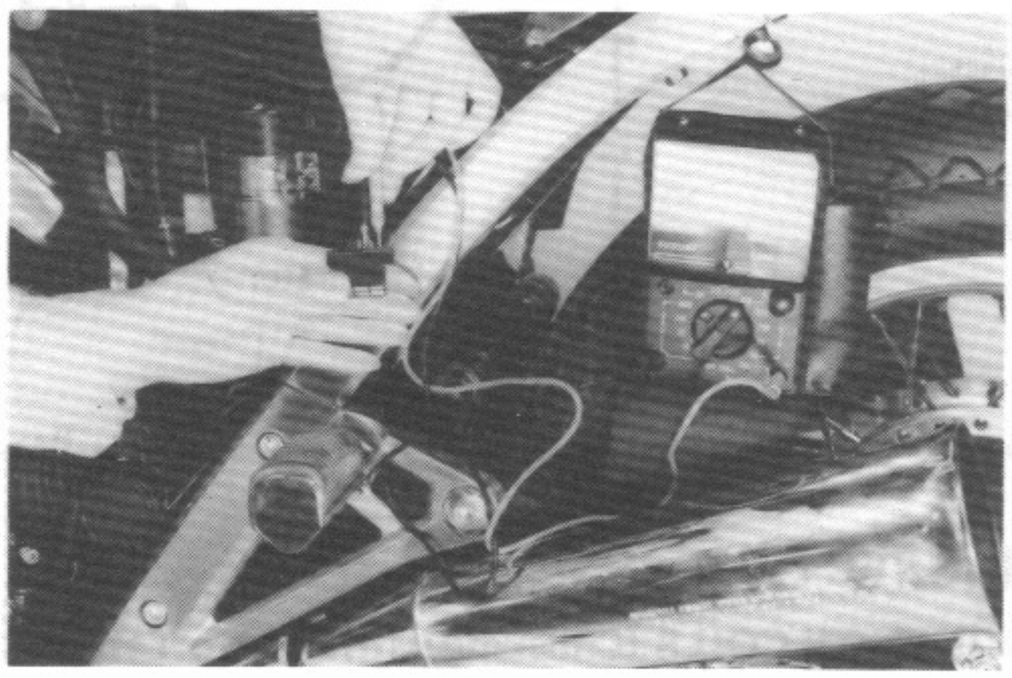
- Remove the seat and left frame cover.
- Using the pocket tester (X 1kΩ range), measure the resistance between the lead wires in the following table.
  If the resistance checked is incorrect, replace the regulator/rectifier.

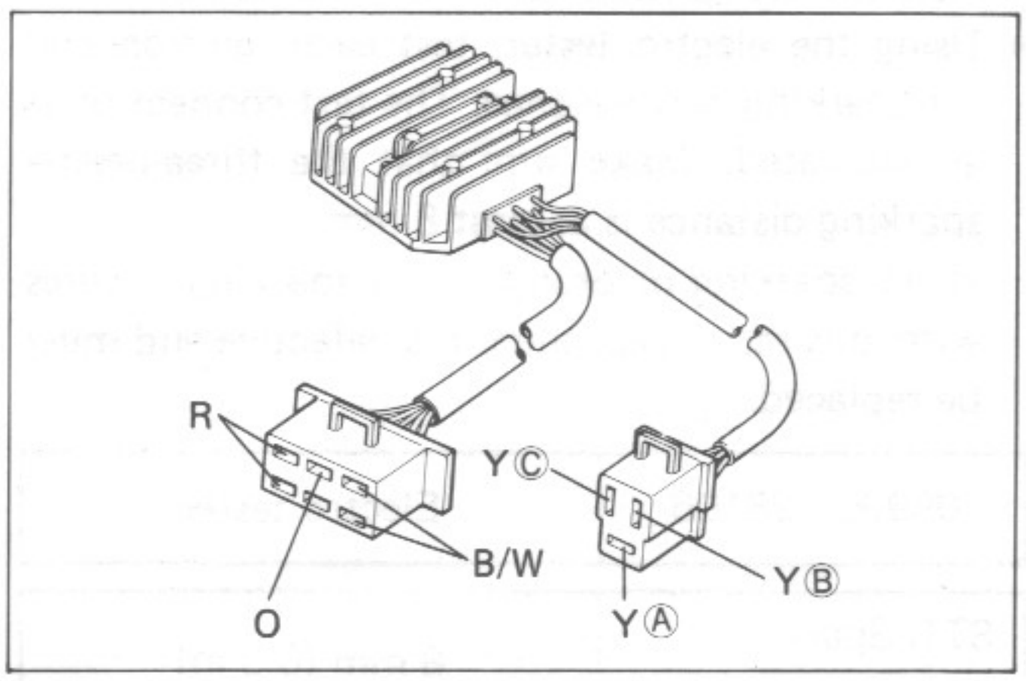
09900 - 25002	Pocket tester

Unit: kΩ

⊖ Probe of tester to: / ⊕ Probe of tester to:	R	O	B/W	Y Ⓐ	Y Ⓑ	Y Ⓒ
R		∞	∞	∞	∞	∞
O	Approx. 80		Approx. 35	Approx. 50	Approx. 50	Approx. 50
B/W	Approx. 8.5	Approx. 5.2		Approx. 3	Approx. 3	Approx. 3
Y Ⓐ	Approx. 3	∞	∞		∞	∞
Y Ⓑ	Approx. 3	∞	∞	∞		
Y Ⓒ	Approx. 3	∞	∞	∞	∞	

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

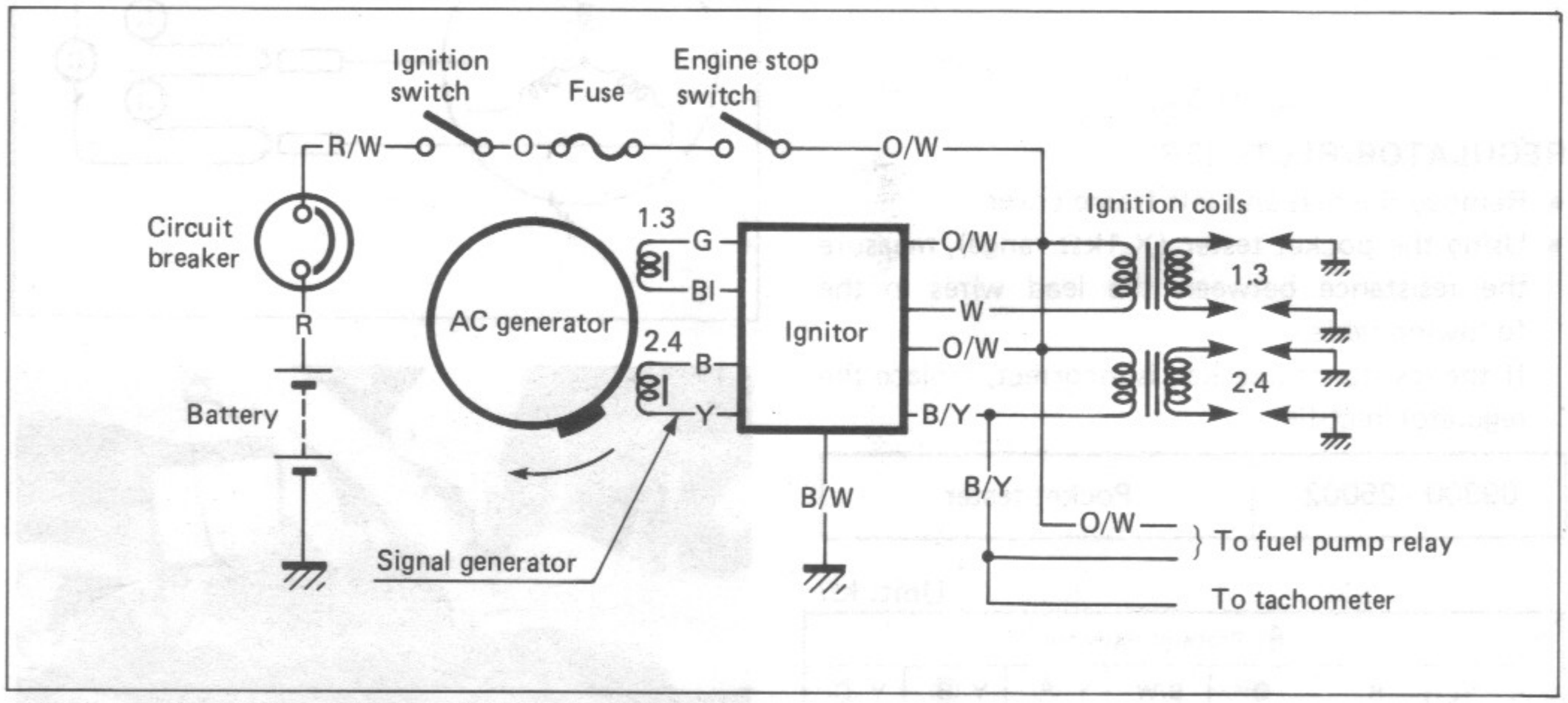
The fully transistorized ignition system consists of a signal generator, ignitor, ignition coils, and spark plugs. The signal generator comprises one rotor tip and two pickup coils.

The signal generator coils are 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 OFF and ON accordingly, thus it induces the secondary current on the ignition coil secondary windings and produce the spark between spark plug gaps.

Ignition cut-off circuit is incorporated in the ignitor unit to prevent over-running engine. If engine r/min. reaches 11,000 r/min., this circuit cuts off the ignition primary current for all spark plugs.

CAUTION:

Engine can run over 11,000 r/min. without load, even if the ignition cut-off circuit is effective, and it may cause engine damage. Do not run the engine without load over 11,000 r/min. at anytime.



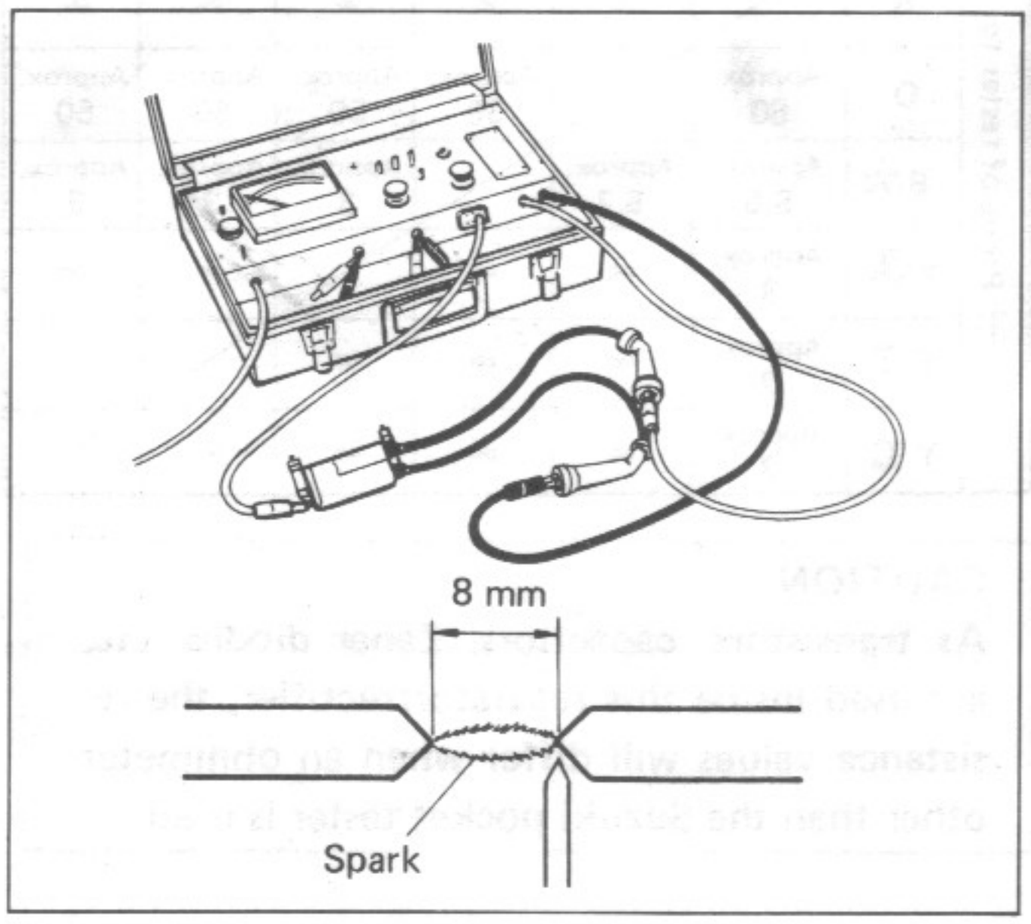
INSPECTION

IGNITION COILS (Checking with Electro Tester)

- Remove the ignition coils 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 occures with this much gap, then it is defective and must be replaced.

09900 - 28106	Electro tester

STD Spark performance	8 mm (0.3 in)

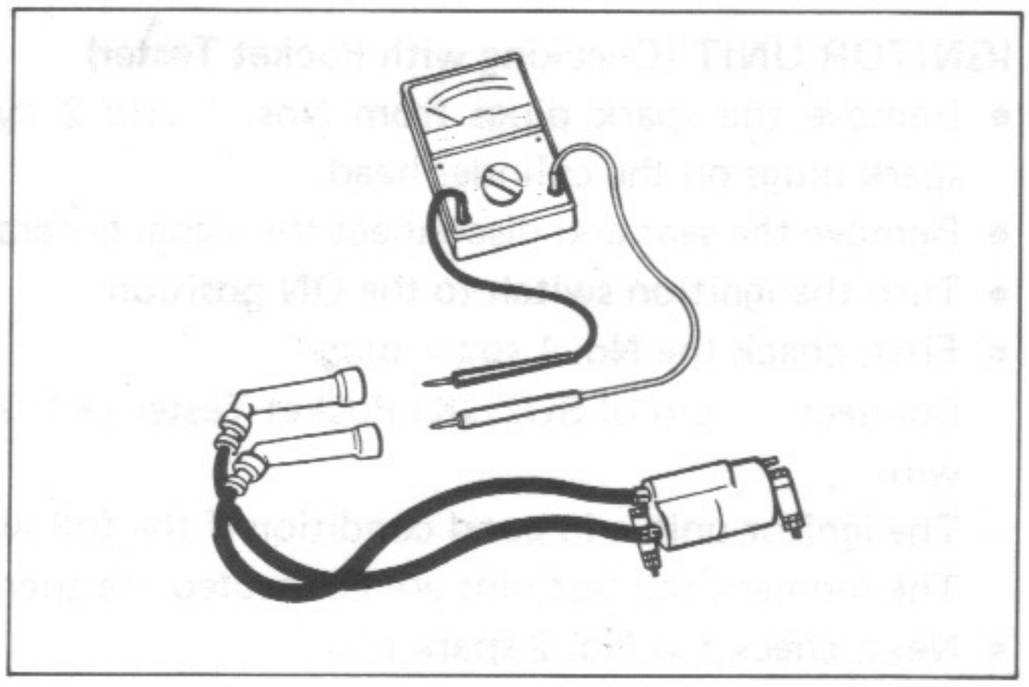


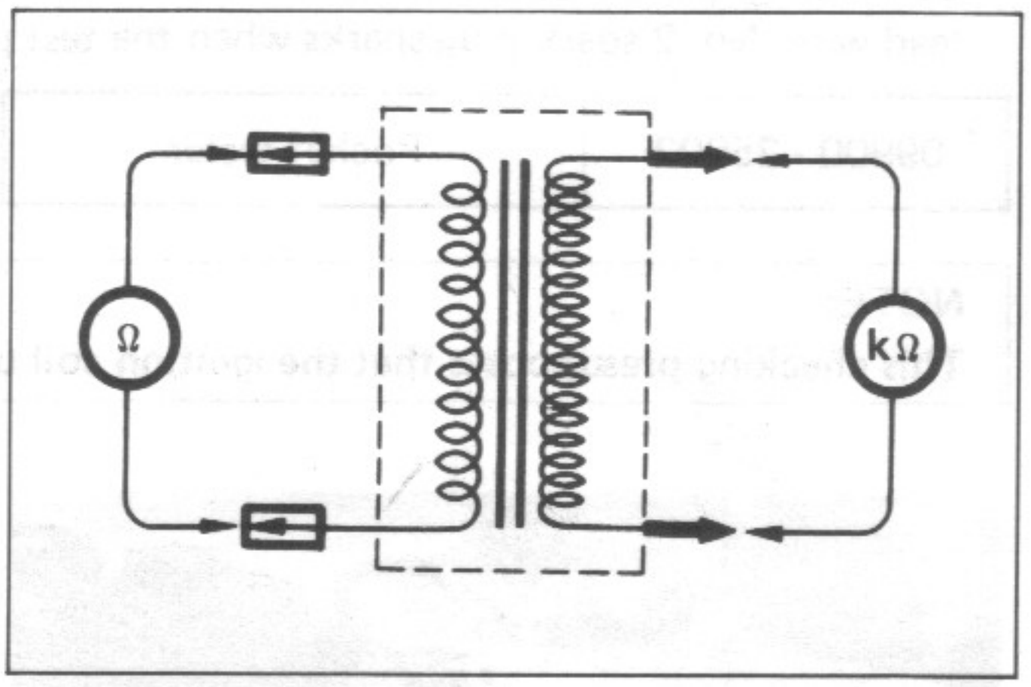
IGNITION COILS (Checking with Pocket Tester)

- 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	3 – 5 Ω
Secondary	10 – 20 kΩ



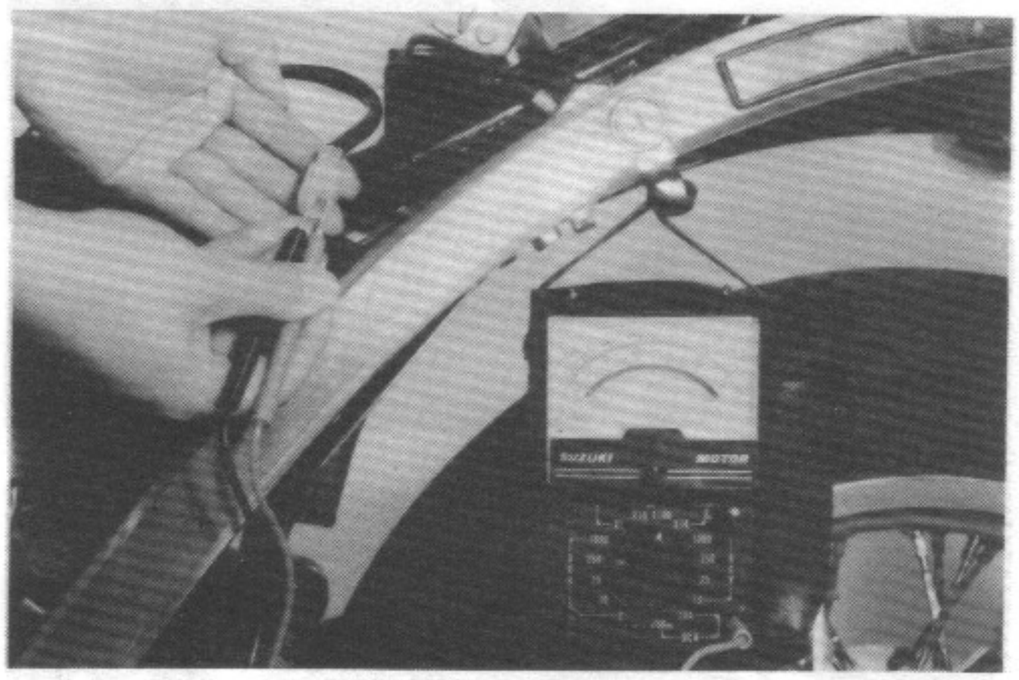


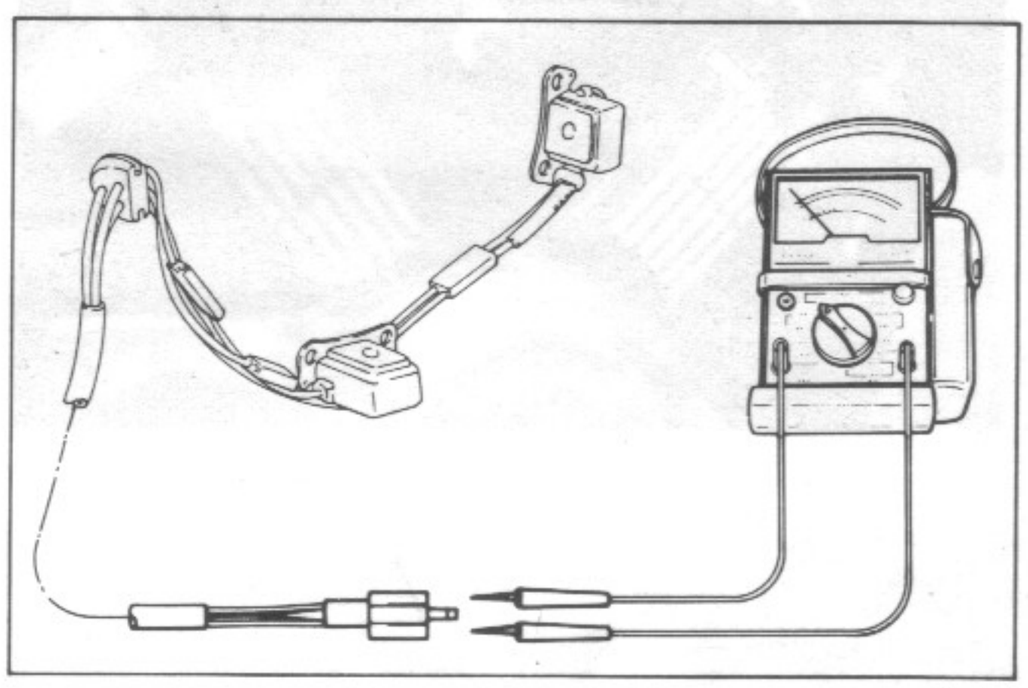
SIGNAL GENERATOR (Checking with Pocket Tester)

- Remove the seat.
- Measure the resistance between lead wires. If the resistance is infinity or less than the specifications, the signal generator must be replaced.

09900 - 25002	Pocket tester

STD resistance	
Green – Blue	90 – 140 Ω
Black – Yellow	



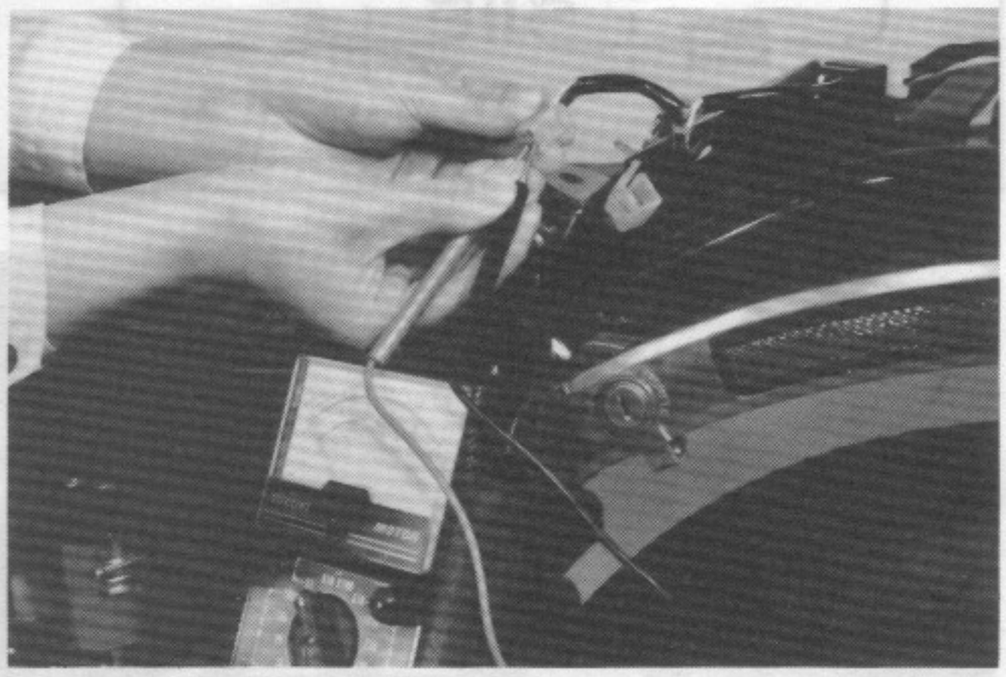


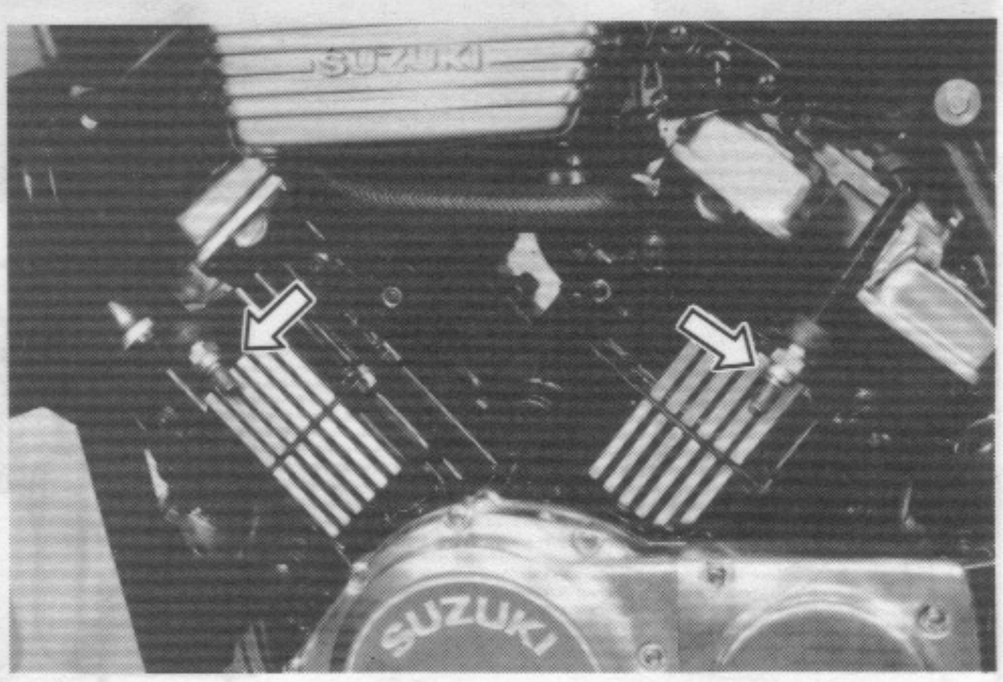
IGNITOR UNIT (Checking with Pocket Tester)

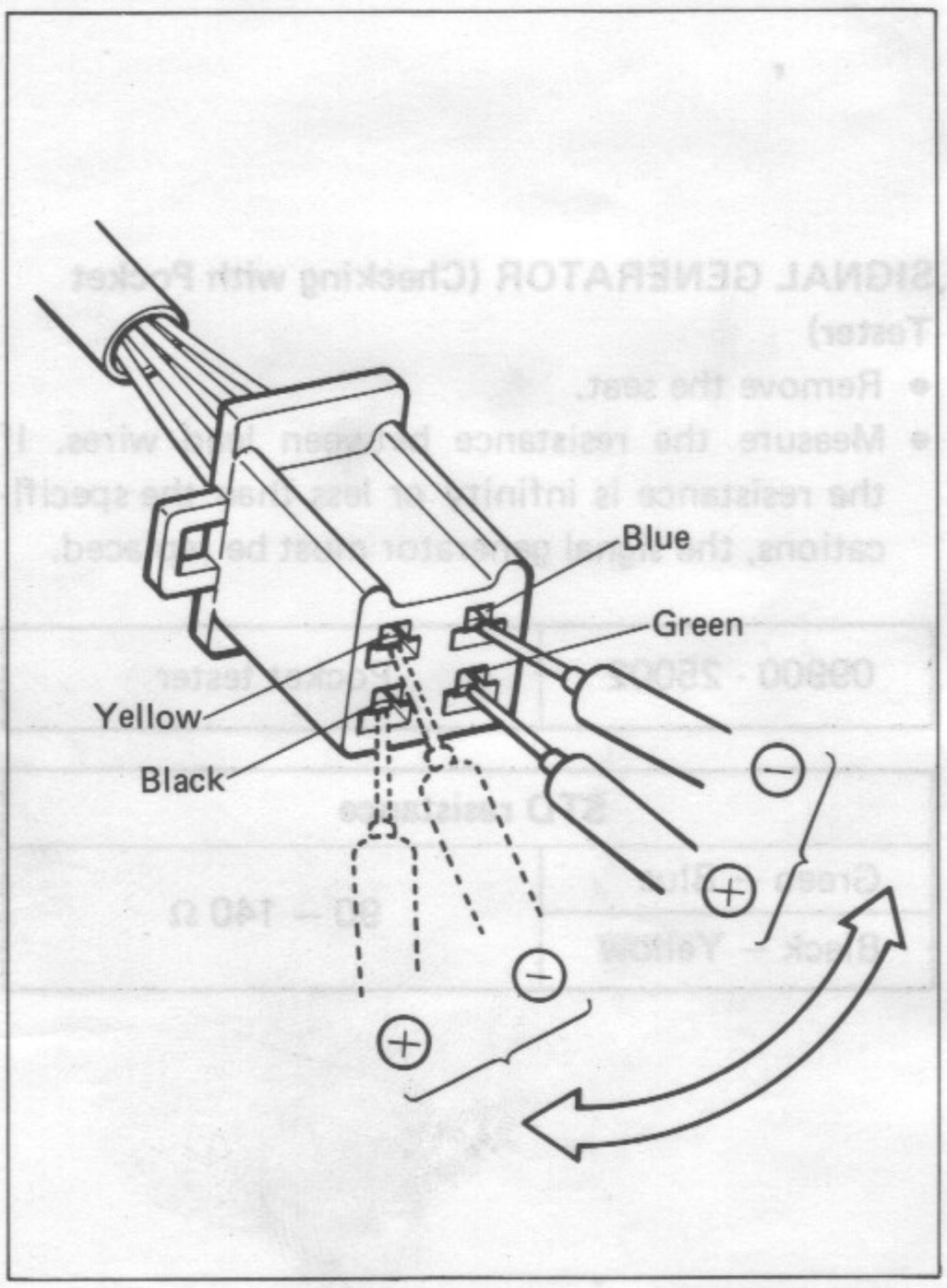
- Remove the spark plugs from Nos. 1 and 2 cylinders. Install the respective plug caps and place the spark plugs on the cylinder head.
- Remove the seat and disconnect the signal generator lead wire coupler from the ignitor.
- Turn the ignition switch to the ON position.
- First, check the No. 1 spark plug.
  Connect ⊖ pin of SUZUKI Pocket Tester (X1 Ω range) with Blue lead wire and ⊕ pin with Green lead wire.
  The ignitor unit is in good condition if the following is observed:
  The moment the test pins are connected the spark plug of No. 1 cylinder sparks.
- Next, check the No. 2 spark plug.
  Connect ⊖ pin of SUZUKI Pocket Tester (X1 Ω range) with Yellow lead wire and ⊕ pin with Black lead wire. No. 2 spark plug sparks when the test pins are connected.

09900 - 25002	Pocket tester

NOTE:
This checking presupposes that the ignition coil used for checking is a good one.





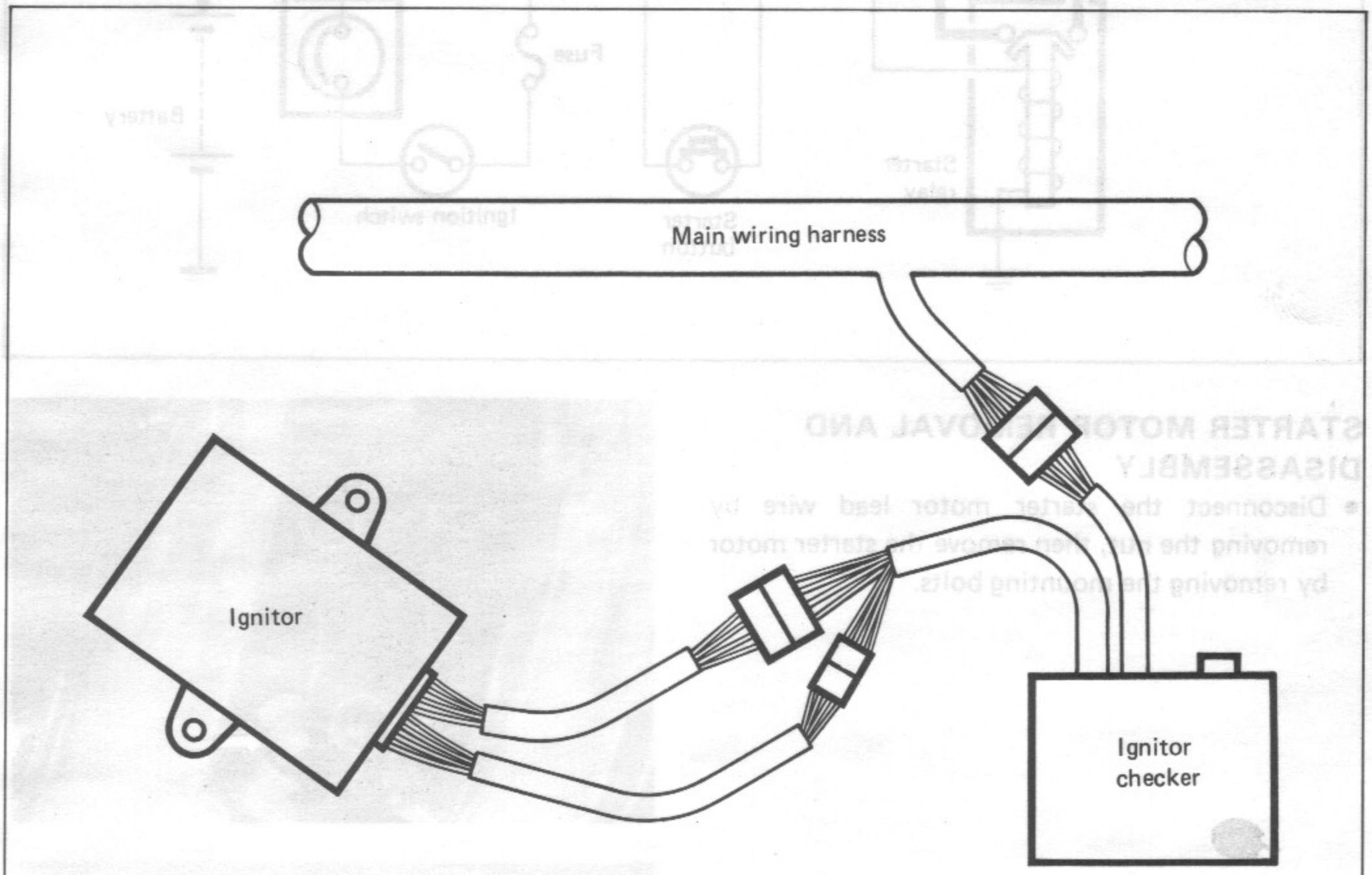


IGNITOR UNIT (Checking with Ignitor Checker)

- Remove the spark plugs from Nos. 1 and 2 cylinders. Install the respective plug caps and place the spark plugs on the cylinder head.
- Remove the seat and disconnect the ignitor lead wire couplers.
- Connect the couplers on the ignitor checker to the ignitor lead wire couplers, as shown in the illustration.
- Turn the ignition switch to the ON position.
- Turn the ignitor checker switch to the ON position and check the sparks of respective spark plugs.

09930 - 70710	Ignitor checker

NOTE:
This checking presupposes that the ignition coil used for checking is a good one.

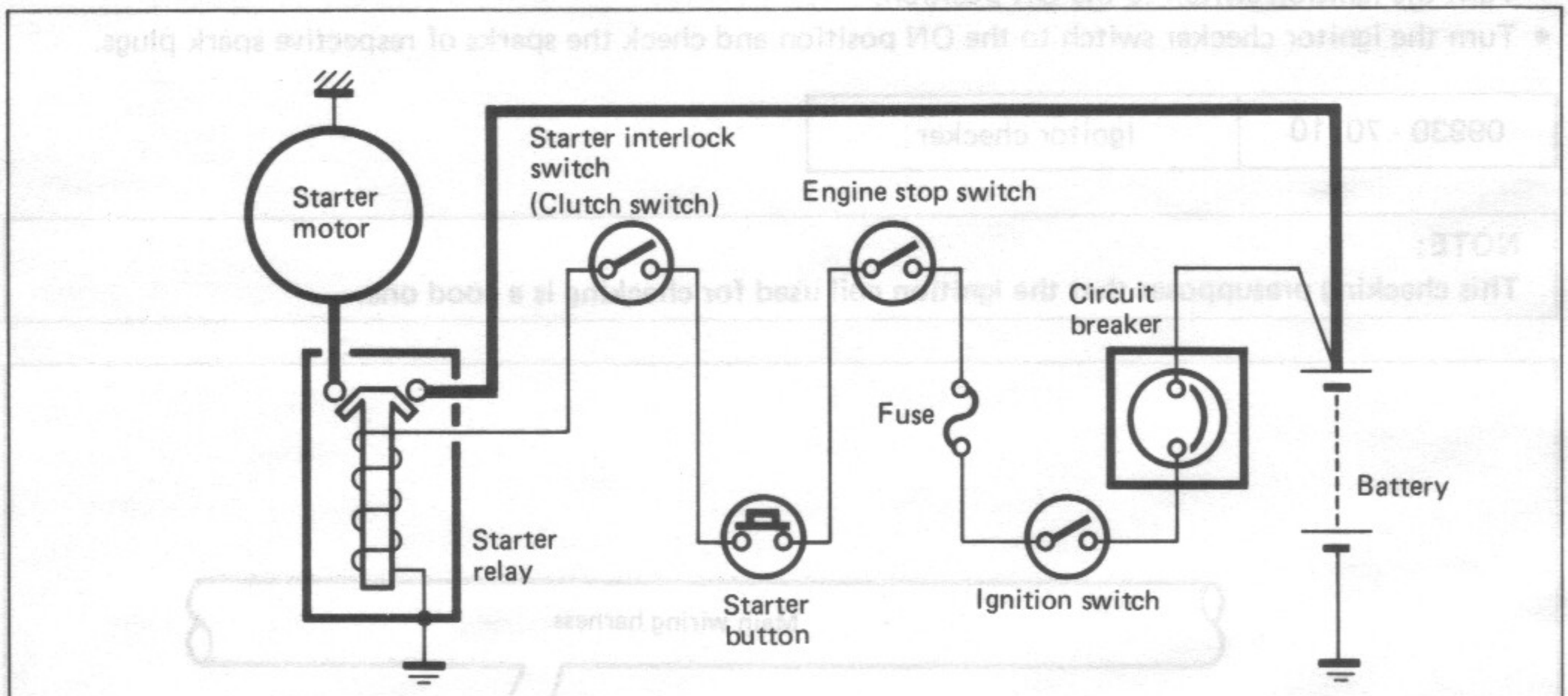


09930 - 70710	Ignitor checker

STARTER SYSTEM

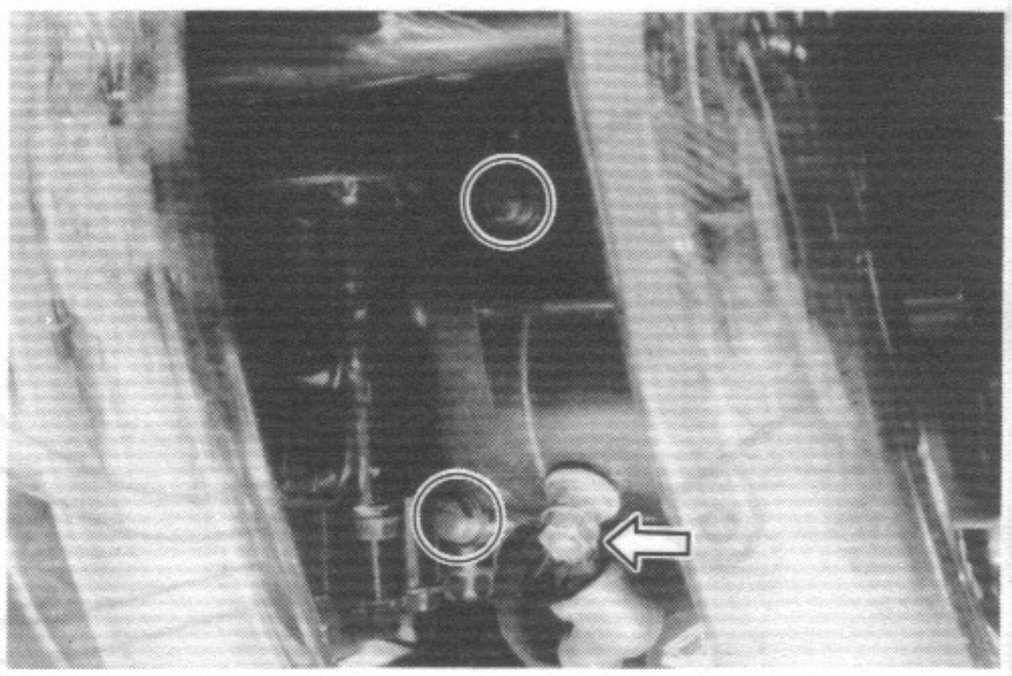
DESCRIPTION

The starter system is shown in the diagram below: namely, the starter motor, relay, interlock switch, starter button, engine stop switch, IG switch and battery. Depressing the starter button (on the right handlebar switch box) energizes the relay, causing the contact points to close which connects the starter motor to the battery. The motor draws about 80 amperes to start the engine.

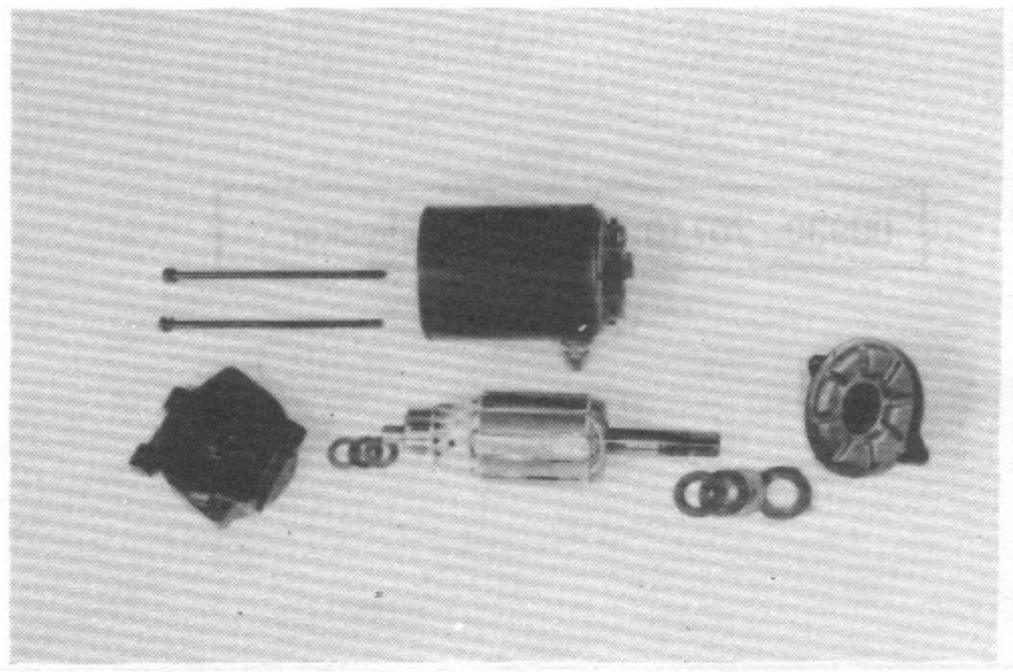


STARTER MOTOR REMOVAL AND DISASSEMBLY

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



- Disassemble the starter motor as shown in Fig.

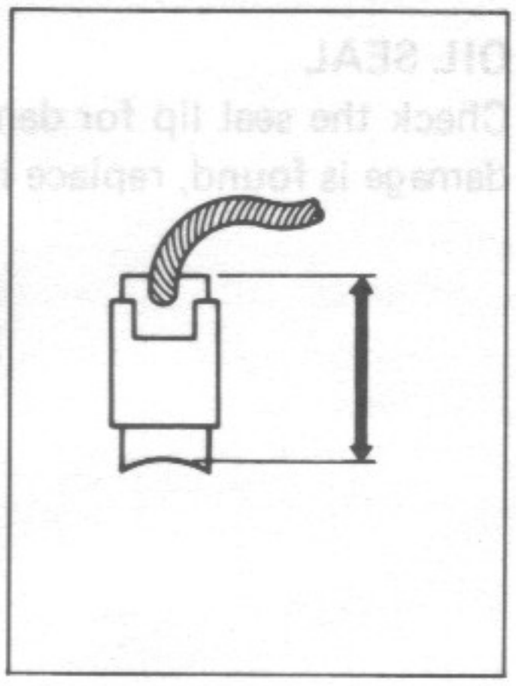


STARTER MOTOR INSPECTION

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	6 mm (0.24 in)

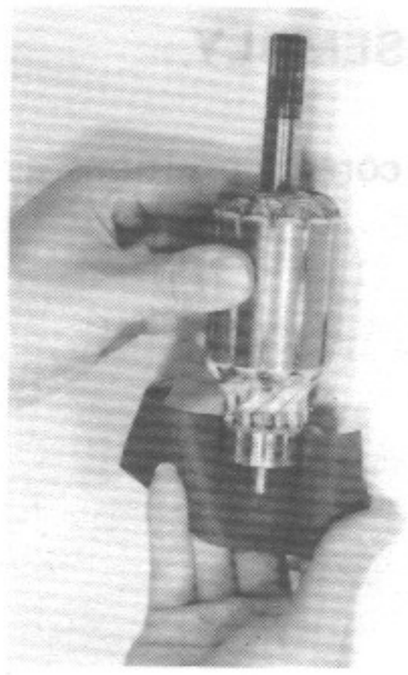


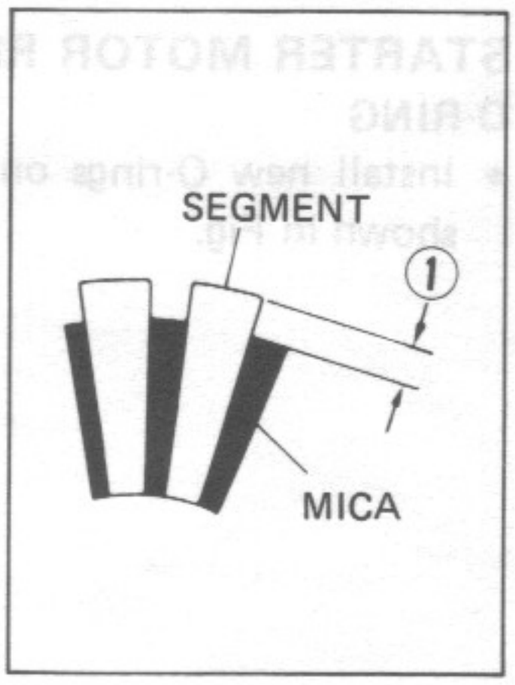
COMMUTATOR

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)



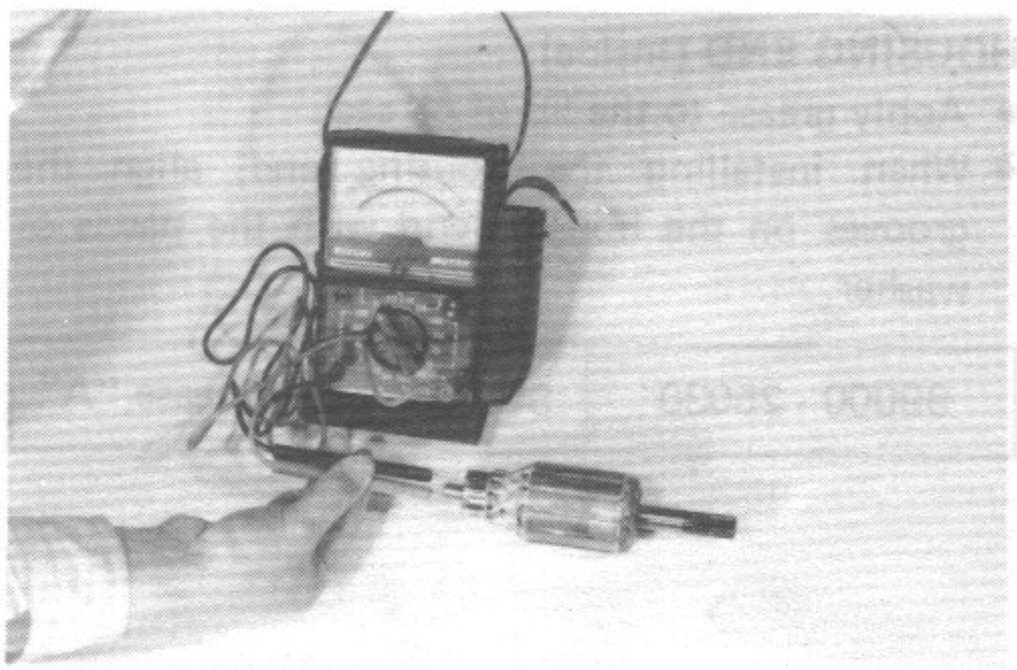


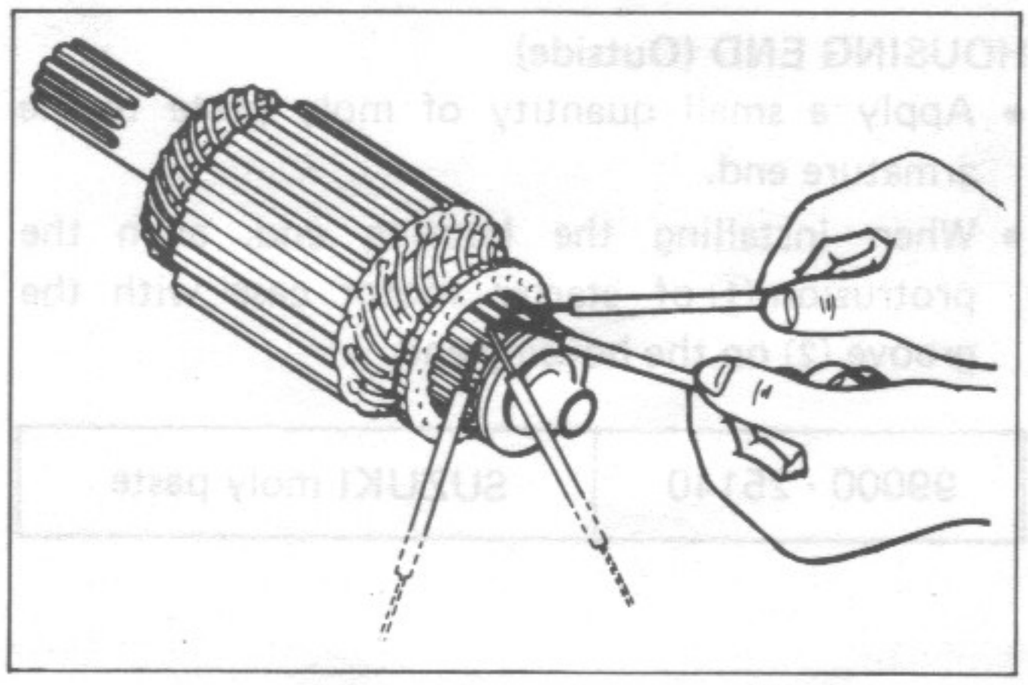
ARMATURE COIL

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.

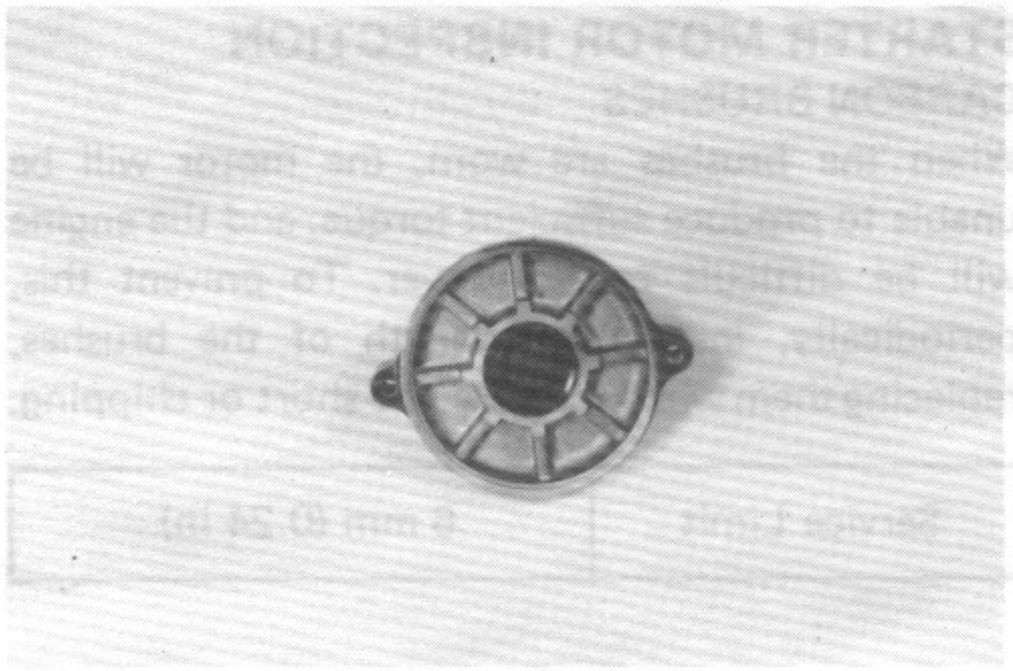
09900 - 25002	Pocket tester





OIL SEAL

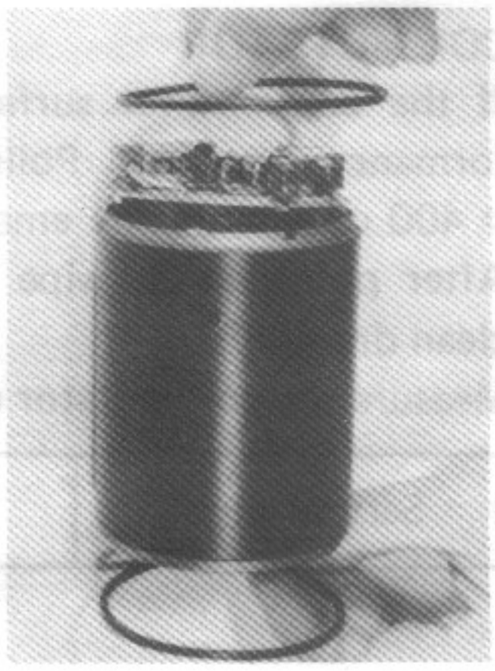
Check the seal lip for damage or oil leakage. If any damage is found, replace it.



STARTER MOTOR REASSEMBLY

O-RING

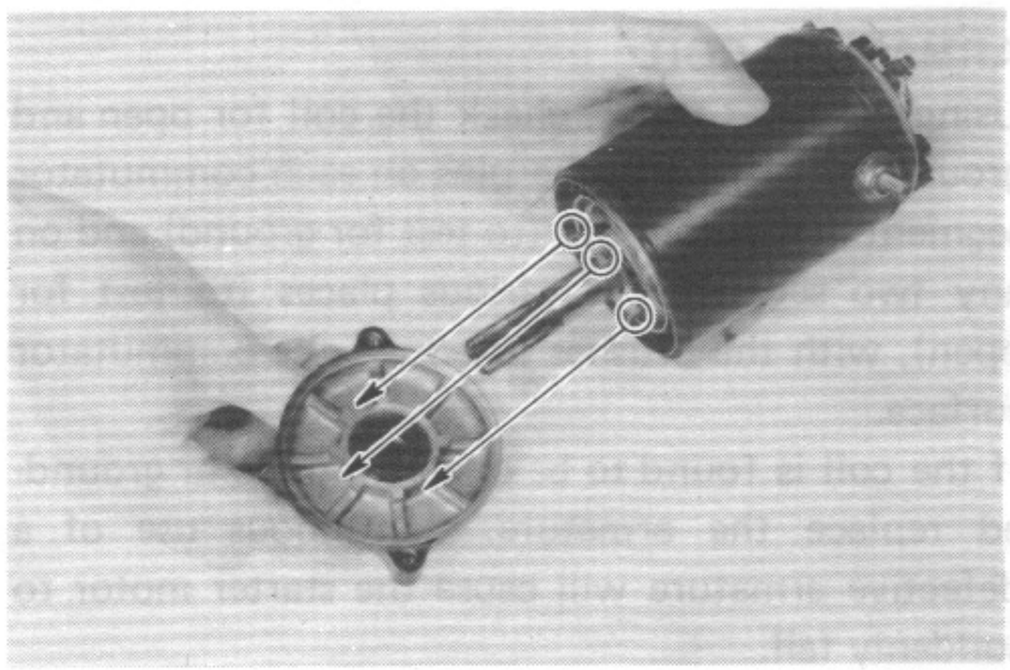
- Install new O-rings on the correct positions as shown in Fig.



HOUSING END (Inside)

- Apply grease to the lip of oil seal.
- When installing the housing end, align the grooves on the housing end with the pawls of washer.

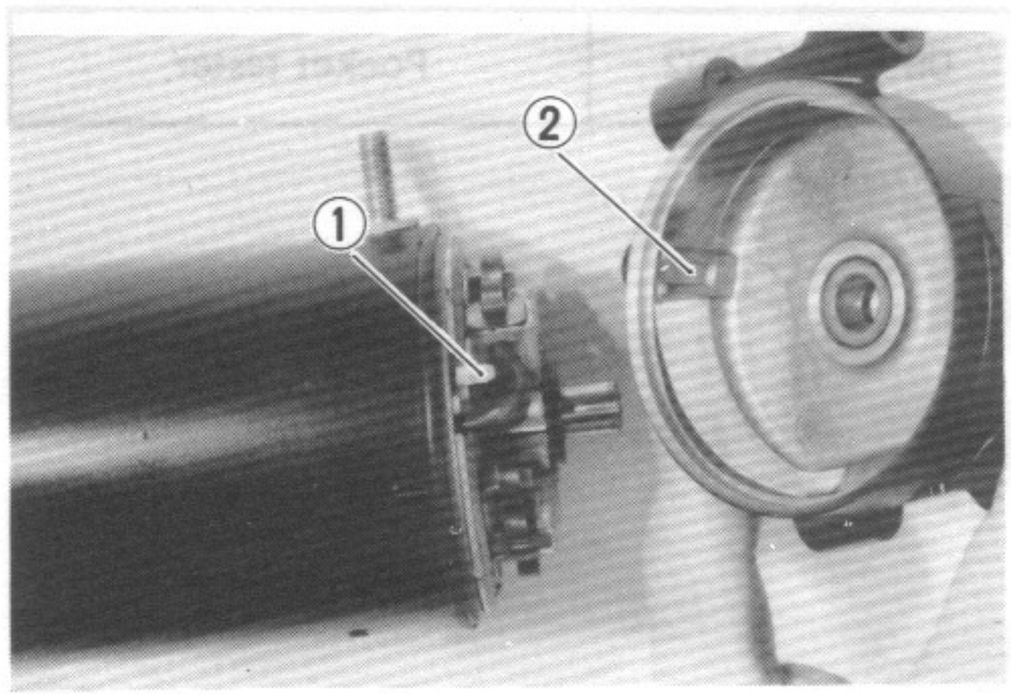
99000 - 25030	SUZUKI super grease "A"



HOUSING END (Outside)

- Apply a small quantity of moly paste to the armature end.
- When installing the housing end, align the protrusion ① of starter motor case with the groove ② on the housing end.

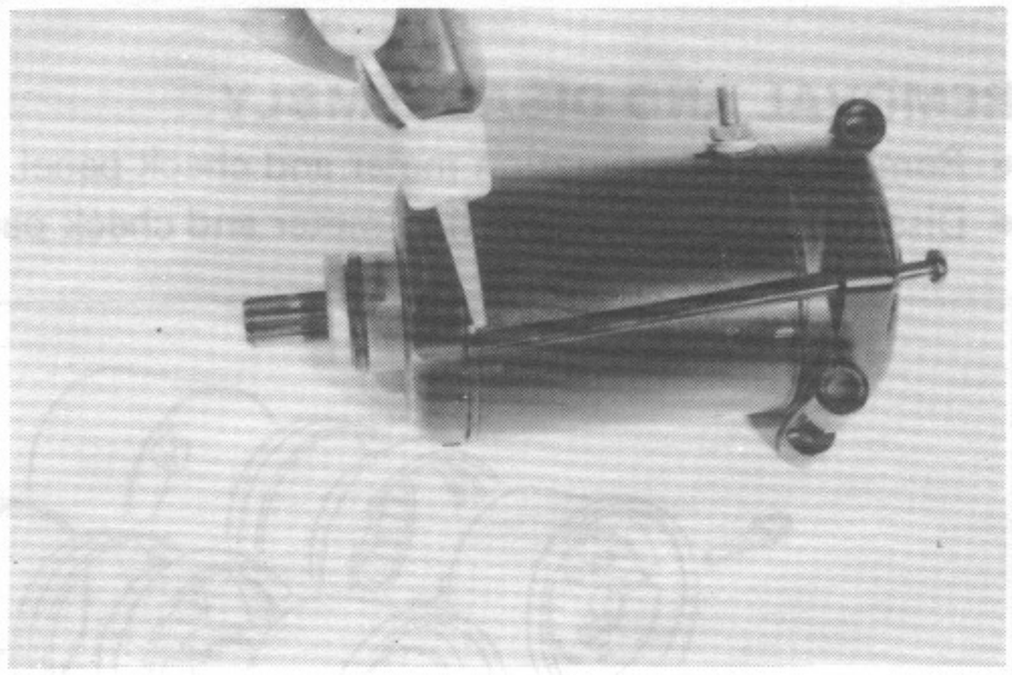
99000 - 25140	SUZUKI moly paste



HOUSING SCREW

- Apply a small quantity of Thread Lock "1363C" to the starter motor housing screws.

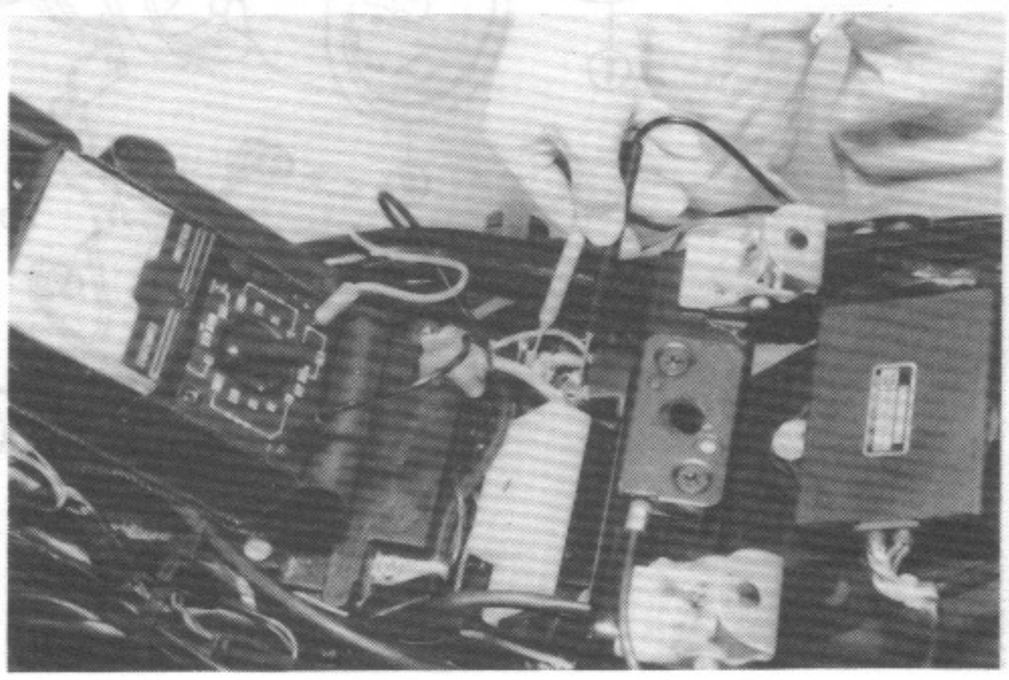
99104 - 32050	Thread Lock "1363C"



STARTER RELAY INSPECTION

- Remove the seat.
- Disconnect the lead wire of the starter motor at 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 terminals, positive and negative, when squeezing the clutch lever and pushing the starter button.

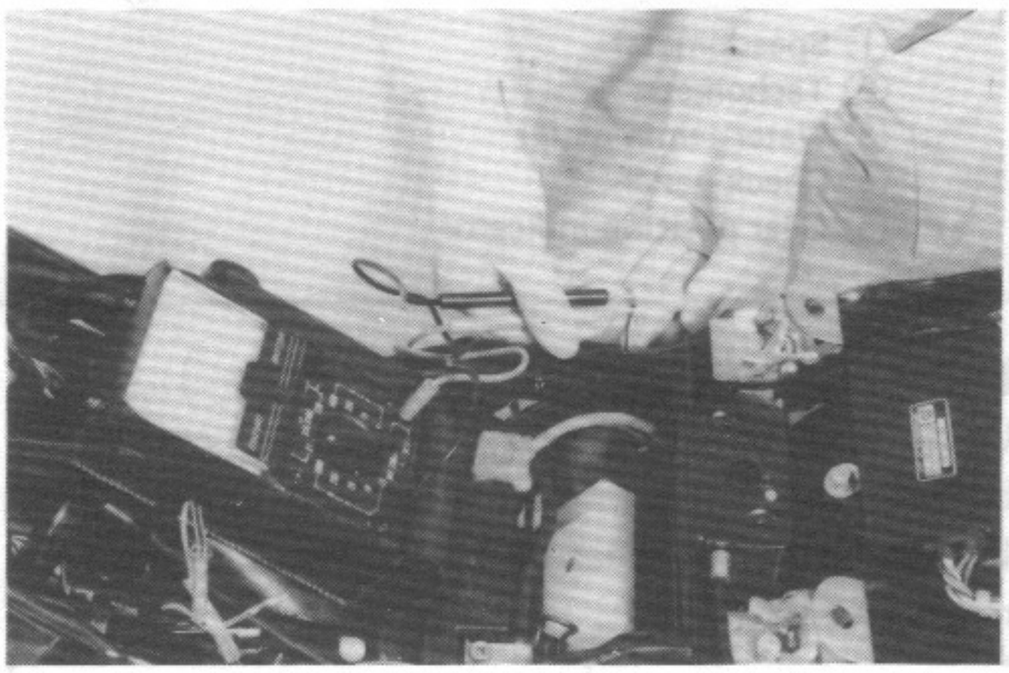
  If the starter relay is in sound condition, continuity is found.

09900 - 25002	Pocket tester

- 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

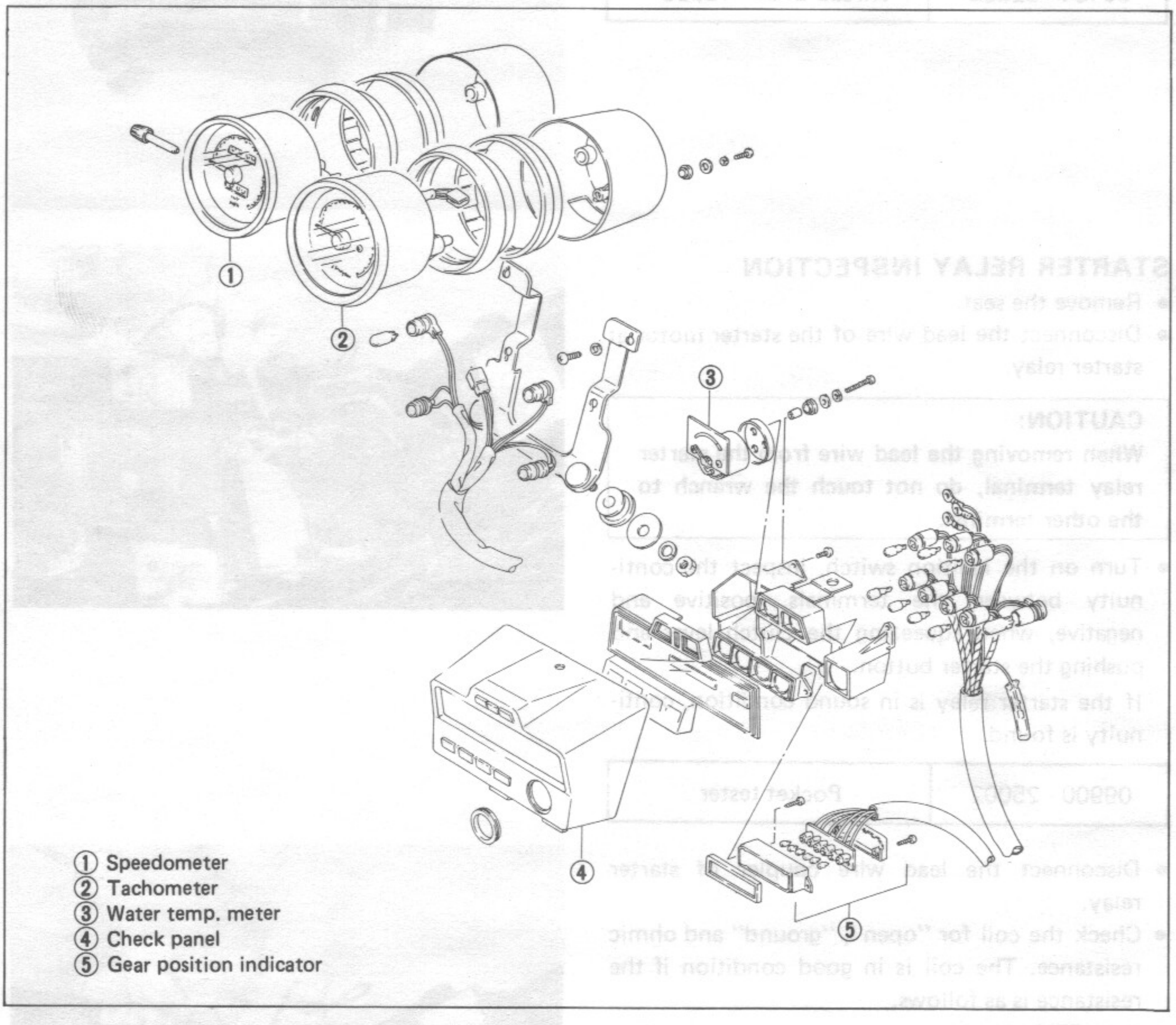
STD resistance	3 – 5 Ω



COMBINATION METER AND CHECK PANEL

REMOVAL AND DISASSEMBLY

- Remove the combination meter and check panel. (See page 9-22)
- Disassemble the combination meter and check panel as follows.



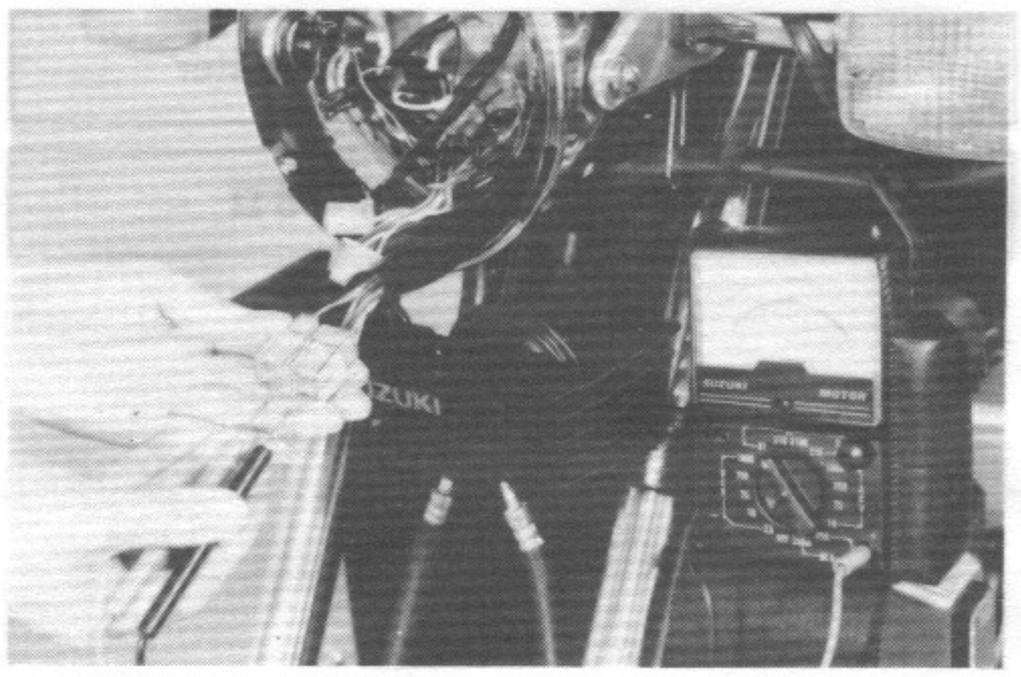
① Speedometer
② Tachometer
③ Water temp. meter
④ Check panel
⑤ Gear position indicator

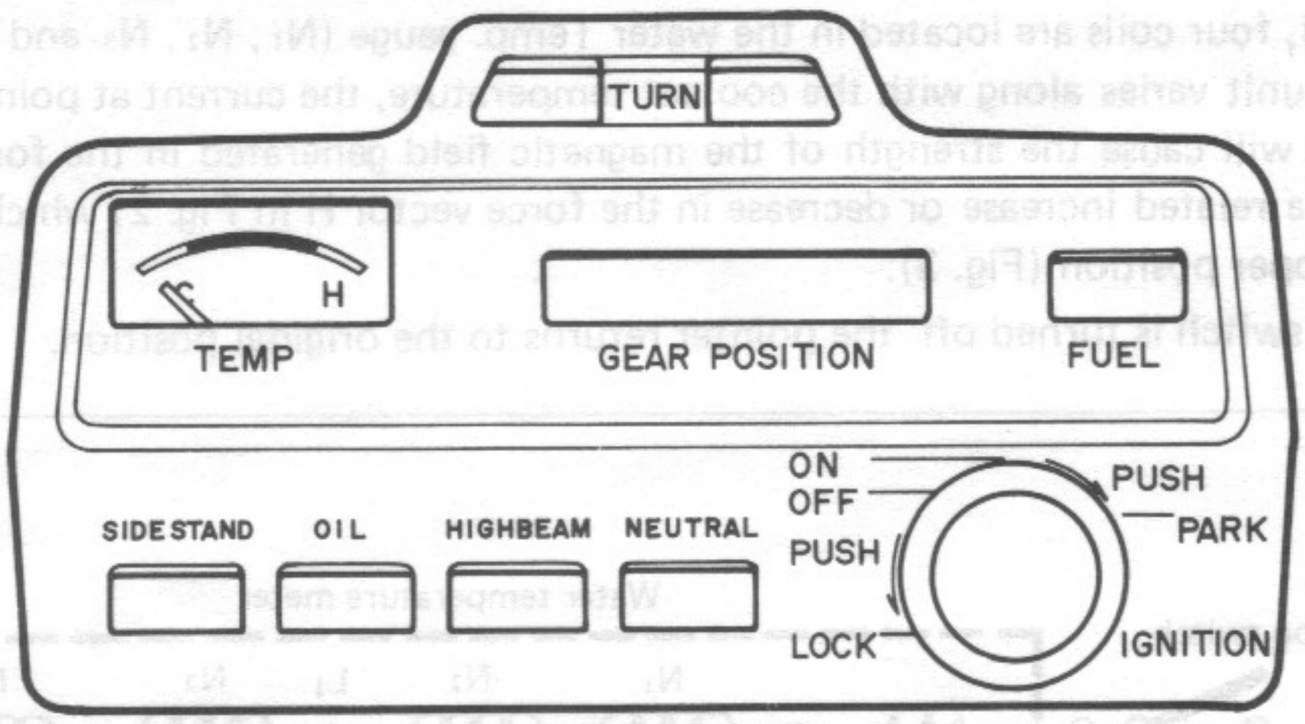
INSPECTION

Using the pocket tester, check the continuity between lead wires in the following diagram.
If the continuity measured is incorrect, replace the respective parts.

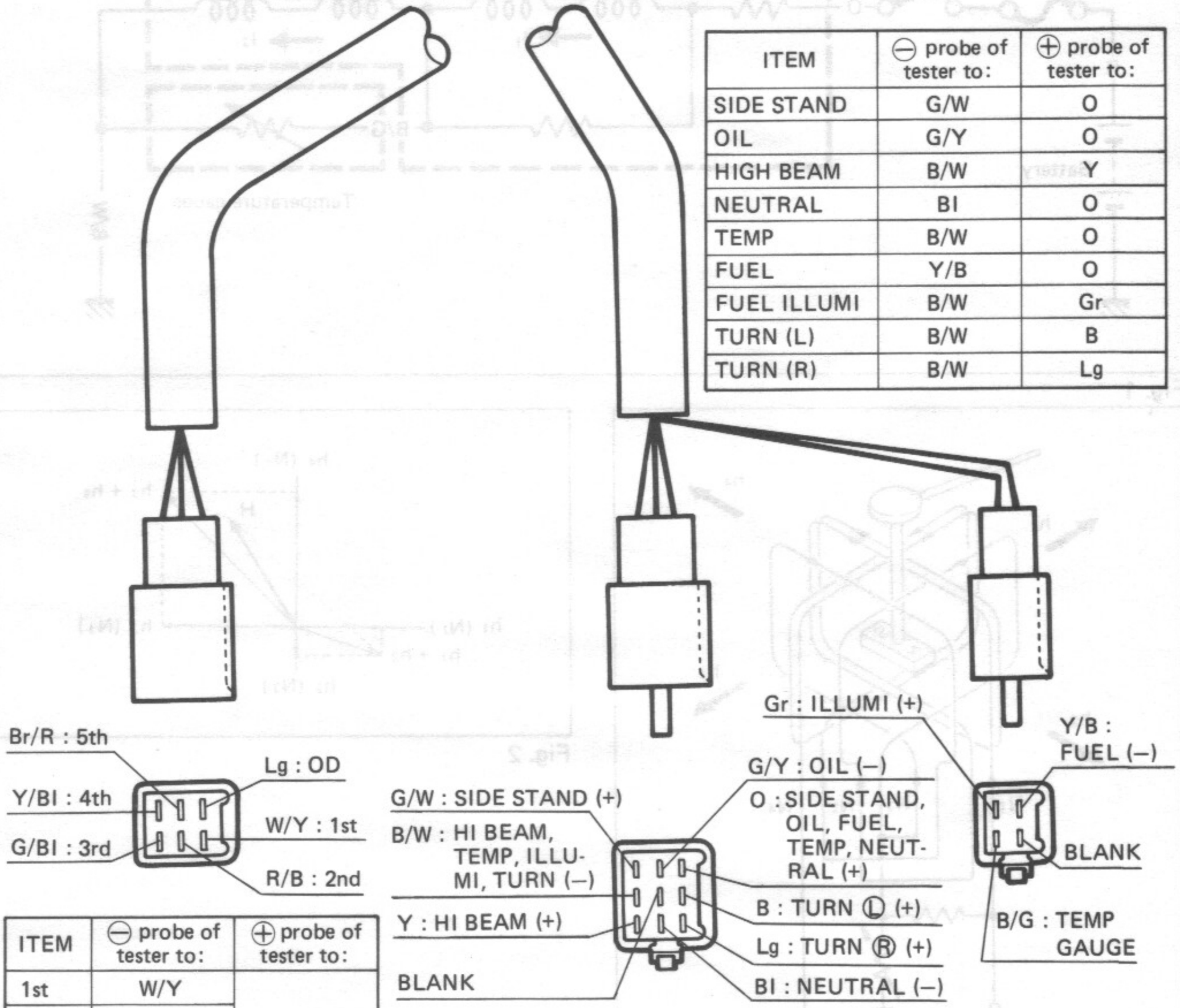
09900 - 25002	Pocket tester

NOTE:
When making this test, it is not necessary to remove the combination meter and check panel.





ITEM	⊖ probe of tester to:	⊕ probe of tester to:
SIDE STAND	G/W	O
OIL	G/Y	O
HIGH BEAM	B/W	Y
NEUTRAL	BI	O
TEMP	B/W	O
FUEL	Y/B	O
FUEL ILLUMI	B/W	Gr
TURN (L)	B/W	B
TURN (R)	B/W	Lg



ITEM	⊖ probe of tester to:	⊕ probe of tester to:
1st	W/Y	Orange
2nd	R/B	
3rd	G/BI	
4th	Y/BI	
5th	Br/R	
OD	Lg	

WATER TEMPERATURE METER

As shown in Fig. 1, four coils are located in the water Temp. gauge (N_1, N_2, N_3 and N_4). As the resistance from the sending unit varies along with the coolant temperature, the current at points L_1 and L_2 will also vary. This in turn will cause the strength of the magnetic field generated in the four coils to increase or decrease (causing a related increase or decrease in the force vector H in Fig. 2) which will force the needle to move to the proper position (Fig. 3).

When the ignition switch is turned off, the pointer returns to the original position.

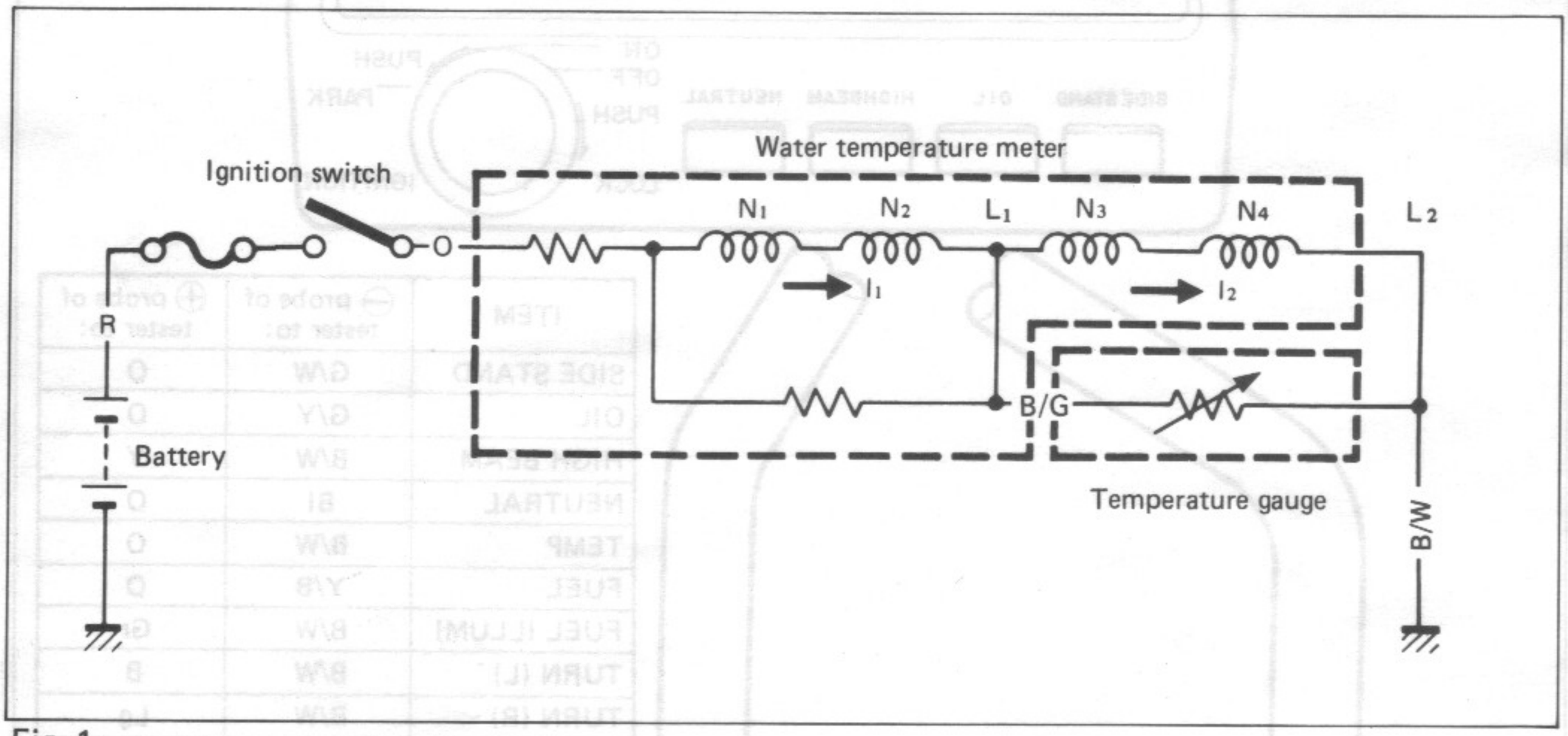


Fig. 1

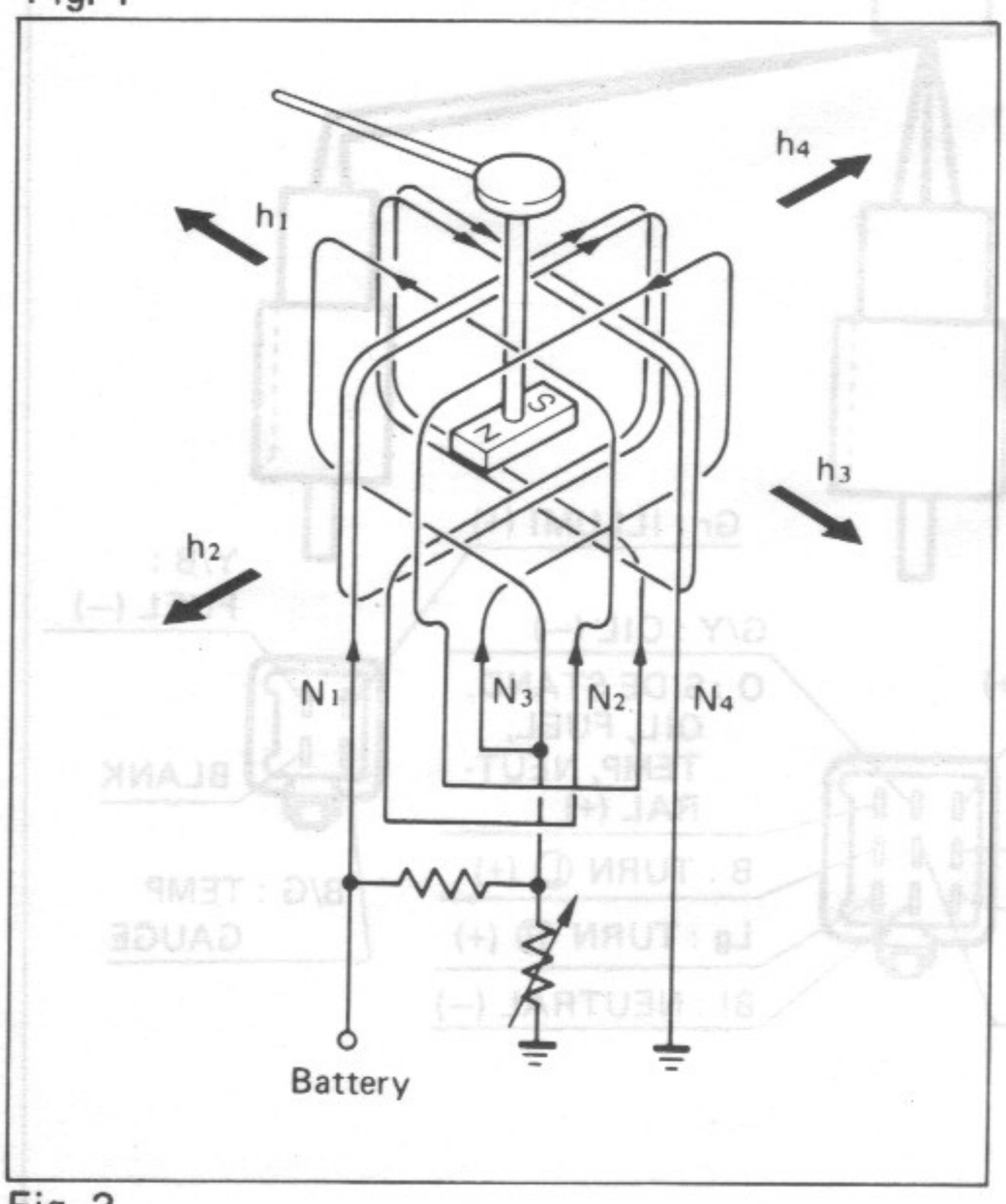


Fig. 3

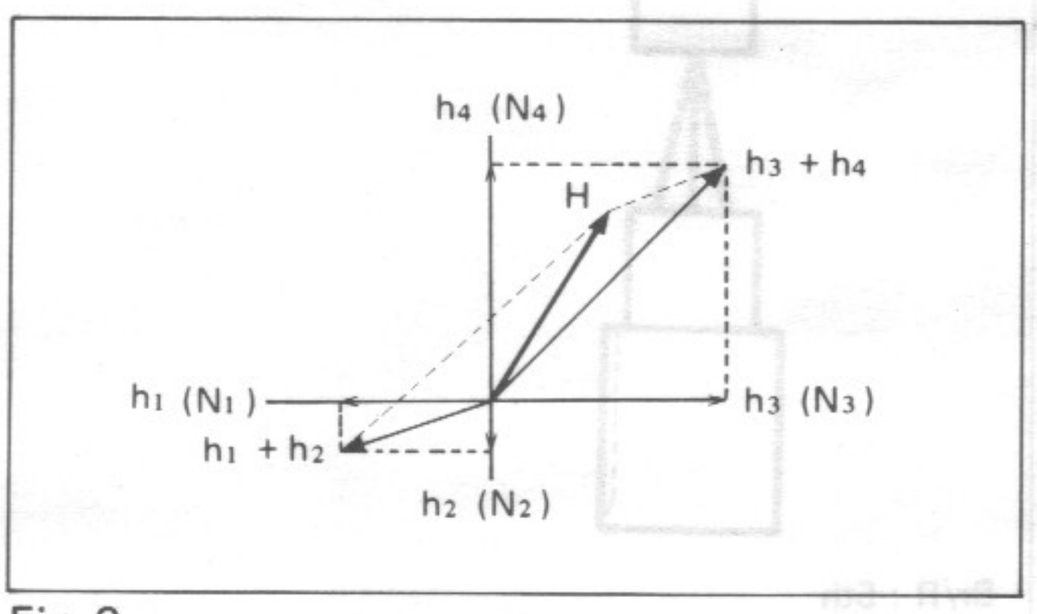


Fig. 2

WATER TEMPERATURE METER INSPECTION

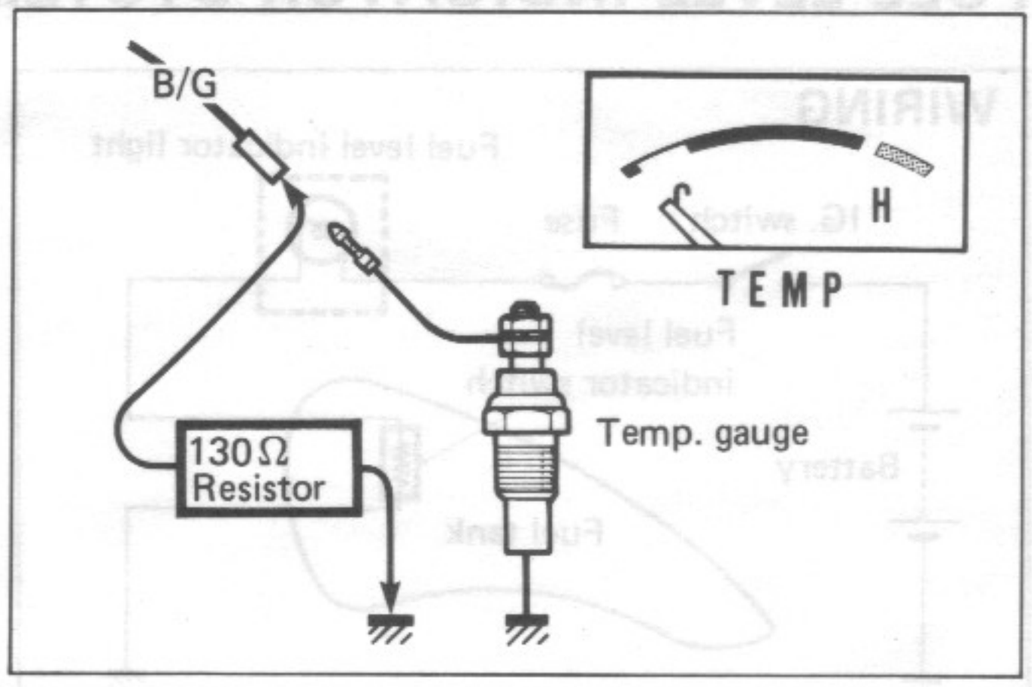
As the coil spring is installed on the needle shaft of the water temperature meter, the needle is forcibly back to the original position when ignition switch is turned OFF.

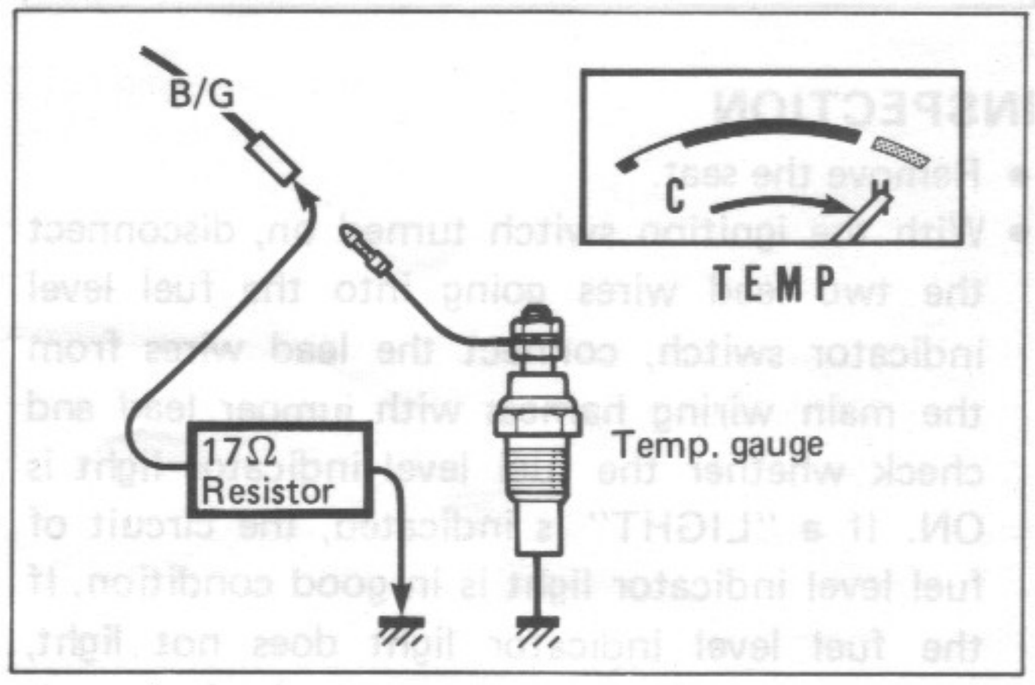
To test the water temperature meter two different checks may be used. The first, and simplest test will tell if the meter is operating but will not indicate the meters accuracy throughout the range.

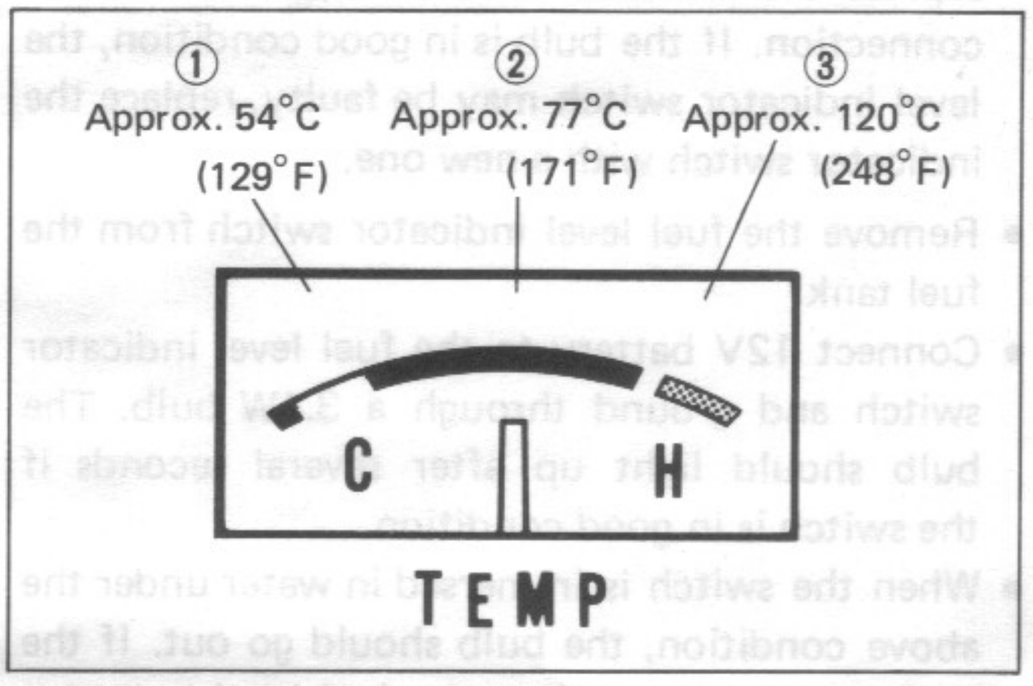
To perform this test, disconnect the B/G lead wire of the water temperature meter from the water temperature gauge. Connect a jumper wire between B/G wires coming from the main wiring harness and engine ground. With the ignition switch turned on, the water temperature meter should indicate "H".

The second test will check the accuracy of the meter in the "H" and "C" positions.

Connect a 130-ohm resistor between the B/G lead wire of the water temperature gauge and the ground lead wire. The water temperature gauge is normal if its pointer indicates the C position when the specified voltage is applied to the circuit and if its pointer indicates the H position when the resistor is changed to 17 ohms. If either one or both indications are abnormal, replace the water temperature meter with a new one.

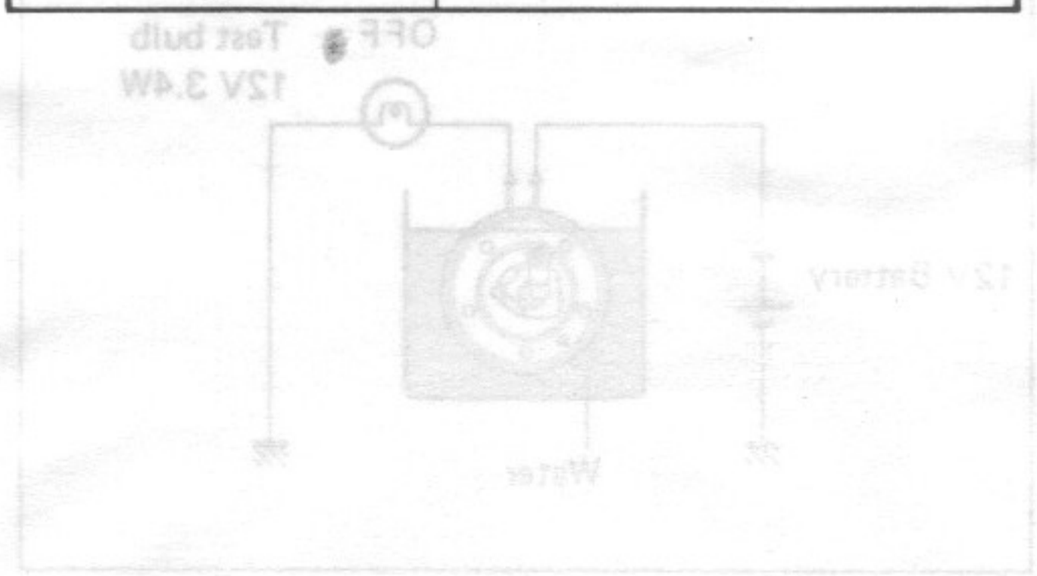




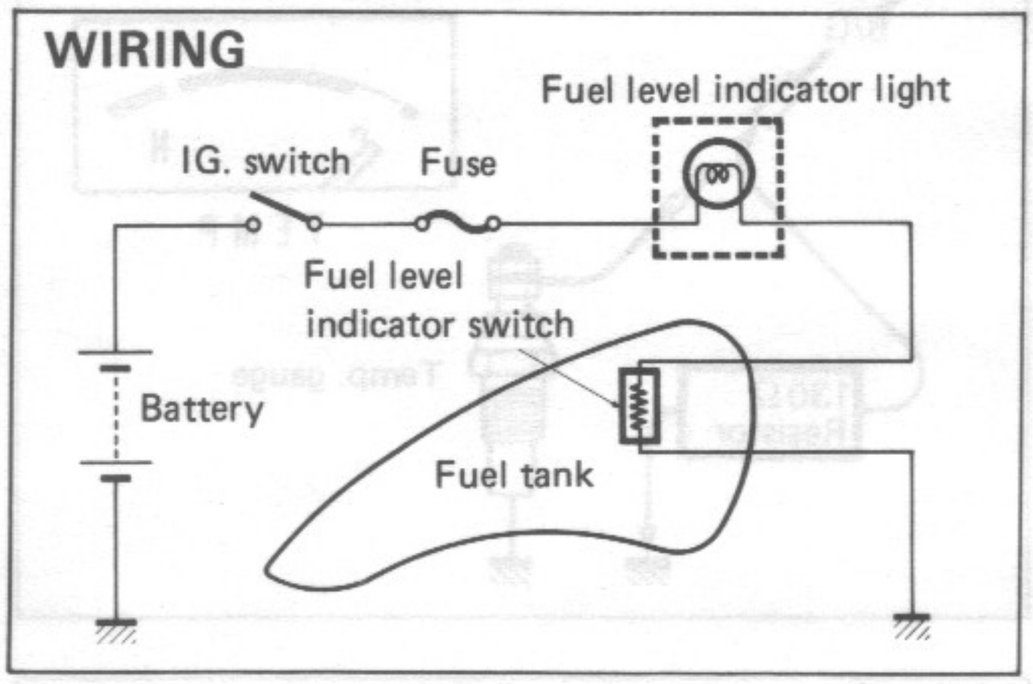


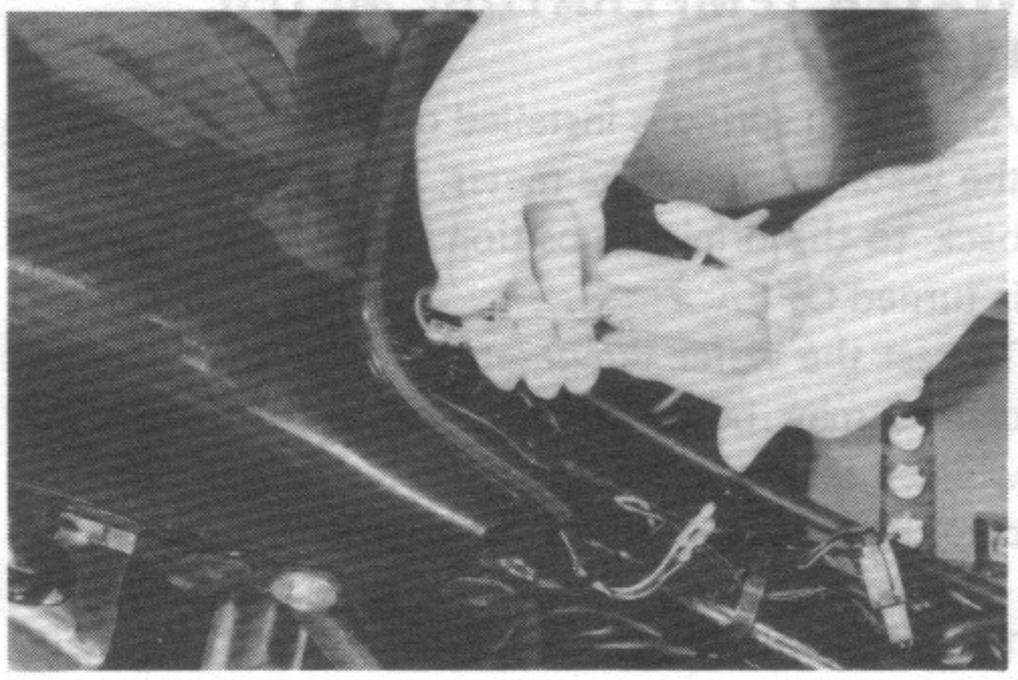
WATER TEMPERATURE METER

POSITION	RESISTANCE
①	130 Ω
②	56 Ω
③	17 Ω



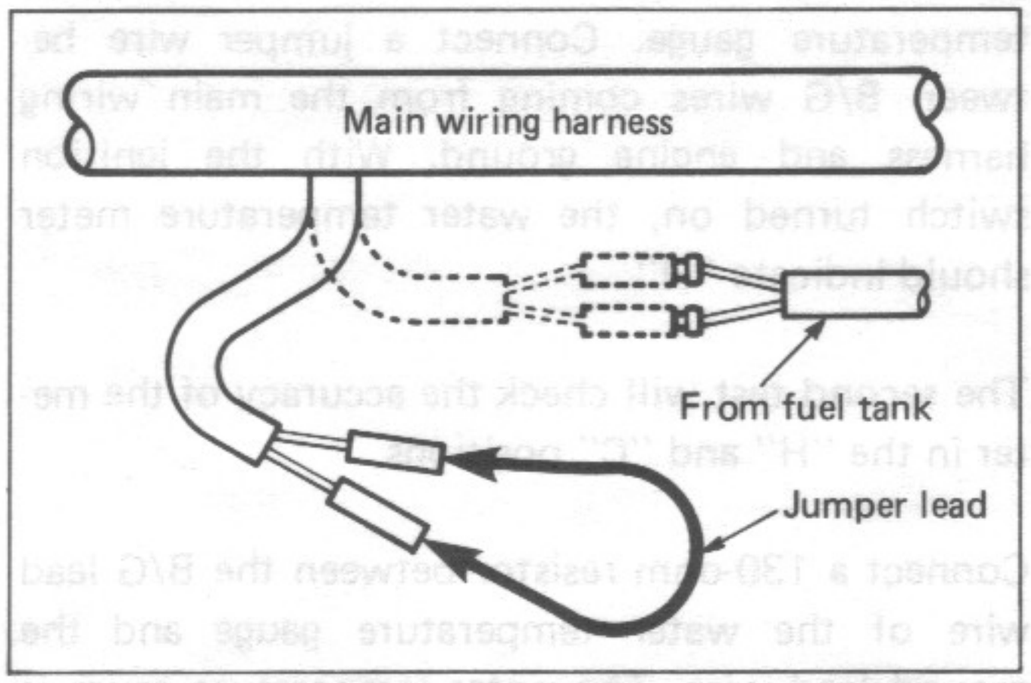
FUEL LEVEL INDICATOR SYSTEM

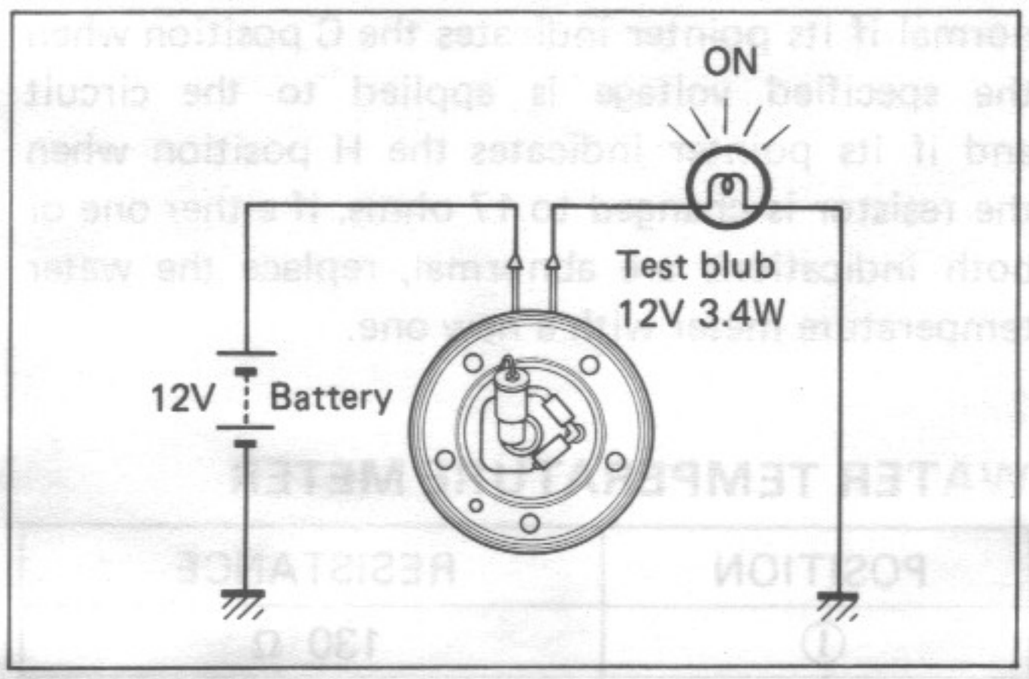


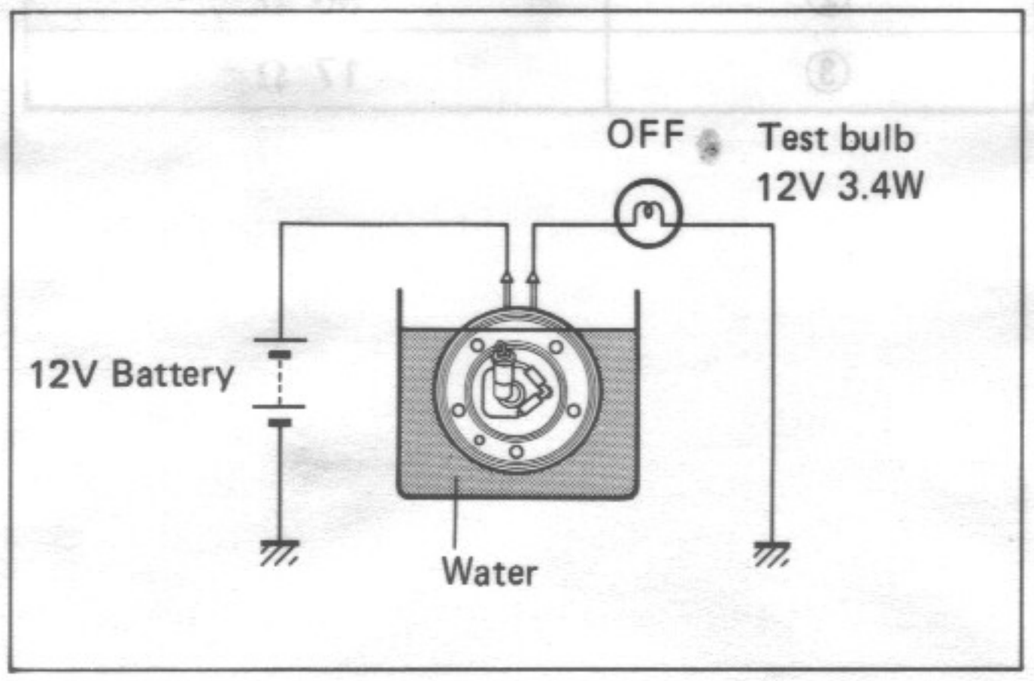


INSPECTION

- Remove the seat.
- With the ignition switch turned on, disconnect the two lead wires going into the fuel level indicator switch, connect the lead wires from the main wiring harness with jumper lead and check whether the fuel level indicator light is ON. If a "LIGHT" is indicated, the circuit of fuel level indicator light is in good condition. If the fuel level indicator light does not light, replace the indicator bulb or repair the circuit connection. If the bulb is in good condition, the level indicator switch may be faulty, replace the indicator switch with a new one.
- Remove the fuel level indicator switch from the fuel tank.
- Connect 12V battery to the fuel level indicator switch and ground through a 3.4W bulb. The bulb should light up after several seconds if the switch is in good condition.
- When the switch is immersed in water under the above condition, the bulb should go out. If the bulb remains lit, replace the fuel level indicator switch.

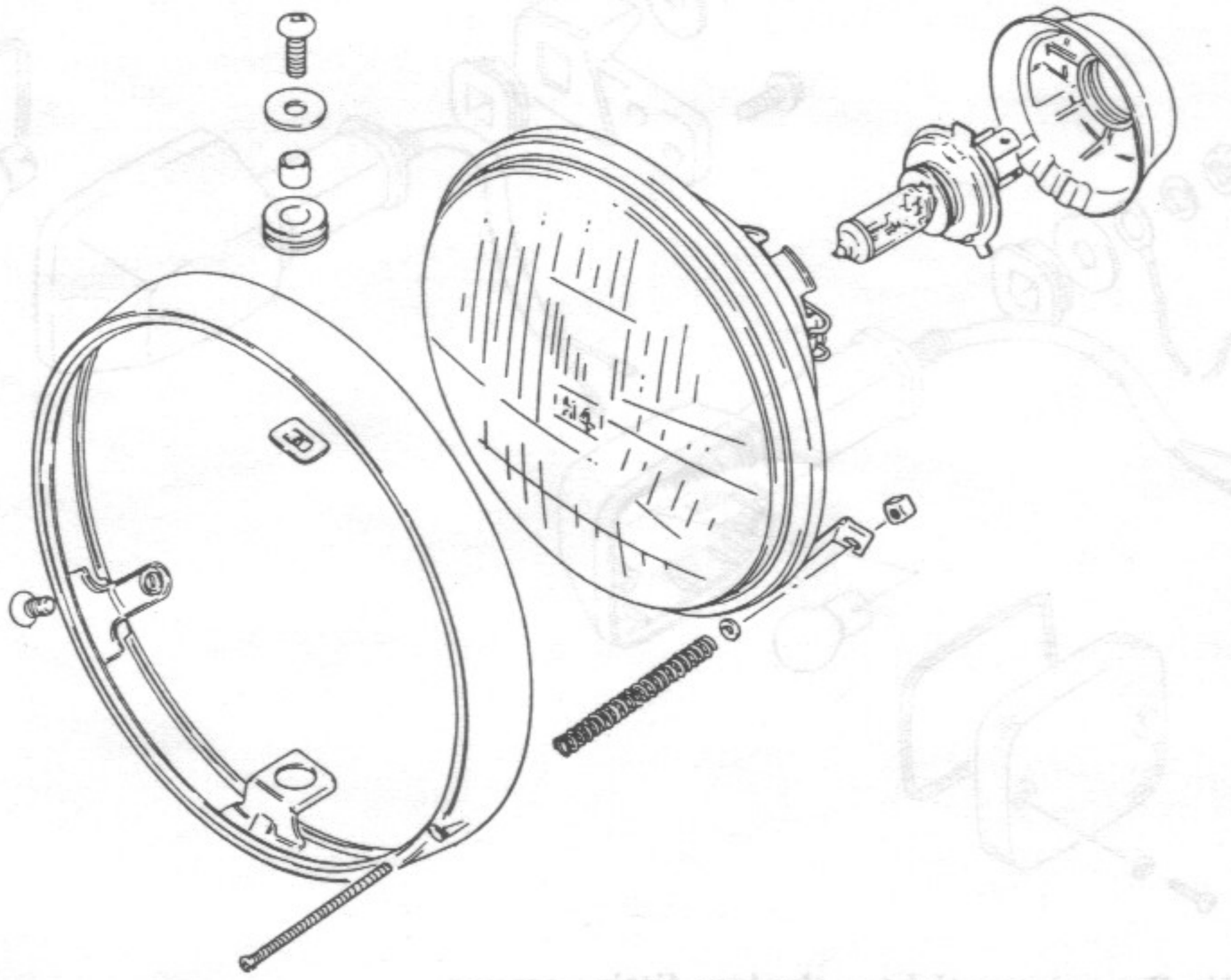






LAMPS

HEADLIGHT

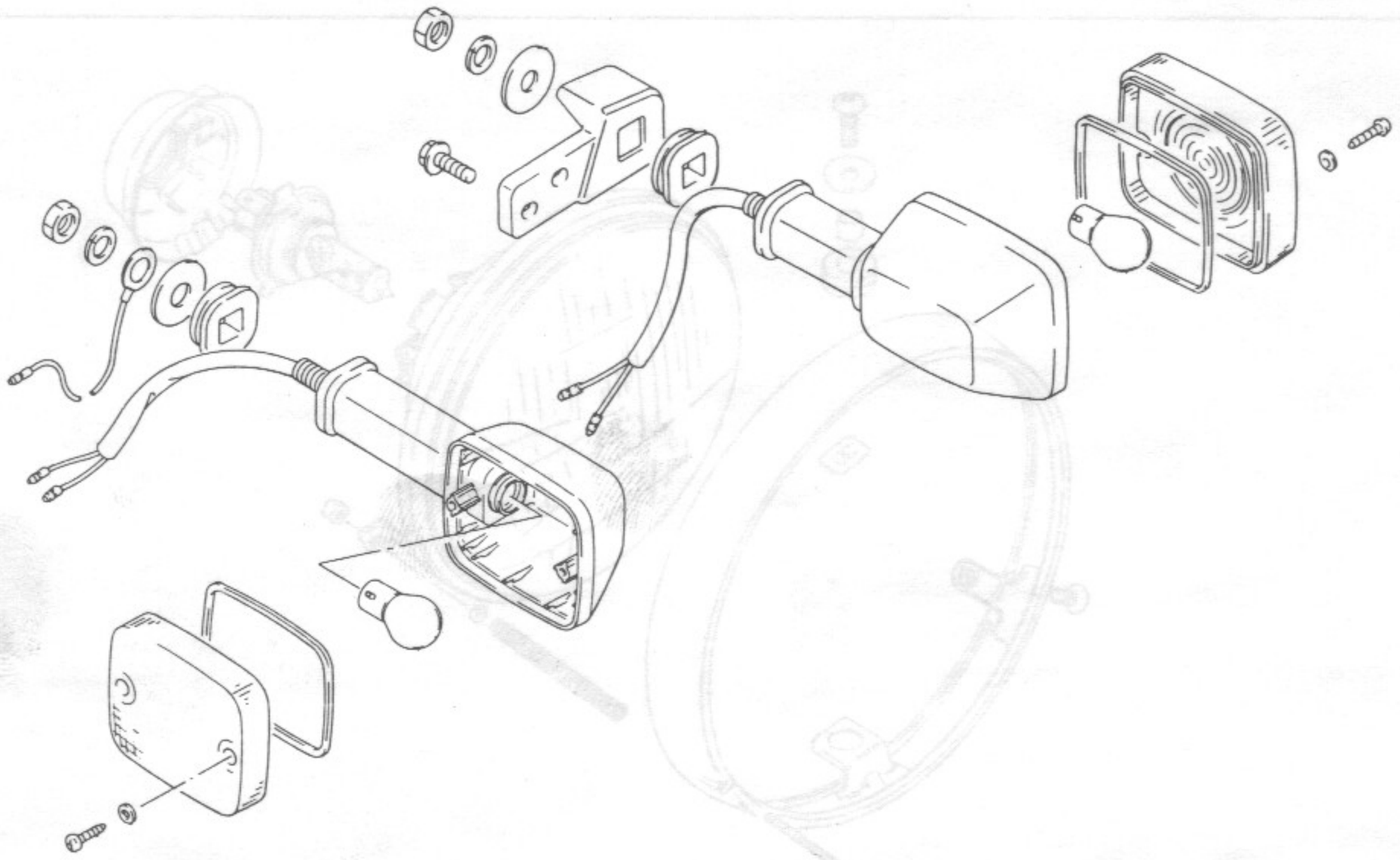


NOTE: Adjust the headlight, both vertical and holizontal, after reassembling.

TAIL/BRAKE LIGHT

CAUTION: Do not overtighten the lens fitting screws.

TURN SIGNAL LIGHT

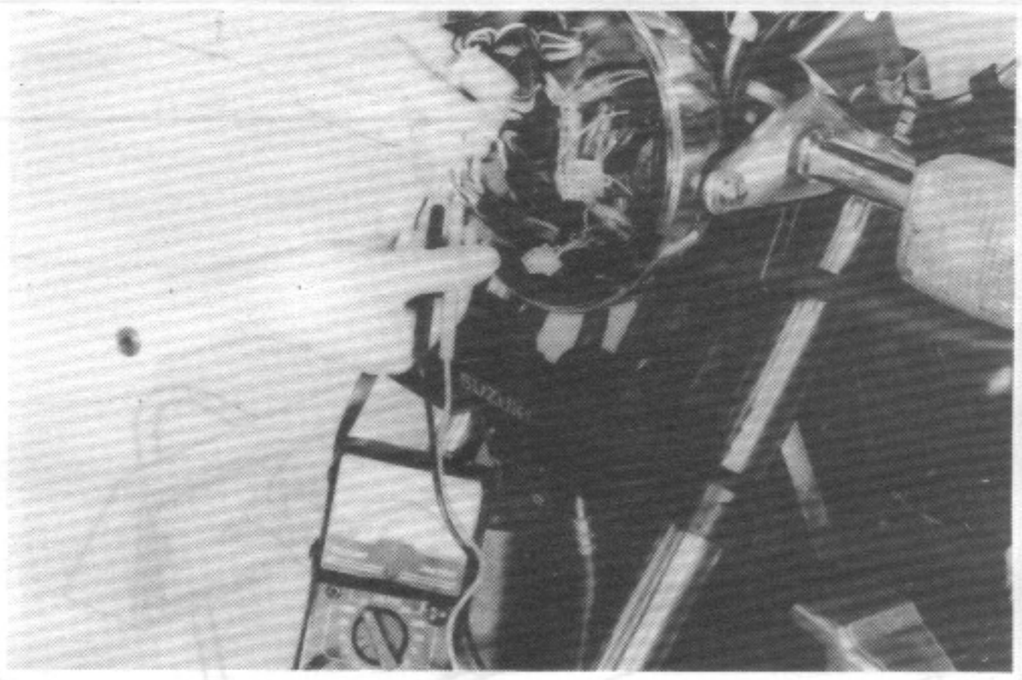


CAUTION: Do not overtighten the lens fitting screws.

SWITCHES

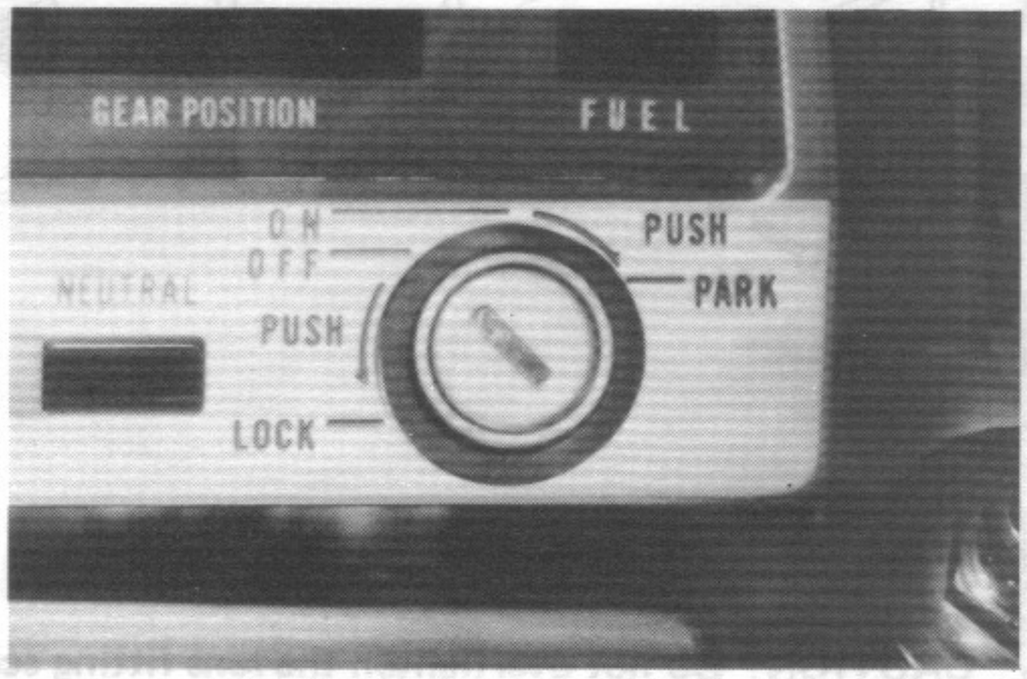
Inspect each switch for continuity with the pocket tester referring to the chart. If any abnormality is found, replace the respective switch assemblies with new ones.

09900 - 25002	Pocket tester



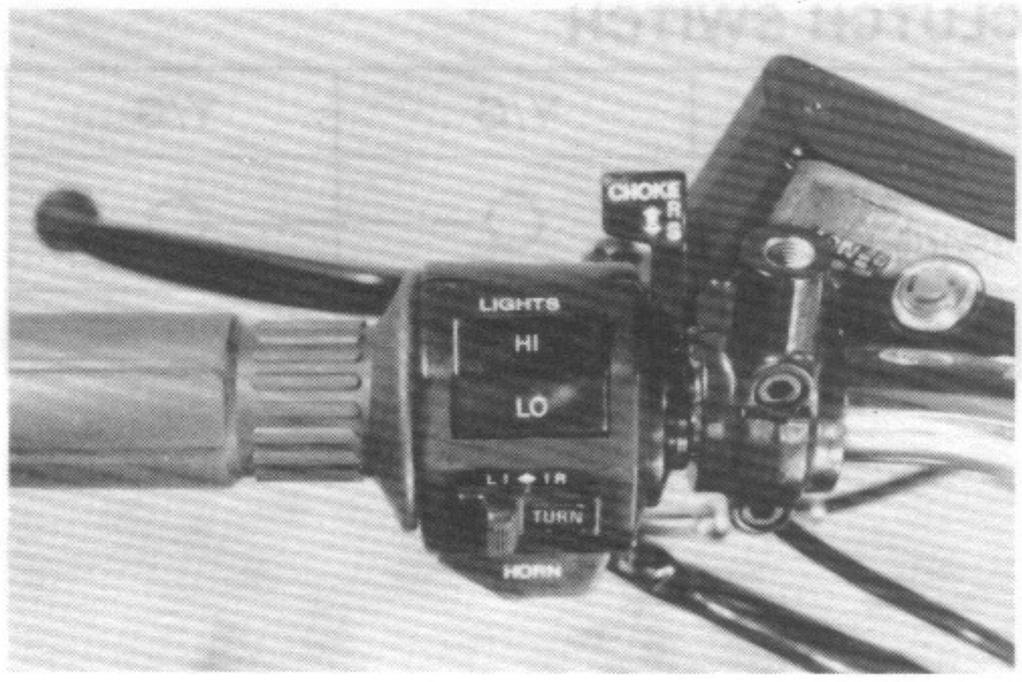
IGNITION SWITCH

	R/W	O	Gr	Br
OFF				
ON	○——	——○	○——	——○
P	○——			——○



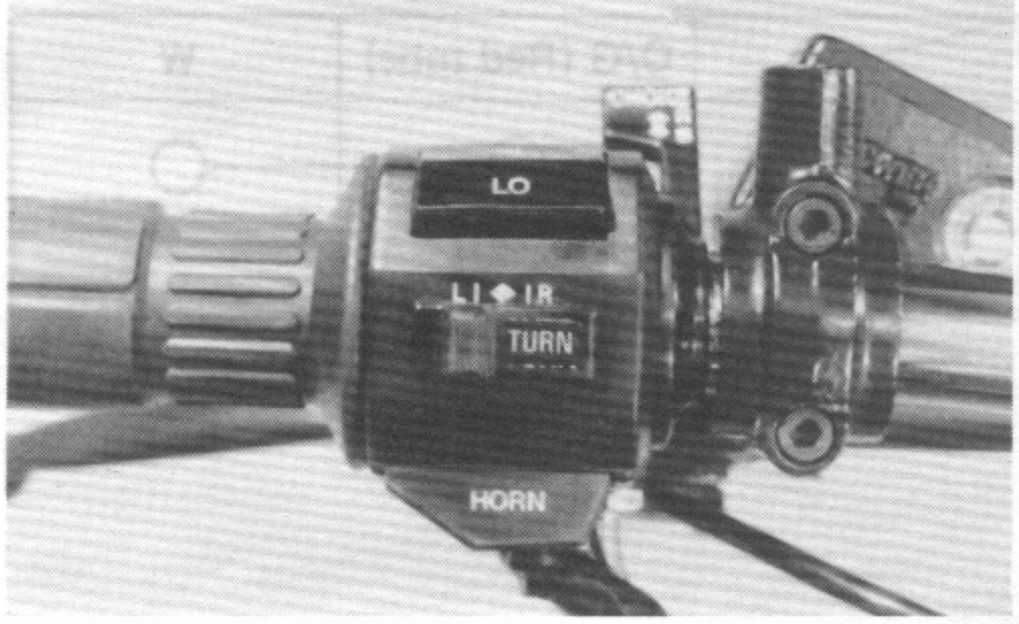
DIMMER SWITCH

	W	Y	Y/W
HI		○	○
LO	○		○



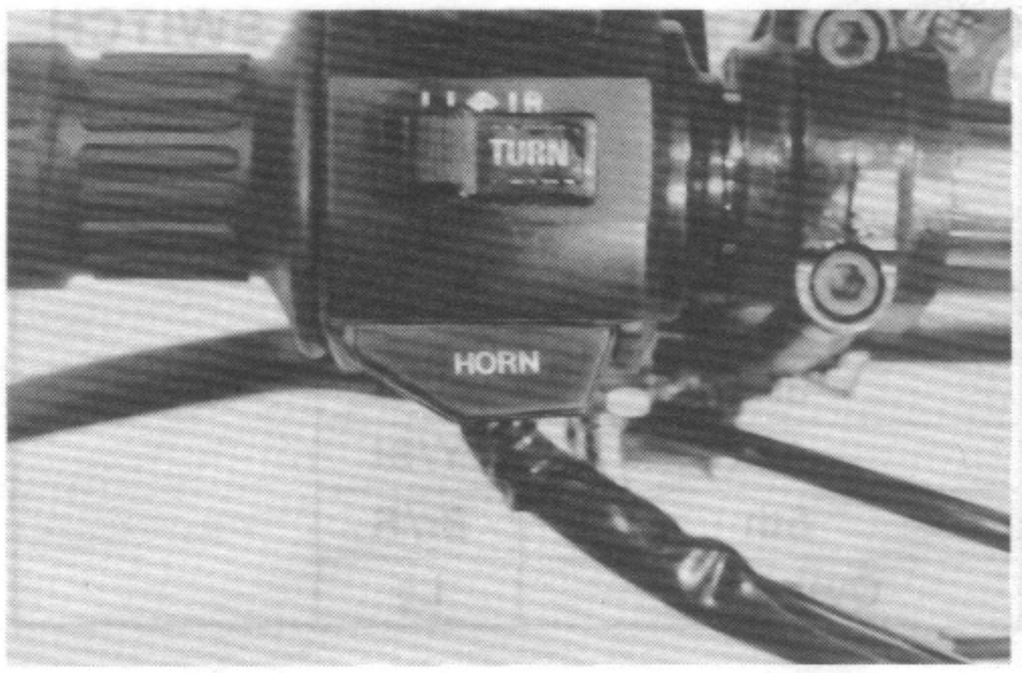
TURN SIGNAL SWITCH

	B	Lbl	Lg
R		○	○
•			
L	○	○	



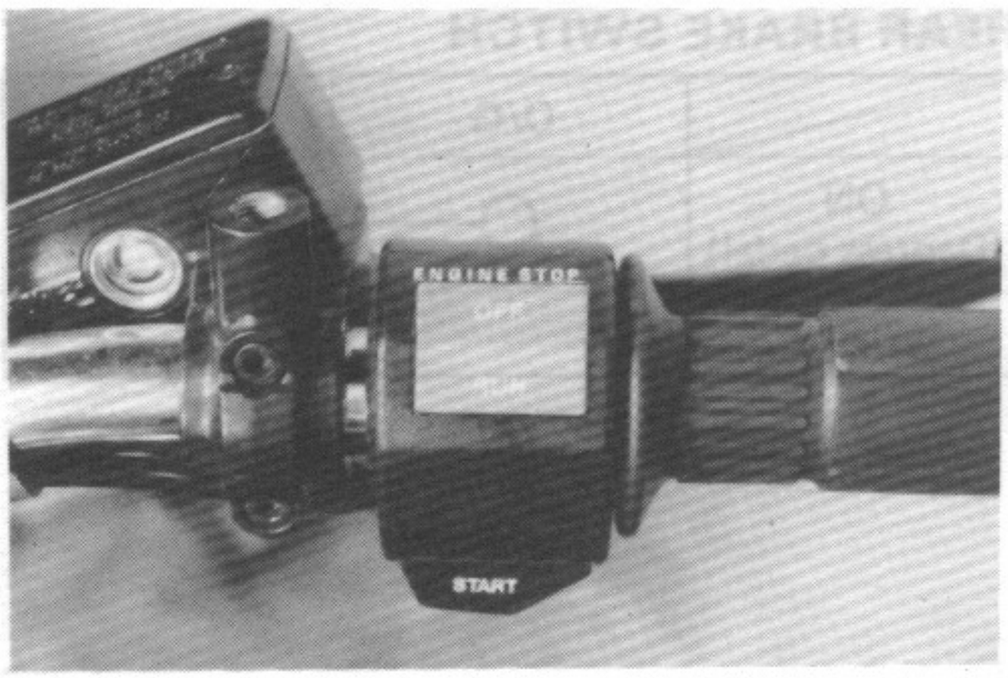
HORN SWITCH

	G	B/W
ON (Push)	○	○
OFF		



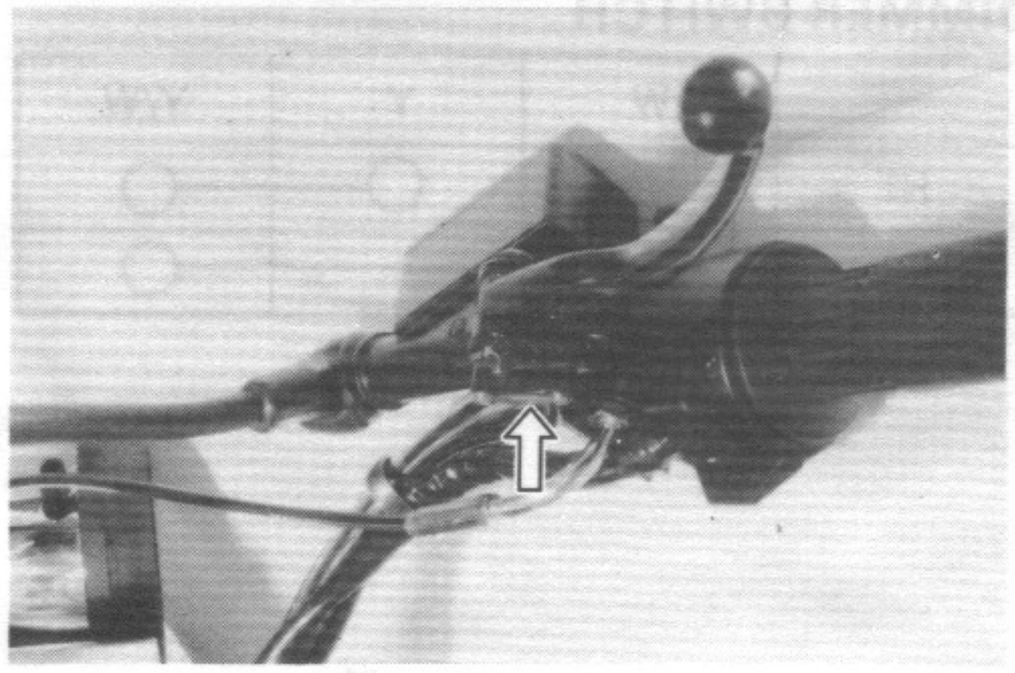
ENGINE STOP AND START SWITCH

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



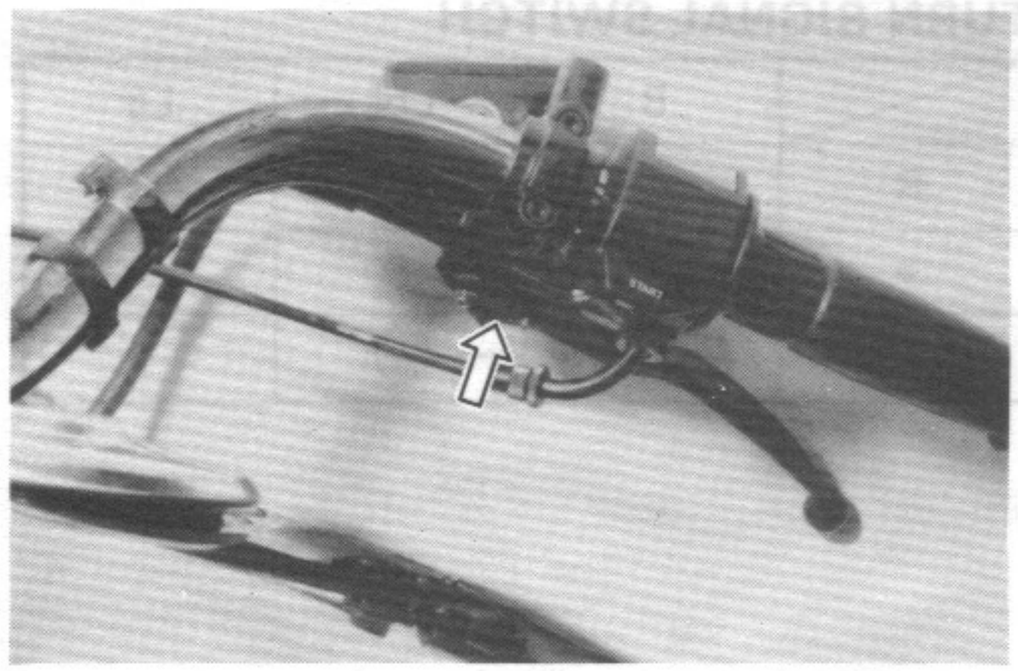
CLUTCH SWITCH

	Y/G	Y/G
ON (Squeeze lever)	○———	———○
OFF		



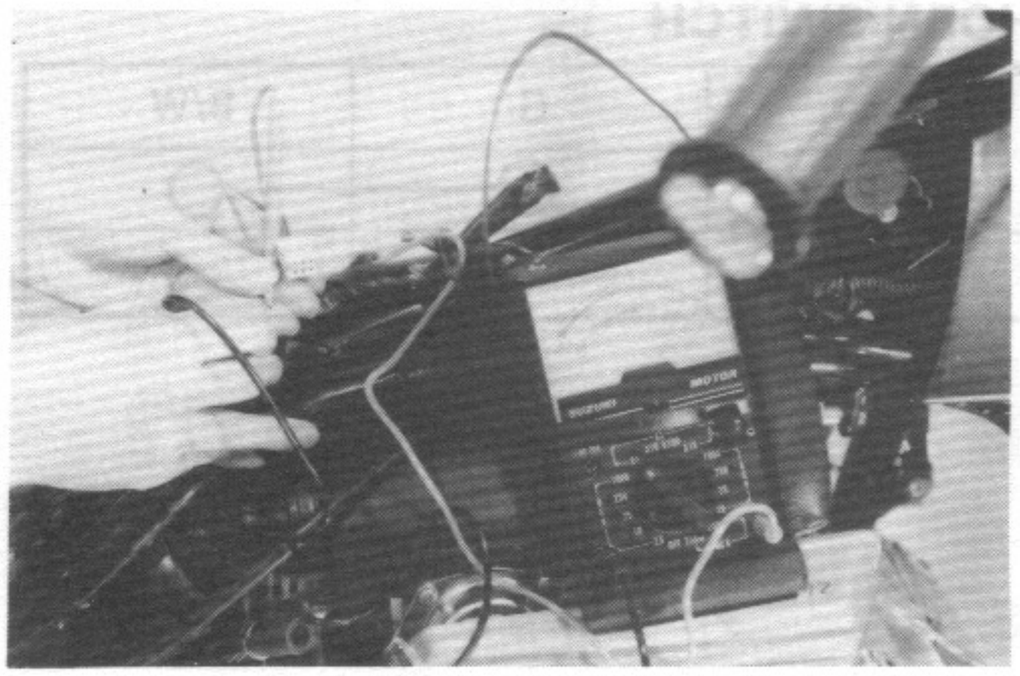
FRONT BRAKE SWITCH

	O/G (Red tube)	W
ON (Squeeze lever)	○———	———○
OFF		



GEAR POSITION INDICATOR SWITCH

Gear position	Wire color	
1st	W/Y	Ground
Neutral	Bl	
2nd	R/B	
3rd	G/Bl	
4th	Y/Bl	
5th	Br/R	
Over Drive	Lg	

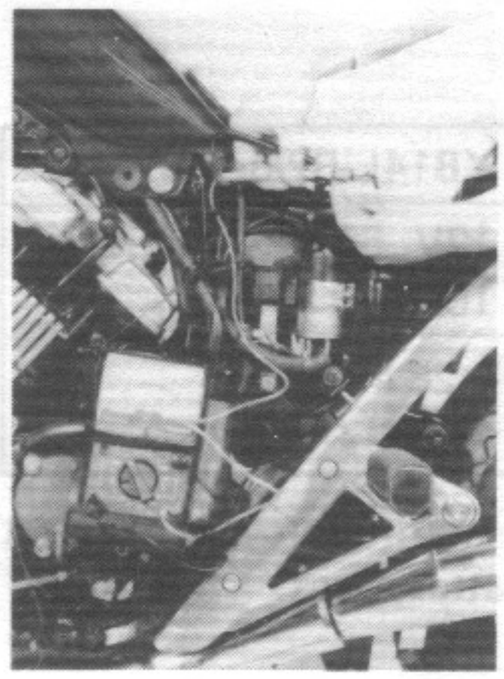


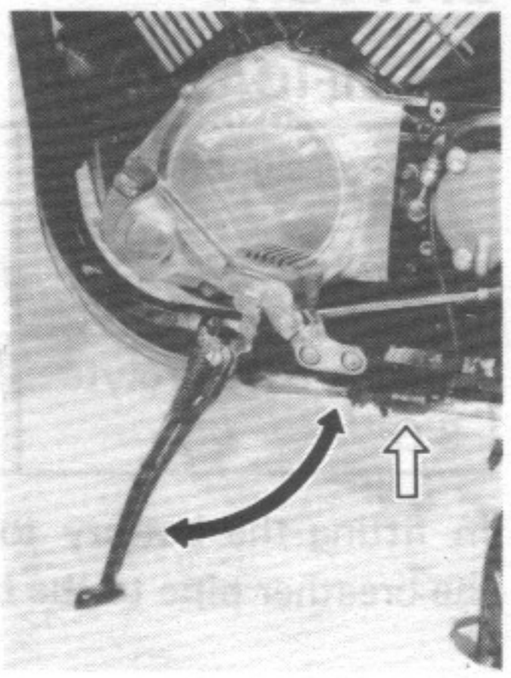
REAR BRAKE SWITCH

	O/G	W
ON (Depress pedal)	○———	———○
OFF		

SIDE STAND CHECK SWITCH

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

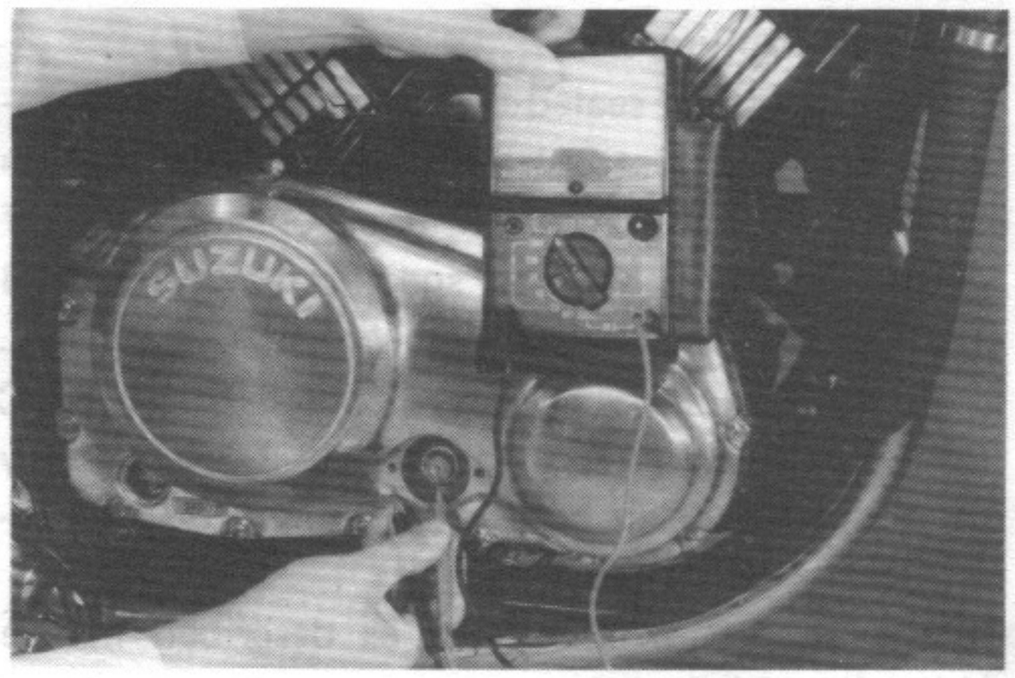




OIL PRESSURE SWITCH

- Continuity, when engine is stopped.
- No continuity, when engine is running.

NOTE:
Before inspecting the oil pressure switch, check the engine oil level at oil inspection window.



WIRE COLOR

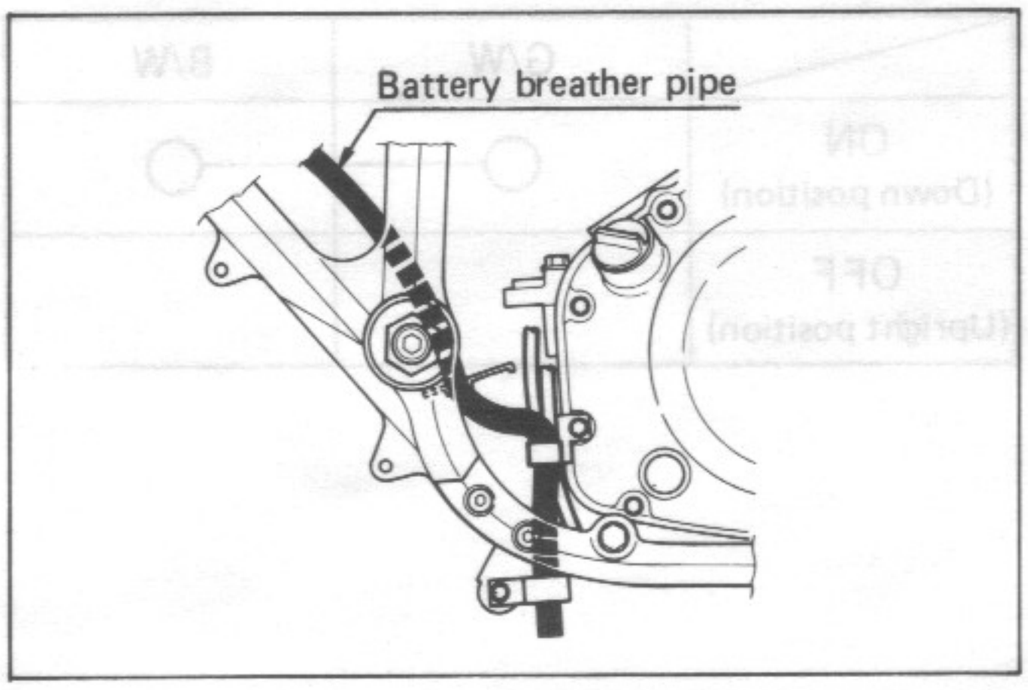
R/W . . . . . Red with White tracer
O . . . . . Orange
Gr . . . . . Gray
Br . . . . . Brown
W . . . . . White
Y . . . . . Yellow
Y/W . . . . . Yellow with White tracer
B . . . . . Black
Lbl . . . . . Light blue
Lg . . . . . Light green
G/W . . . . . Green with White tracer
G . . . . . Green
B/W . . .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

BATTERY

SPECIFICATIONS

Type designation	YB14L-B2 or 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.

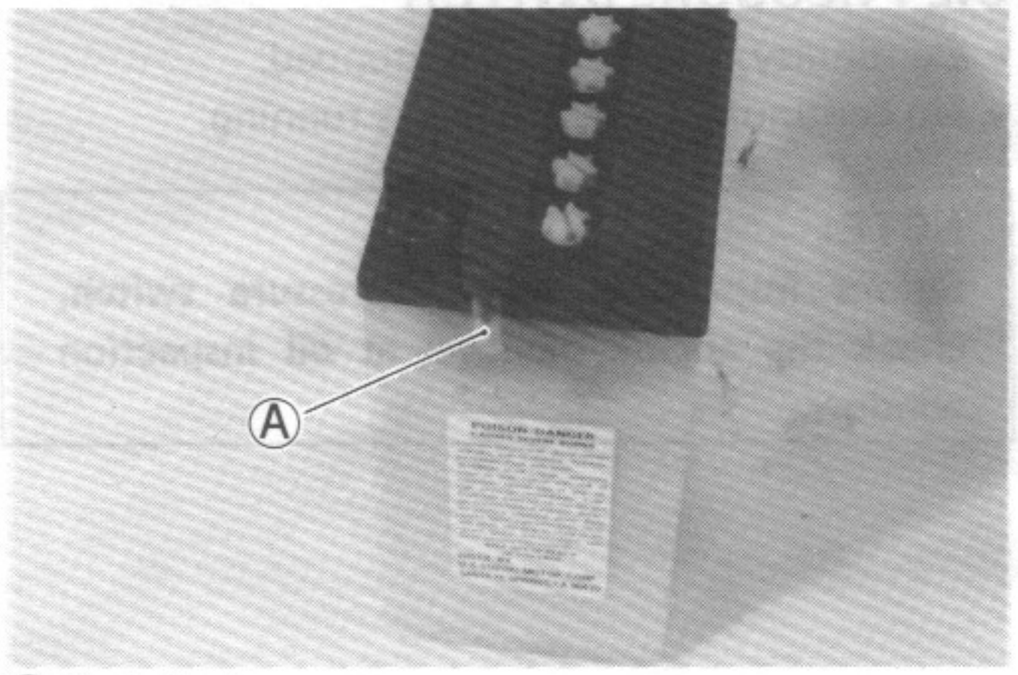


INITIAL CHARGING

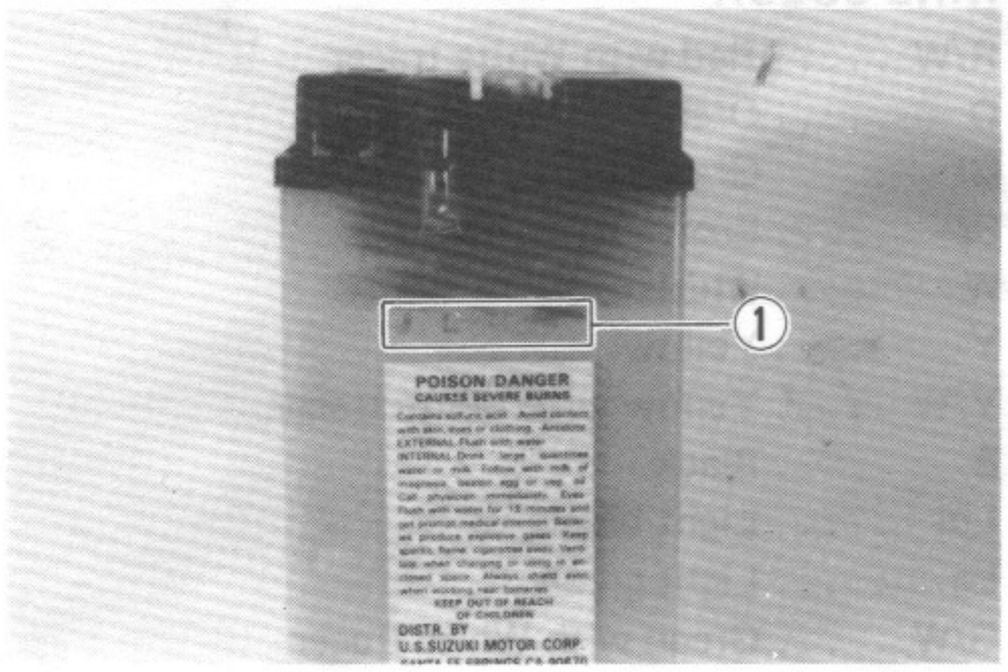
Filling electrolyte

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 battery standing for half an hour after filling. Add additional electrolyte if necessary.

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



Ⓐ Sealed tube



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.

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

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.

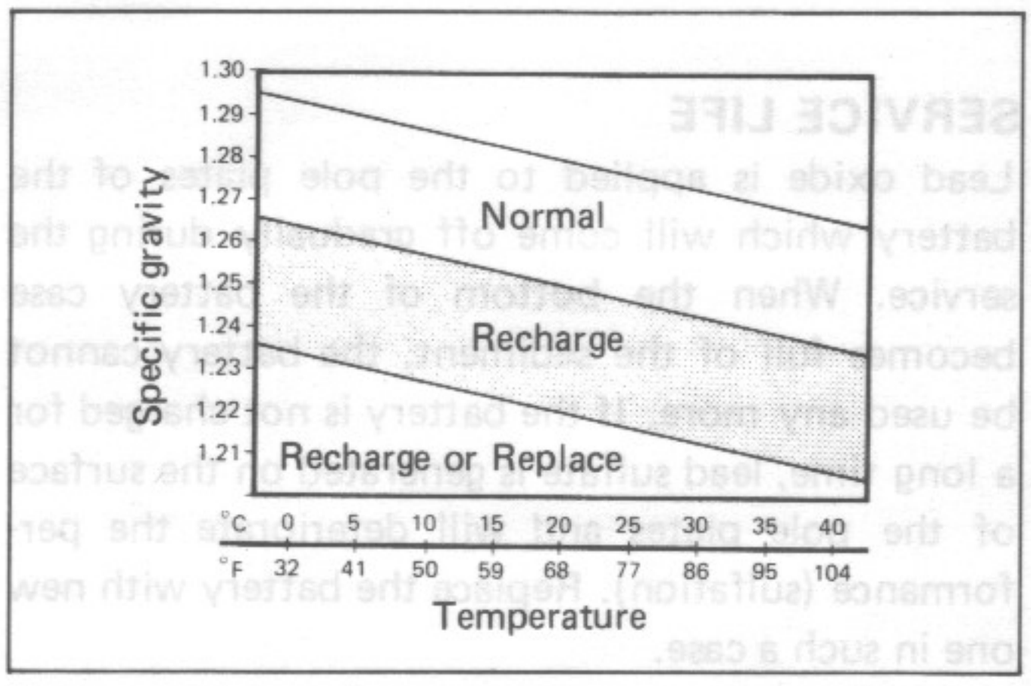
If the battery terminals are found to be coated with rust or an acidic white powdery substance, then this can be cleaned away with sandpaper.

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.

NOTE:
First, remove the ⊖ lead wire.

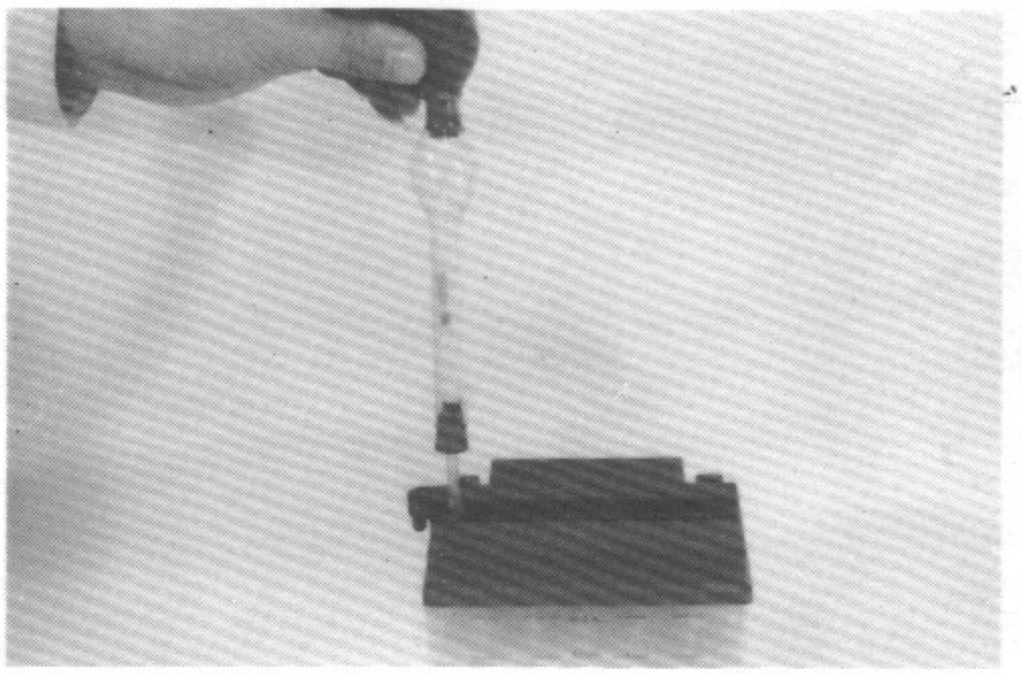
RECHARGING OPERATION BASED ON S.G. READING

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.



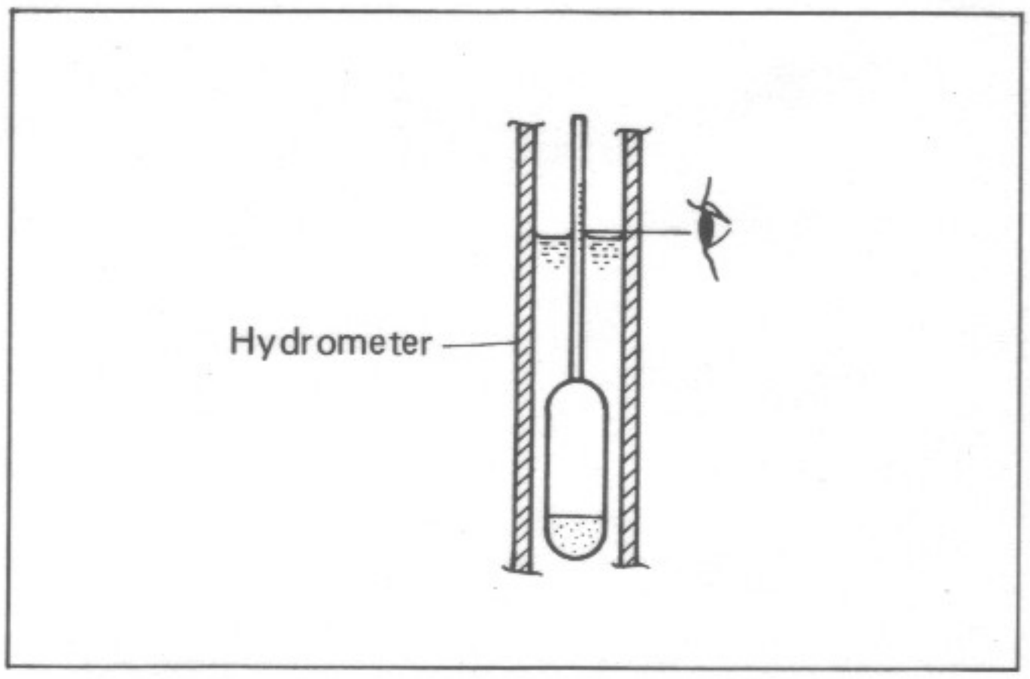
Check the reading (as corrected to 20°C) with chart to determine the recharging time in hour by constant-current charging at a charging rate of 1.4 amperes (which is tenth of the capacity of the present battery).

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.

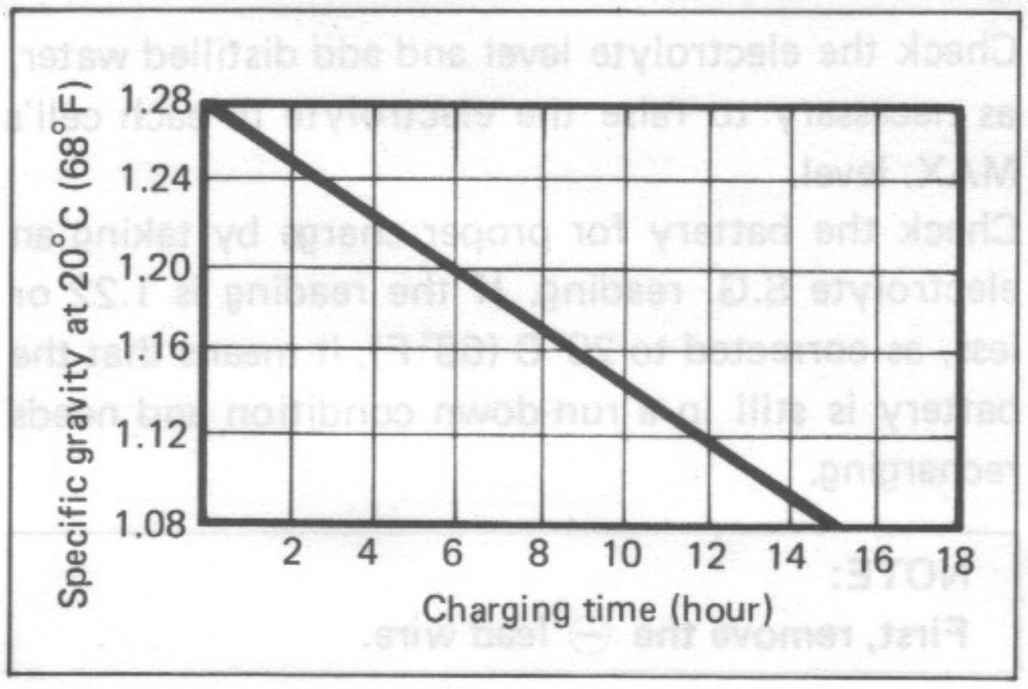


Electrolyte specific gravity	1.28 at 20°C (68°F)

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.

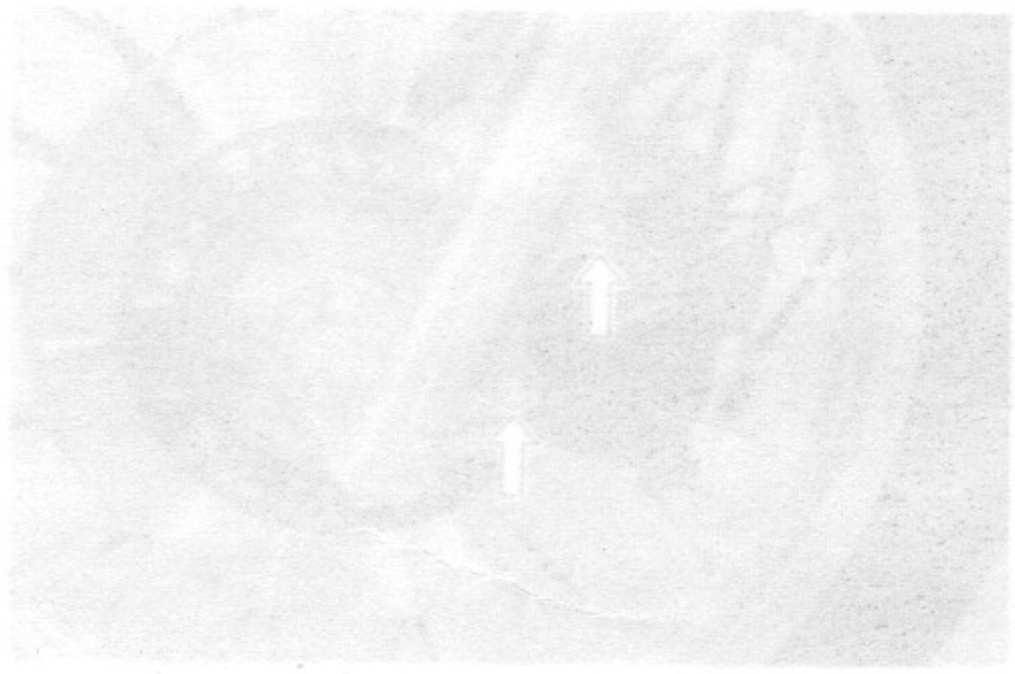
WARNING:

- **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

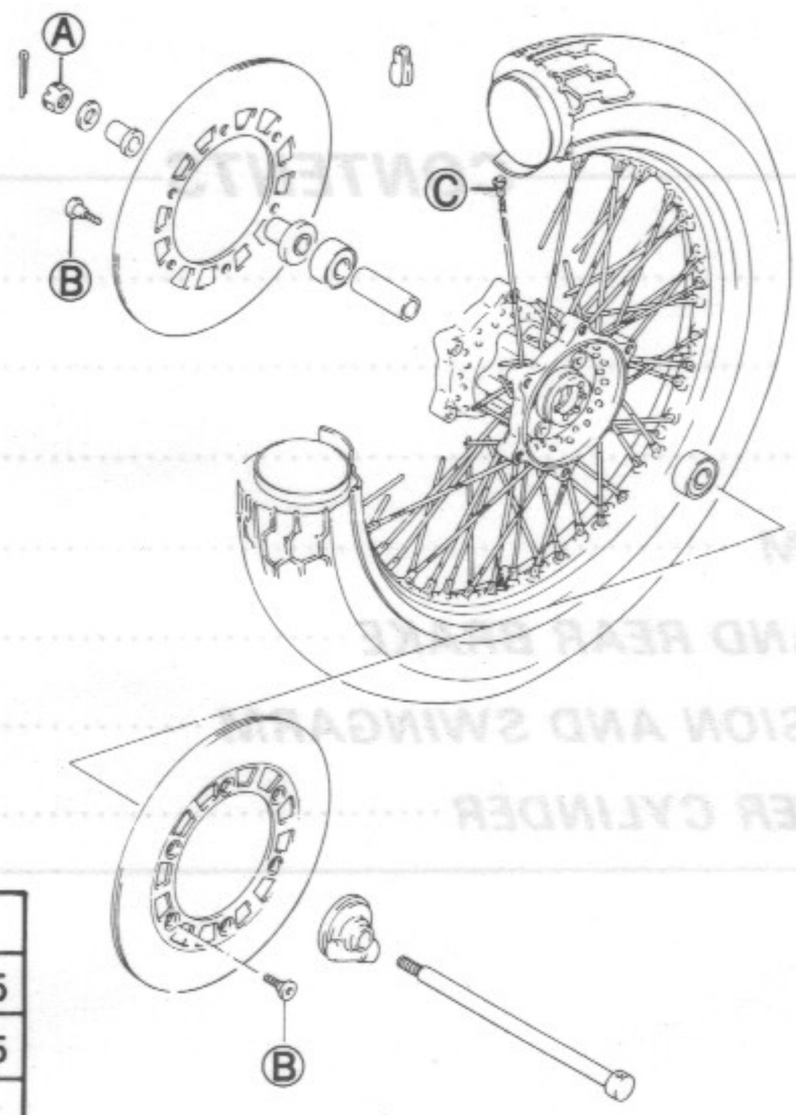
CONTENTS

FRONT WHEEL 9- 1
FRONT BRAKE 9- 6
FRONT FORK 9-13
STEERING STEM 9-20
REAR WHEEL AND REAR BRAKE 9-25
REAR SUSPENSION AND SWINGARM 9-32
CLUTCH MASTER CYLINDER 9-42



FRONT WHEEL

CONSTRUCTION



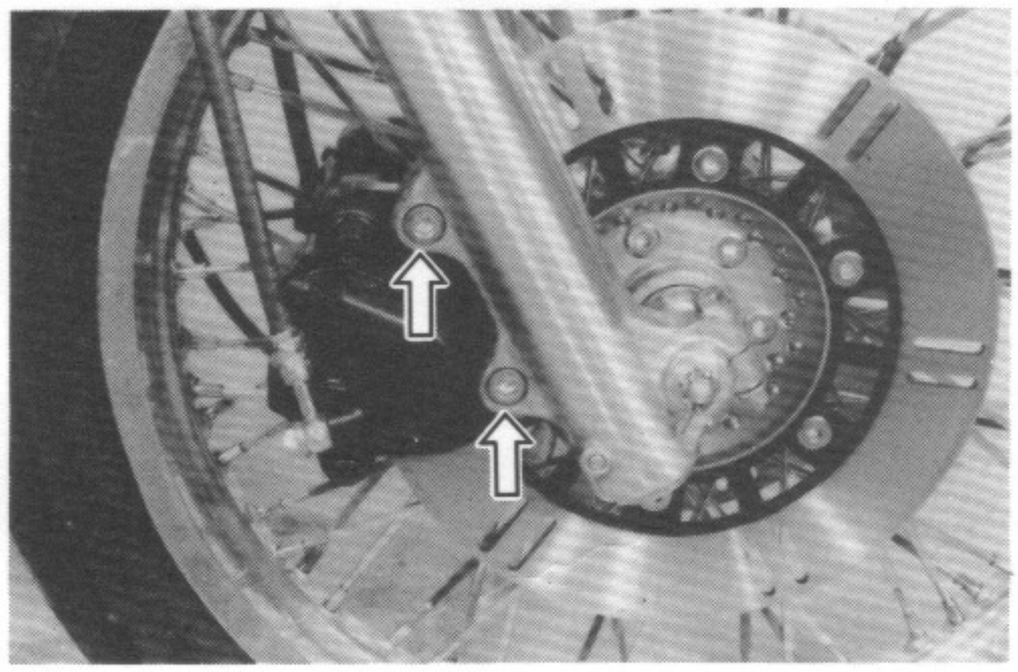
Tightening torque

Item	N·m	kg-m	lb-ft
Ⓐ	36–52	3.6–5.2	26.0–37.5
Ⓑ	20–30	2.0–3.0	14.5–21.5
Ⓒ	4–5	0.4–0.5	3.0–3.5

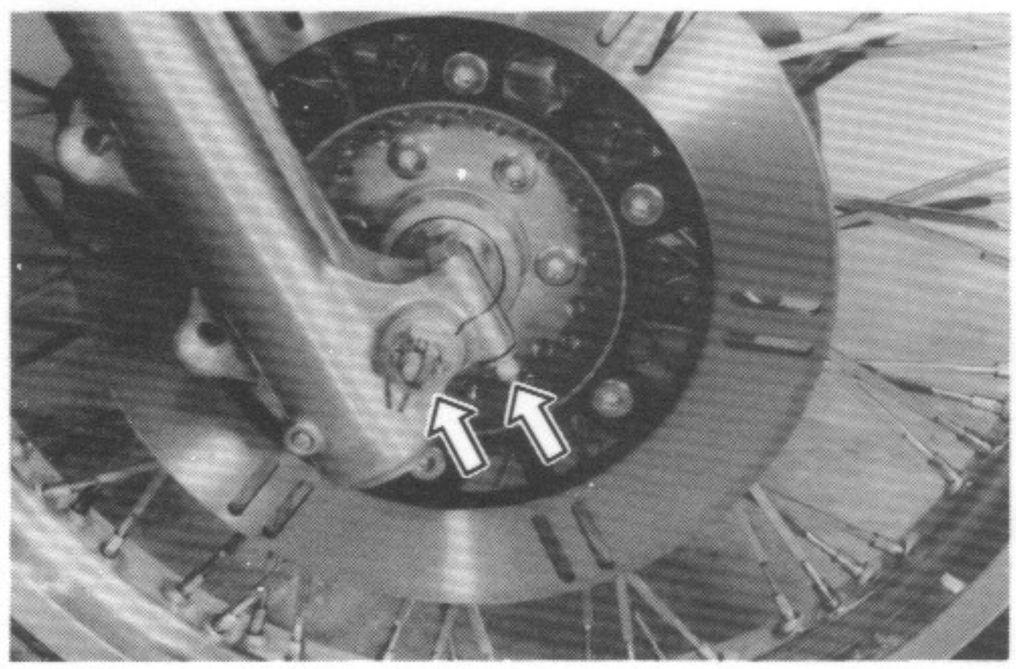
REMOVAL AND DISASSEMBLY

- Support the machine by using center stand and jack with wooden block.
- Remove caliper mounting bolts and dismount the caliper.

NOTE:
Do not operate the brake lever while dismounting the caliper.

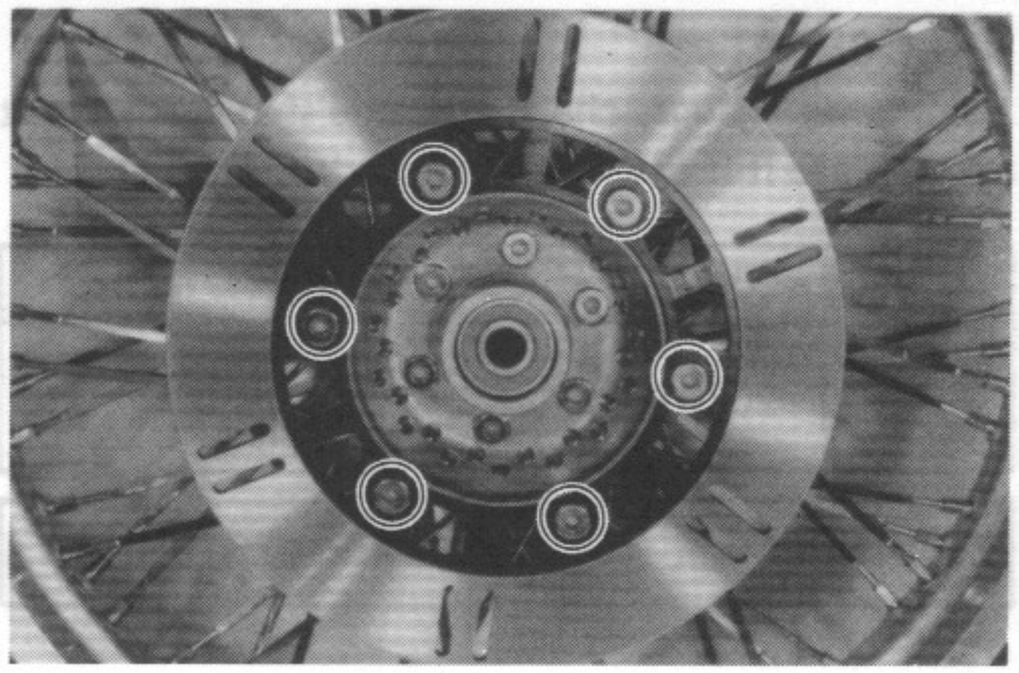


- Pull off cotter pin and remove axle nut and washer.
- Loosen the axle clamp bolt.
- Draw out axle shaft and take off front wheel.



BRAKE DISC

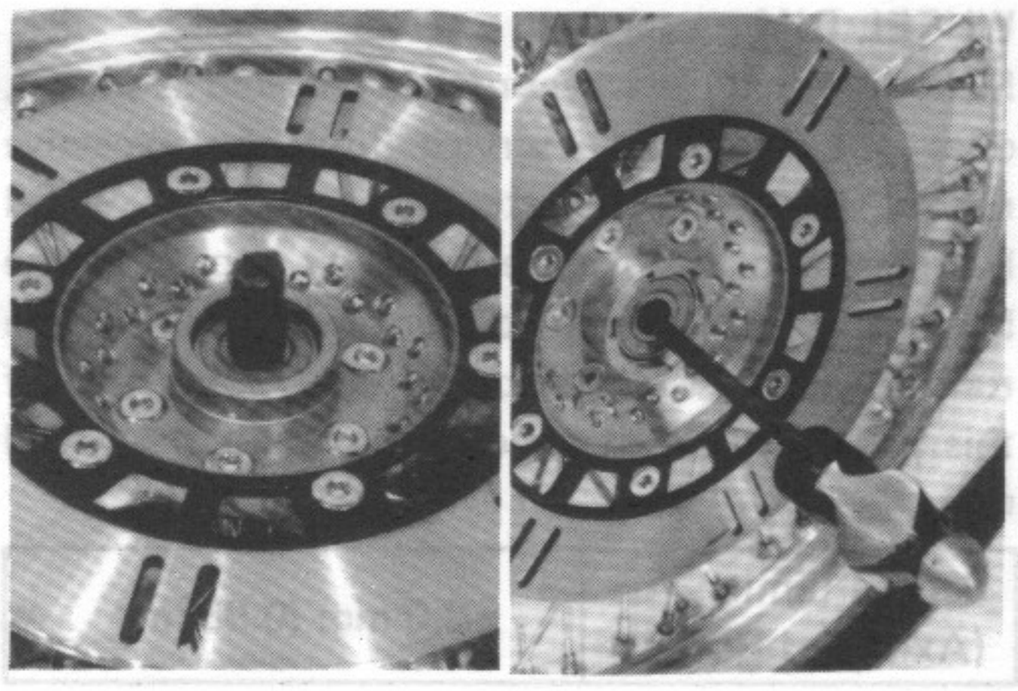
- Remove the securing bolts and separate the discs from wheel (Right and Left).



WHEEL BEARING

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

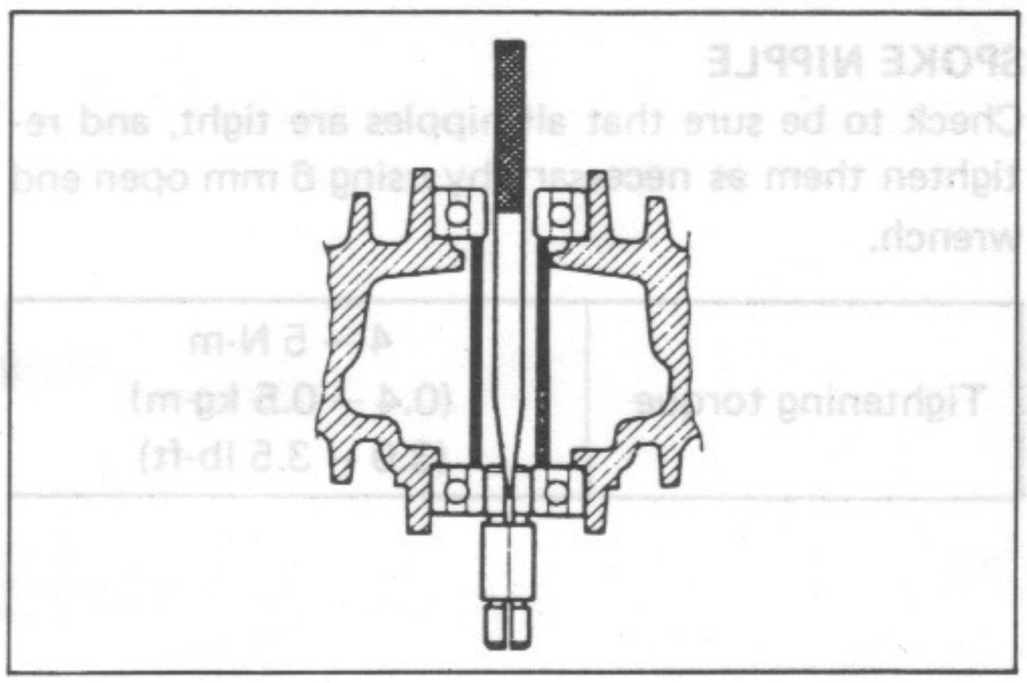
- Insert the adapter into the wheel bearing.
- After inserting the wedge bar from the opposite side, lock the wedge bar in the slit of the adapter.



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

CAUTION:
The removed bearing should be replaced.

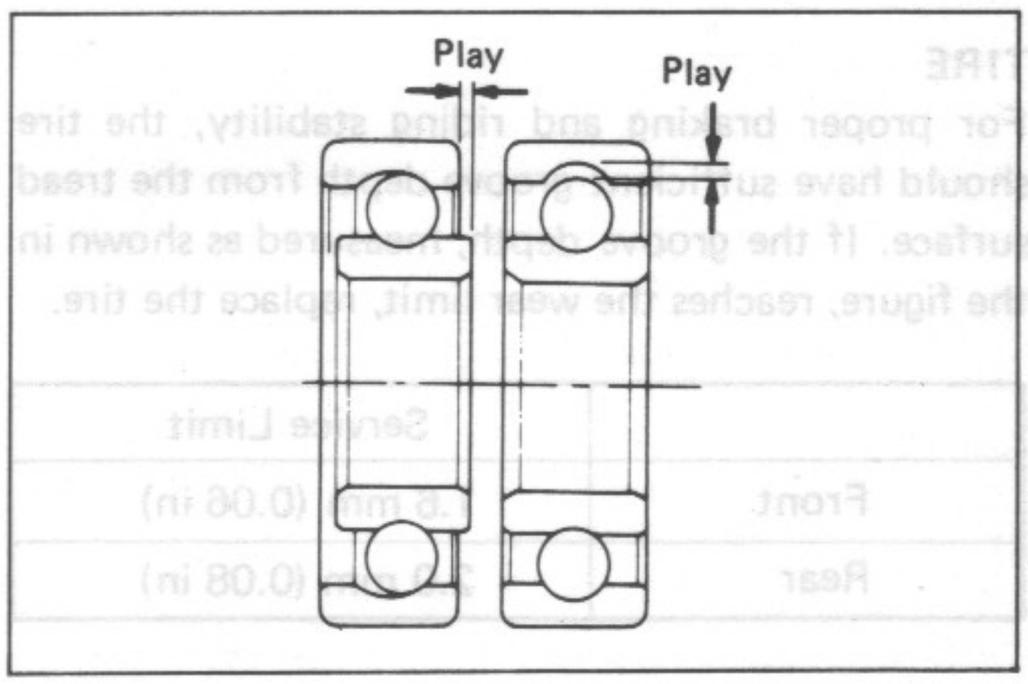
09941 - 50110	Bearing remover (Not available in USA)



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.

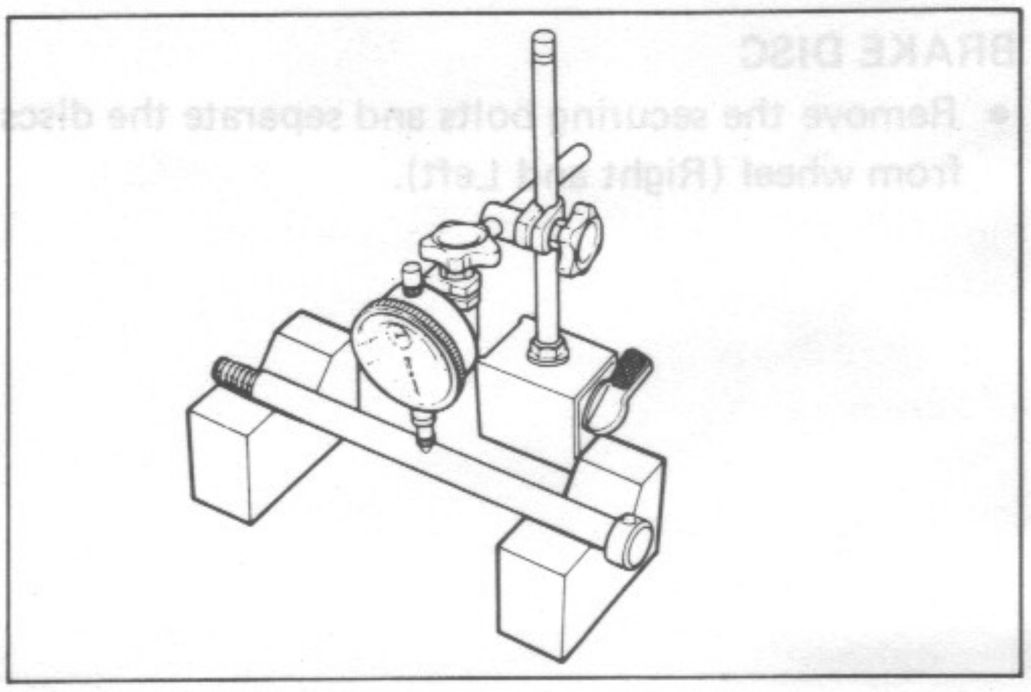


AXLE SHAFT

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 USA)

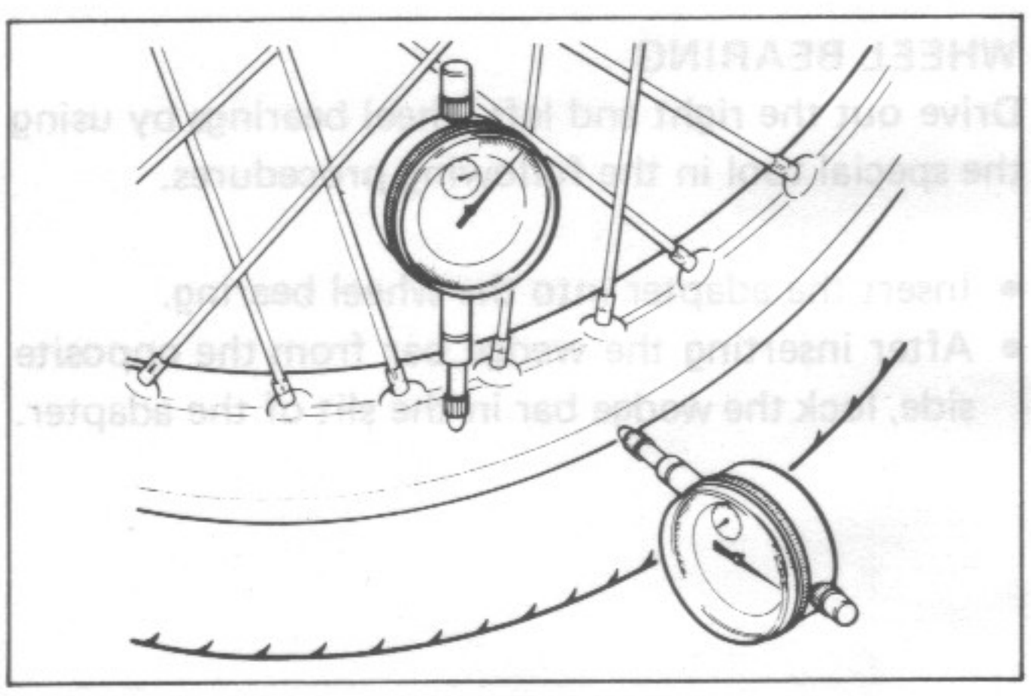
Service Limit	0.25 mm (0.010 in.)



WHEEL RIM

Make sure that the wheel runout checked as shown, does not exceed the service limit. An excessive runout is usually due to worn or loose wheel bearings and can be reduced by replacing the bearings. If bearing replacement fails to reduce the runout, adjust the tension of the spokes and, if this proves to be of no effect, replace the wheel rim.

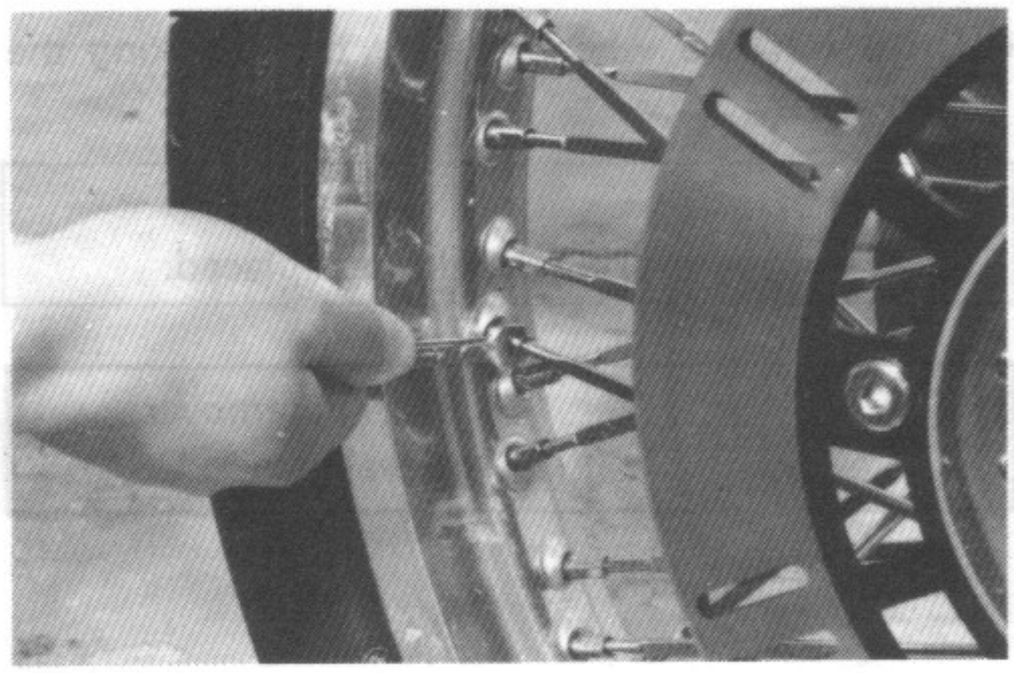
Service Limit (Axial and Radial)	2.0 mm (0.08 in)



SPOKE NIPPLE

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

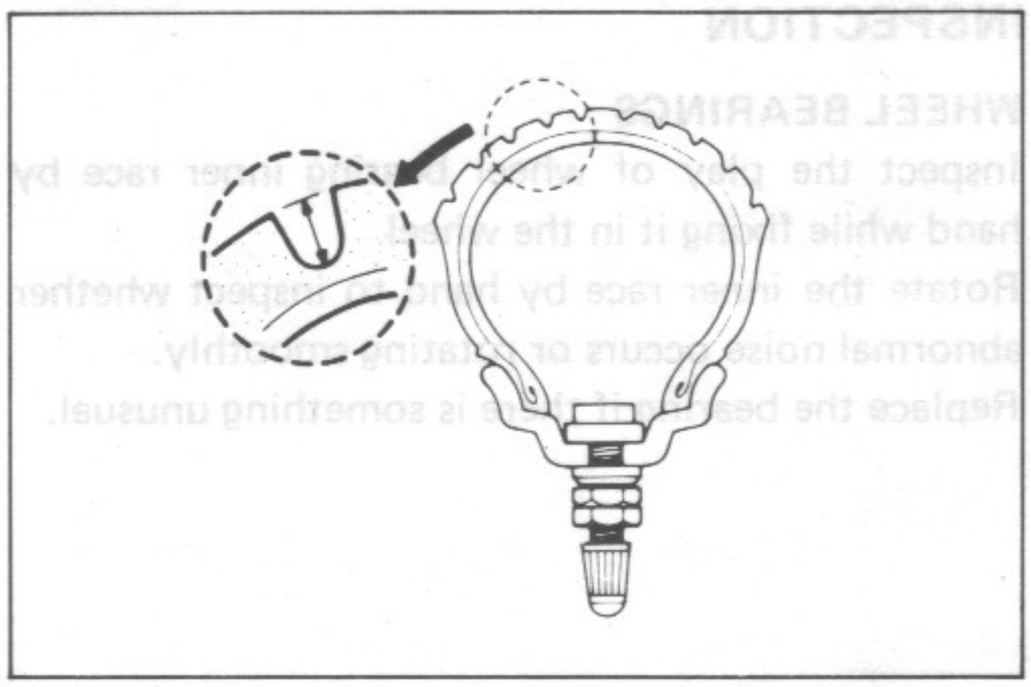
Tightening torque	4 – 5 N·m (0.4 – 0.5 kg-m) (3.0 – 3.5 lb-ft)



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)



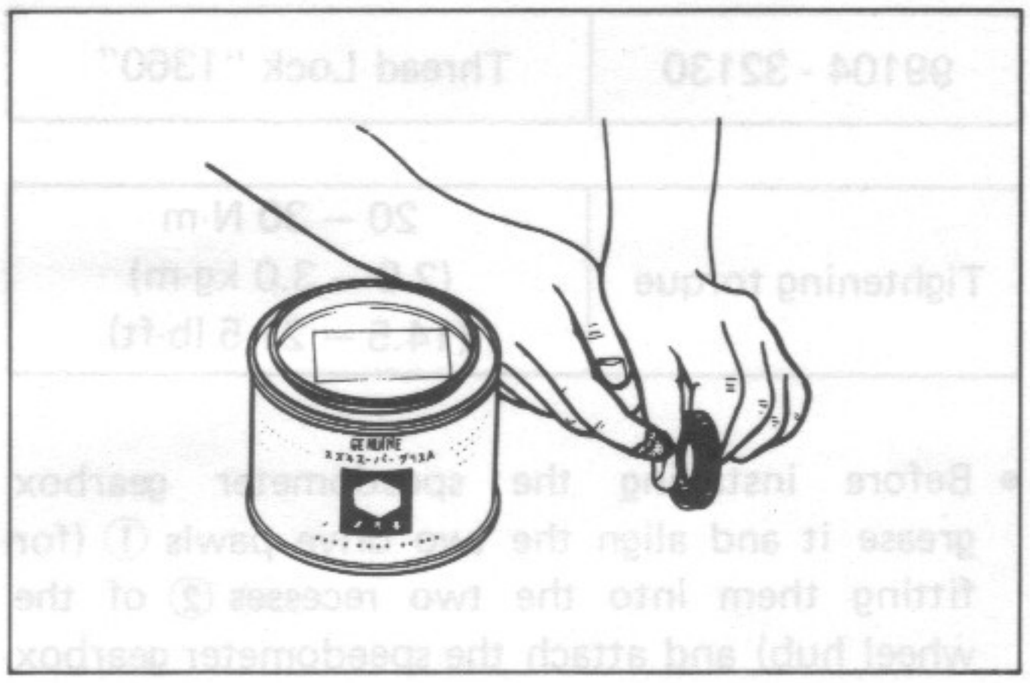
REASSEMBLY

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.

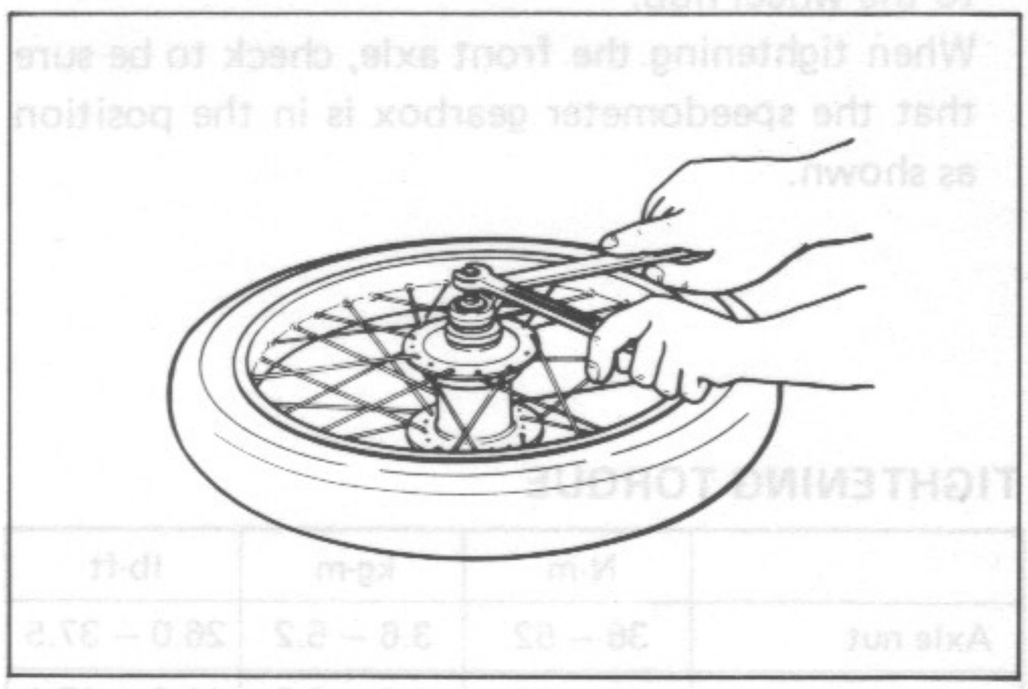
99000 - 25030	SUZUKI super grease "A"

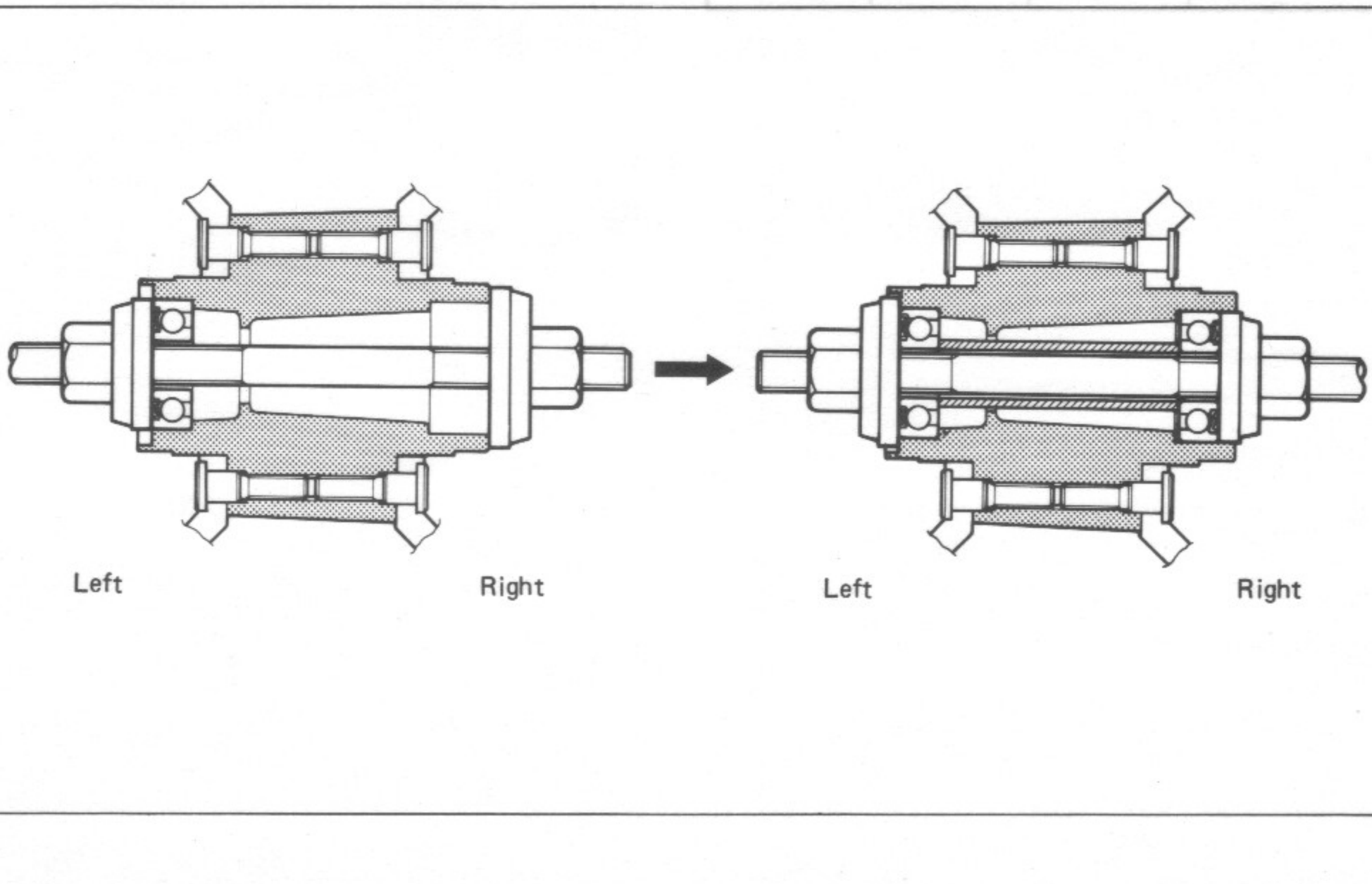


- Install the wheel bearings as follows by using the special tool.

CAUTION:
First install the wheel bearing for left side.

09924 - 84510	Bearing installer set

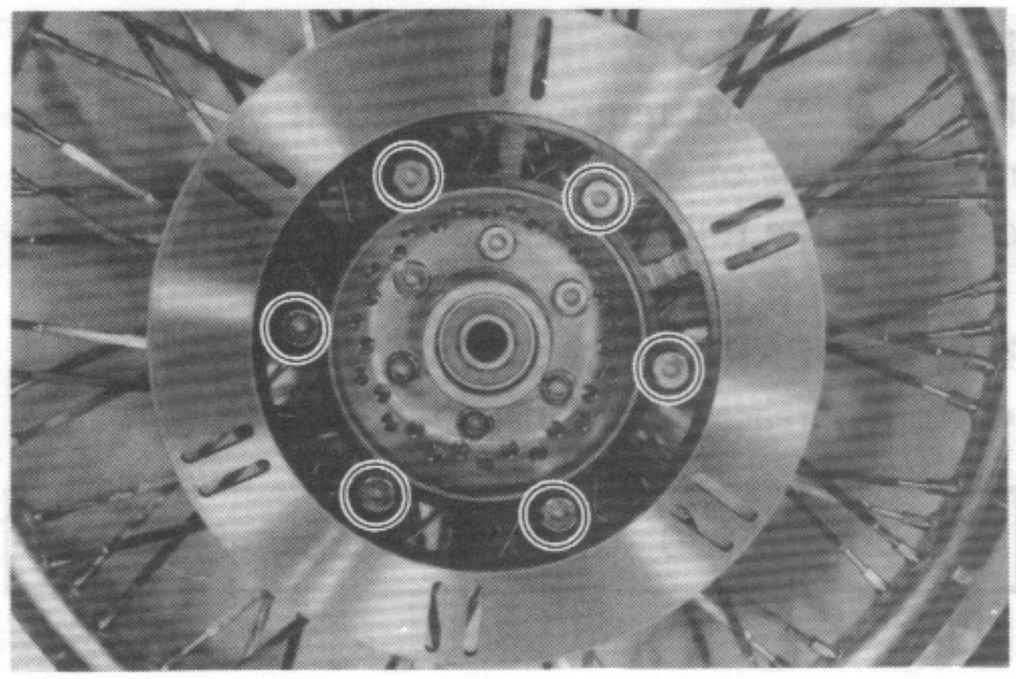




- Make sure that the brake disc is clean and free of any greasy matter. Apply thread lock "1360" to the disc bolts and tighten the disc bolts to specified torque.

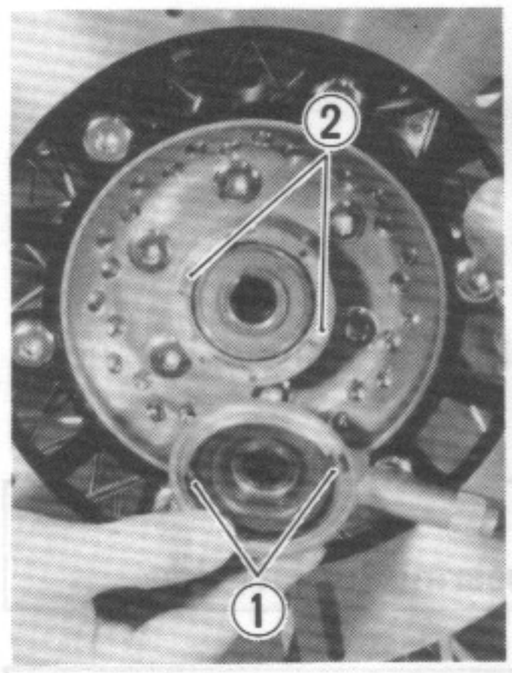
99104 - 32130	Thread Lock "1360"

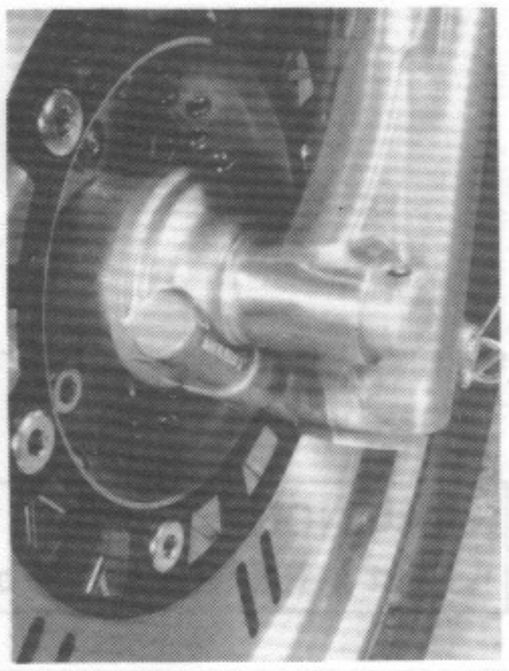
Tightening torque	20 – 30 N·m (2.0 – 3.0 kg-m) (14.5 – 21.5 lb-ft)



- Before installing the speedometer gearbox grease it and align the two drive pawls ① (for fitting them into the two recesses ② of the wheel hub) and attach the speedometer gearbox to the wheel hub.

When tightening the front axle, check to be sure that the speedometer gearbox is in the position as shown.





TIGHTENING TORQUE

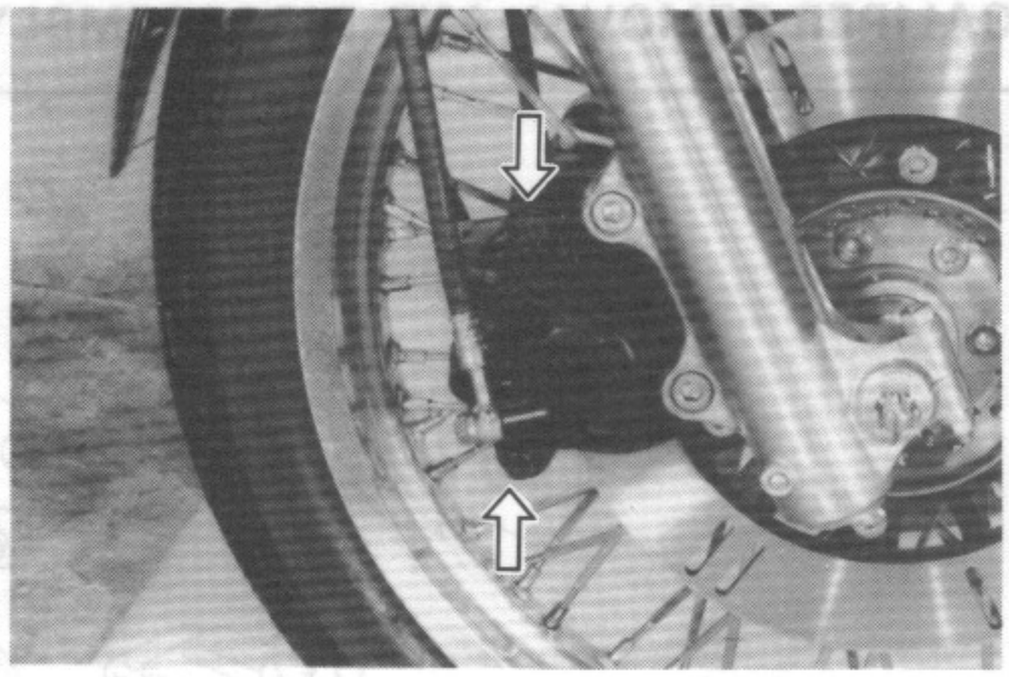
	N·m	kg-m	lb-ft
Axle nut	36 – 52	3.6 – 5.2	26.0 – 37.5
Axle clamp nut	15 – 25	1.5 – 2.5	11.0 – 18.0

FRONT BRAKE

BRAKE PAD REPLACEMENT

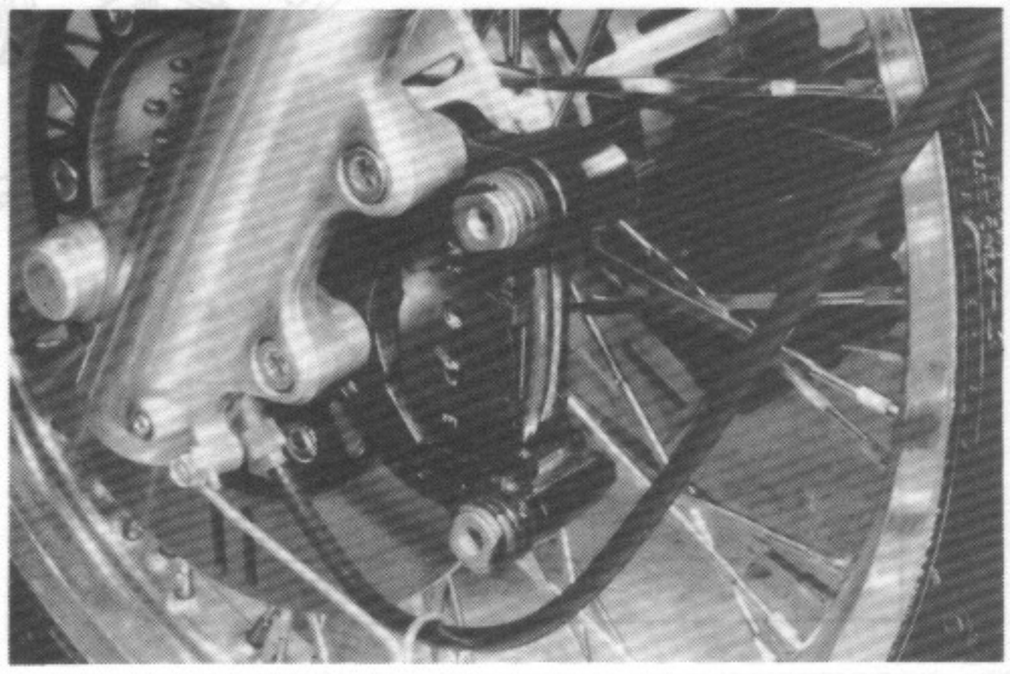
- Remove caliper axle bolts and take off caliper.

CAUTION:
Do not operate the brake lever while dismounting the caliper.



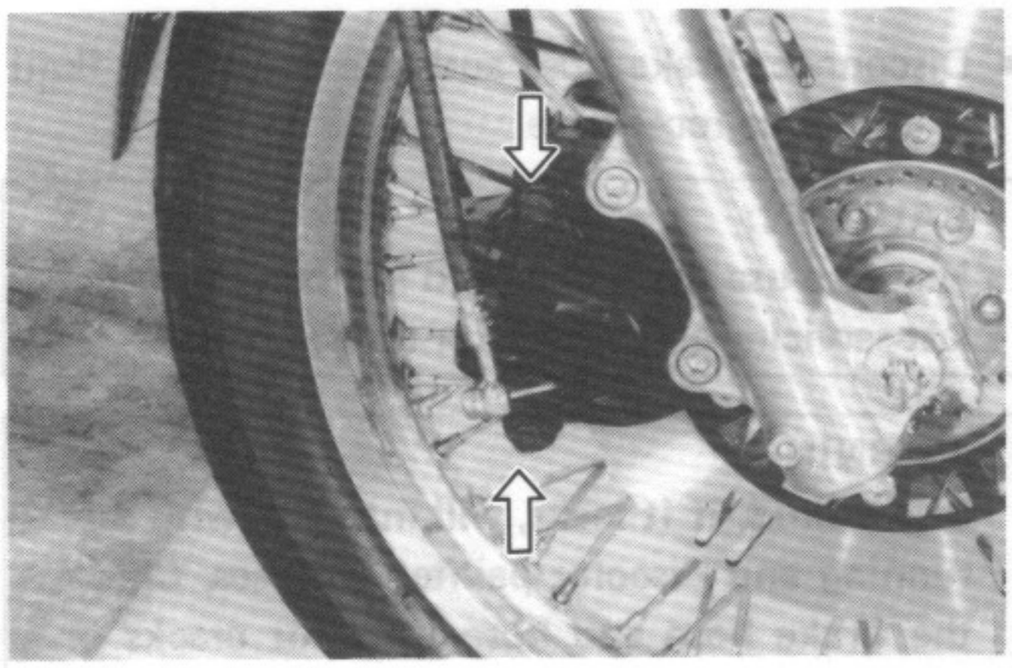
- Pull out brake pads with pad shim.

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

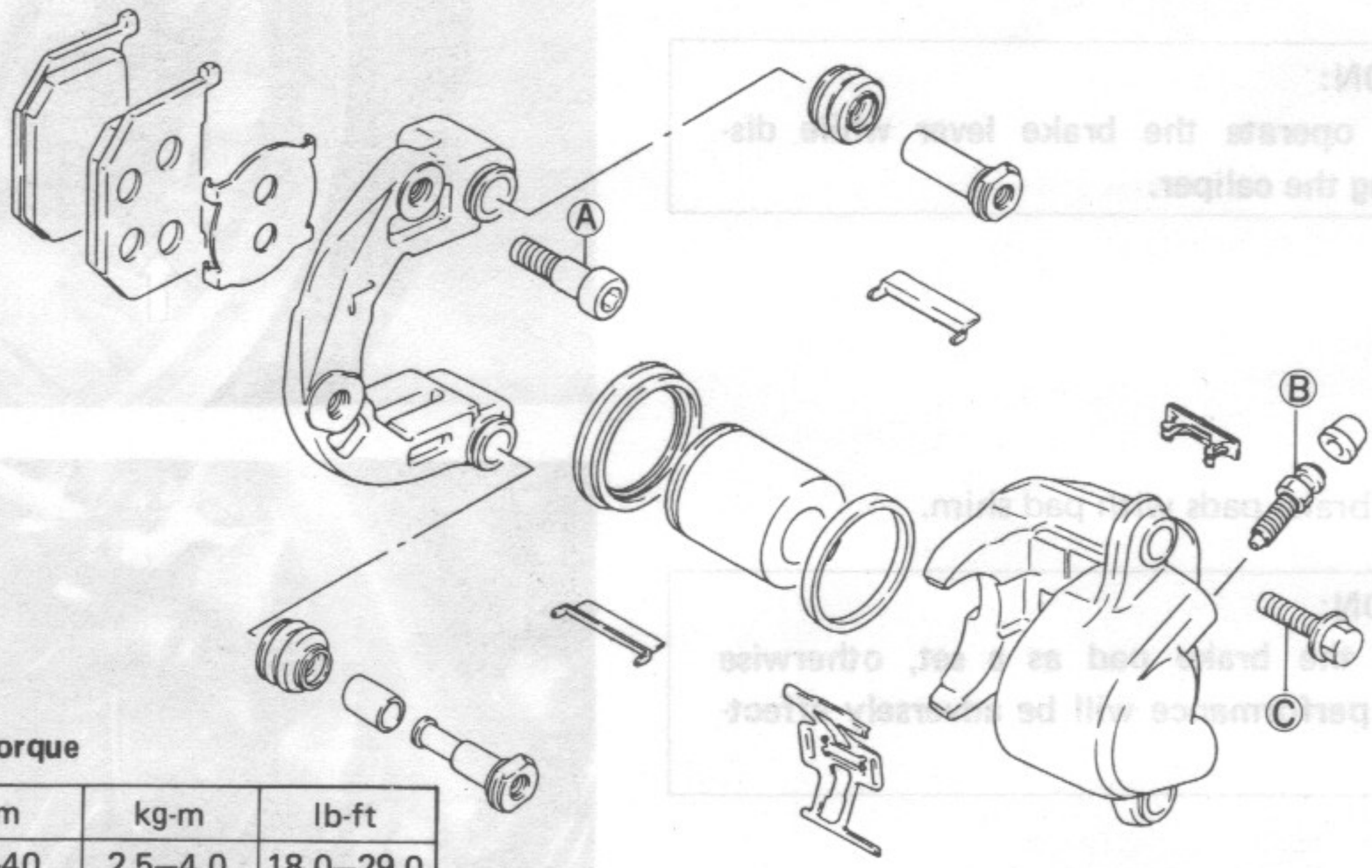


NOTE:
Push in the piston all the way to the caliper when remounting the caliper.

Caliper axle tightening torque	15 – 20 N·m (1.5 – 2.0 kg-m) (11.0 – 14.5 lb-ft)



CALIPER REMOVAL AND DISASSEMBLY



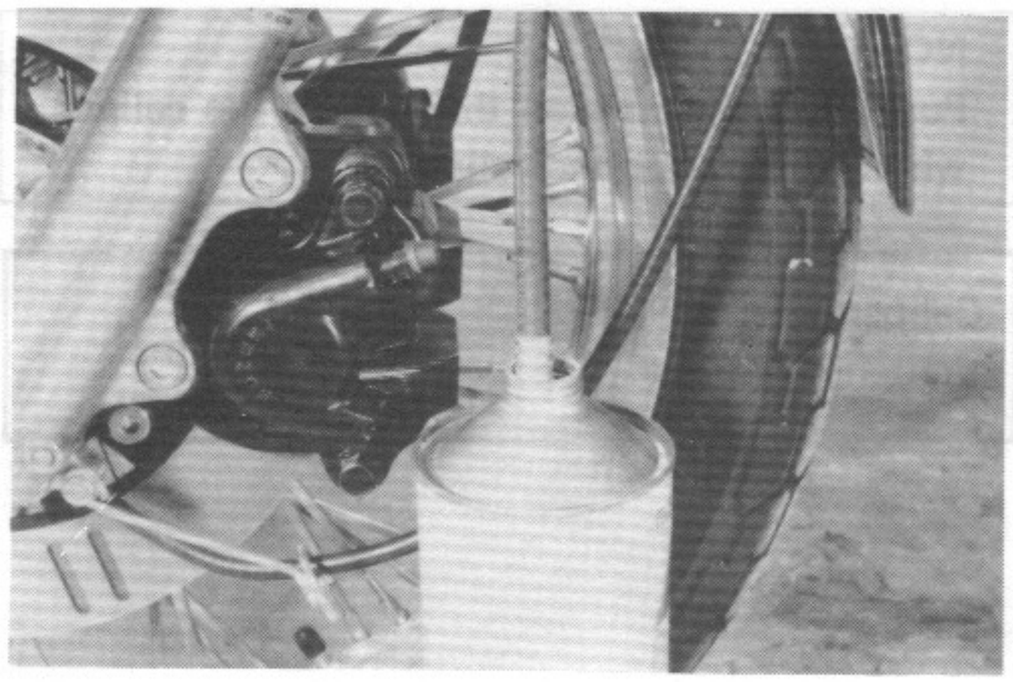
Tightening torque

Item	N·m	kg-m	lb-ft
Ⓐ	25–40	2.5–4.0	18.0–29.0
Ⓑ	6–9	0.6–0.9	4.5–6.5
Ⓒ	15–20	1.5–2.0	11.0–14.5

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

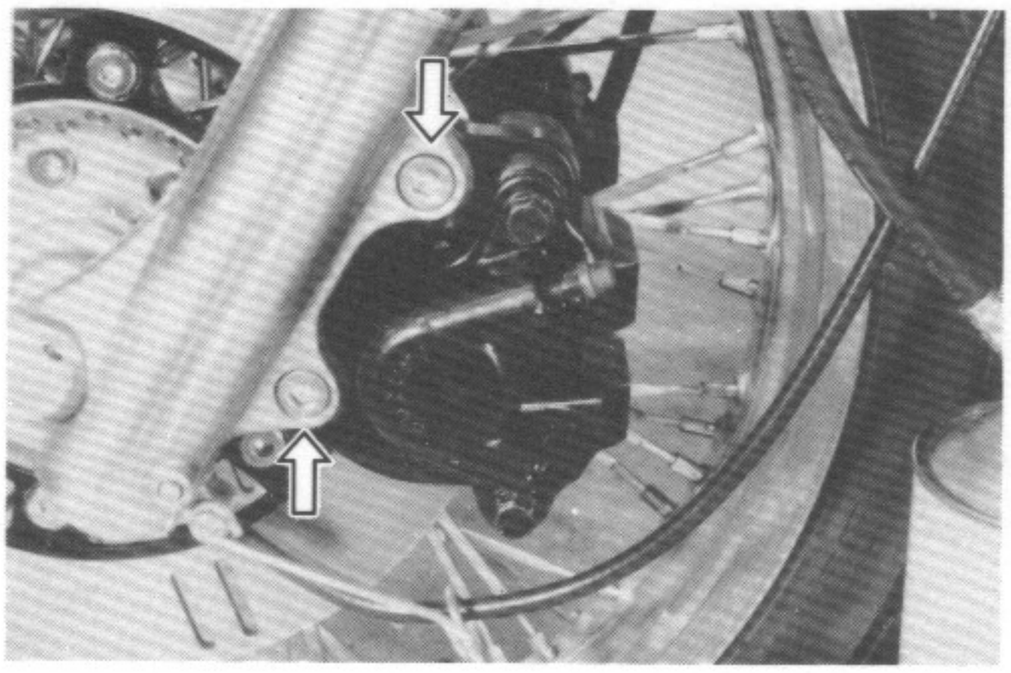
CAUTION:
Never re-use the brake fluid left over from the last servicing and stored for long periods.

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.

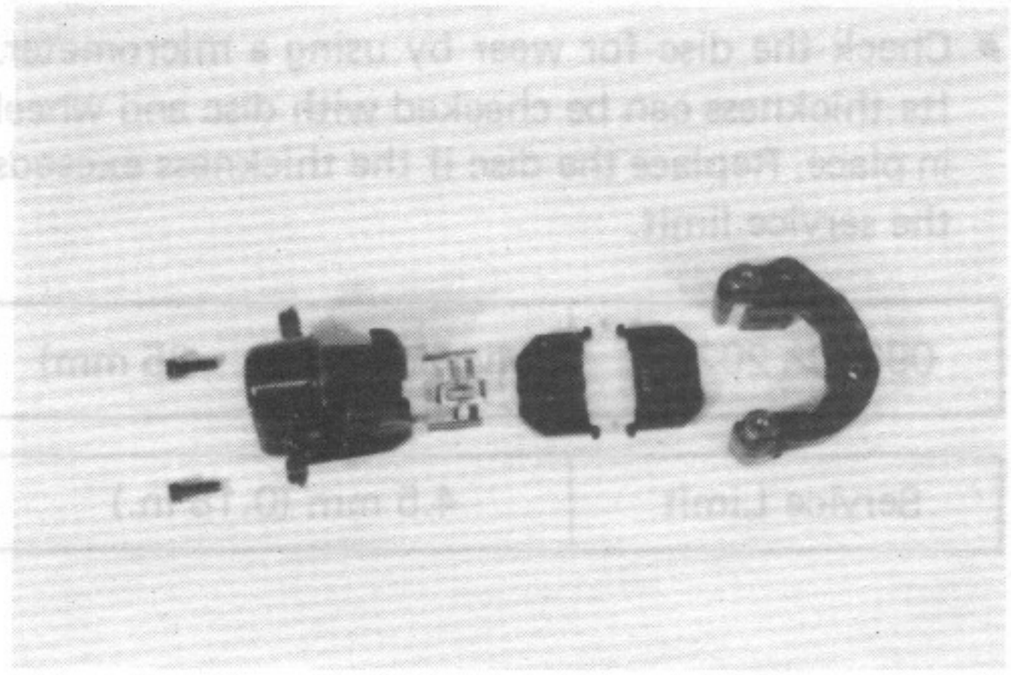


- Remove the caliper mounting bolts and take off the caliper

NOTE:
Slightly loosen the caliper axle bolts to facilitate later disassembly.

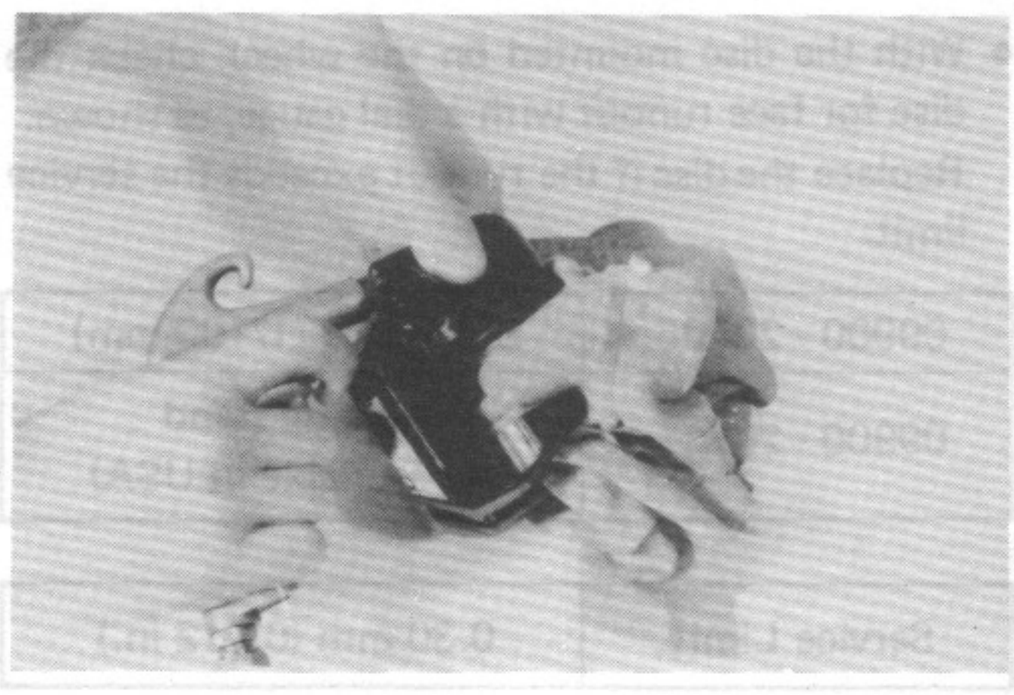


- Remove caliper axle bolts, separate the caliper and caliper holder.

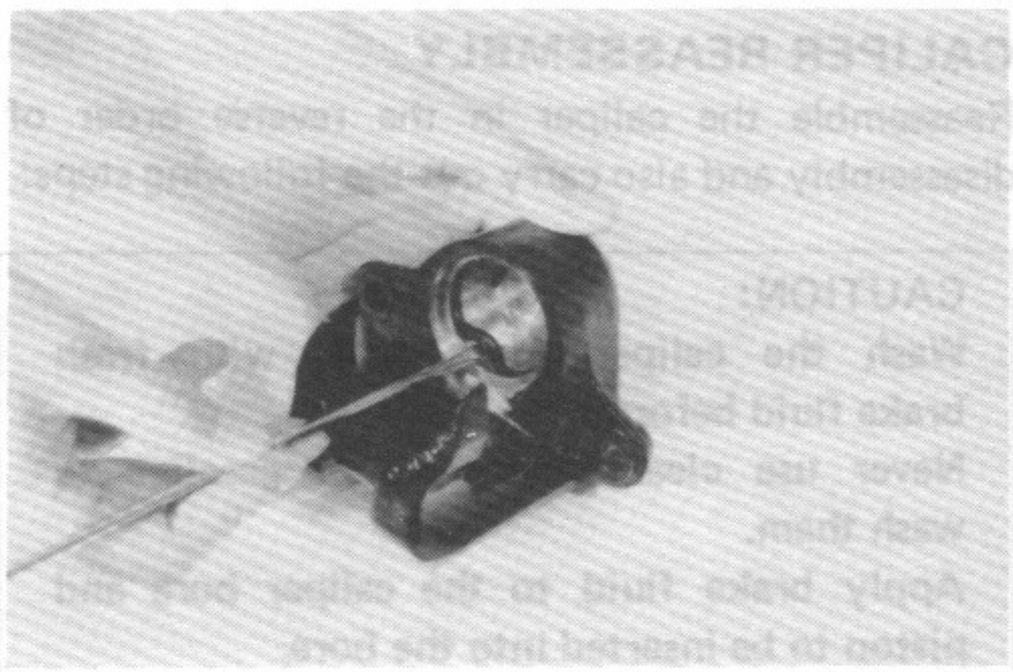


- Place a rag over the piston to prevent popping up. Force out the piston by using air gun.

CAUTION:
Do not use high pressure air to prevent piston damage.

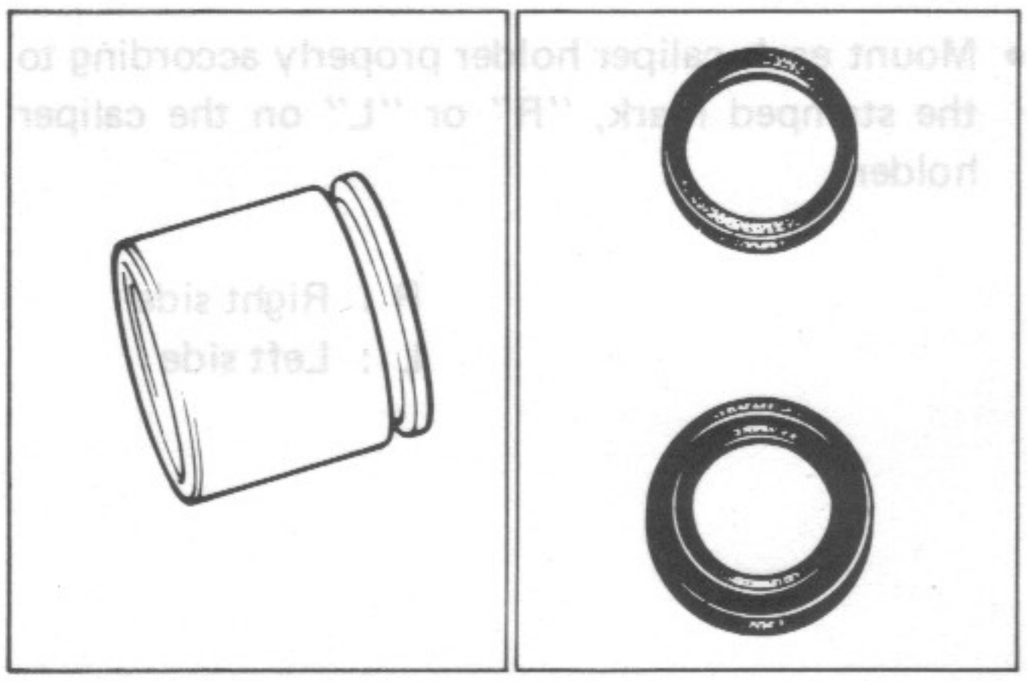


- Remove dust boot and piston seal.



CALIPER AND DISC INSPECTION

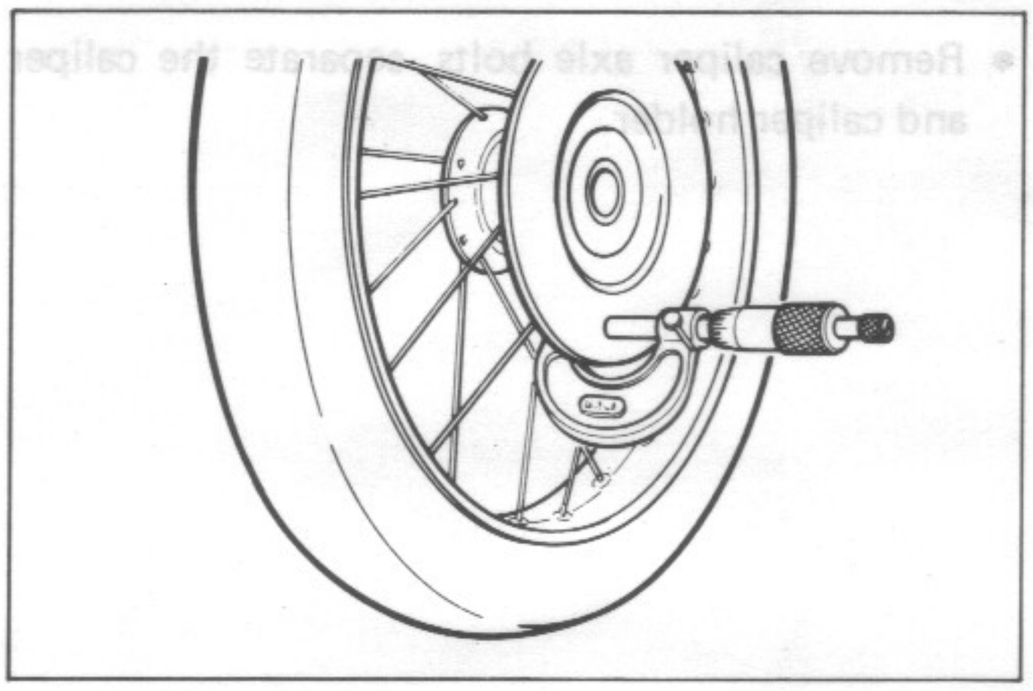
- Inspect the caliper bore wall for nicks, scratches or other damage.
- Inspect each of the rubber parts for damage and wear.
- Inspect the piston surface for any scratches or other damage.



- 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)

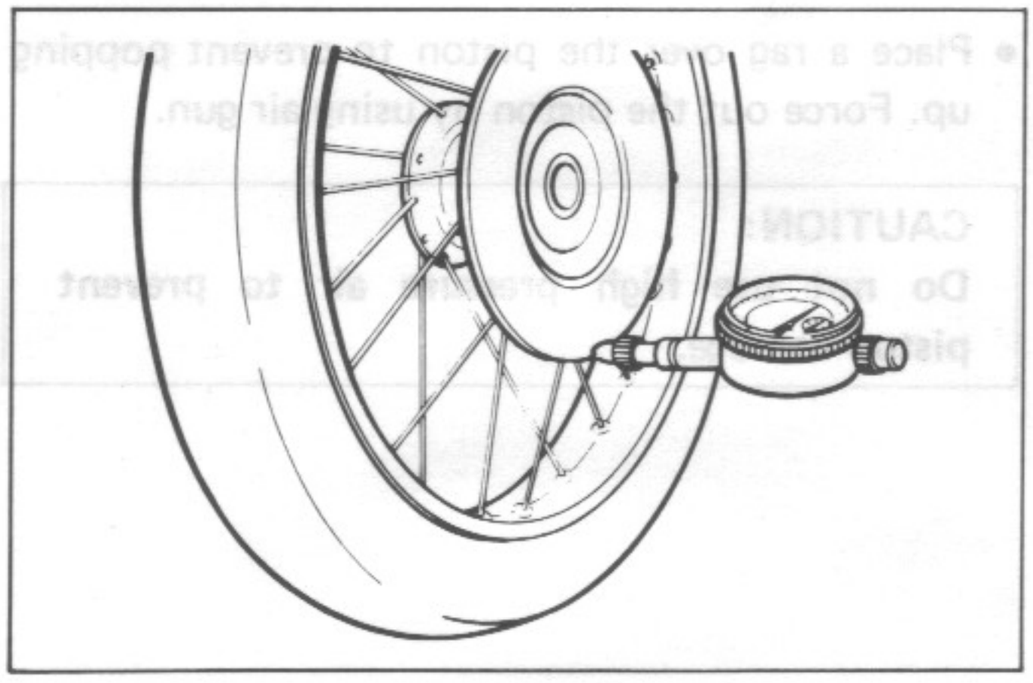
Service Limit	4.5 mm (0.18 in.)



- 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 USA)

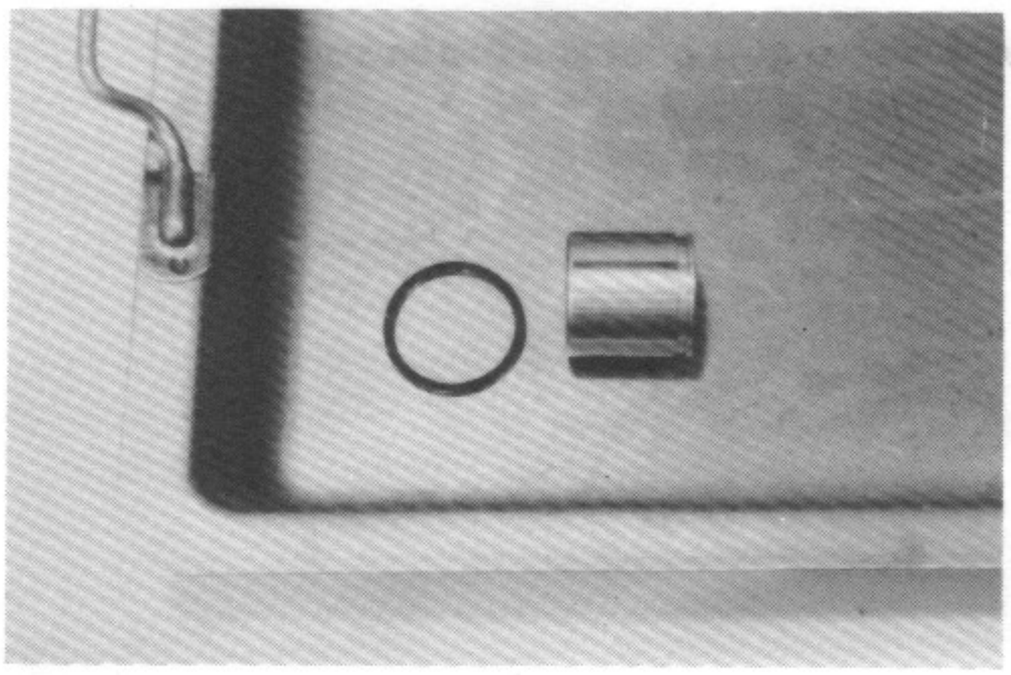
Service Limit	0.30 mm (0.012 in.)



CALIPER REASSEMBLY

Reassemble the caliper in the reverse order of 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.



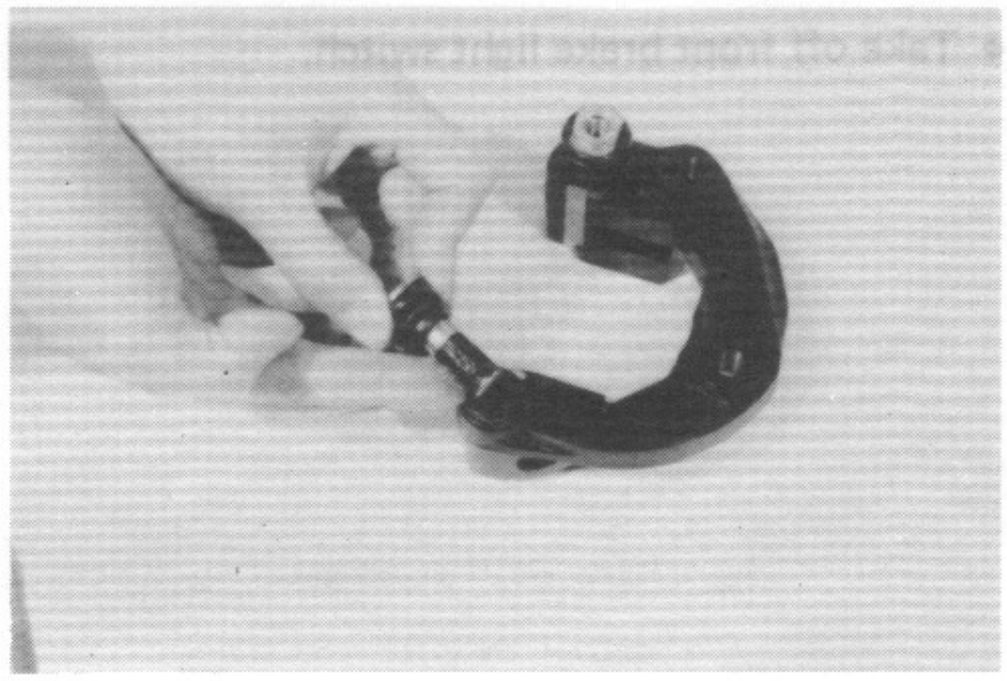
- Mount each caliper holder properly according to the stamped mark, "R" or "L" on the caliper holder.

R : Right side
L : Left side

- Apply SUZUKI silicone grease to the caliper axles.

99000 - 25100	SUZUKI silicone grease

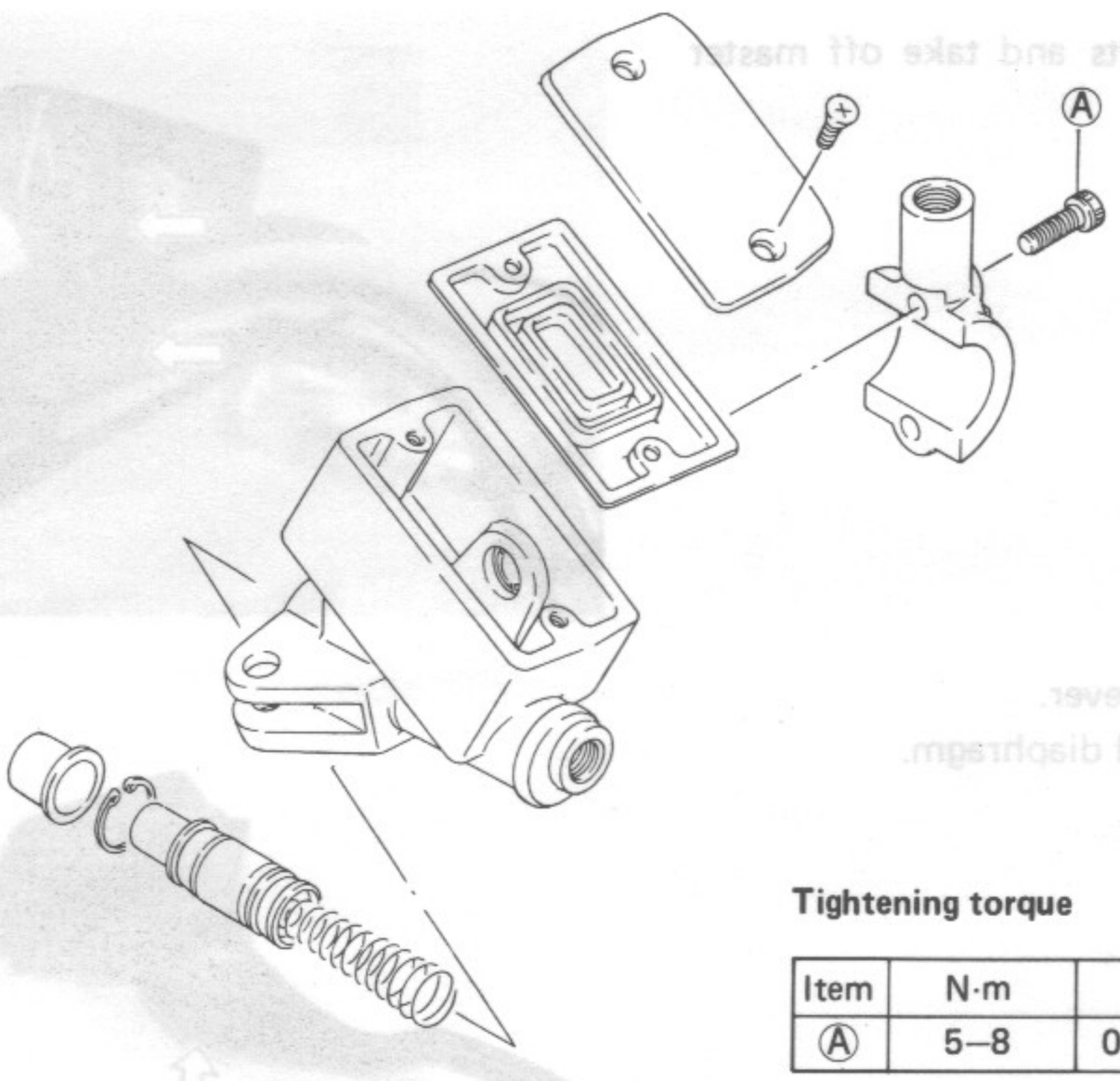
WARNING:
Bleed the air after reassembling caliper (See page 2-11).



Tightening torque:

	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 axle bolt	15 – 20	1.5 – 2.0	11.0 – 14.5

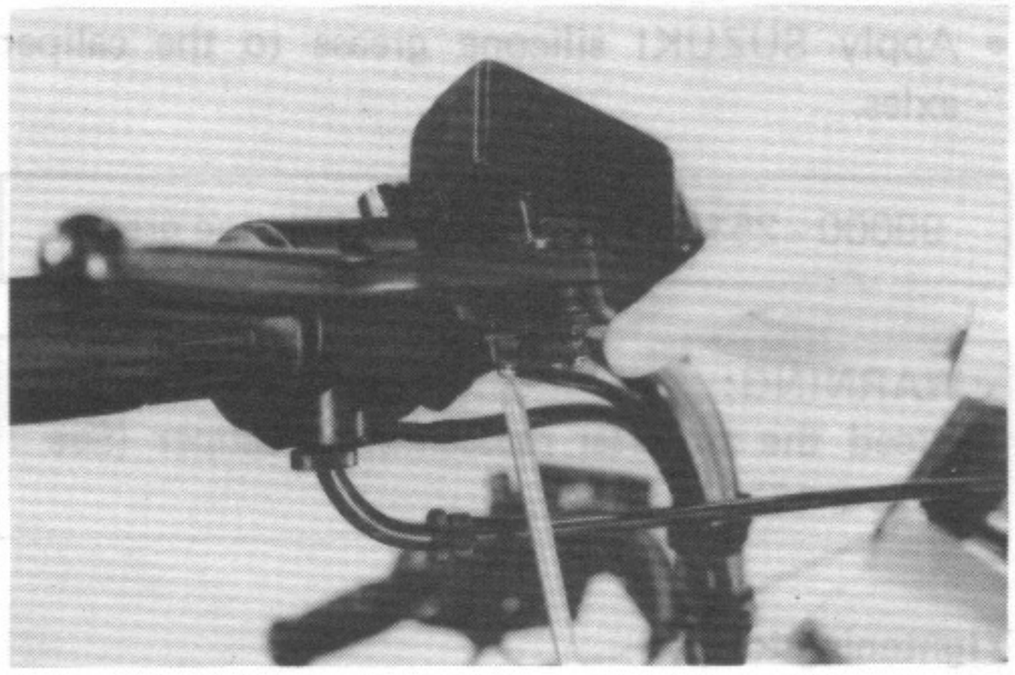
MASTER CYLINDER REMOVAL AND DISASSEMBLY



Tightening torque

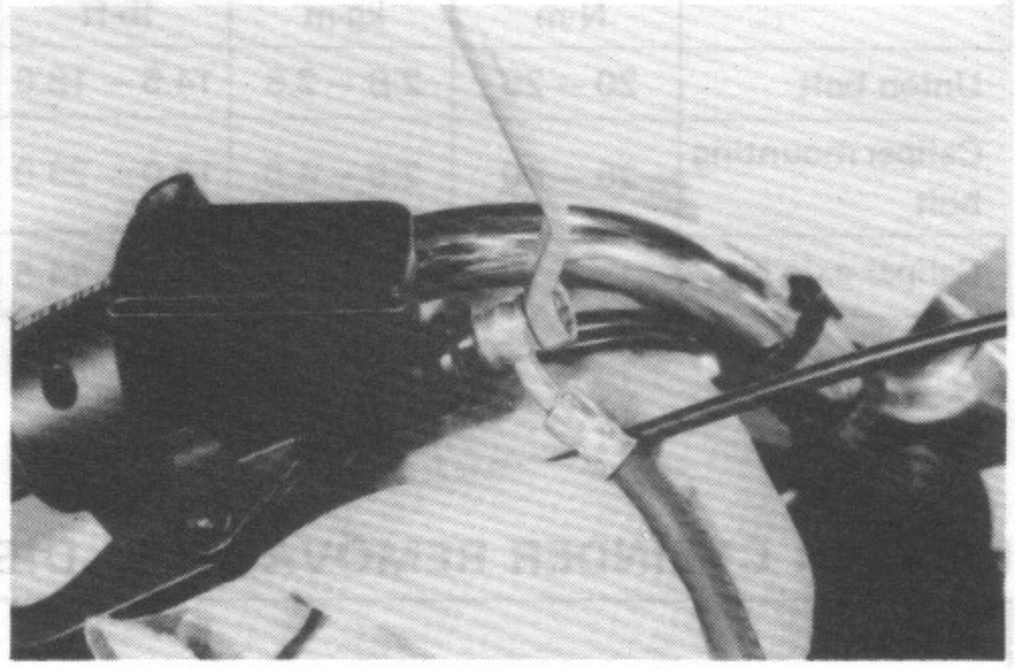
Item	N·m	kg-m	lb-ft
Ⓐ	5–8	0.5–0.8	3.5–6.0

- Take off front brake light switch.

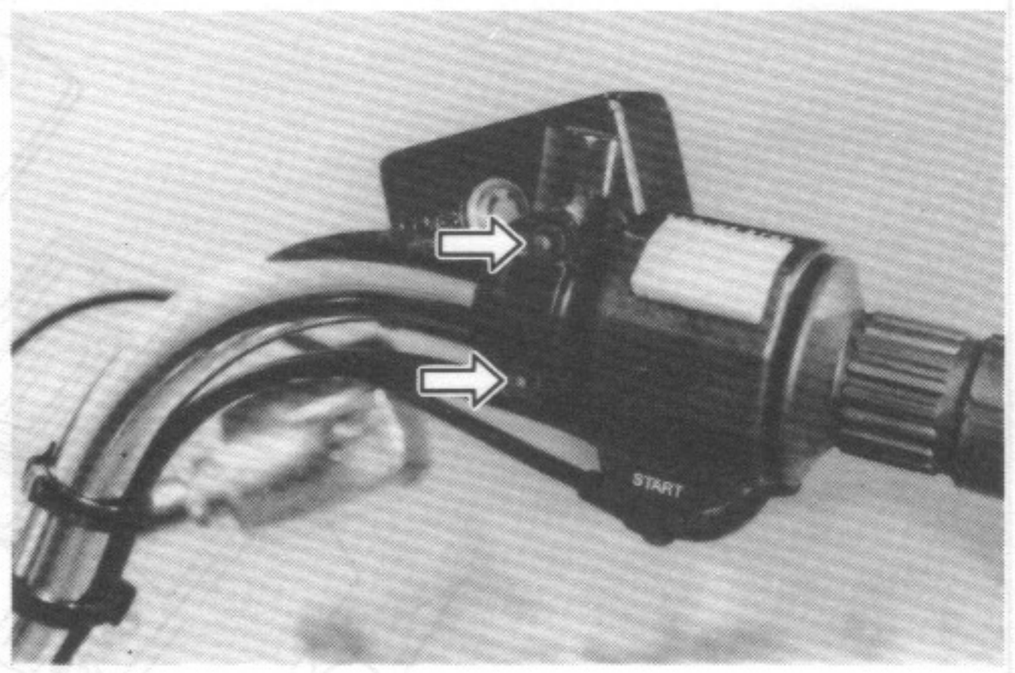


- Place a cloth underneath the union bolt on the master cylinder to catch spilled drops of brake fluid. Unscrew the union bolt and disconnect the brake hose/master cylinder joint.

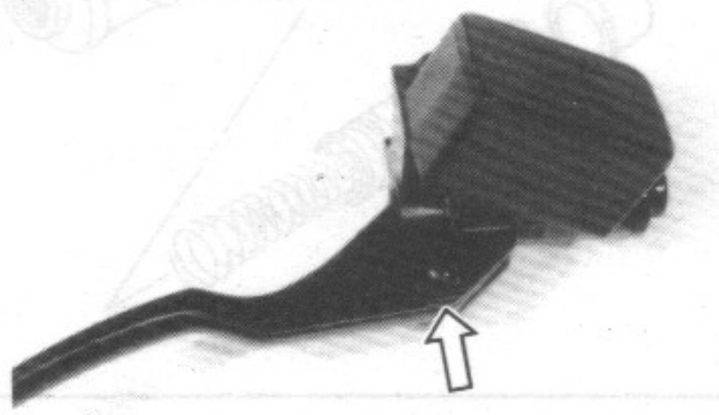
CAUTION:
Completely wipe off any brake fluid adhering to any part of motorcycle. The fluid reacts chemically with paint, plastics, rubber materials, etc.

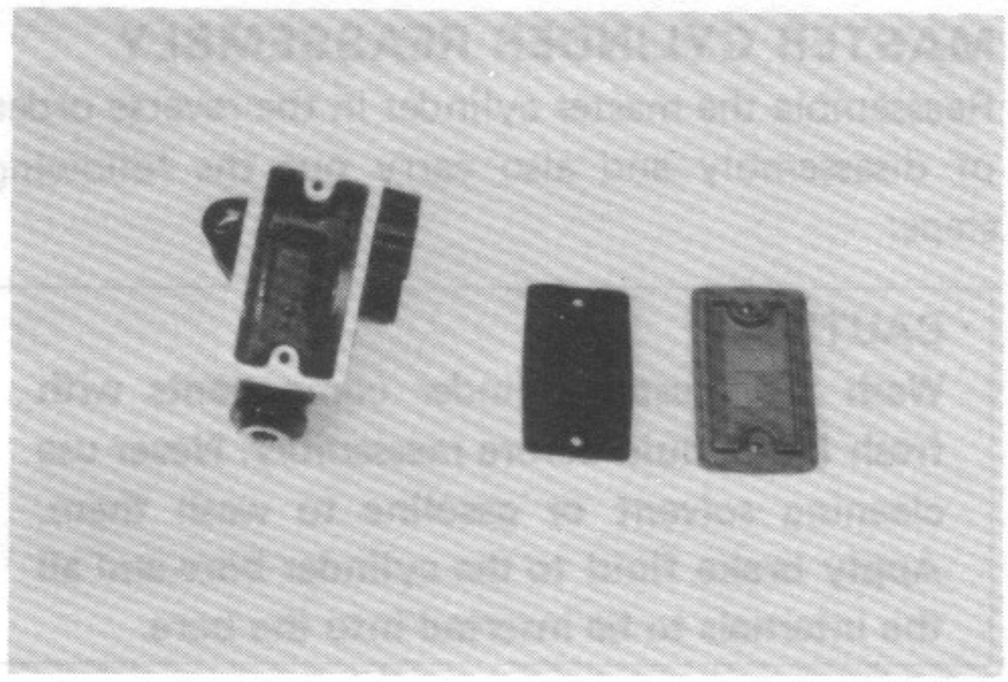


- Remove two clamp bolts and take off master cylinder assembly.



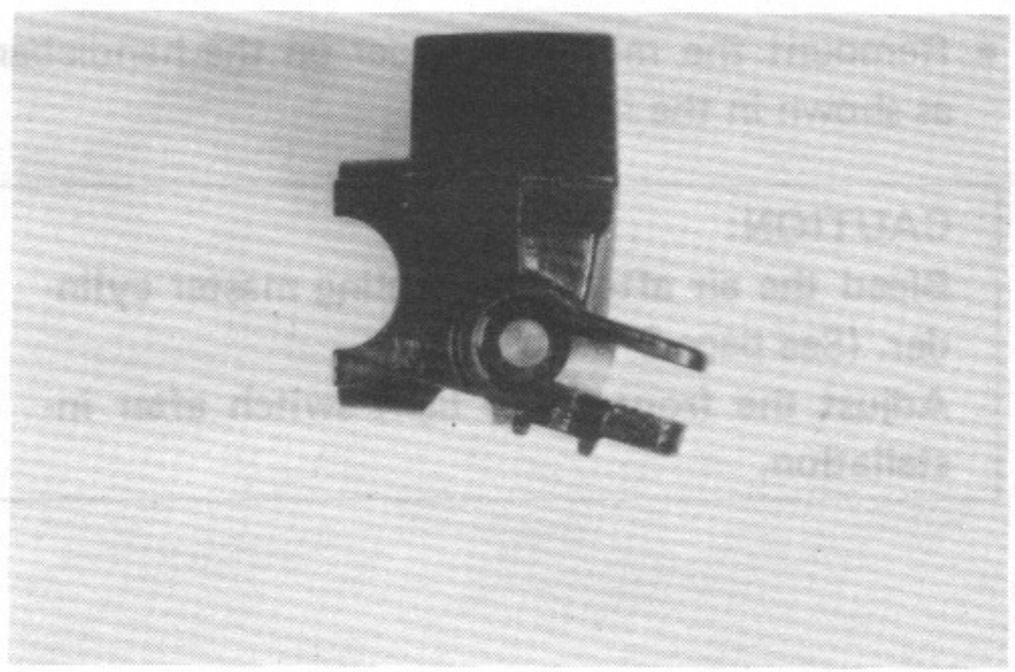
- Remove the front brake lever.
- Remove reservoir cap and diaphragm.
- Drain brake fluid.



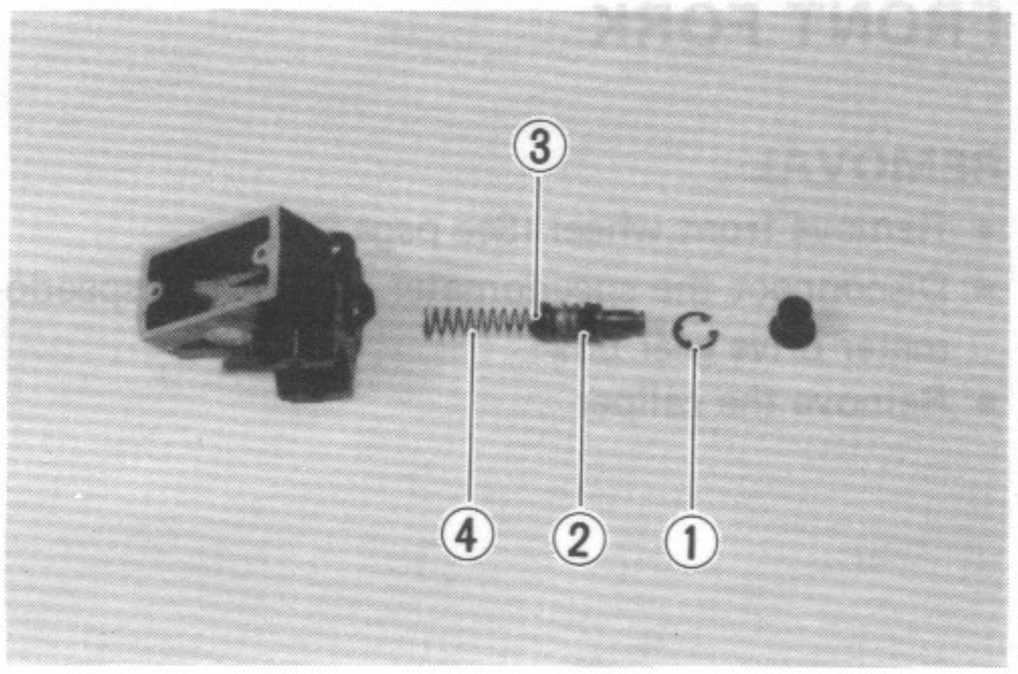


- Pull off dust boot.
- Remove circlip by using the special tool.
- Remove piston, primary cup and spring.

09900 - 06108	Snap ring pliers

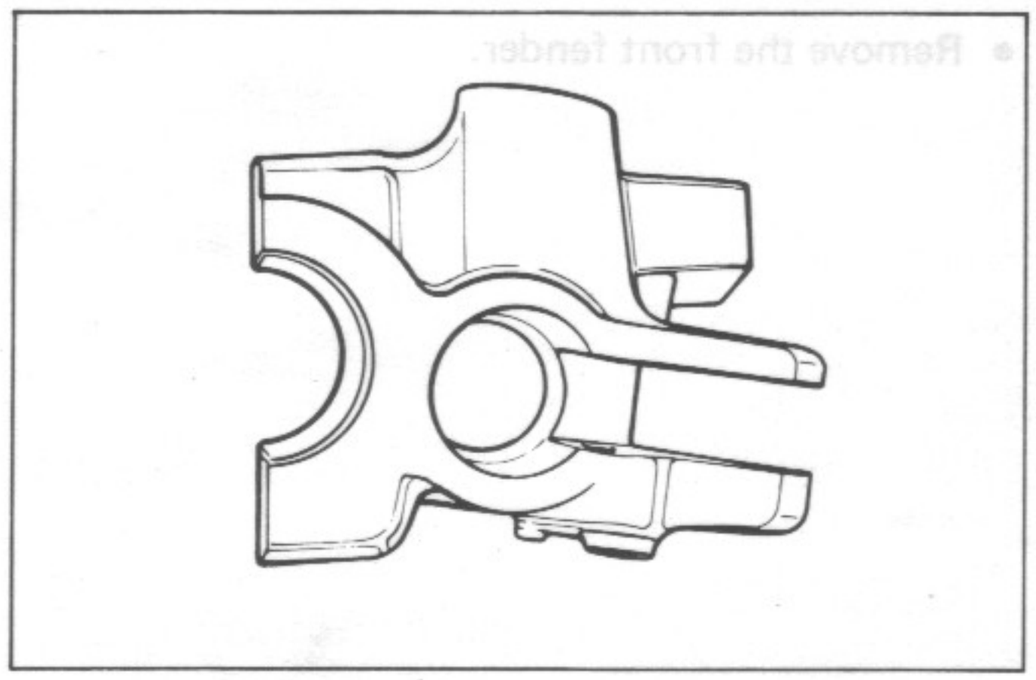


① Circlip ③ Primary cap
② Piston ④ Return spring



MASTER CYLINDER INSPECTION

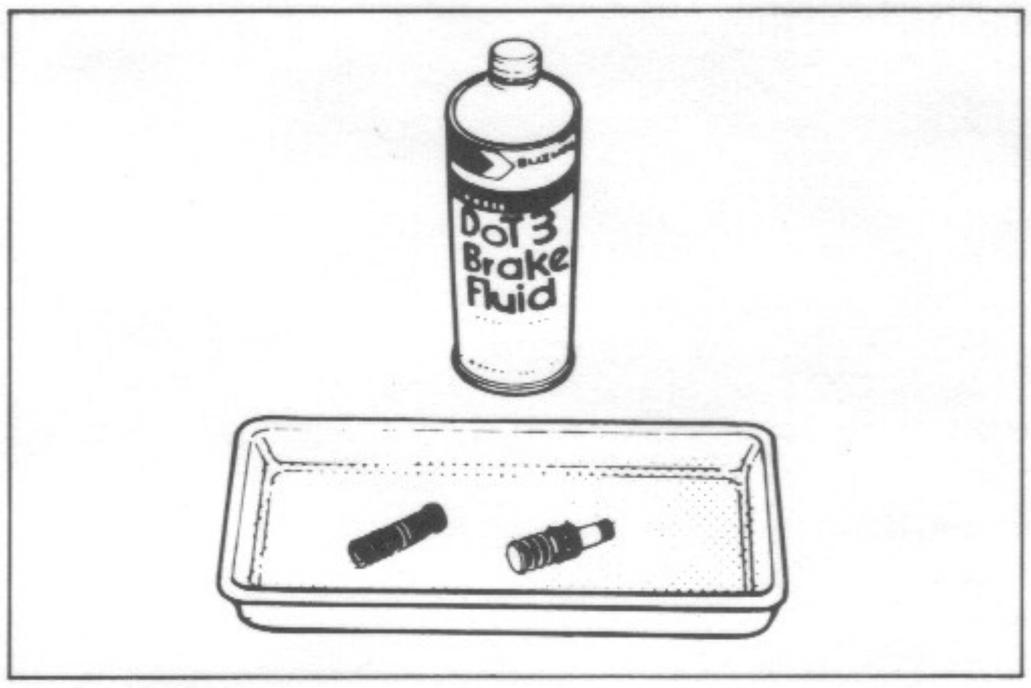
- Inspect the master cylinder bore for any scratches or other damage.
- Inspect the piston surface for scratches or other damage.
- Inspect the primary cup, secondary cup and dust boot for wear or damage.



MASTER CYLINDER REASSEMBLY

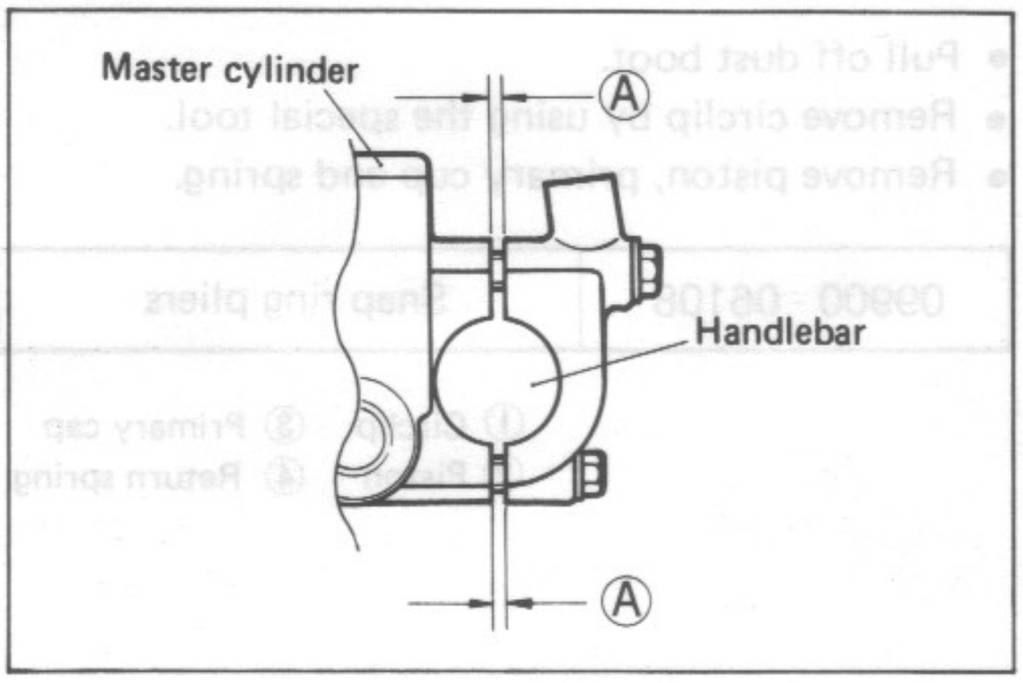
Reassemble the master cylinder in the reverse order of disassembly and also carry out the following steps:

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.

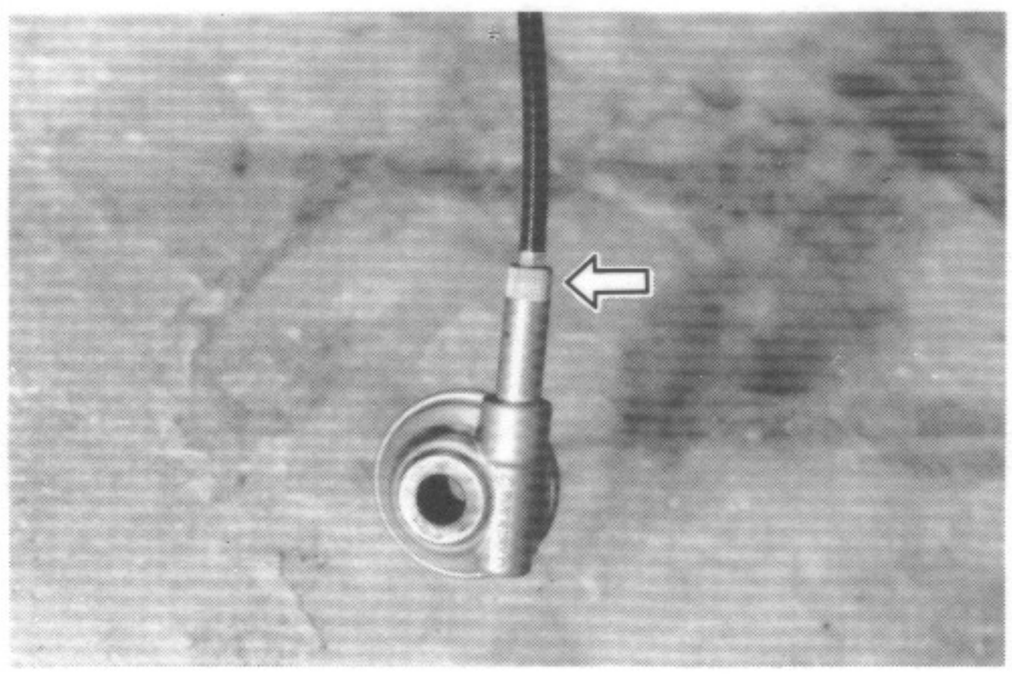
CAUTION:
Bleed the air after reassembling master cylinder. (See page 2-11).
Adjust the front brake light switch after installation.



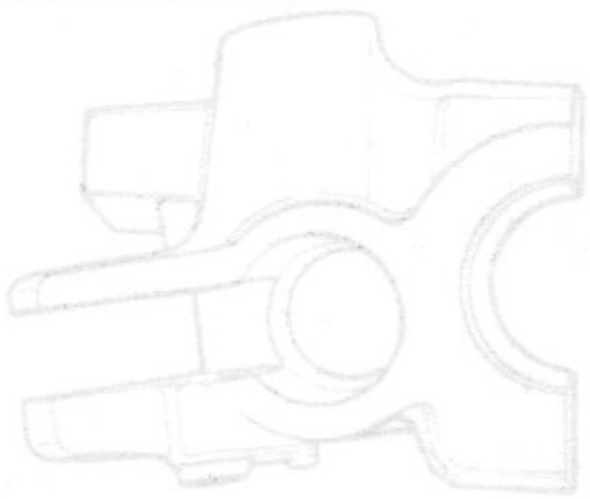
FRONT FORK

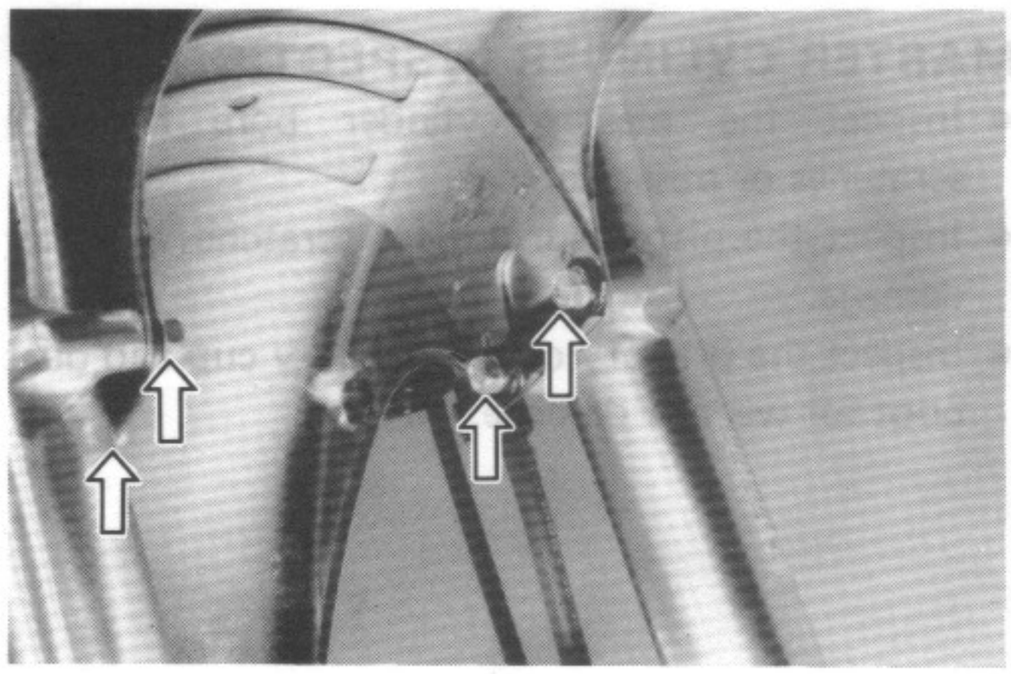
REMOVAL

- Remove front wheel (See page 9-1).
- Disconnect the speedometer cable from speedometer drive gear box.
- Remove the caliper.



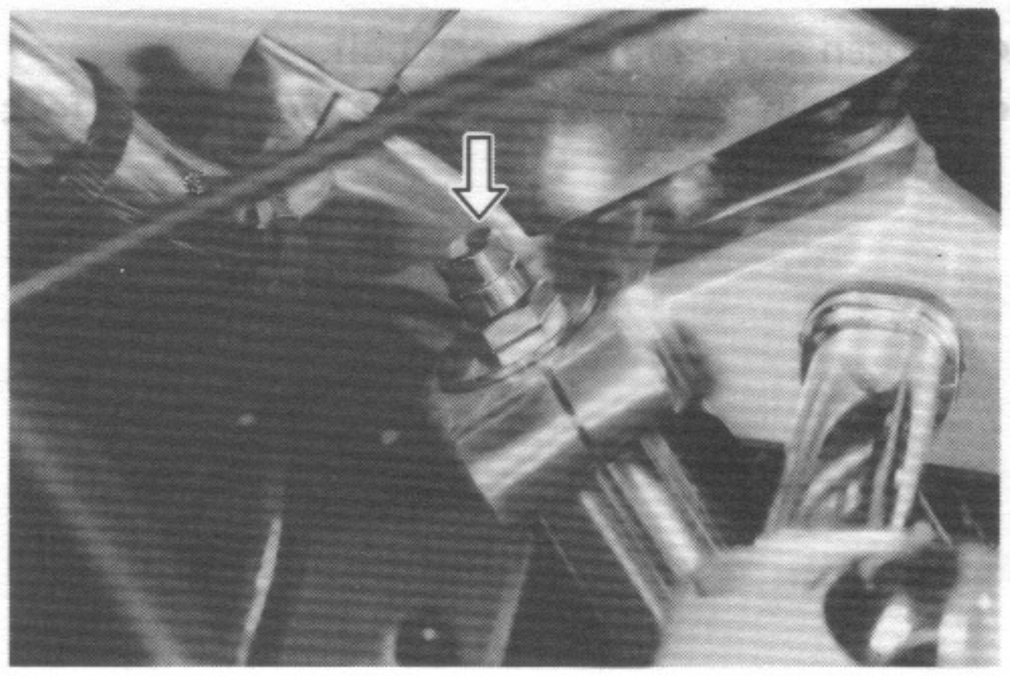
- Remove the front fender.



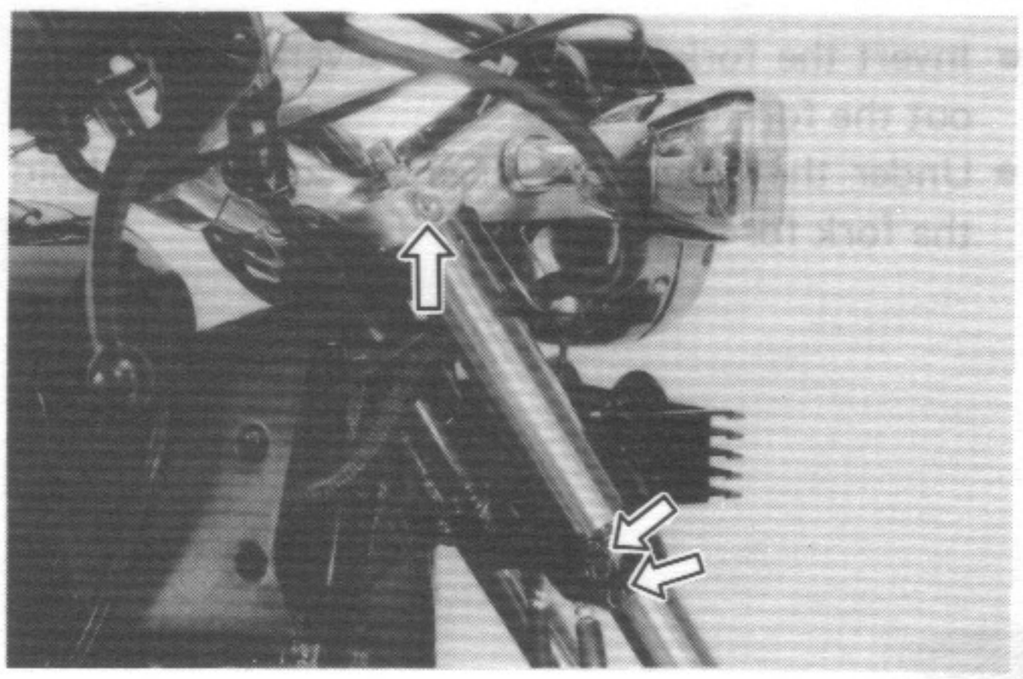


- Remove the valve cap.
- Bleed the air from the front fork.

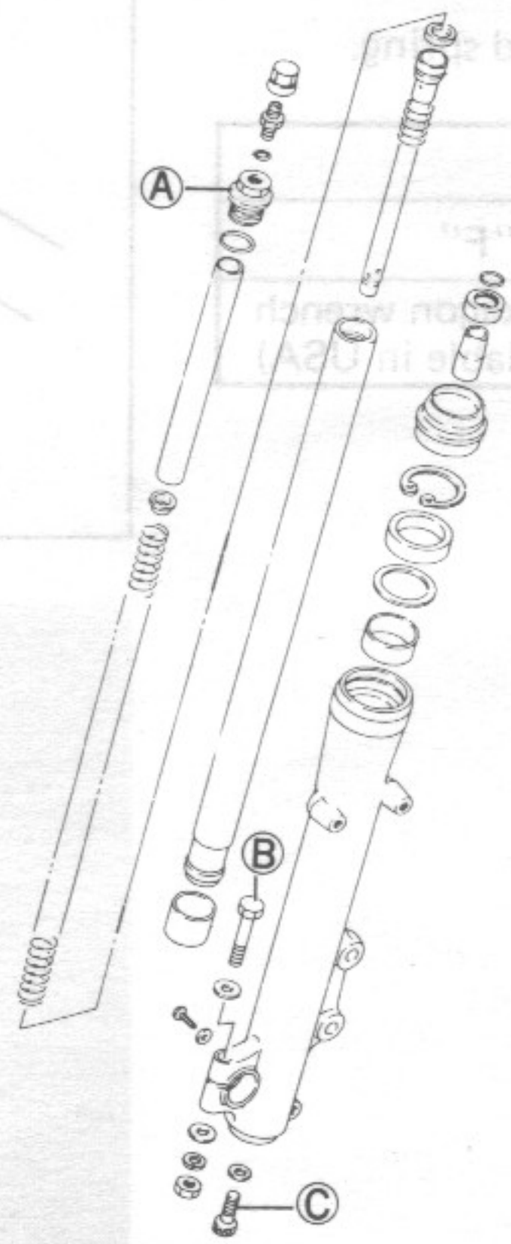
NOTE:
Slightly loosen the front fork cap bolt to facilitate later disassembly after loosening the front fork upper clamp bolt.



- Loosen the front fork upper and lower clamp bolts.
- Pull off the front fork.



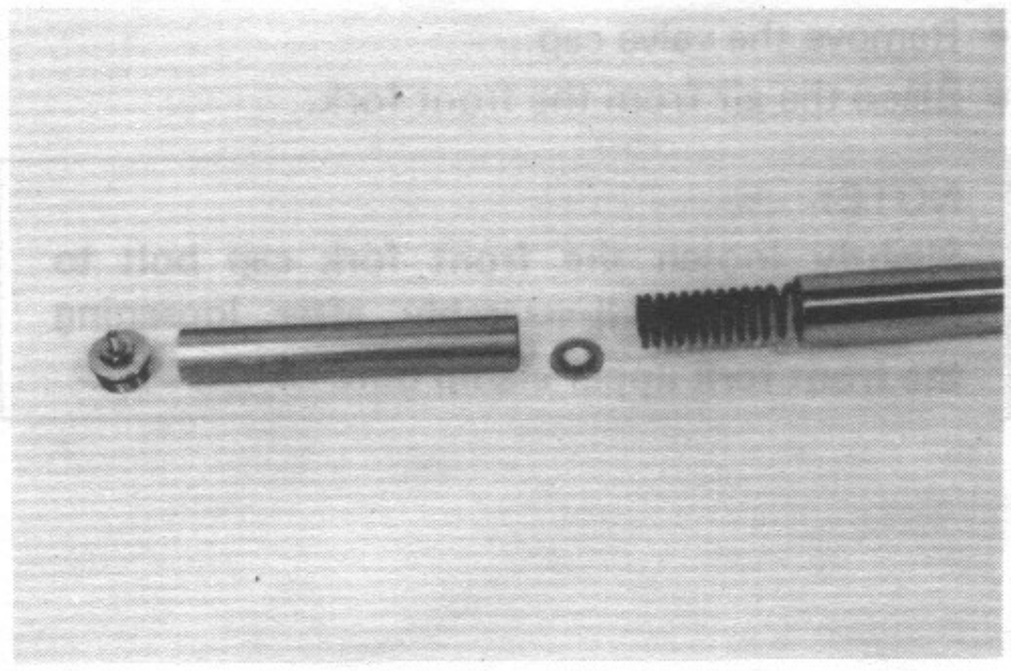
DISASSEMBLY



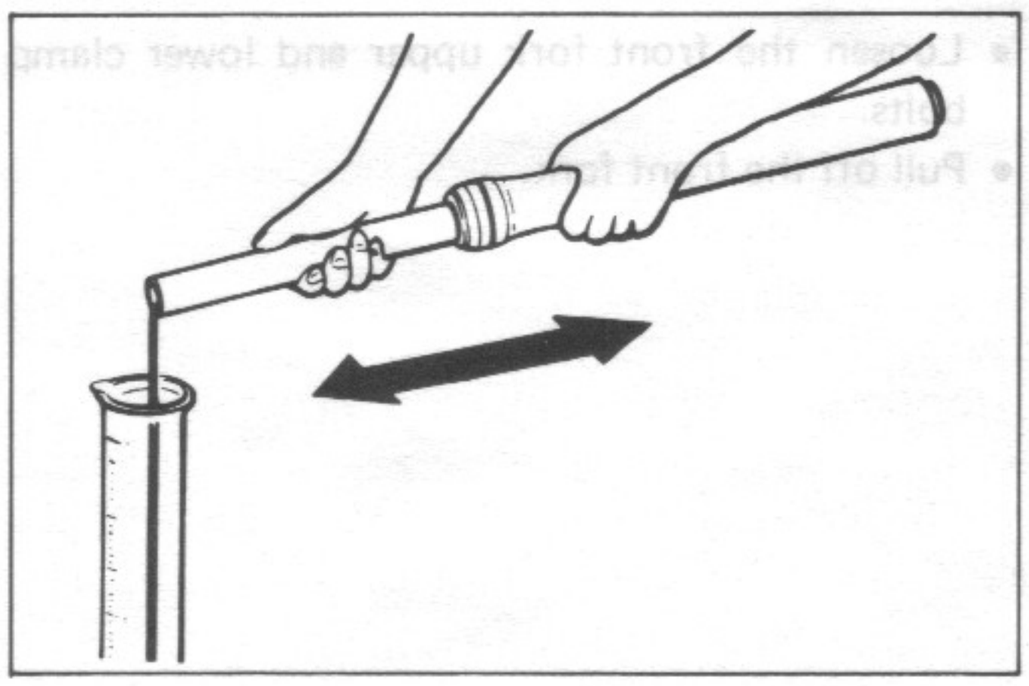
Tightening torque

Item	N·m	kg-m	lb-ft
Ⓐ	15–30	1.5–3.0	11.0–21.5
Ⓑ	15–25	1.5–2.5	11.0–18.0
Ⓒ	32–42	3.2–4.2	23.0–30.5

- Loosen and remove the cap bolt.
- Draw out the spacer, spring guide and fork spring.

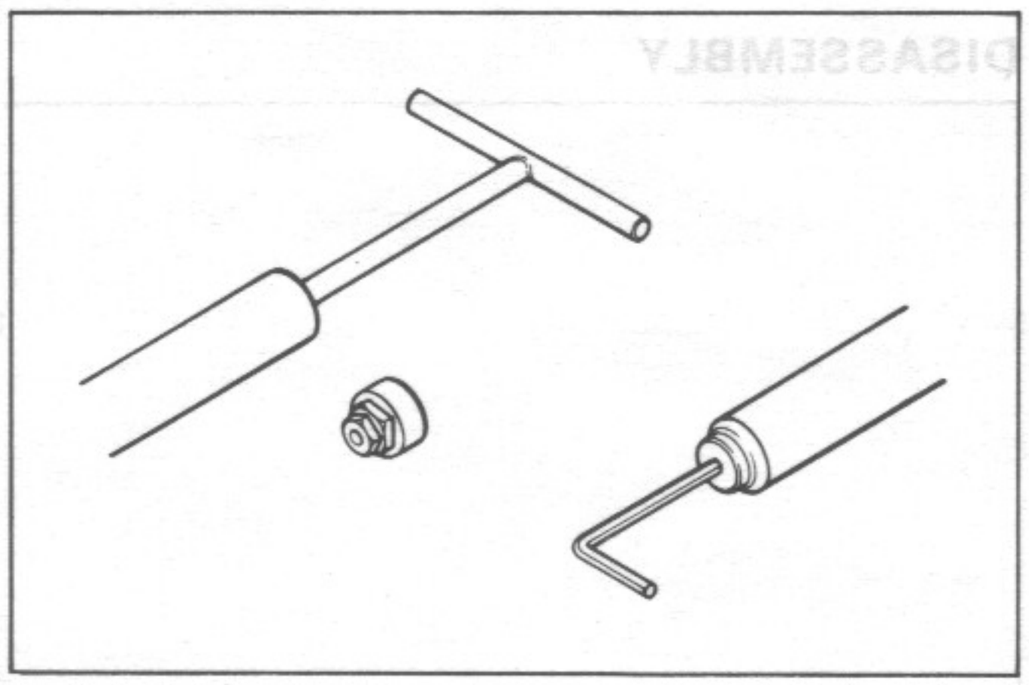


- Invert the fork and stroke it several times to let out the fork oil.
- Under the condition (inverted condition), hold the fork for a few minutes.

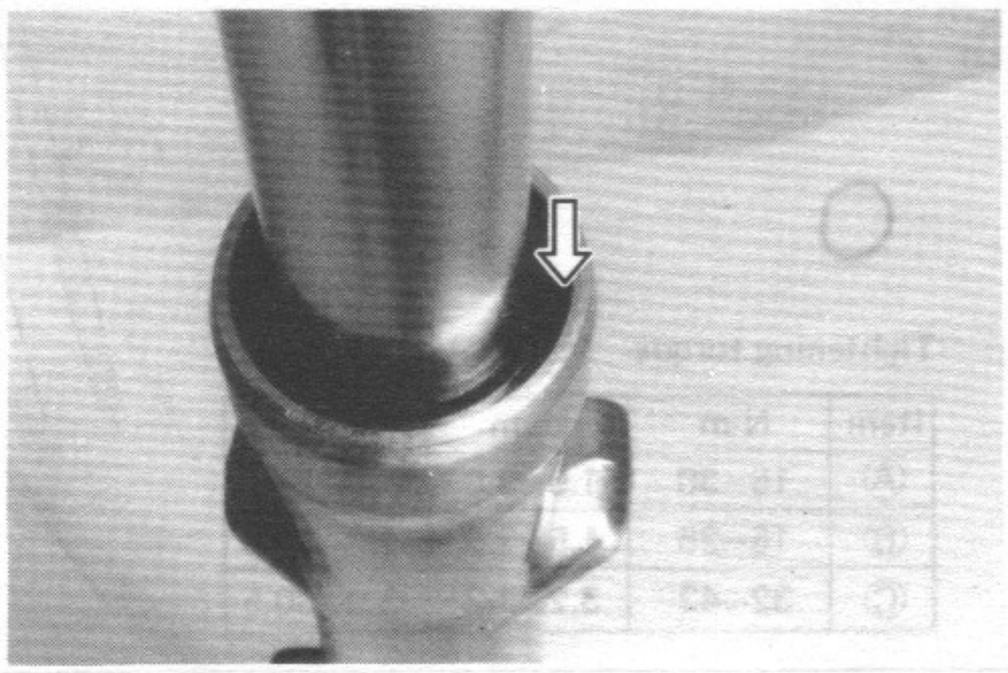


- Remove damper rod securing bolt by using the special tools.
- Draw out damper rod and rebound spring.

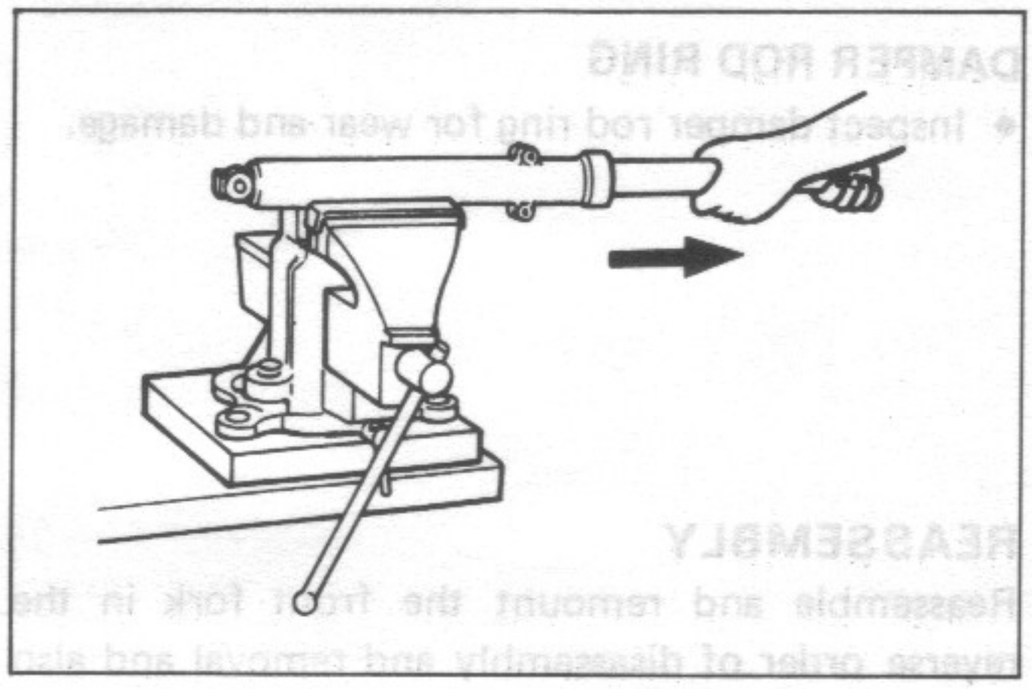
09940 - 34520	"T" handle
09940 - 34581	Attachment "F"
09900 - 00401	"L" type hexagon wrench set (Not available in USA)



- Draw out dust seal.
- Remove stopper ring.

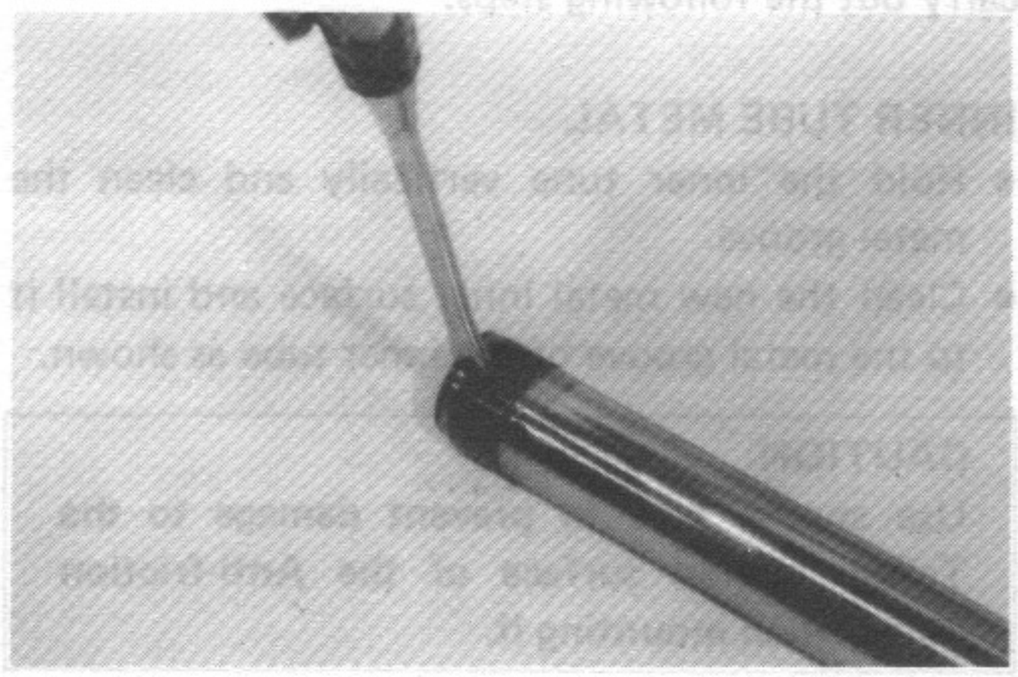


- While holding the caliper mounting portion of the outer tube by vise, separate the inner tube from the outer tube as shown.



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

- Remove inner tube anti-friction metal.

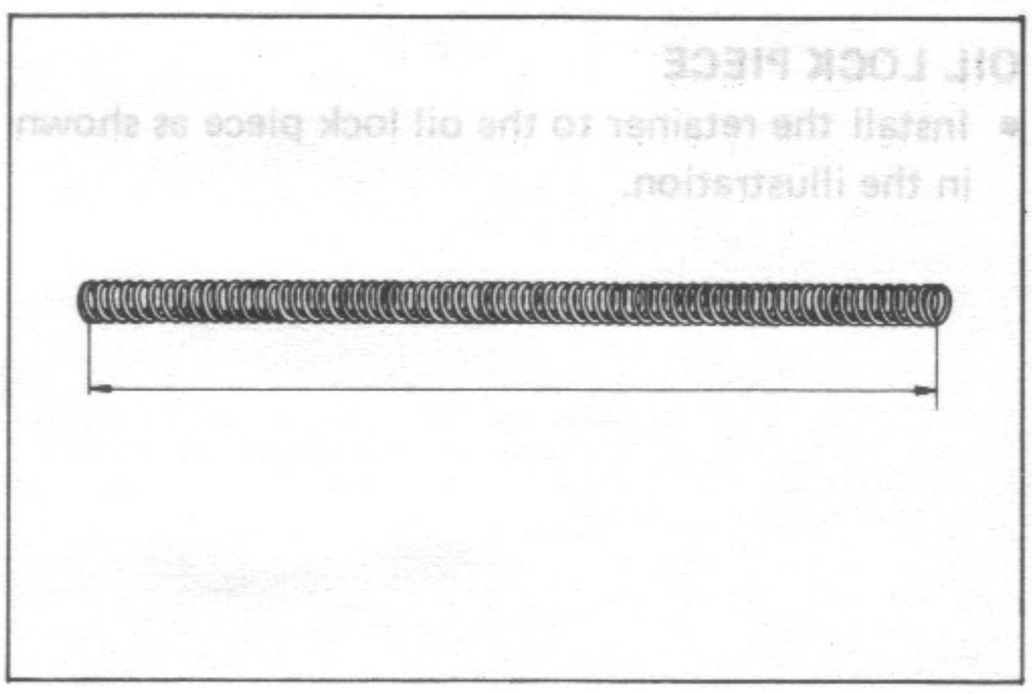


INSPECTION

FORK SPRING

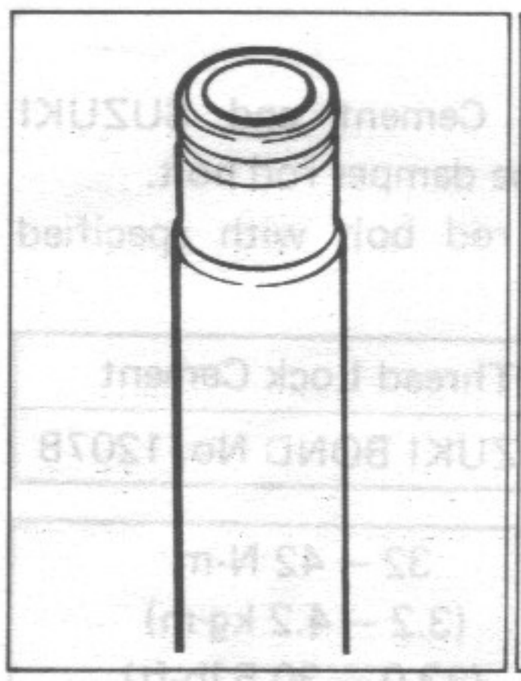
- Measure the fork spring free length. If it is shorter than service limit, replace it.

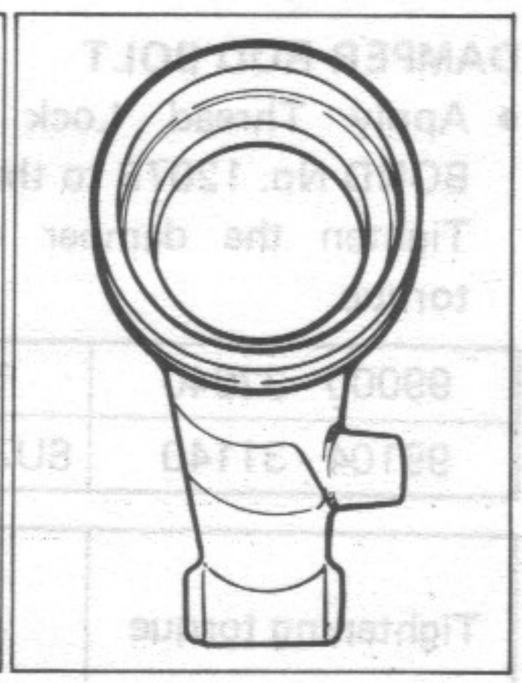
Service Limit	433 mm (17.0 in.)



INNER TUBE AND OUTER TUBE

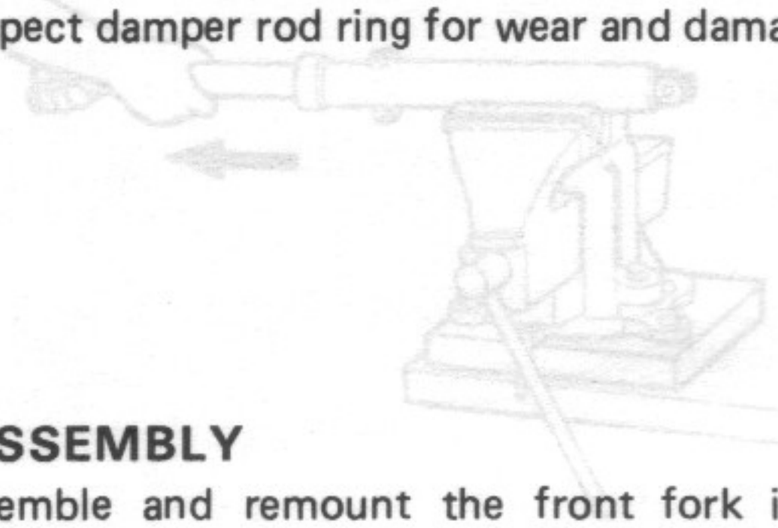
- Inspect inner tube sliding surface for any scuffing and check for bend. Inspect outer tube sliding surface for any scuffing.

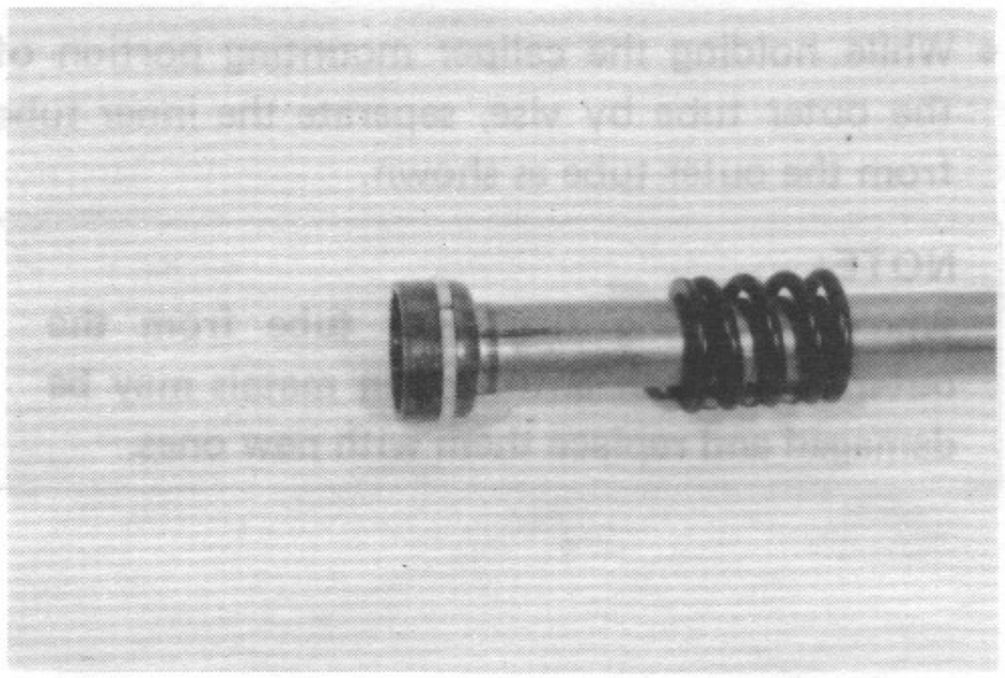




DAMPER ROD RING

- Inspect damper rod ring for wear and damage.





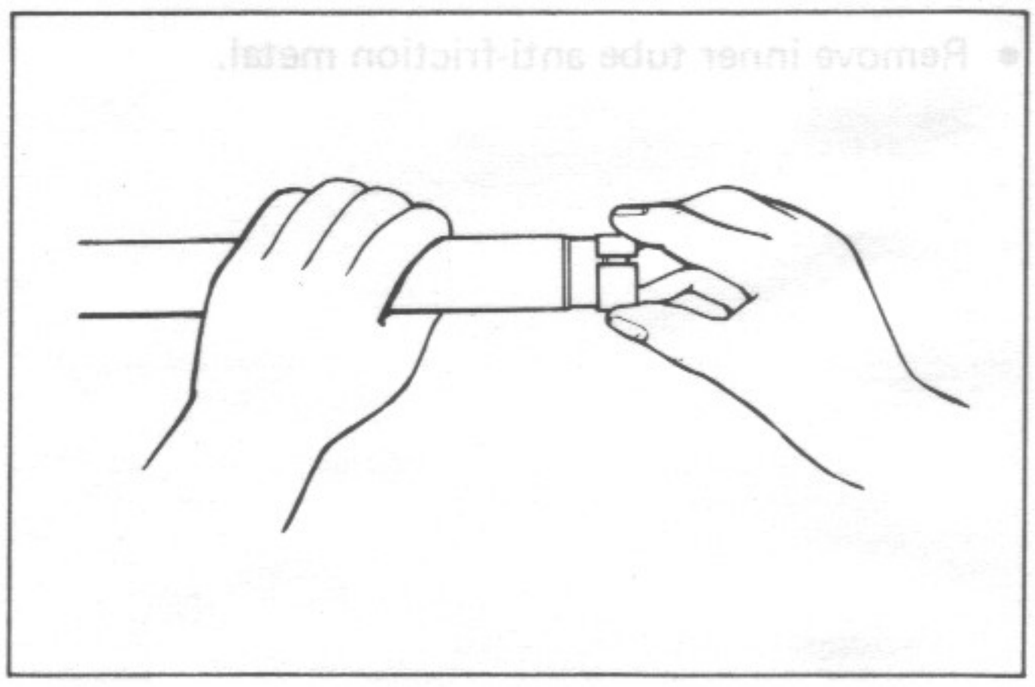
REASSEMBLY

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

INNER TUBE METAL

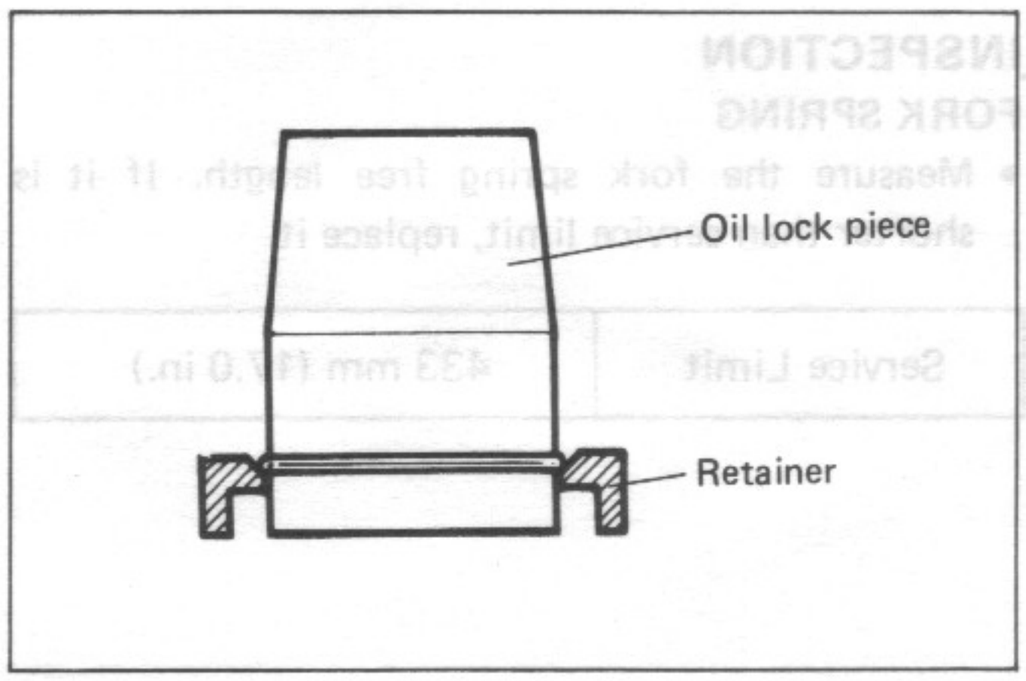
- Hold the inner tube vertically and clean the metal groove.
- Clean the new metal inner surface and install it to the metal groove of the inner tube as shown.

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



OIL LOCK PIECE

- Install the retainer to the oil lock piece as shown in the illustration.

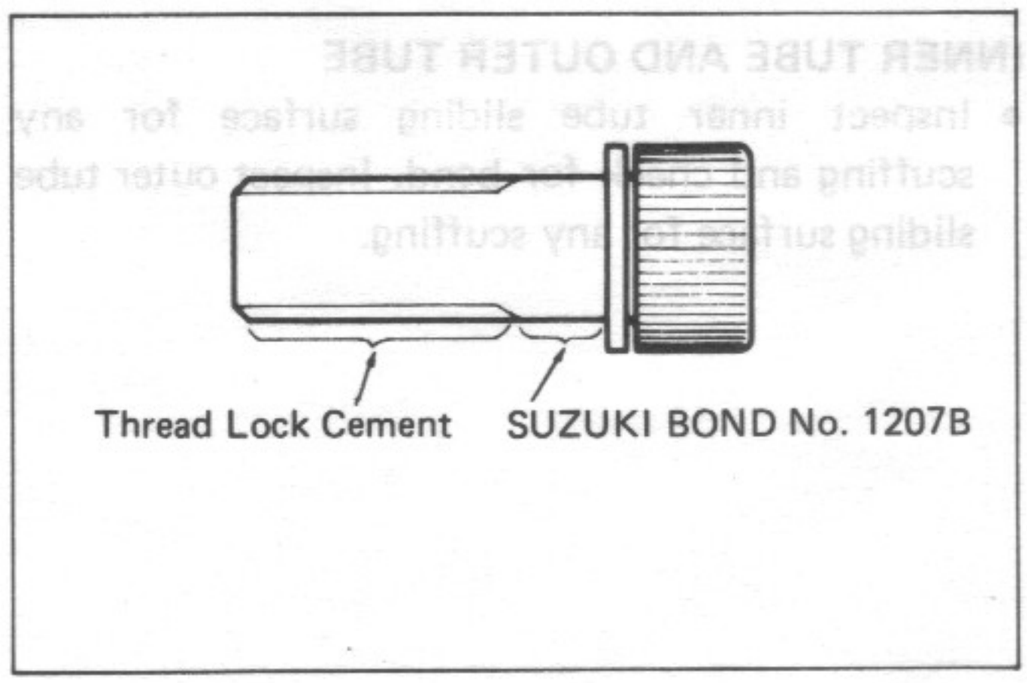


DAMPER ROD BOLT

- Apply Thread Lock Cement and SUZUKI BOND No. 1207B to the damper rod bolt.
  Tighten the damper rod bolt with specified torque.

99000 - 32040	Thread Lock Cement
99104 - 31140	SUZUKI BOND No. 1207B

Tightening torque	32 – 42 N·m (3.2 – 4.2 kg-m) (23.0 – 30.5 lb-ft)



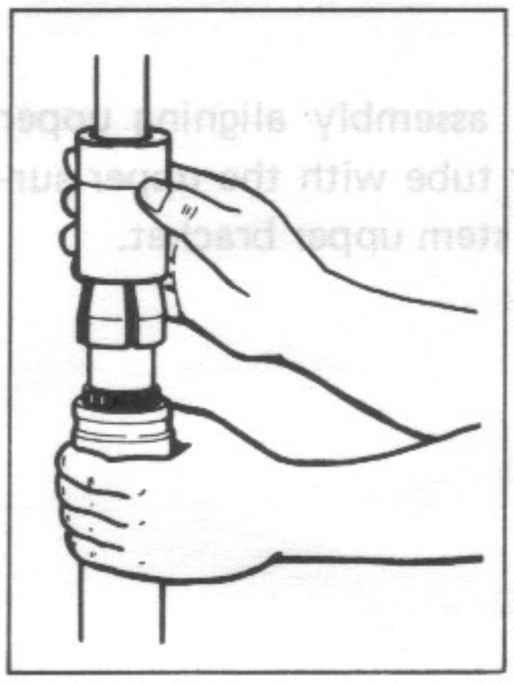
OUTER TUBE METAL, OIL SEAL AND DUST SEAL

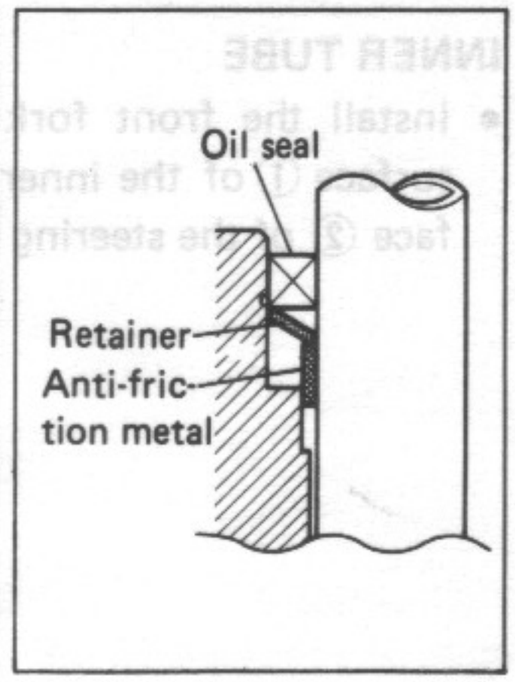
Clean the metal groove of outer tube and new metal outer surface.

Install the outer tube metal, oil seal retainer, oil seal 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

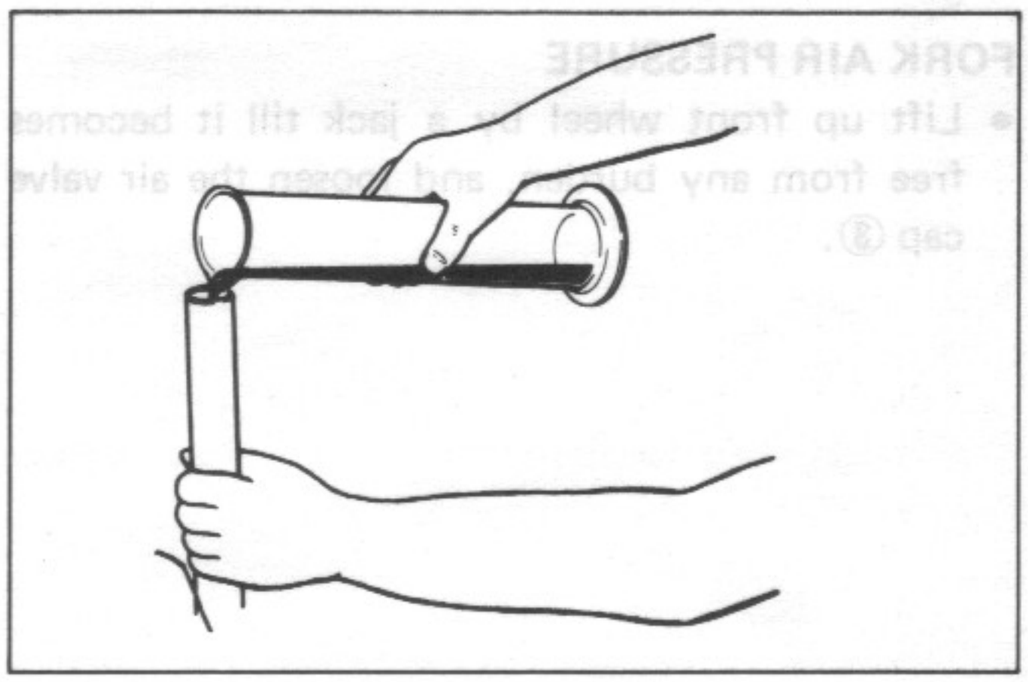




FORK OIL

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

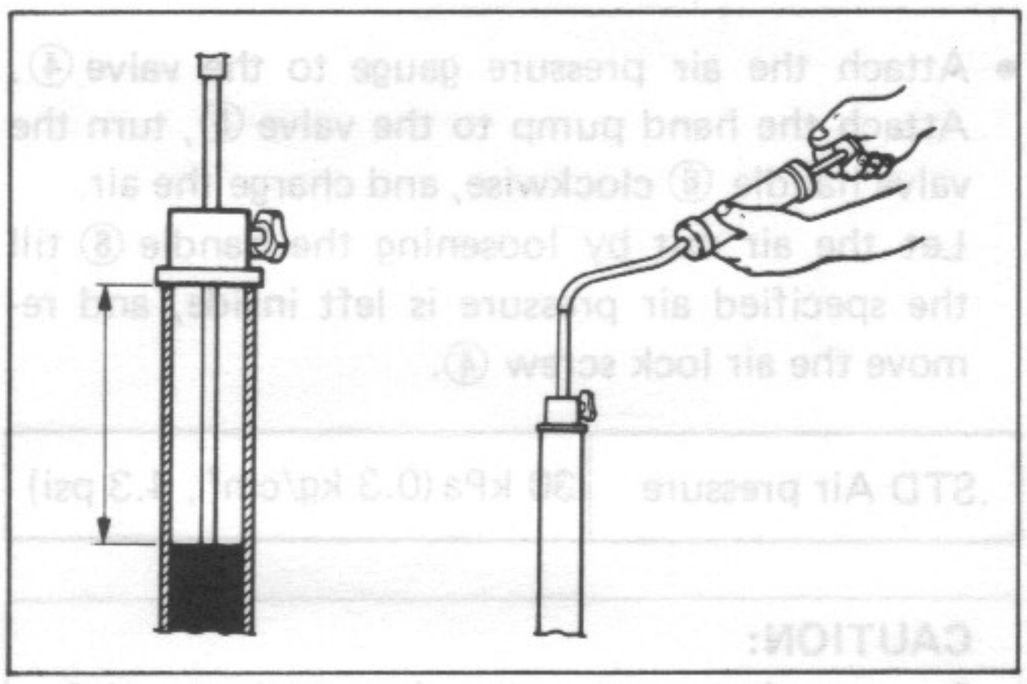
Fork oil type	Fork oil # 15
Fork oil capacity	479 ml (16.2 US oz)



- Hold the front fork vertical and adjust the fork oil level with the special tool.

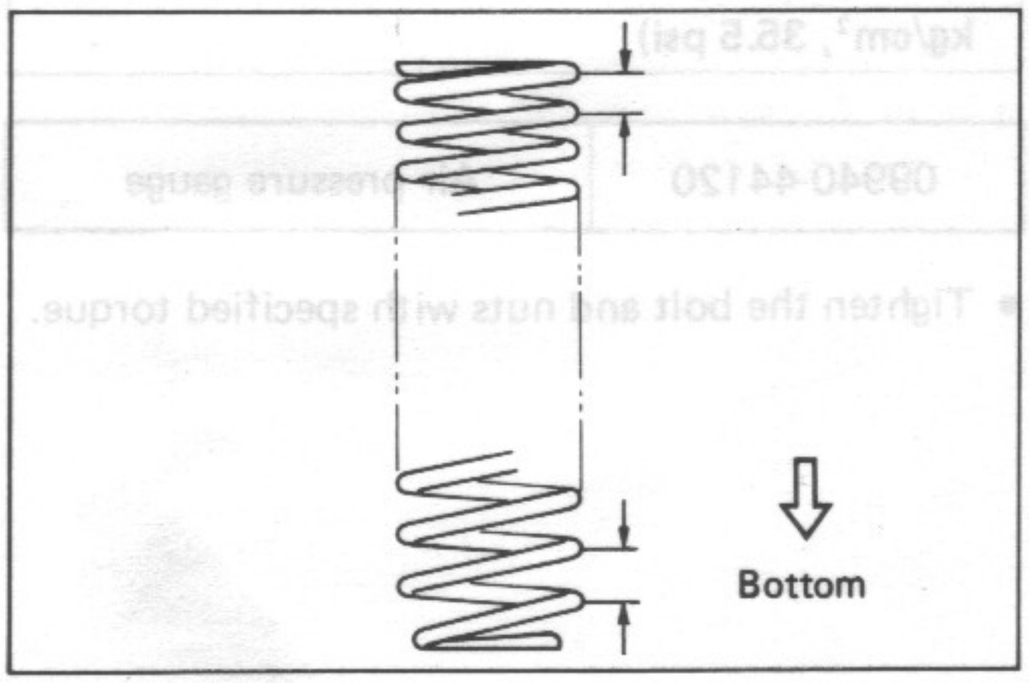
NOTE:
When adjusting oil level, remove the fork spring and compress the inner tube fully.

09943-74111	Fork oil level gauge
STD oil level	142 mm (5.6 in.)



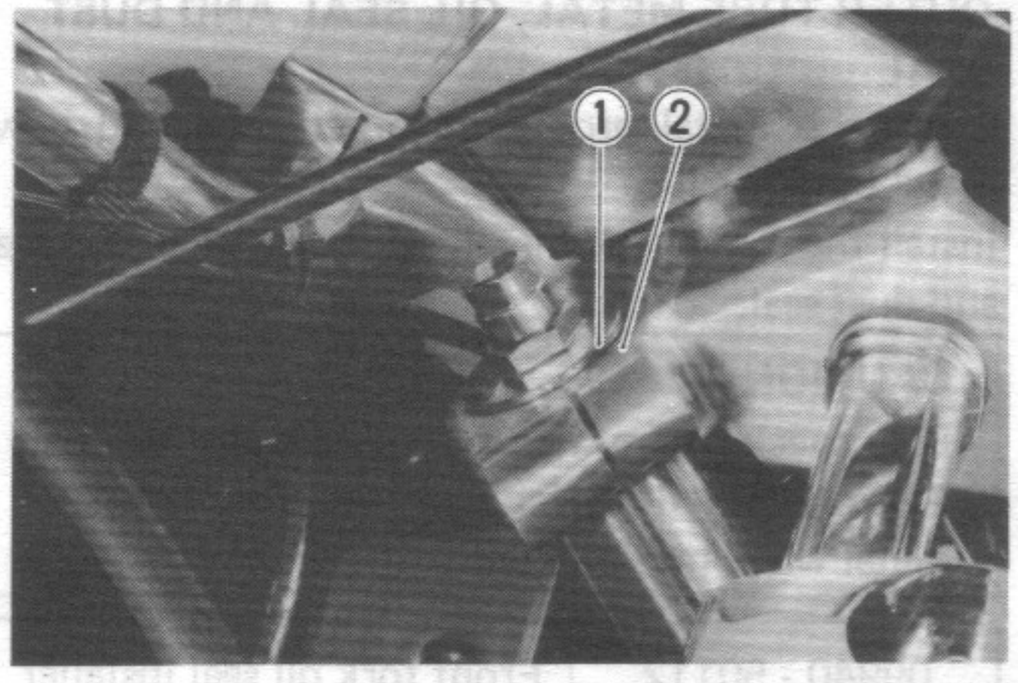
FORK SPRING

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



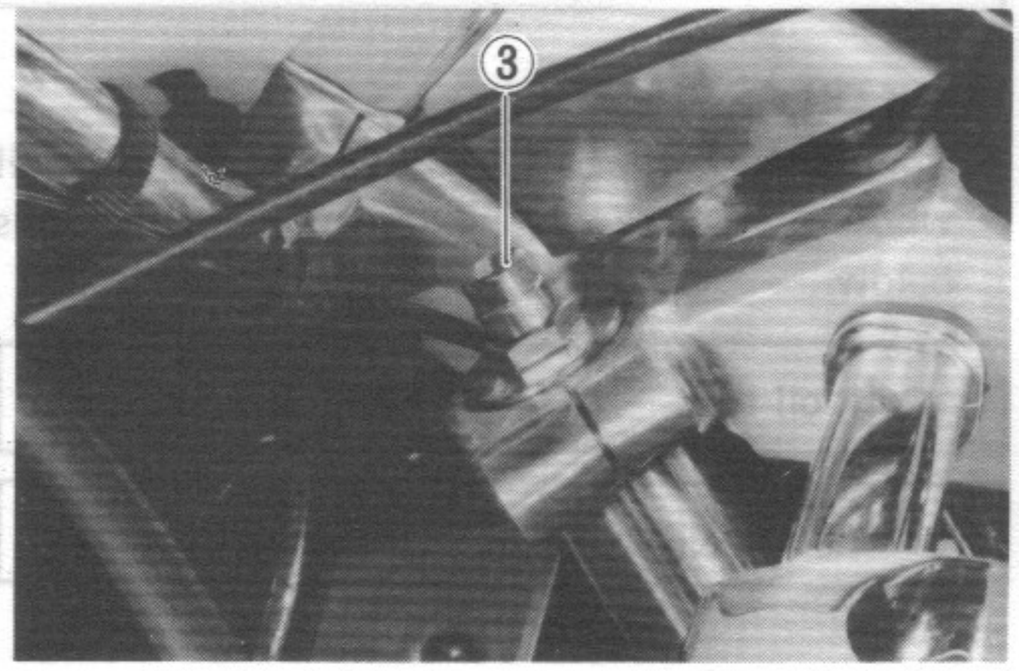
INNER TUBE

- Install the front fork assembly aligning upper surface ① of the inner tube with the upper surface ② of the steering stem upper bracket.

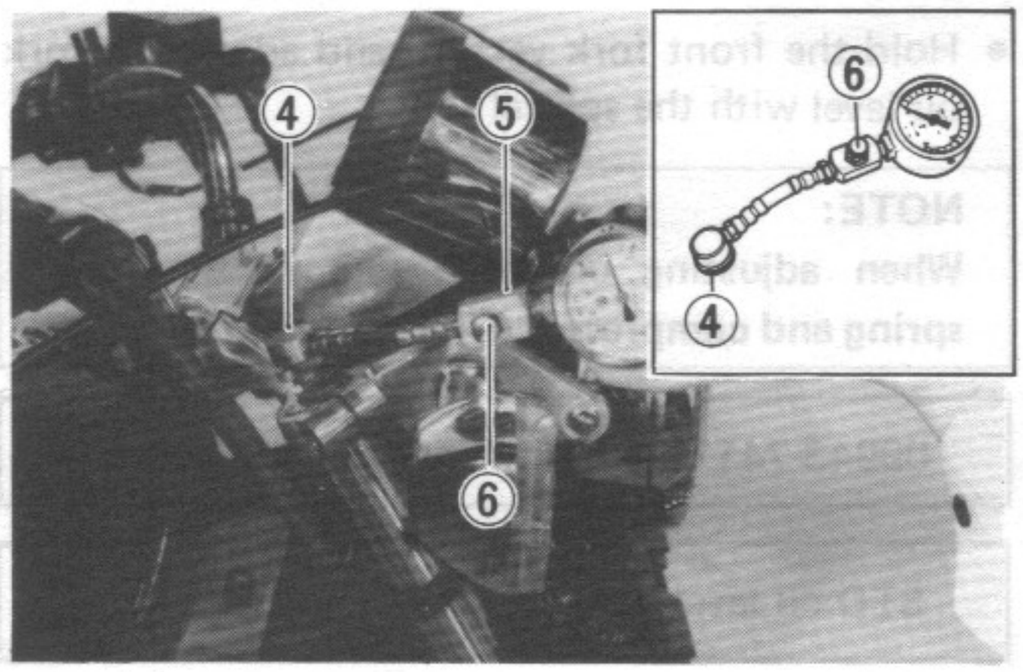


FORK AIR PRESSURE

- Lift up front wheel by a jack till it becomes free from any burden, and loosen the air valve cap ③.



- Attach the air pressure gauge to the valve ④. Attach the hand pump to the valve ⑤, turn the valve handle ⑥ clockwise, and charge the air.
  Let the air out by loosening the handle ⑥ till the specified air pressure is left inside, and remove the air lock screw ④.



STD Air pressure	30 kPa (0.3 kg/cm², 4.3 psi)

CAUTION:
Do not charge air more than 245 kPa (2.5 kg/cm², 35.5 psi)

09940-44120	Air pressure gauge

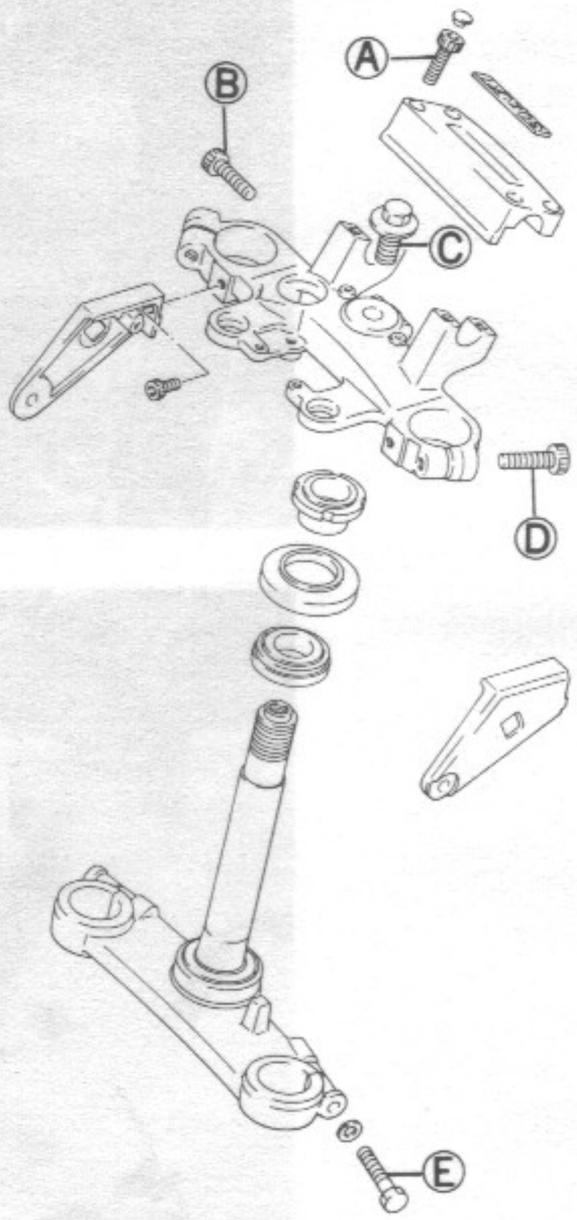
- Tighten the bolt and nuts with specified torque.

Tightening torque:

	N·m	kg-m	lb-ft
Front fork upper clamp bolt	20 – 30	2.0 – 3.0	14.5 – 21.5
Front fork lower clamp bolt	15 – 25	1.5 – 2.5	11.0 – 18.0
Damper rod bolt	32 – 42	3.2 – 4.2	23.0 – 30.5
Front fork cap bolt	15 – 30	1.5 – 3.0	11.0 – 21.5

STEERING STEM

CONSTRUCTION

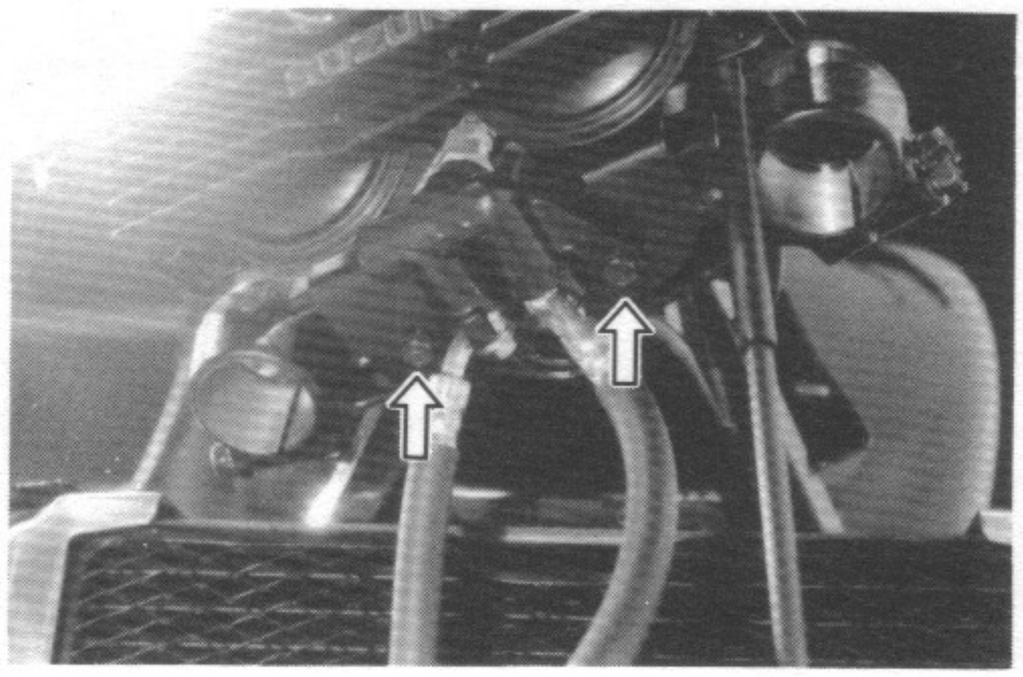


Tightening torque

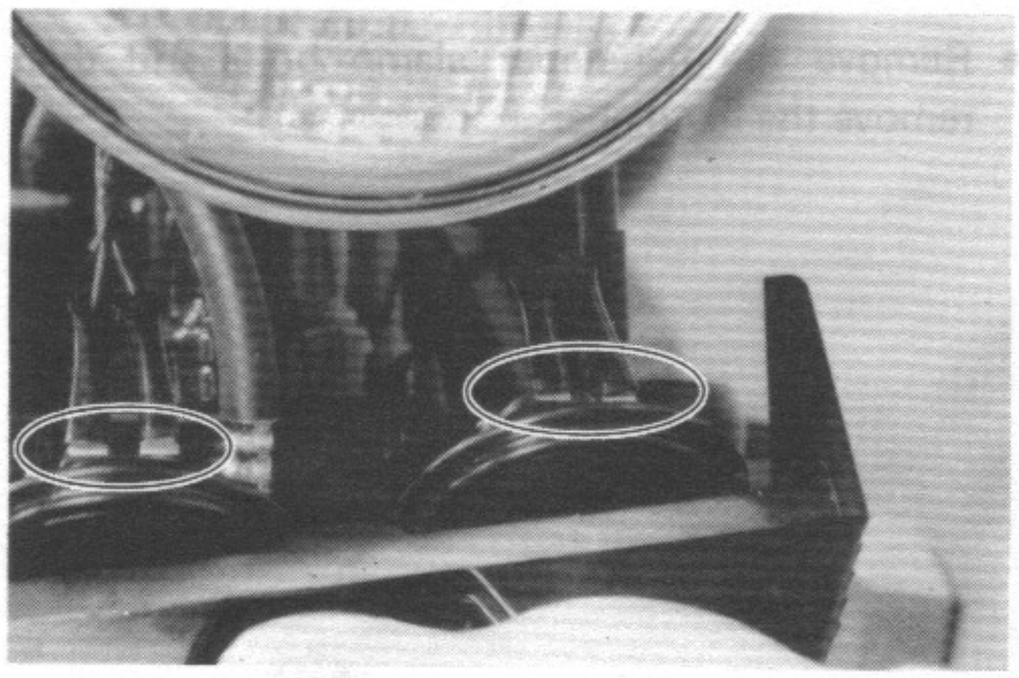
Item	N·m	kg-m	lb-ft
Ⓐ	12–20	1.2–2.0	8.5–14.5
Ⓑ	15–25	1.5–2.5	11.0–18.0
Ⓒ	20–30	2.0–3.0	14.5–21.5
Ⓓ	20–30	2.0–3.0	14.5–21.5
Ⓔ	15–25	1.5–2.5	11.0–18.0

DISASSEMBLY

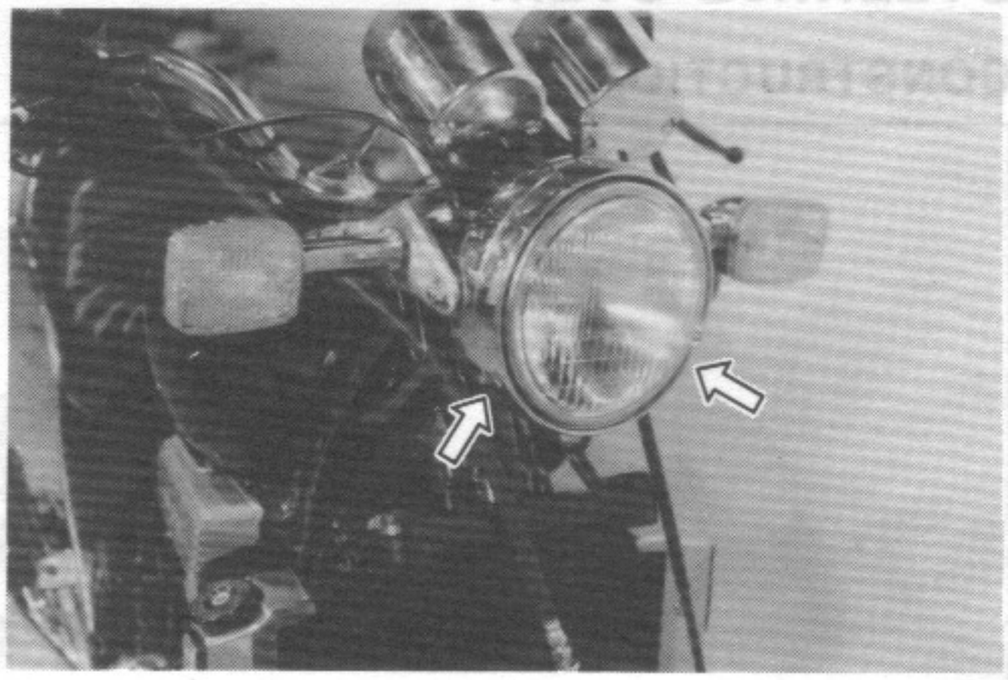
- Remove the front wheel. (See page 9-1)
- Remove the front fork. (See page 9-13)
- Remove the brake hose joint part.



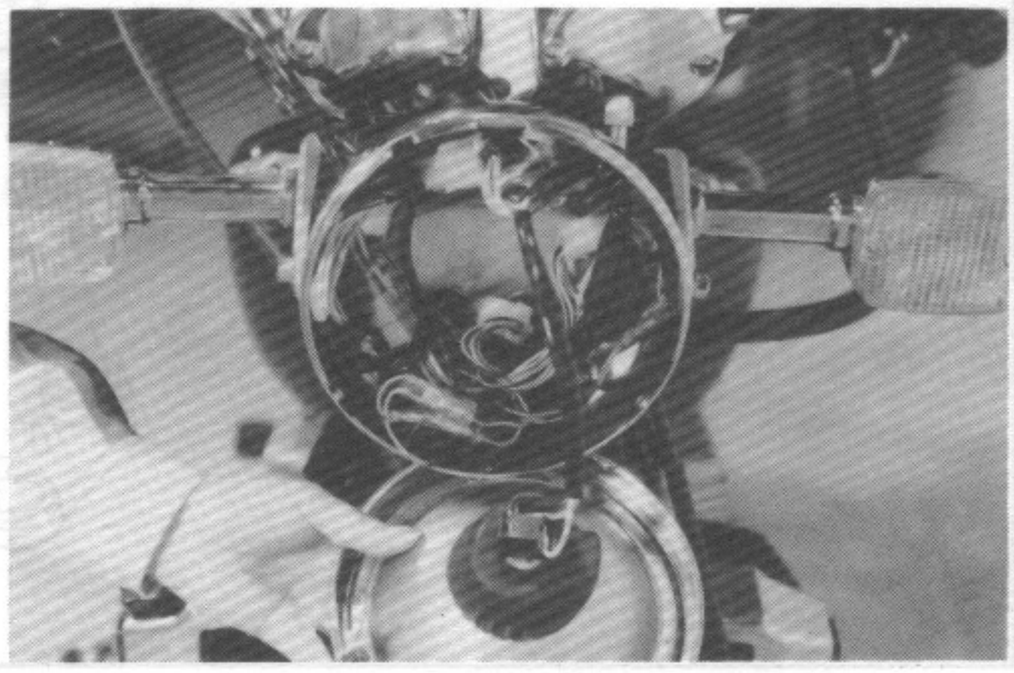
- Disconnect the horn lead wires.



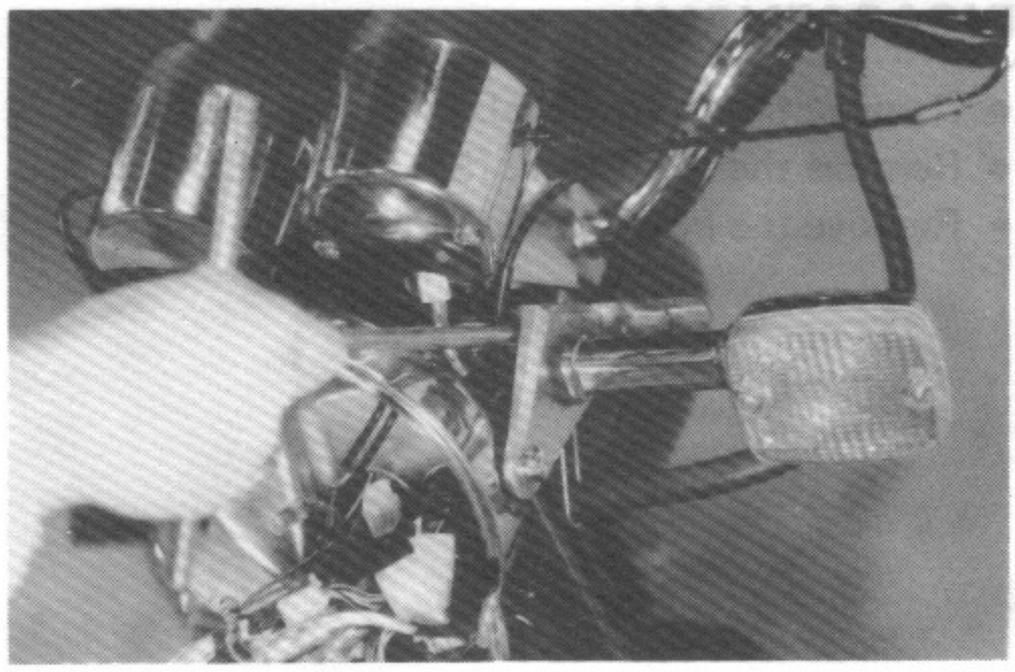
- Remove the headlight.



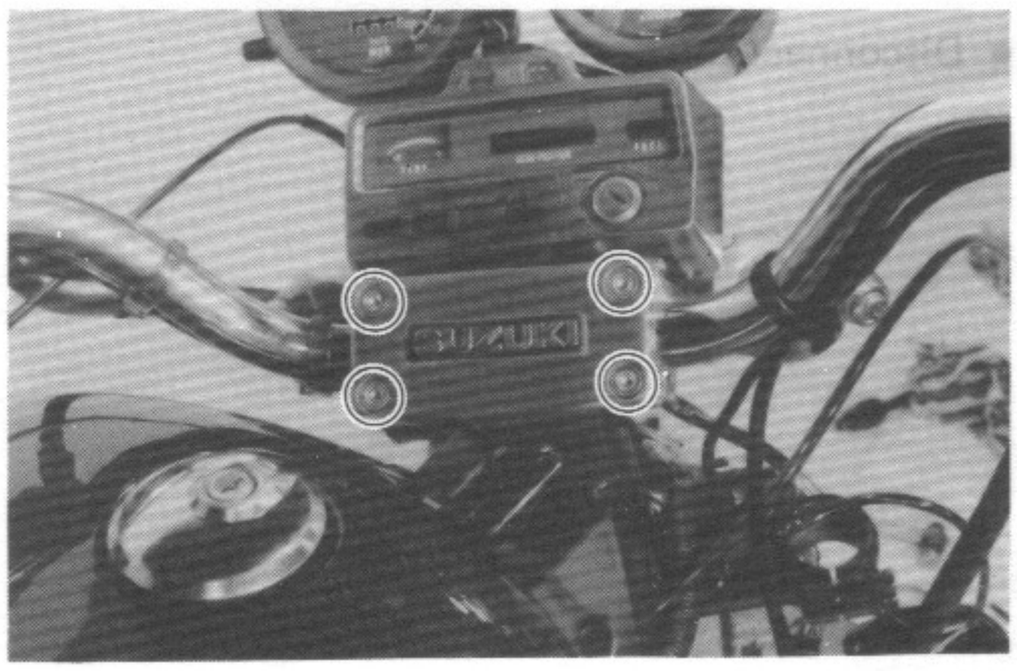
- Disconnect the lead wires.



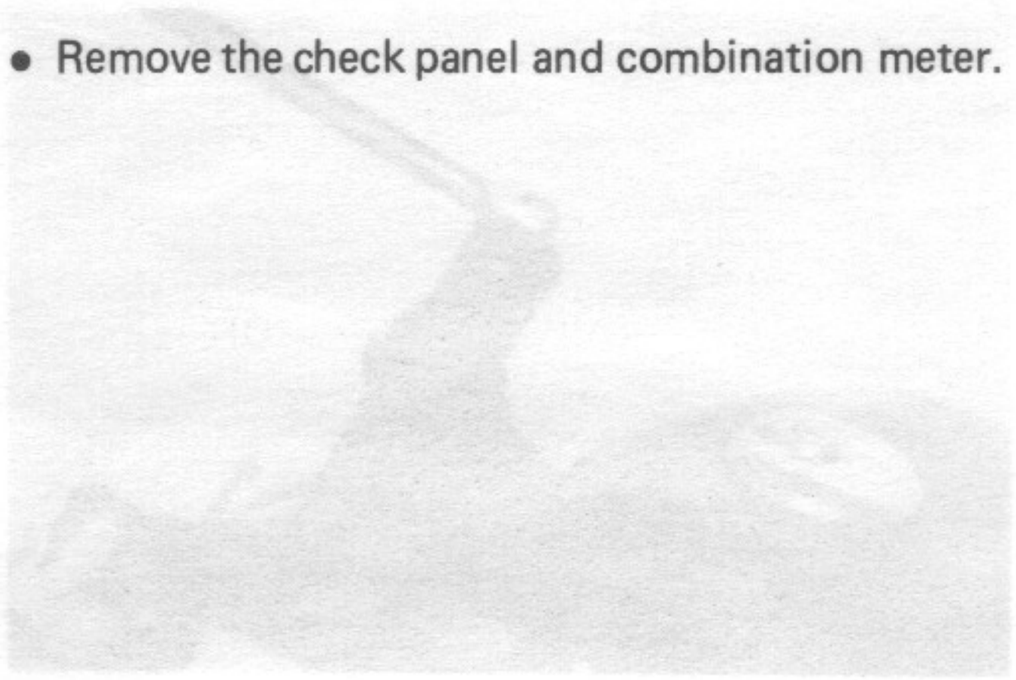
- Remove the headlight brackets.

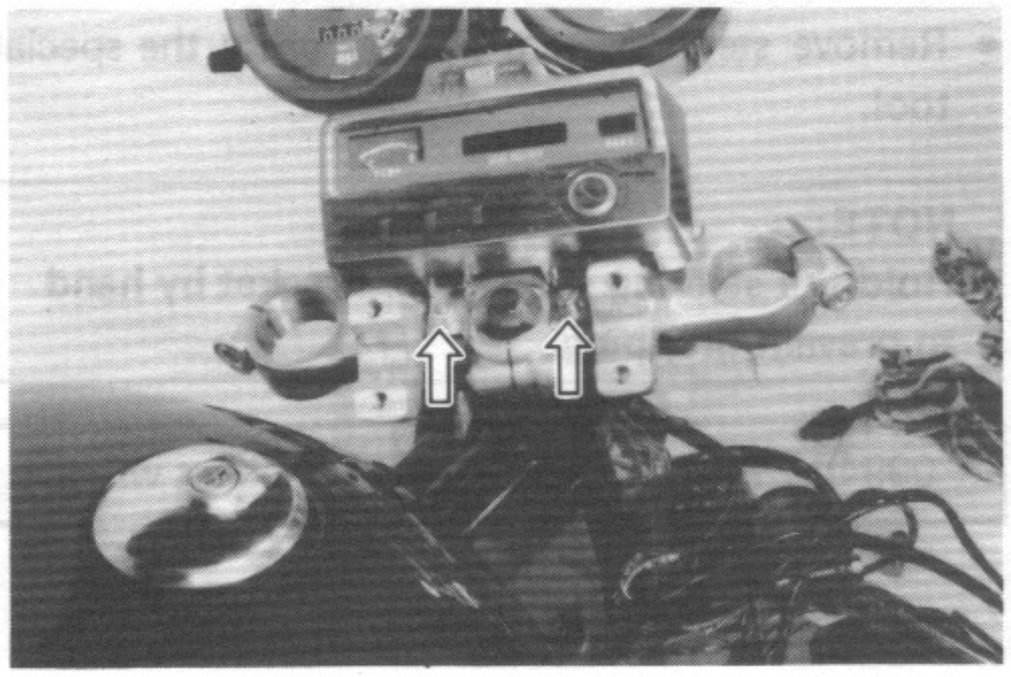


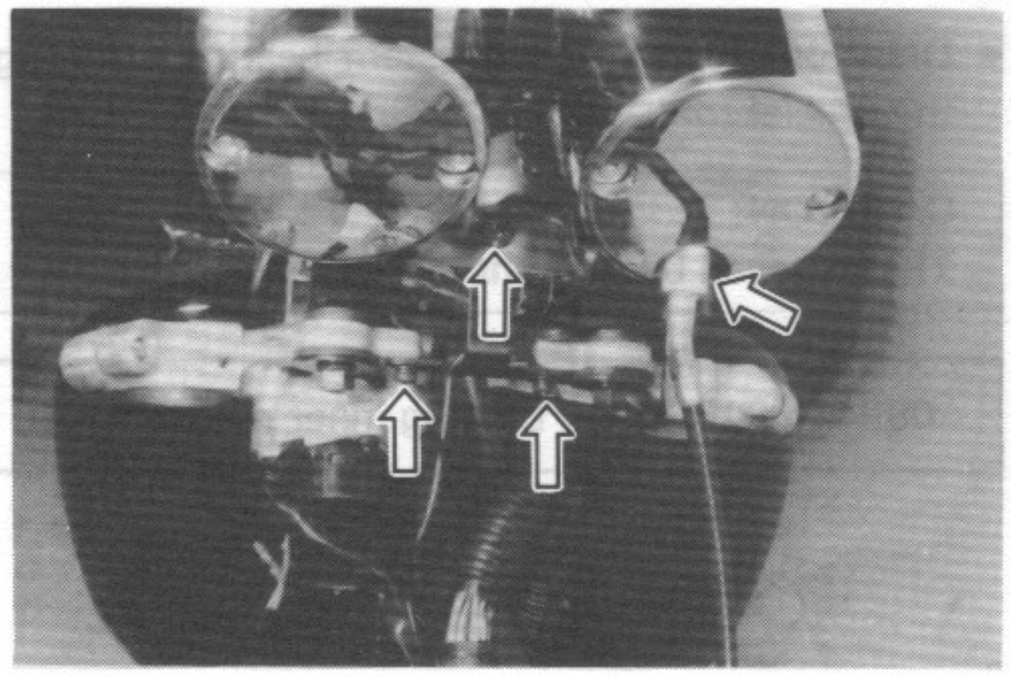
- Remove the handlebar clamp bolts and then remove the handlebar.



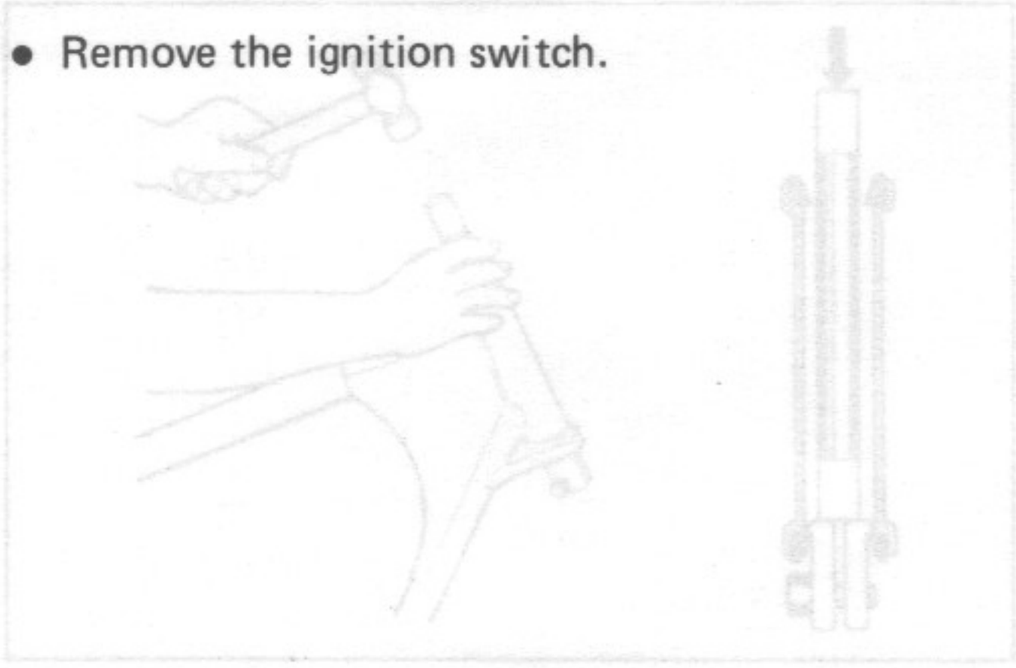
- Remove the check panel and combination meter.

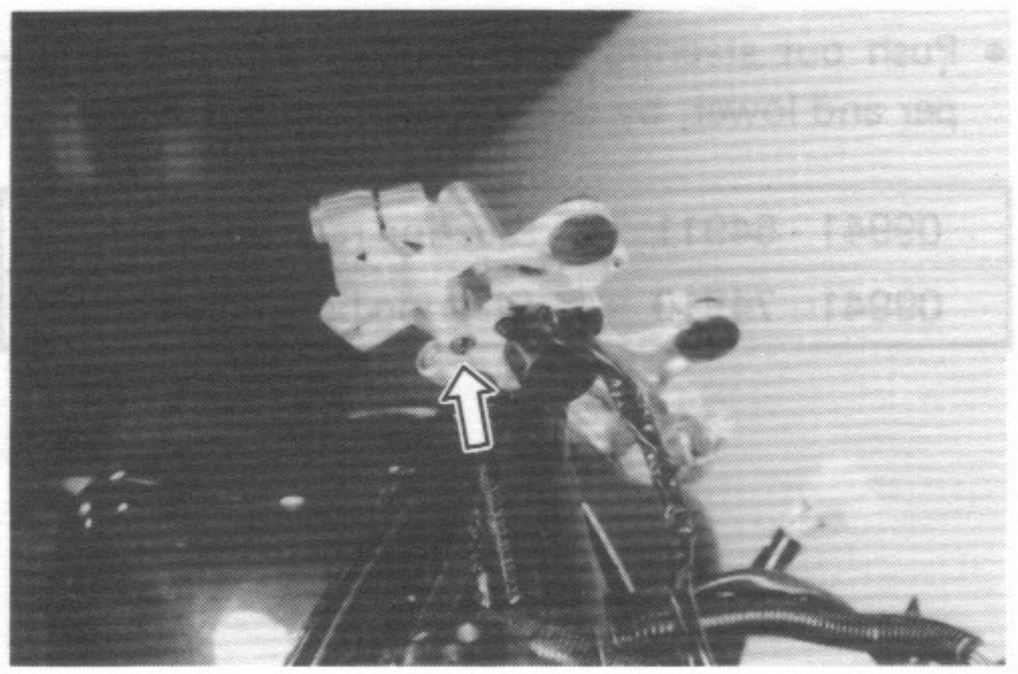






- Remove the ignition switch.

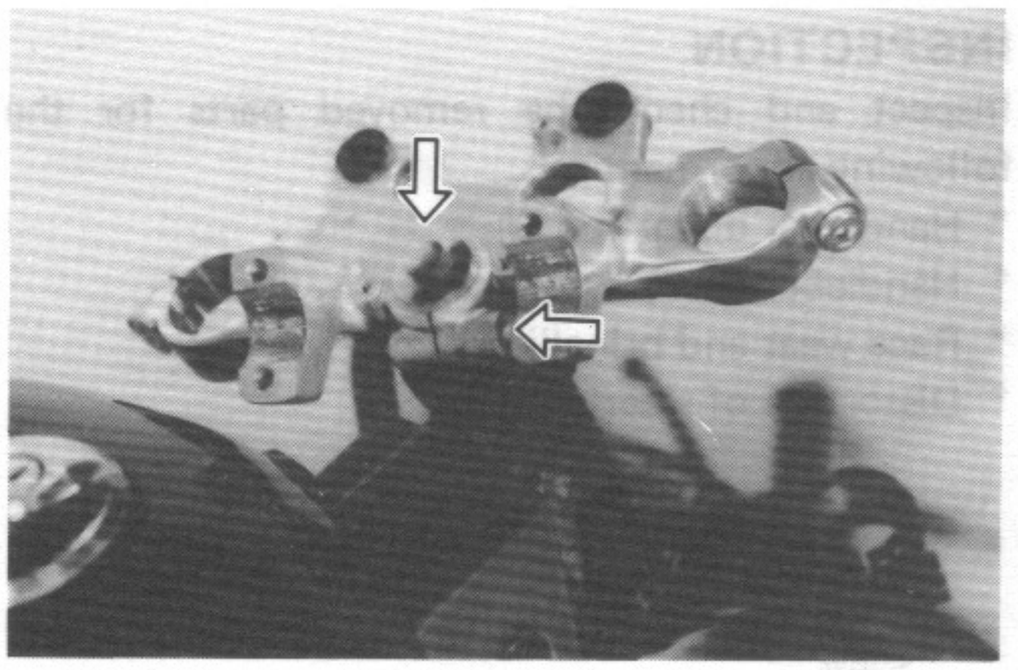




- Loosen the steering stem head bolt and clamp bolt.
- Remove the front fork upper bracket.

Tightening torque

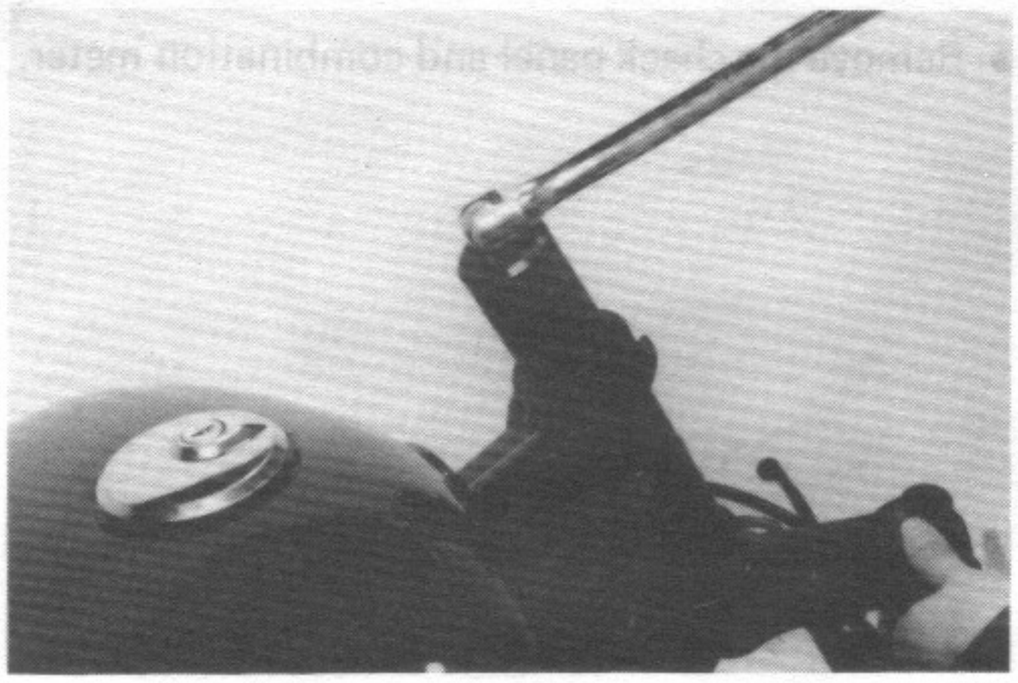
	N·m	kg-m	lb-ft
Steering stem head bolt	20 – 30	2.0 – 3.0	14.5 – 21.5
Steering stem clamp bolt	15 – 25	1.5 – 2.5	11.0 – 18.0



- Remove steering stem nut by using the special tool.

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

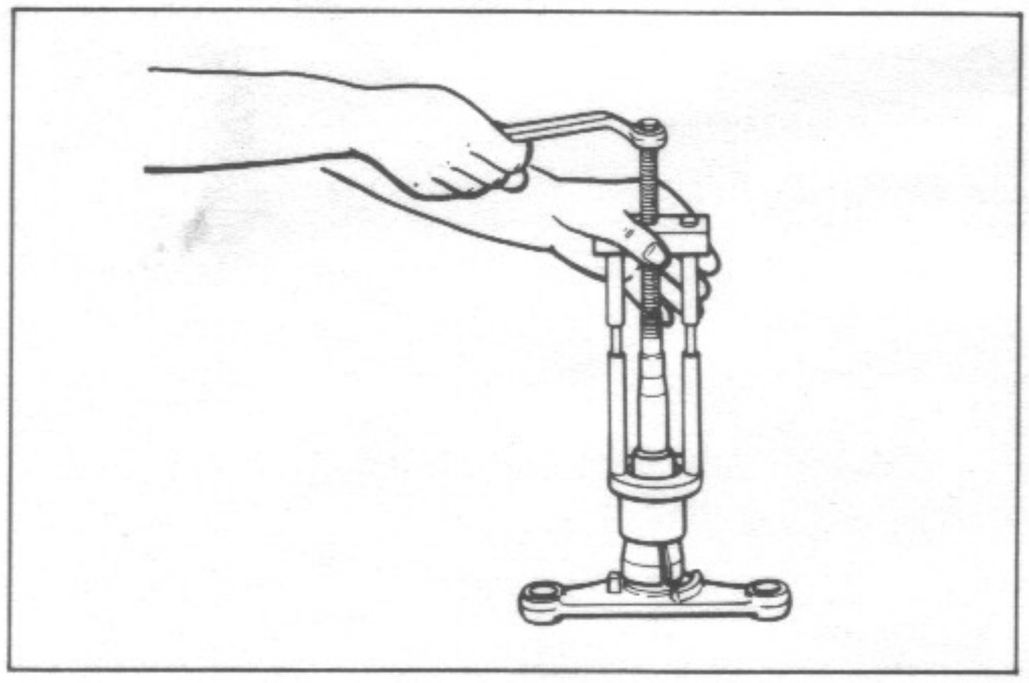
09940 - 14911	Steering nut socket wrench



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

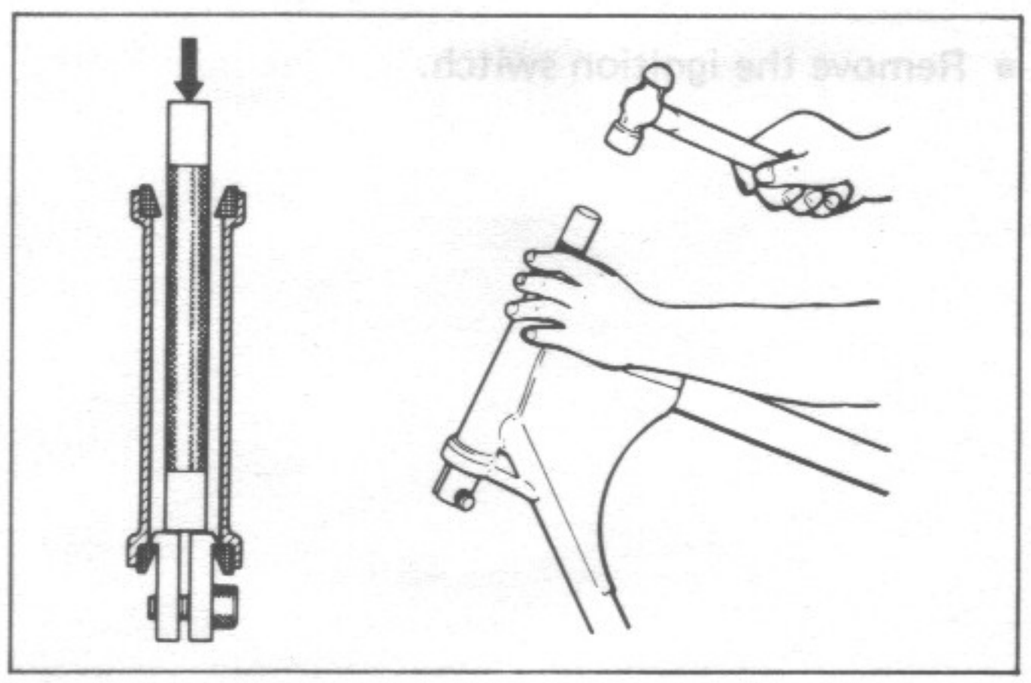
CAUTION:
The removed bearing should be replaced.

09941 - 84510	Bearing inner race remover



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

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



INSPECTION

Inspect and check the removed parts for the following abnormalities.

* Handlebar distortion.
* Handlebar clamp wear.
* Race wear and brinelling.
* Distortion of steering stem.

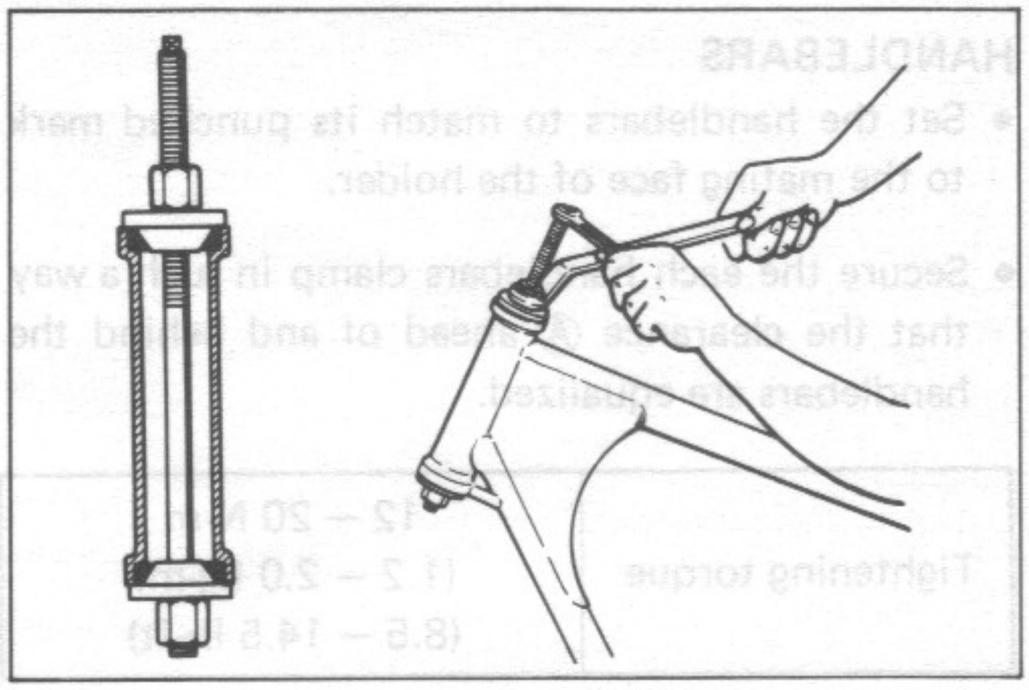
REASSEMBLY

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.

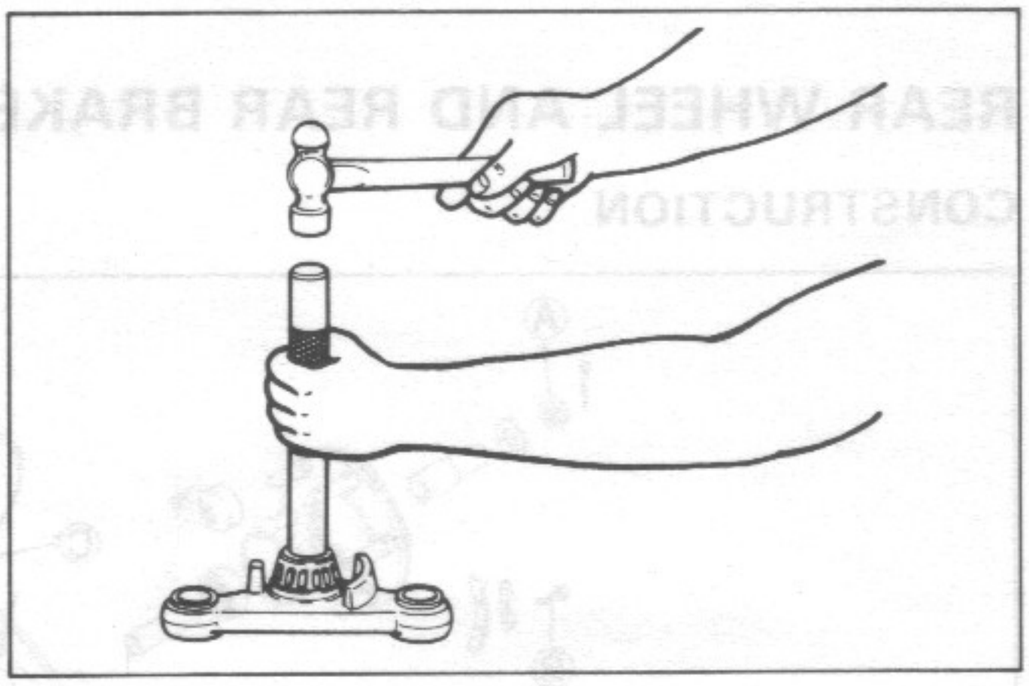
09941 - 34513	Steering outer race installer



BEARING

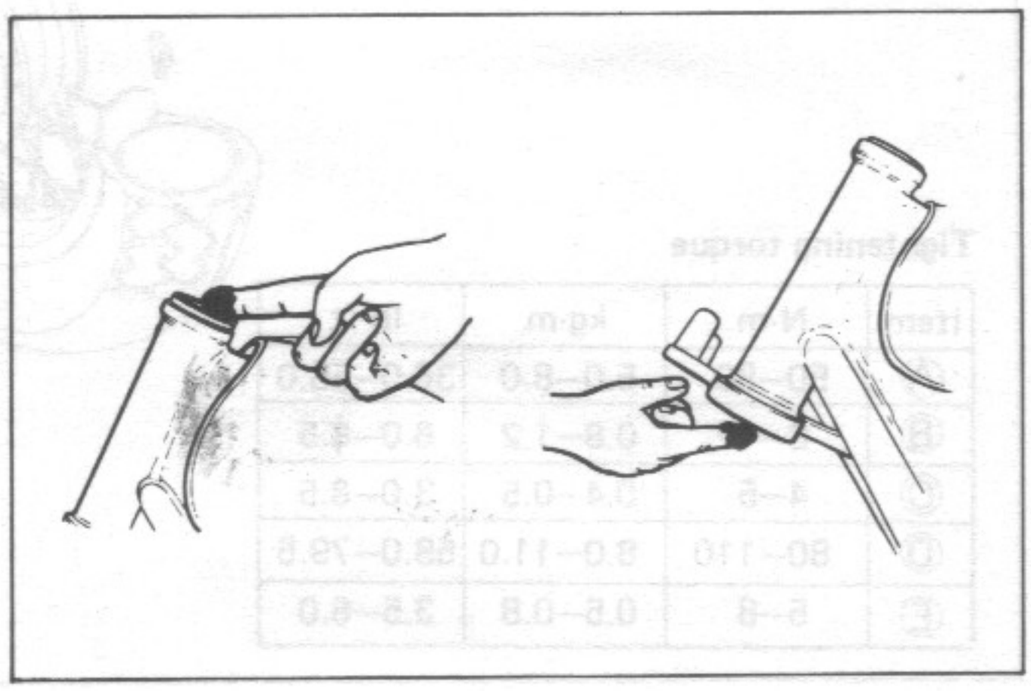
- Press in the lower bearing by using the special tool.

09941 - 74910	Steering bearing installer



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

99000 - 25030	SUZUKI super grease "A"

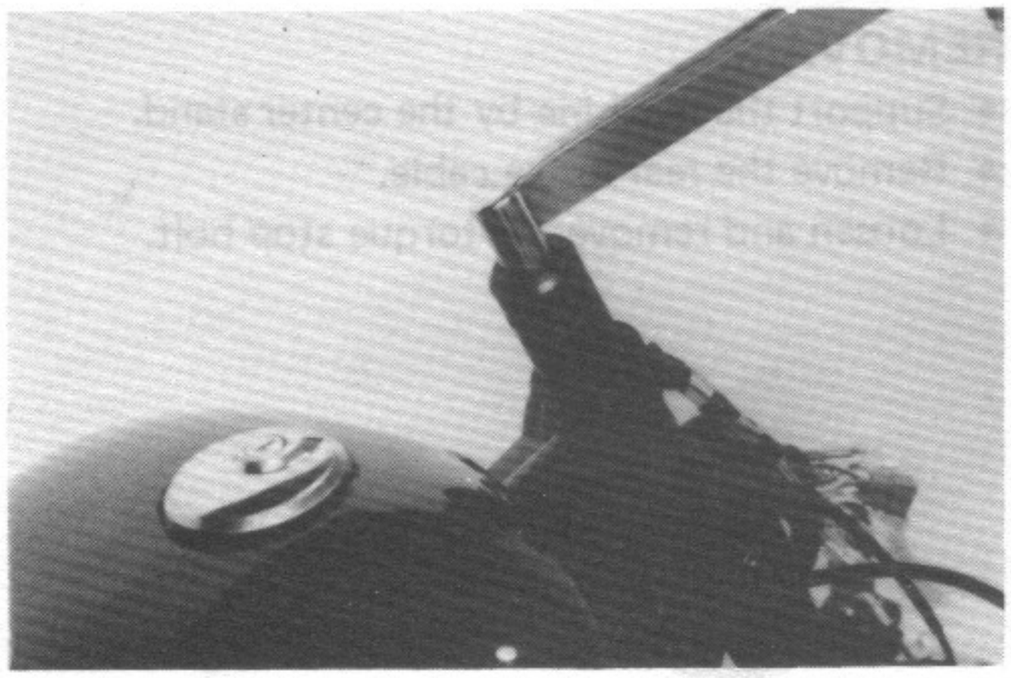


STEM NUT

- Tighten the steering stem nut by using the special tool to the specified torque.
  Turn the front fork right and left 5 or 6 times to seat the bearings.
  Turn out the steering stem nut 1/4 turn.
  Then retighten very lightly so that no play can be detected in the stem.

09940 - 14911	Stem nut socket wrench

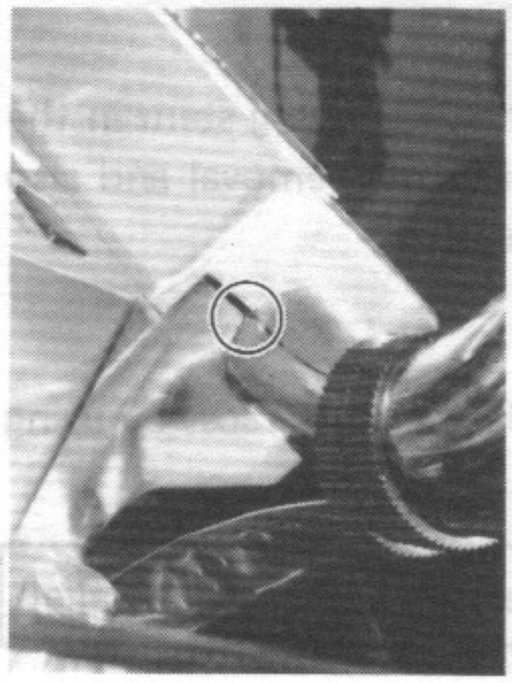
Tightening torque	40 – 50 N·m (4.0 – 5.0 kg-m) (29.0 – 36.0 lb-ft)

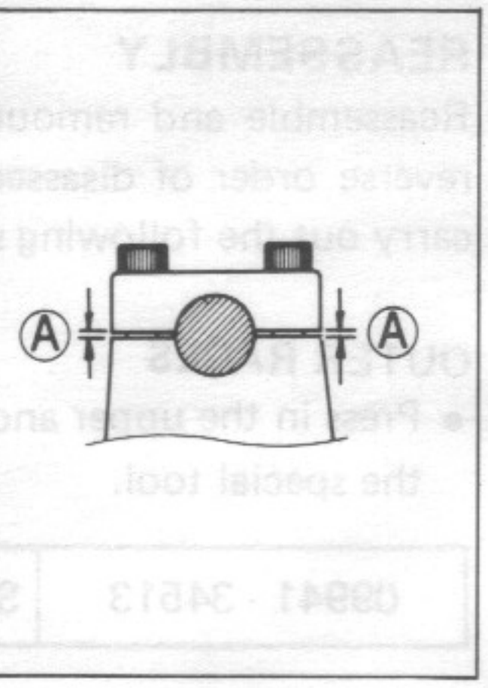


HANDLEBARS

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

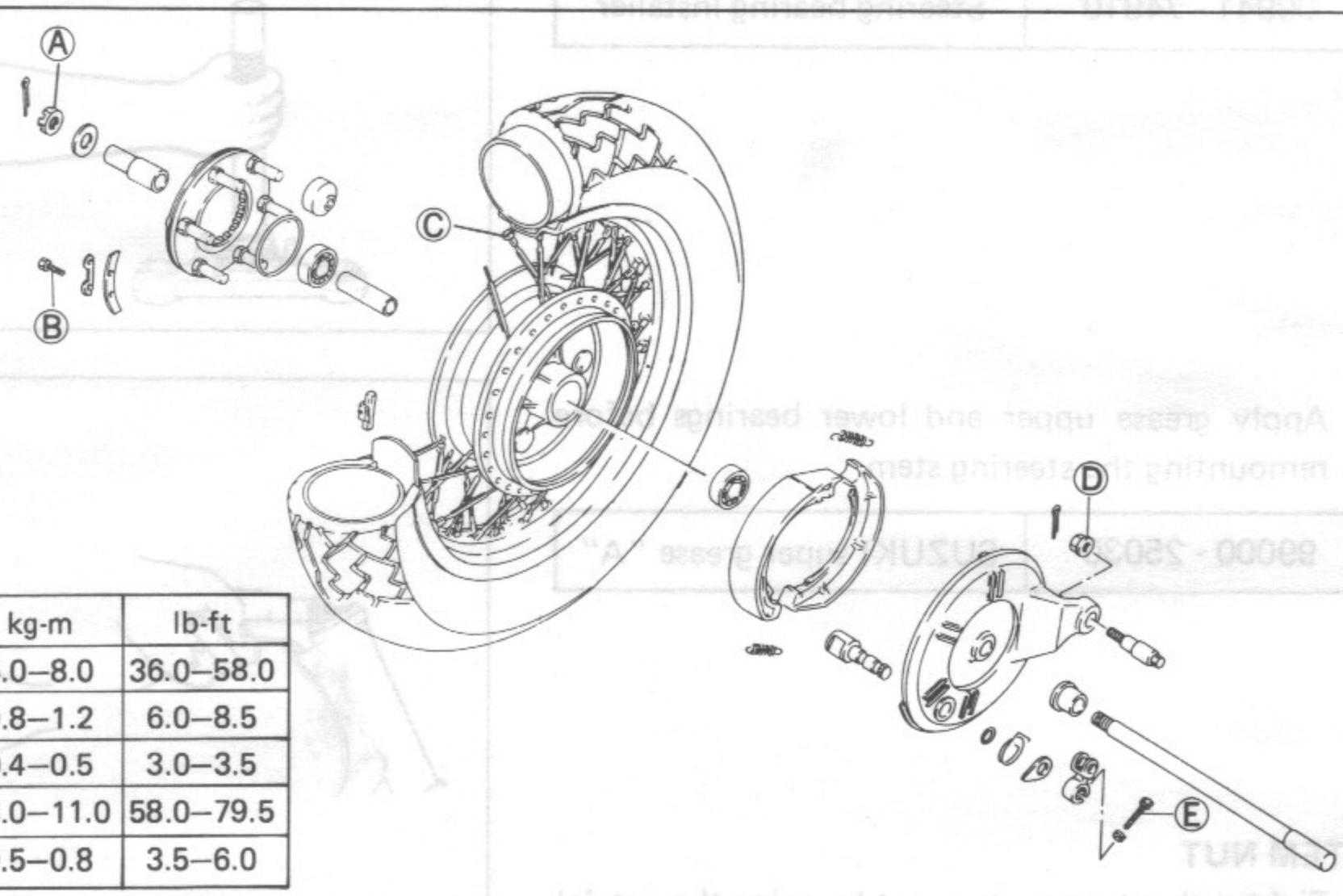
Tightening torque	12 – 20 N·m (1.2 – 2.0 kg-m) (8.5 – 14.5 lb-ft)





REAR WHEEL AND REAR BRAKE

CONSTRUCTION

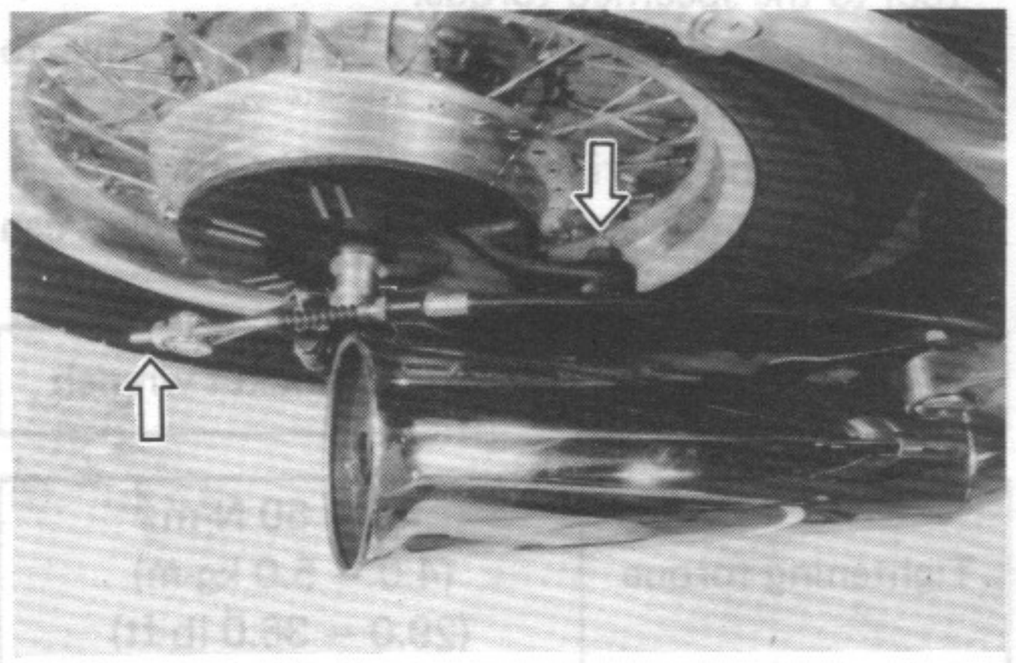


Tightening torque

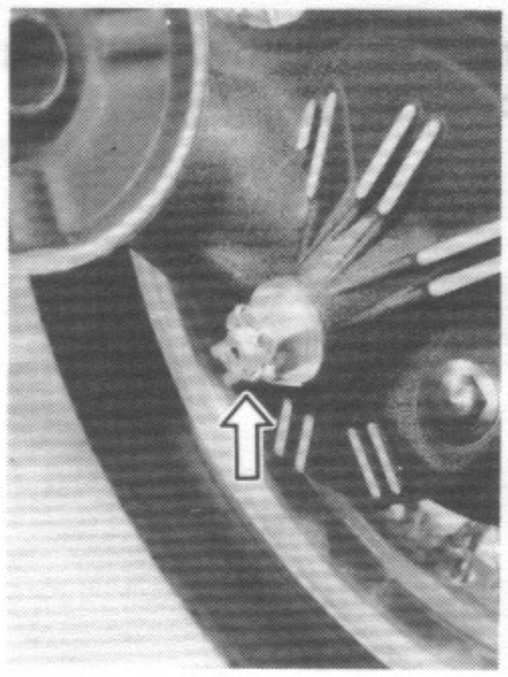
Item	N·m	kg-m	lb-ft
Ⓐ	50–80	5.0–8.0	36.0–58.0
Ⓑ	8–12	0.8–1.2	6.0–8.5
Ⓒ	4–5	0.4–0.5	3.0–3.5
Ⓓ	80–110	8.0–11.0	58.0–79.5
Ⓔ	5–8	0.5–0.8	3.5–6.0

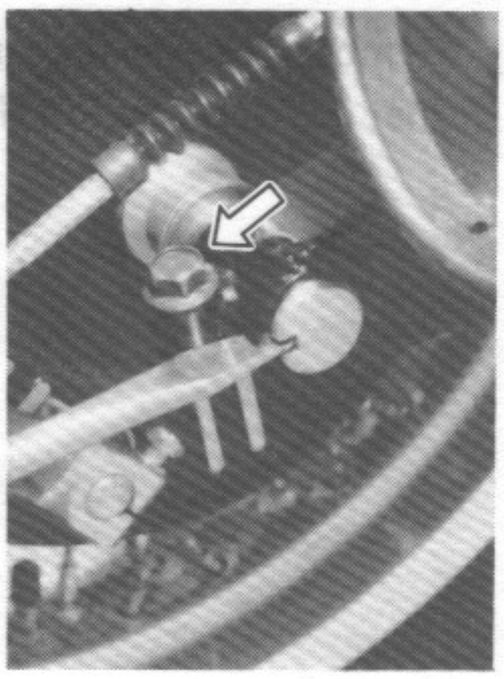
REMOVAL

- Support the machine by the center stand.
- Remove the rear brake cable.
- Loosen and remove the torque stop bolt.



- Remove the cotter pin.
- Loosen the axle clamp bolt.
- Loosen the axle nut by holding the axle.
- Take off the rear wheel.

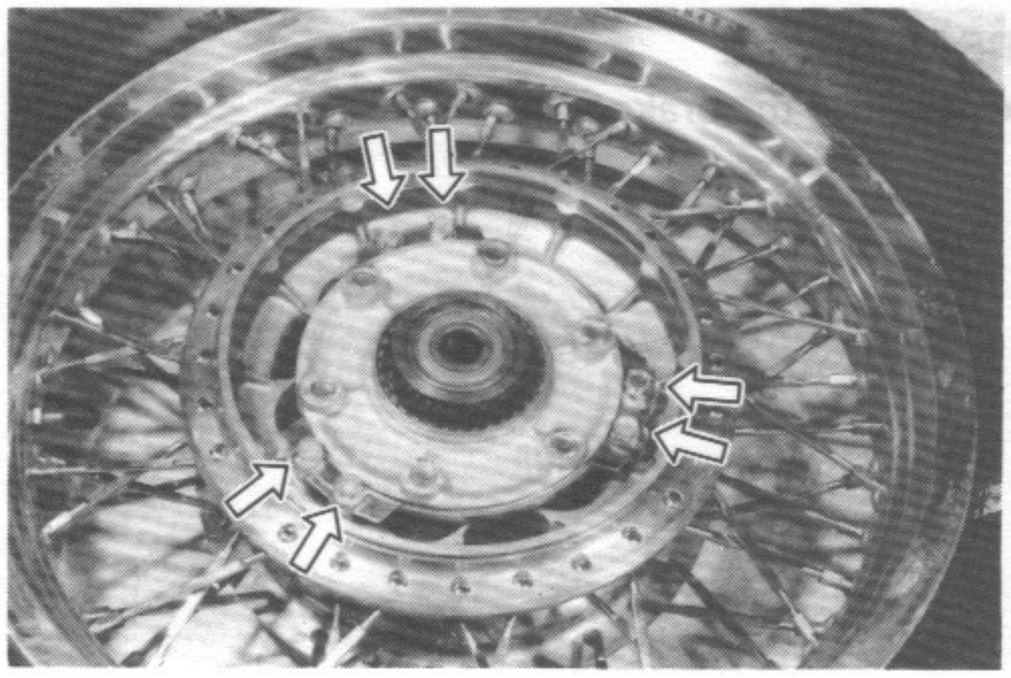


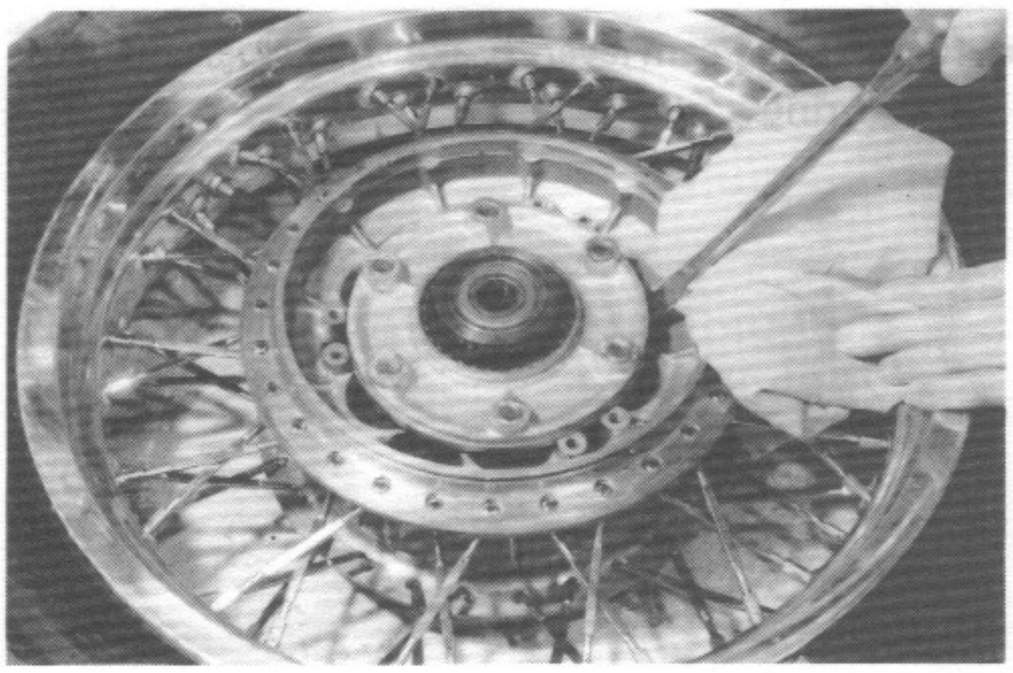


DISASSEMBLY

- Flatten the lock washers.
- Remove fitting bolts and pull off driven joint.

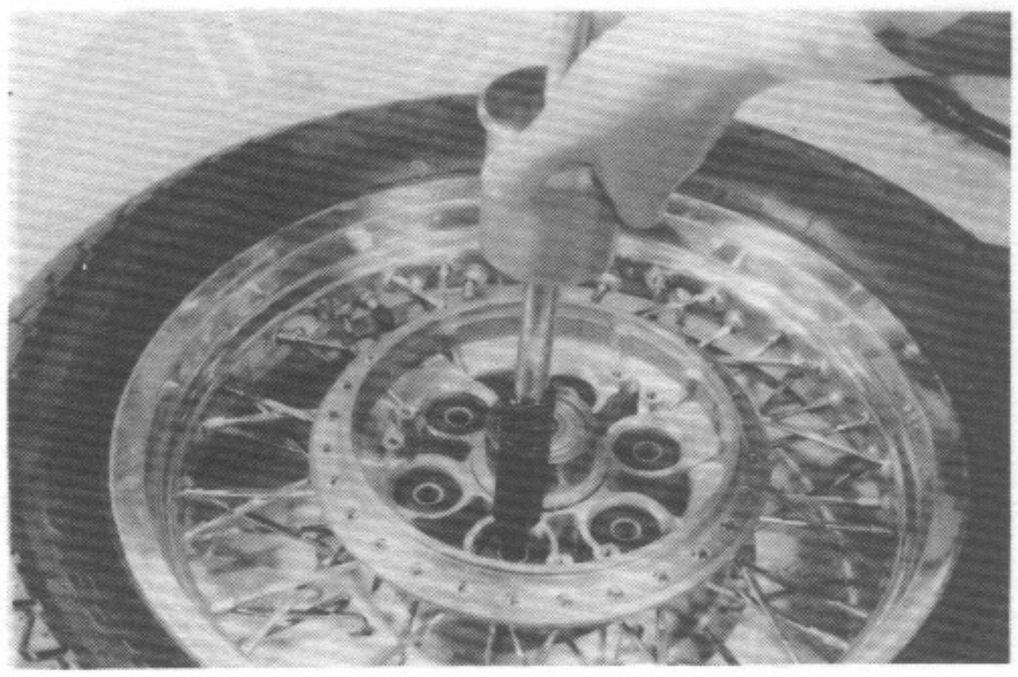
Tightening torque	8 – 12 N·m (0.8 – 1.2 kg-m) (6.0 – 8.5 lb-ft)



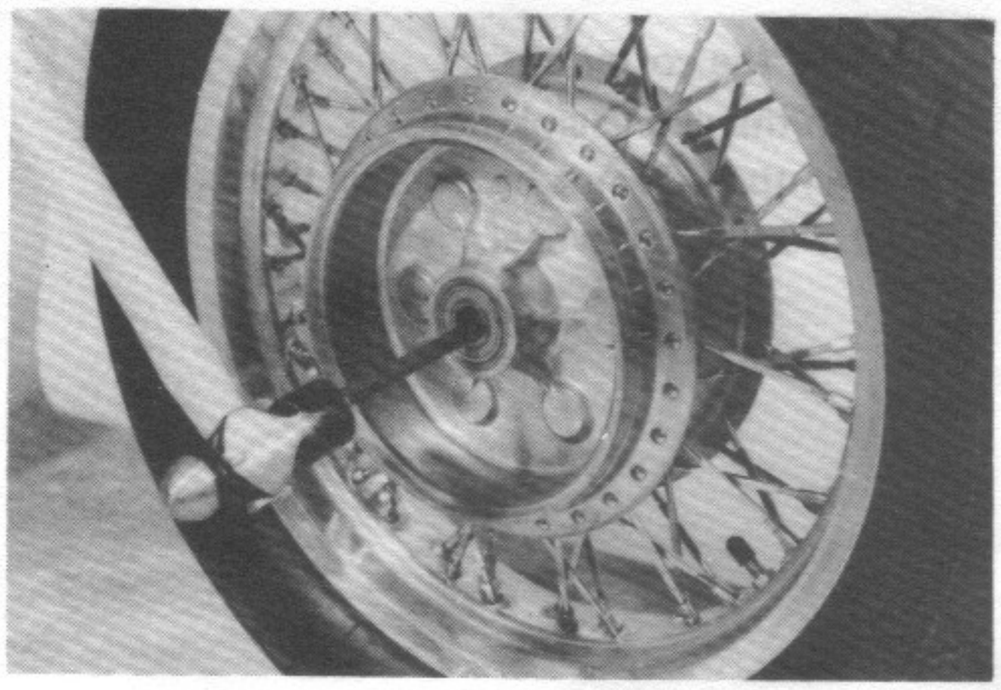


- Remove the O-ring.
- Take off the dampers by using the special tools.

09921 - 20210	Bearing remover
09930 - 30102	Sliding shaft

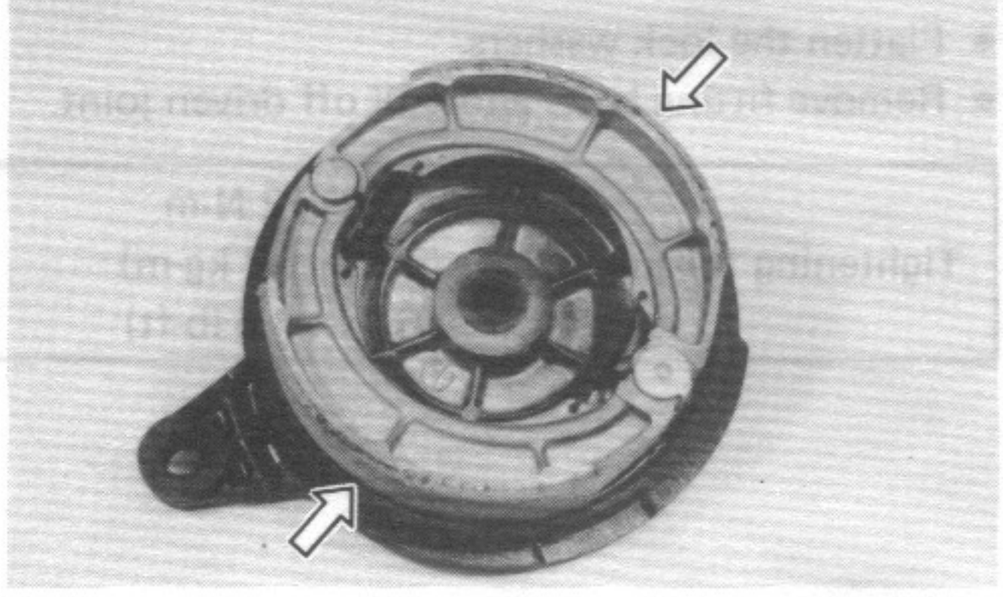


- Remove the wheel bearings with same manner as that of front bearing (Refer to page 9-2).

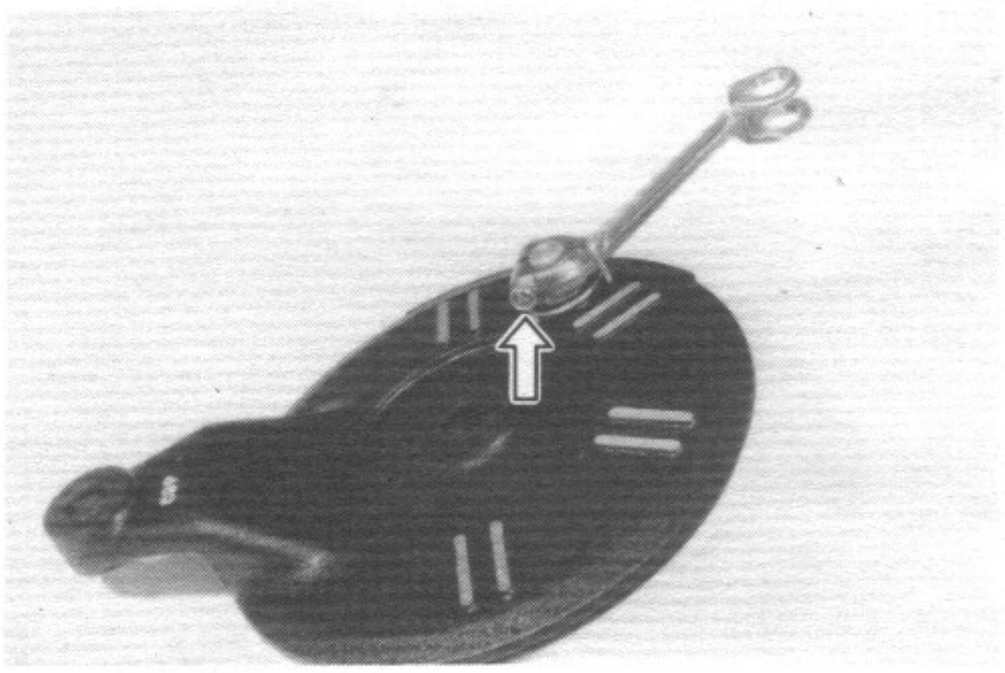


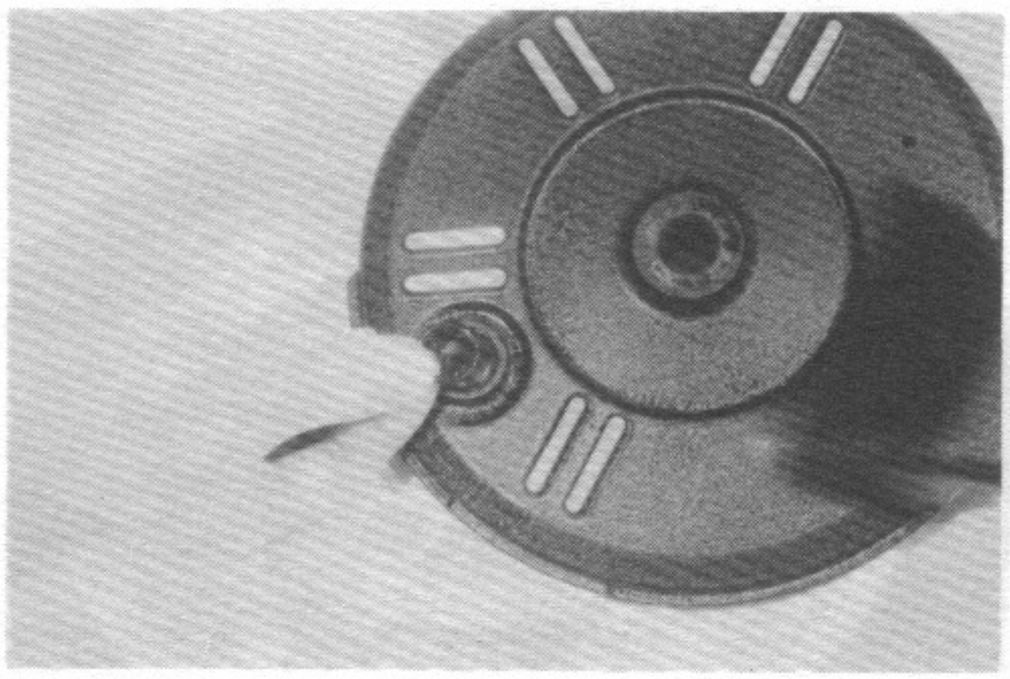
REAR BRAKE

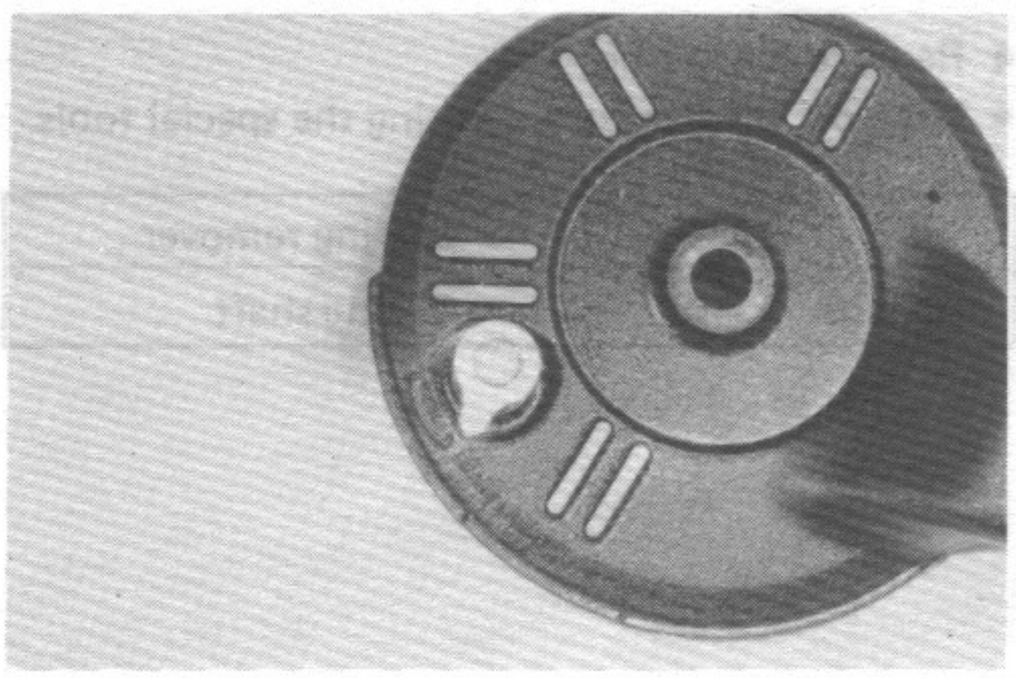
- Remove the brake shoe.



- Remove the cam lever, brake shoe wear indicator and O-ring.





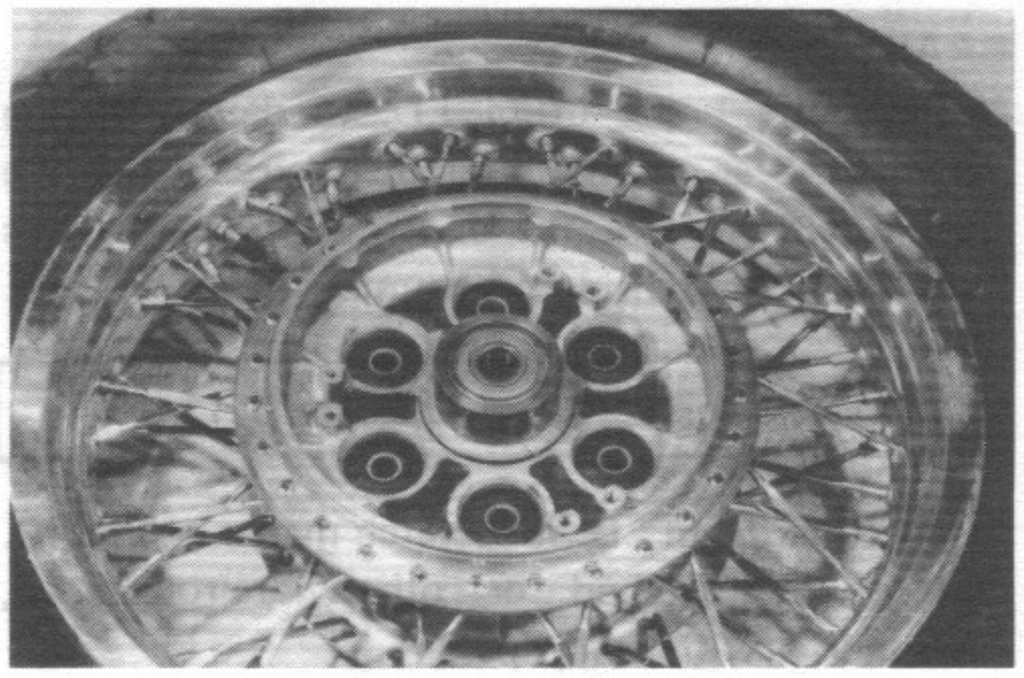


INSPECTION

WHEEL BEARING ..... Refer to page 9-2
AXLE SHAFT ..... Refer to page 9-3
WHEEL RIM ..... Refer to page 9-3
SPOKE NIPPLE ..... Refer to page 9-3
TIRE ..... Refer to page 9-3

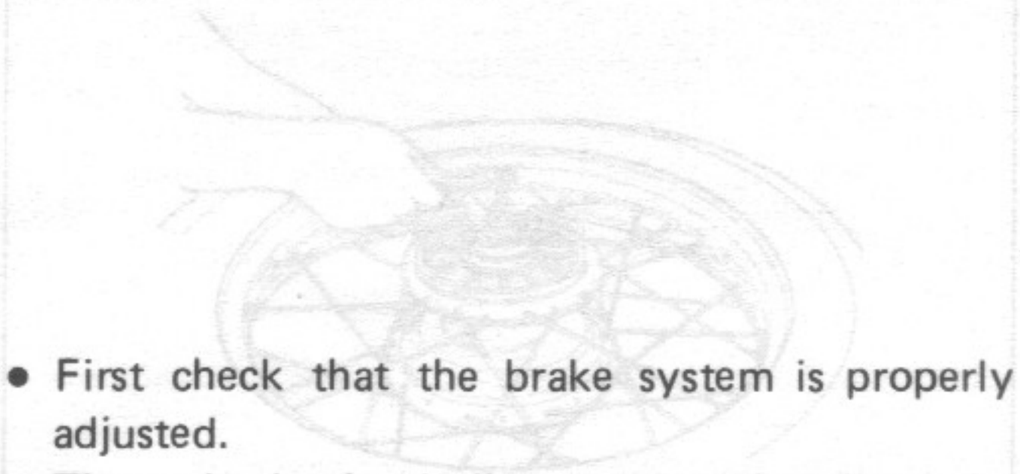
WHEEL DAMPER

Inspect the wheel dampers and driven joint O-ring for damage or wear.



BRAKE SHOE

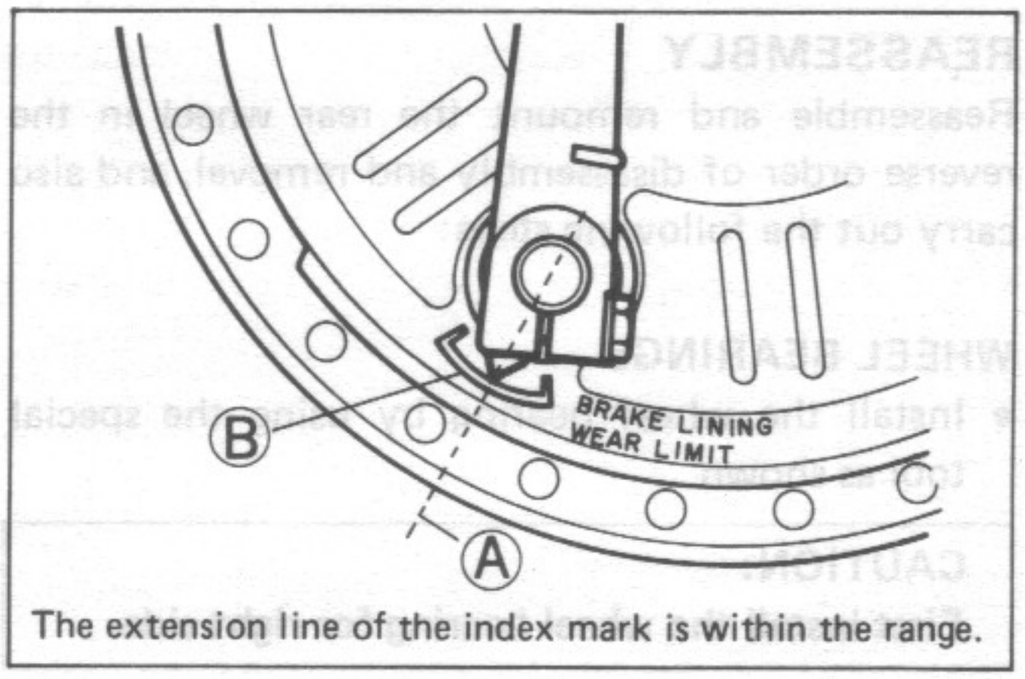
The brake panel incorporates a brake lining wear limit range. If the lining condition is normal, the brake shoe wear indicator Ⓐ , when extended, will fall within the range Ⓑ embossed on the brake panel (when brake is on).



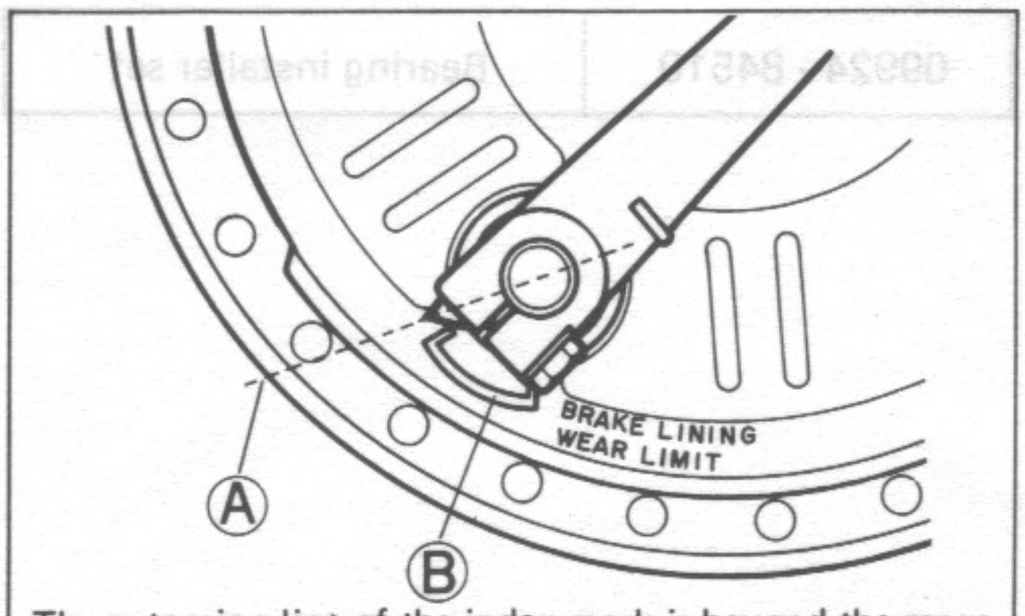
- First check that the brake system is properly adjusted.
- Then check the indicator extension line; the brake should be on at this time.

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.



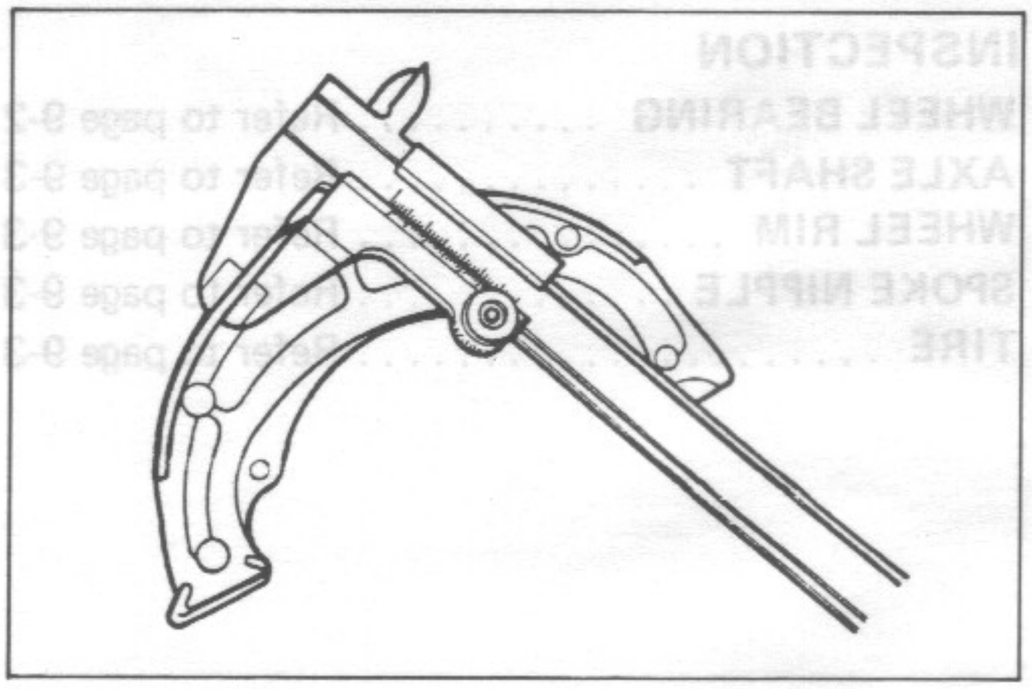
The extension line of the index mark is within the range.



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

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

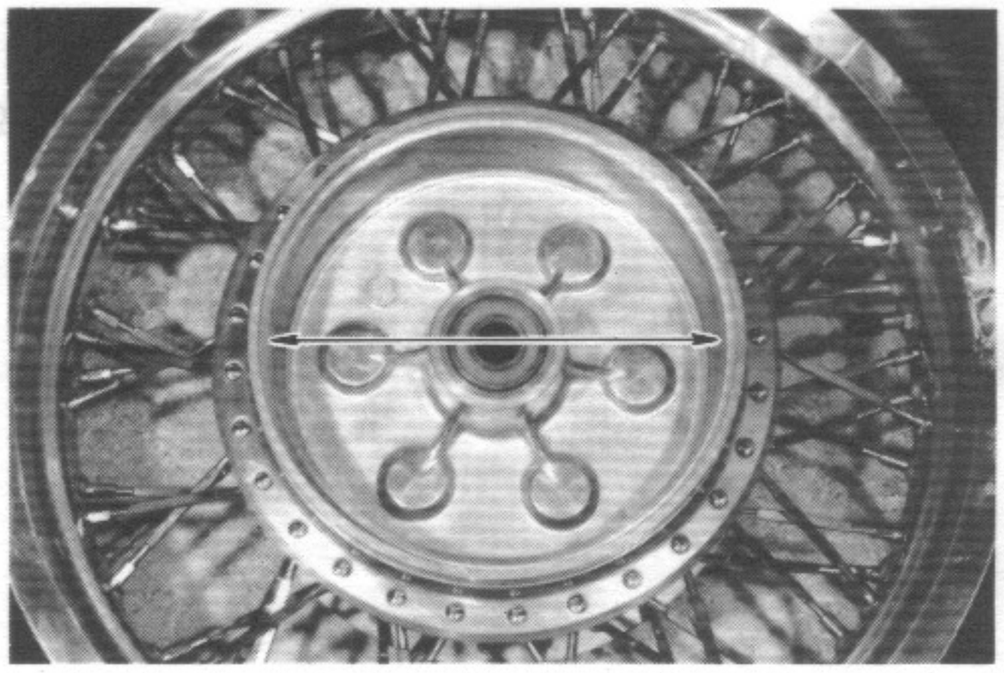
Service Limit	1.5 mm (0.06 in.)



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	180.7 mm (7.11 in.)



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

REASSEMBLY

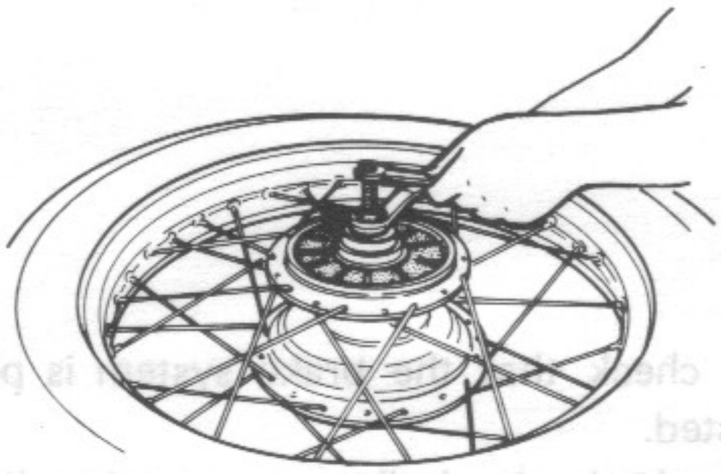
Reassemble and remount the rear wheel in the reverse order of disassembly and removal, and also carry out the following steps:

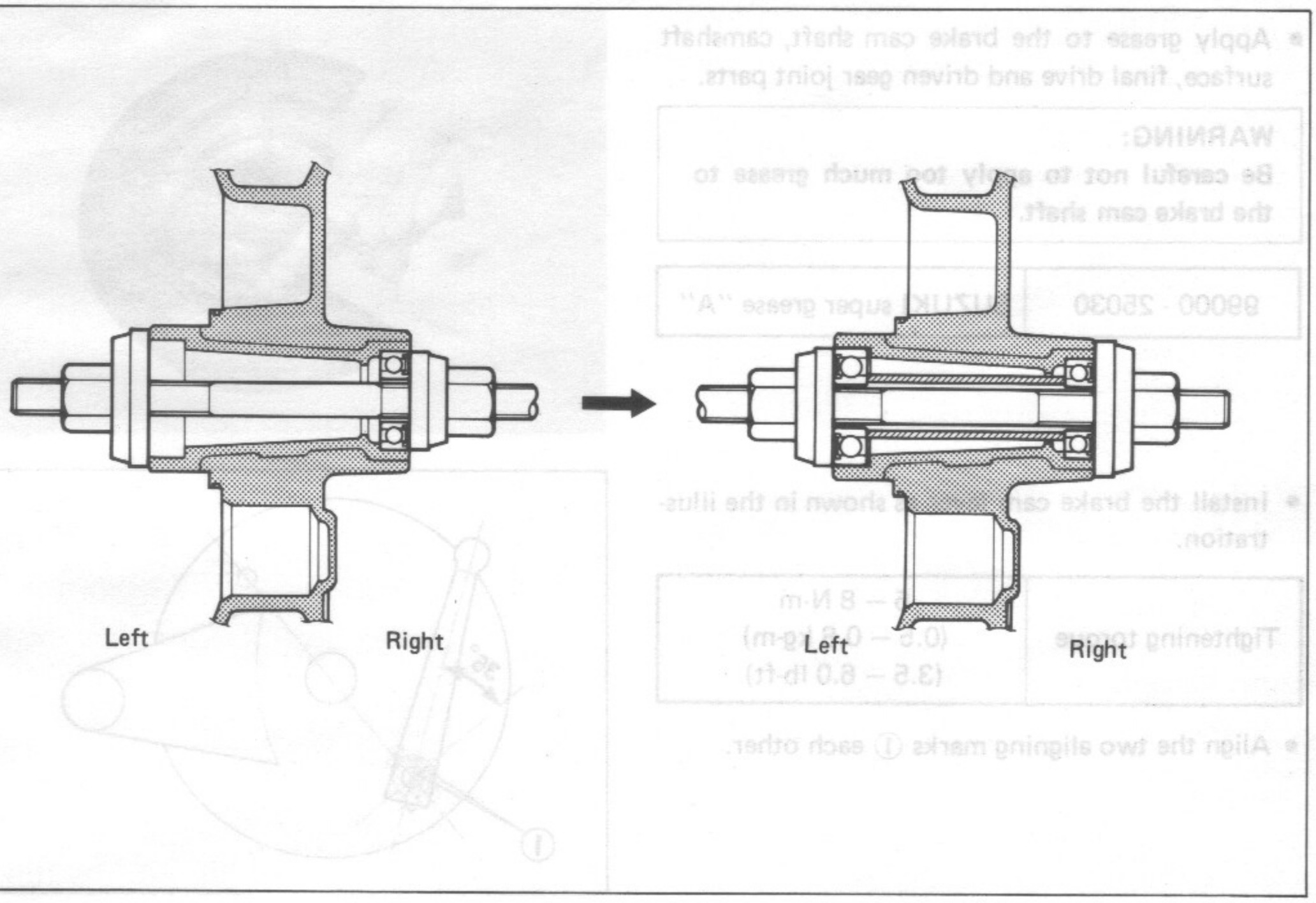
WHEEL BEARINGS

- Install the wheel bearing by using the special tool as shown.

CAUTION:
First install the wheel bearing for right side.

09924 - 84510	Bearing installer set





- Install the dampers.

NOTE:
If soap water is applied around the damper, it makes the job easier.

- Apply grease to the O-ring before installing the driven joint.
- Apply grease to the final gear spline before installing the rear wheel.

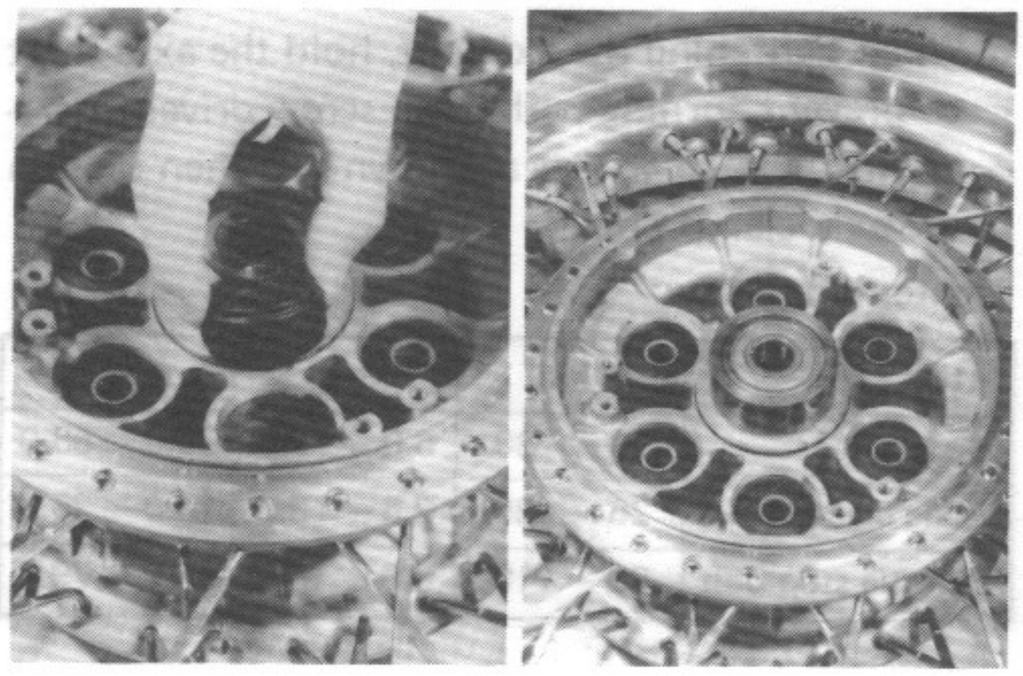
99000 - 25030	SUZUKI super grease "A"

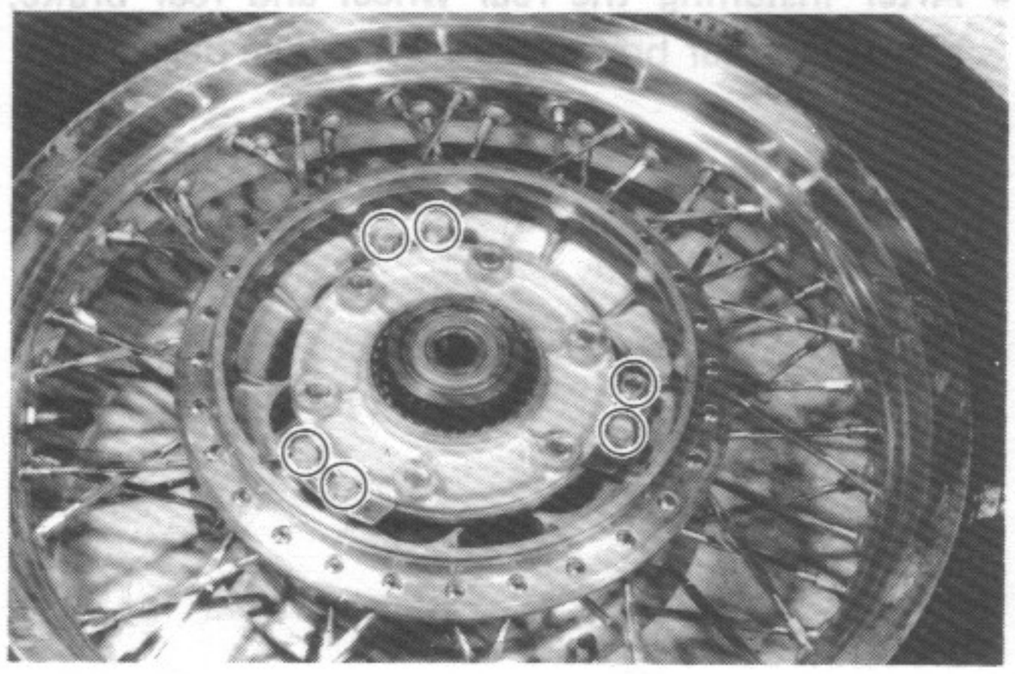
- Tighten the driven joint bolts.

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

- Apply thread lock "1363A" to the thread of driven joint bolts.

99104 - 32030	Thread lock "1363A"

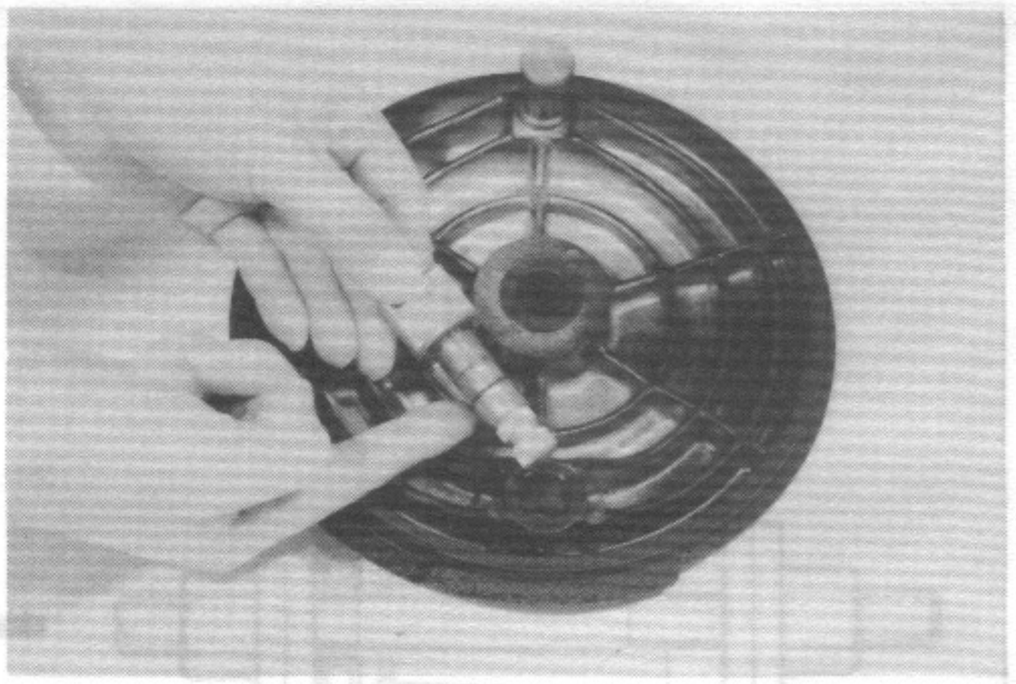




- Apply grease to the brake cam shaft, camshaft surface, final drive and driven gear joint parts.

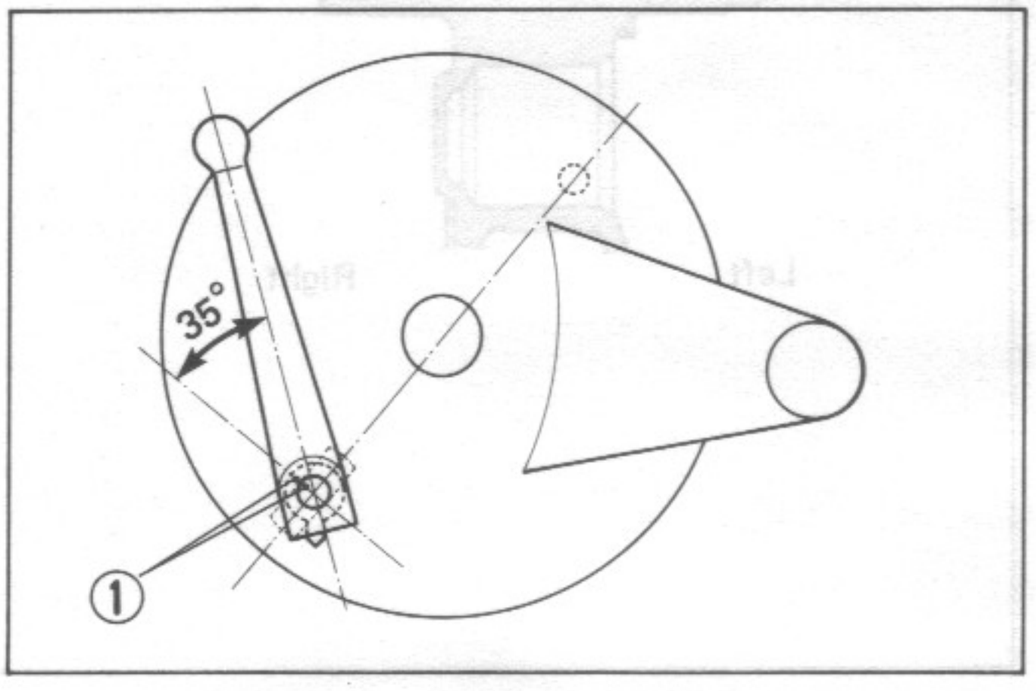
WARNING:
Be careful not to apply too much grease to the brake cam shaft.

99000 - 25030	SUZUKI super grease "A"



- Install the brake cam lever as shown in the illustration.

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

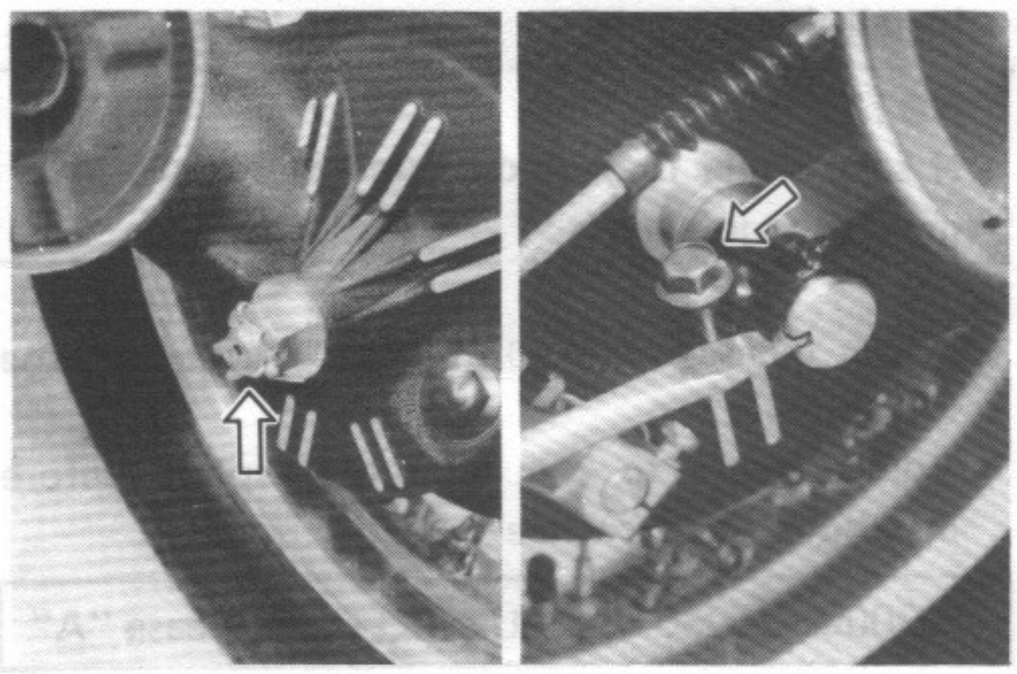


- Align the two aligning marks ① each other.

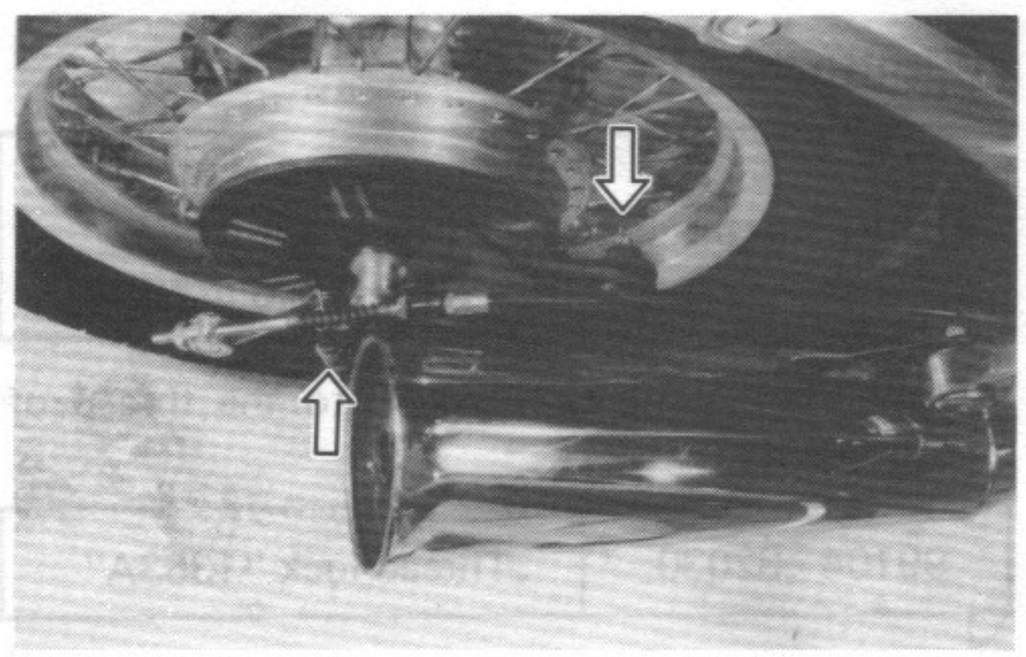
- When tightening the axle nut, hold the axle shaft to prevent turning with plain screw driver inserting in the axle groove as shown and then tighten the axle clamp bolt.

Tightening torque:

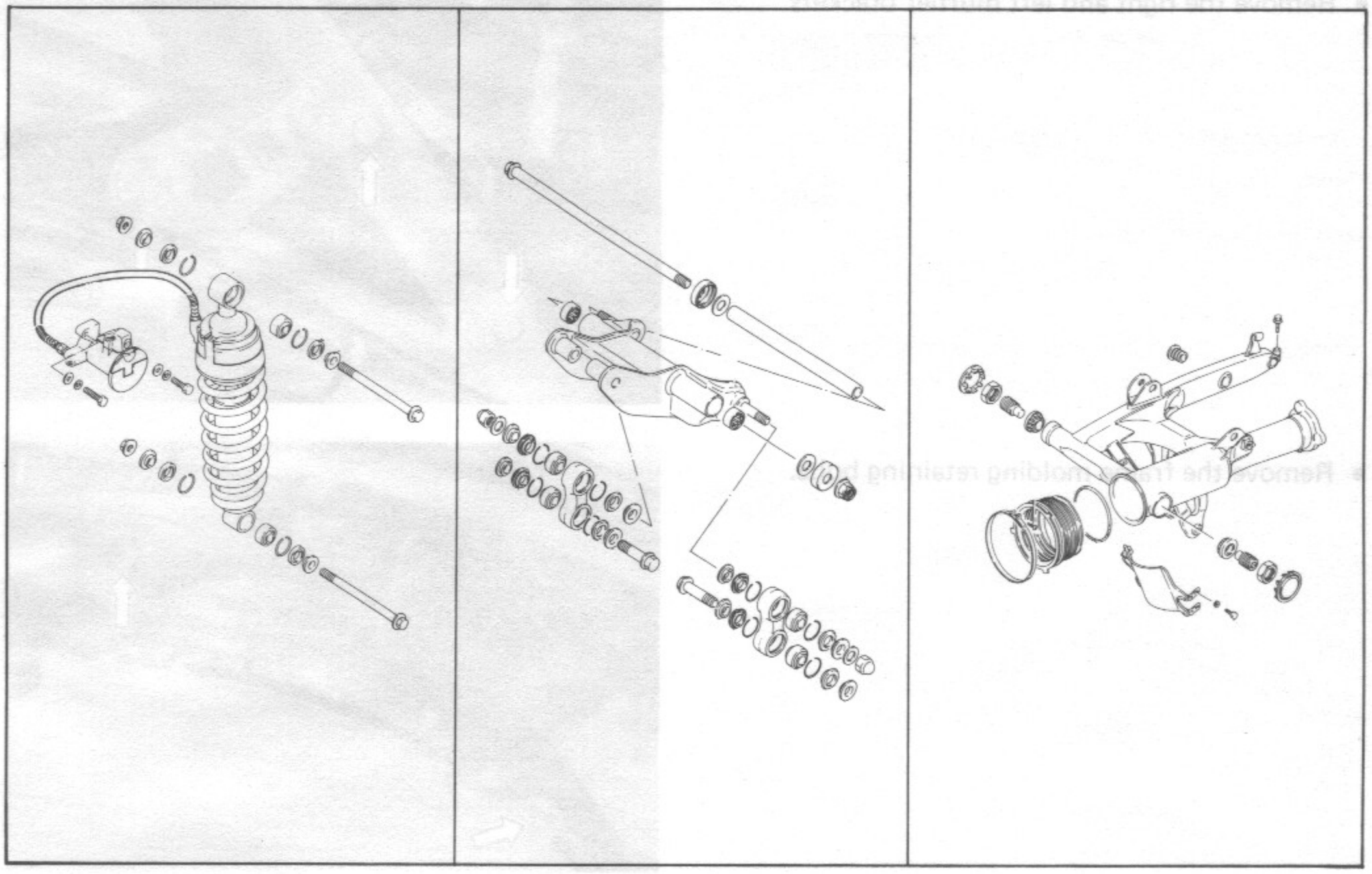
Item	N·m	kg-m	lb-ft
Axle nut	50 – 80	5.0 – 8.0	36.0 – 58.0
Axle clamp bolt	25 – 35	2.5 – 3.5	18.0 – 25.5
Torque stop bolt	80 – 110	8.0 – 11.0	58.0 – 79.5



- After installing the rear wheel and rear brake, adjust the rear brake free travel. (See page 2-12)

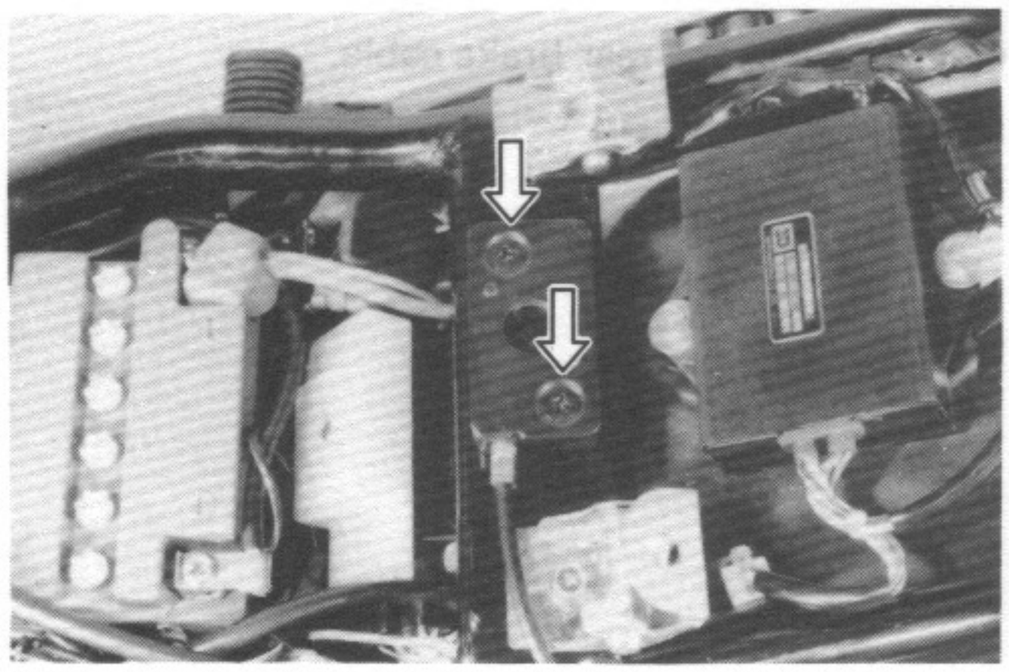


REAR SUSPENSION AND SWINGARM

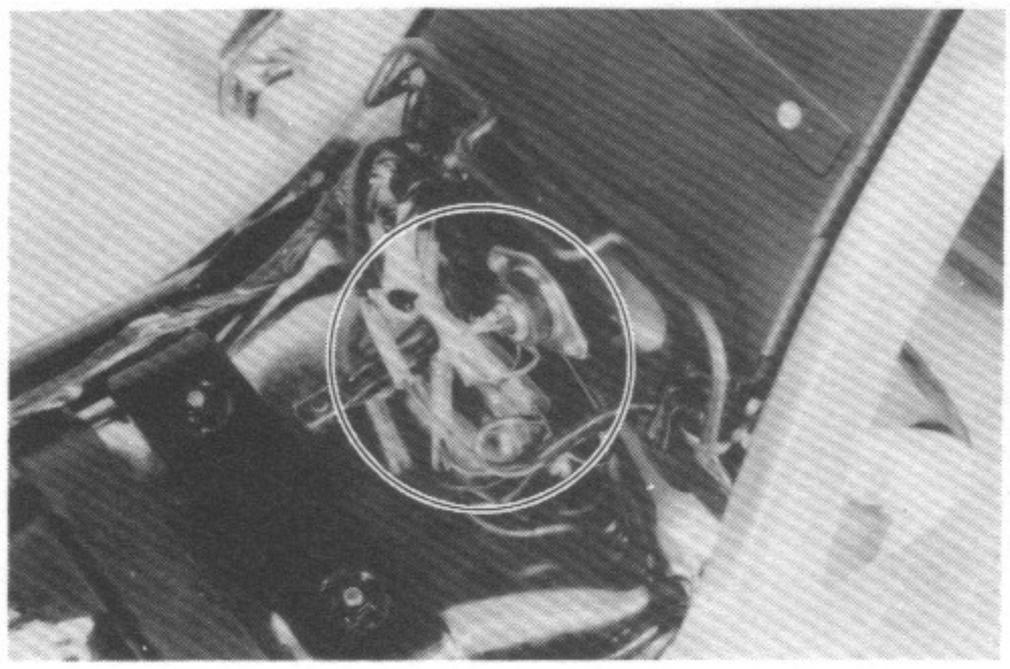


REMOVAL

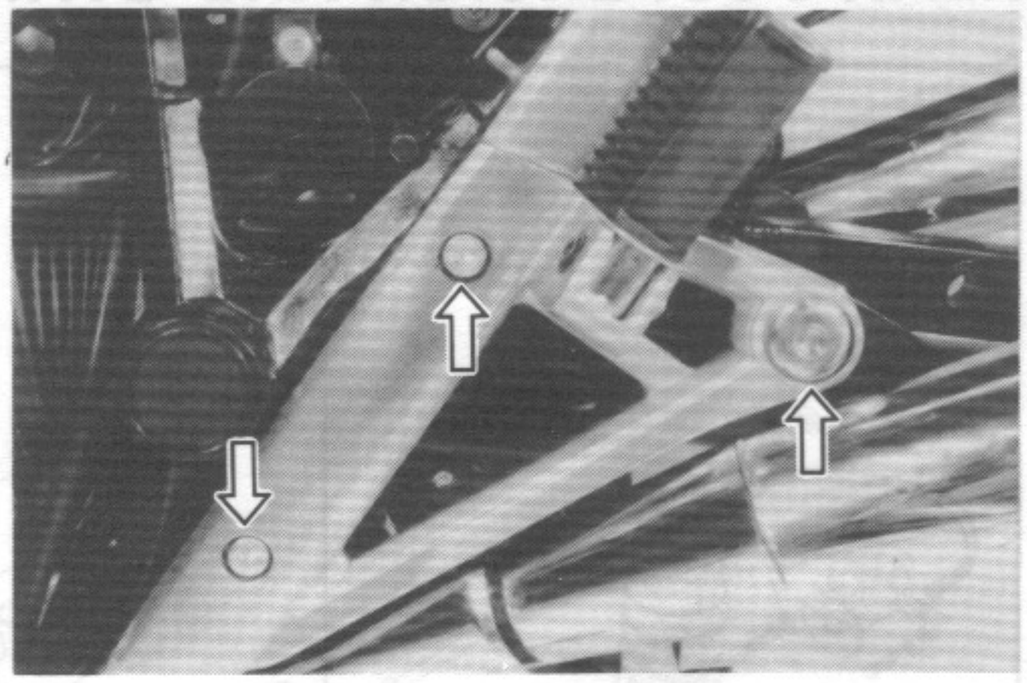
- Remove the rear wheel. (See page 9-25)
- Remove the front seat by using the key and remove the rear seat by depressing the seat locks.
- Take off the seat lock by unscrewing the retainer screws.



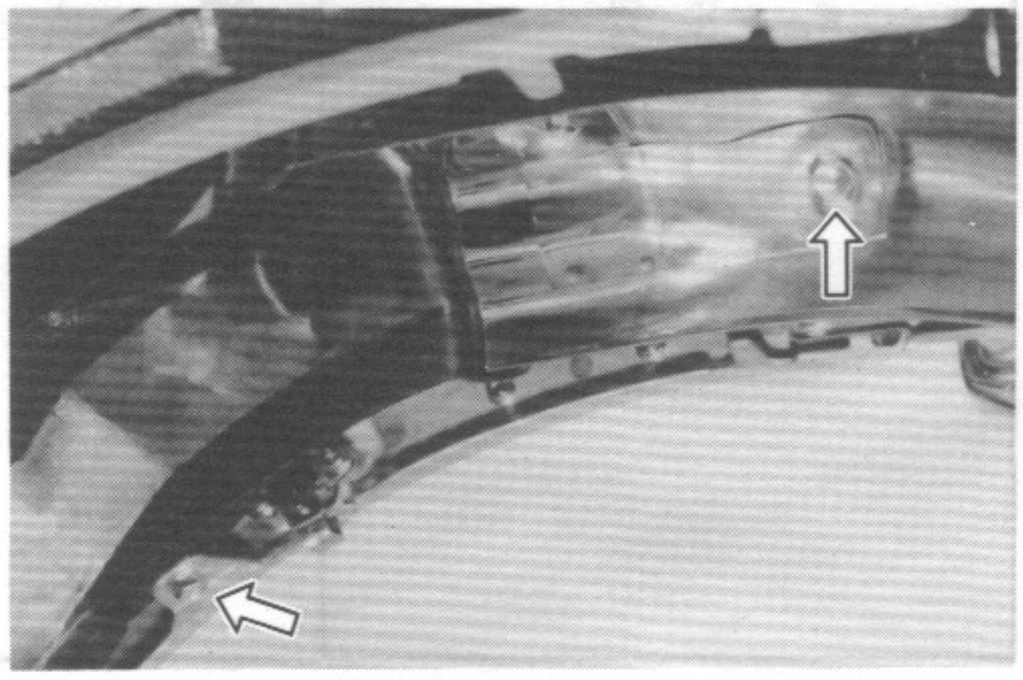
- Disconnect the tail/brake and turn signal wire harness.



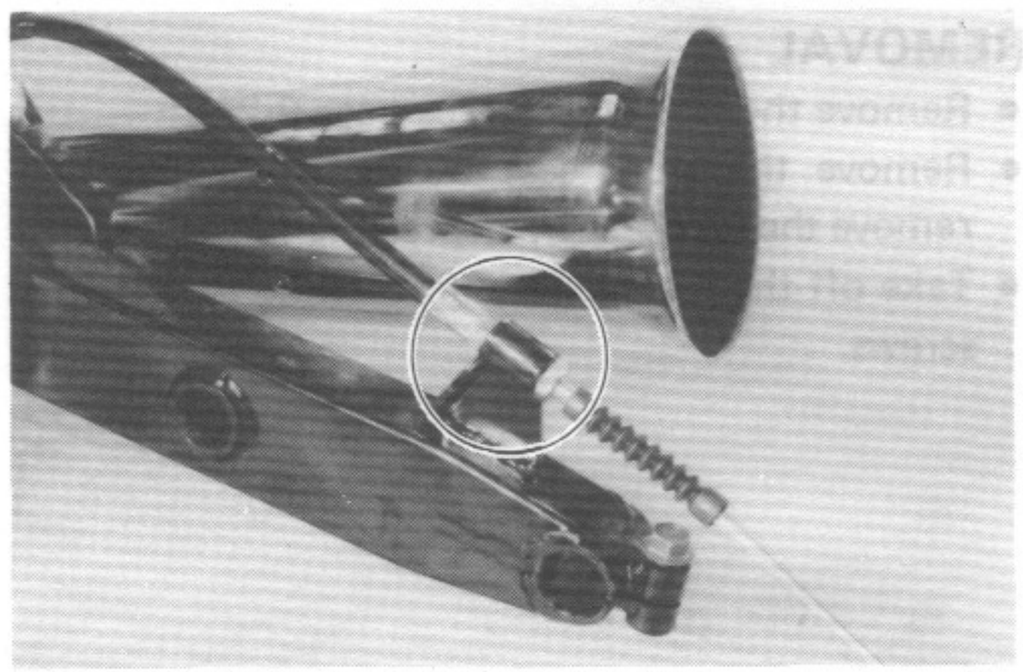
- Remove the right and left muffler brackets.



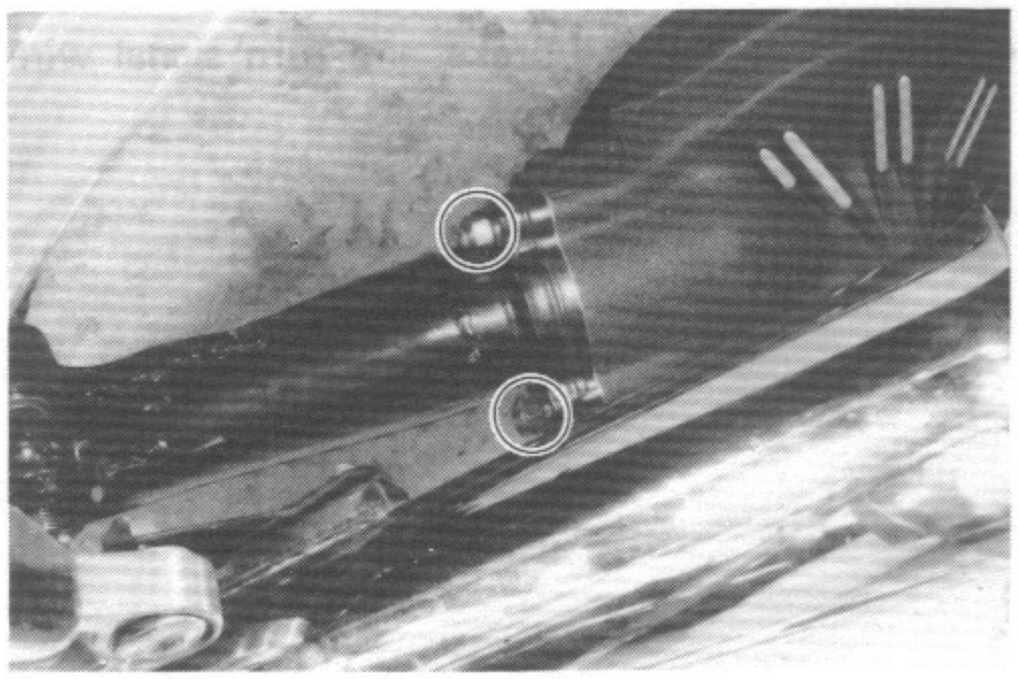
- Remove the frame molding retaining bolts.



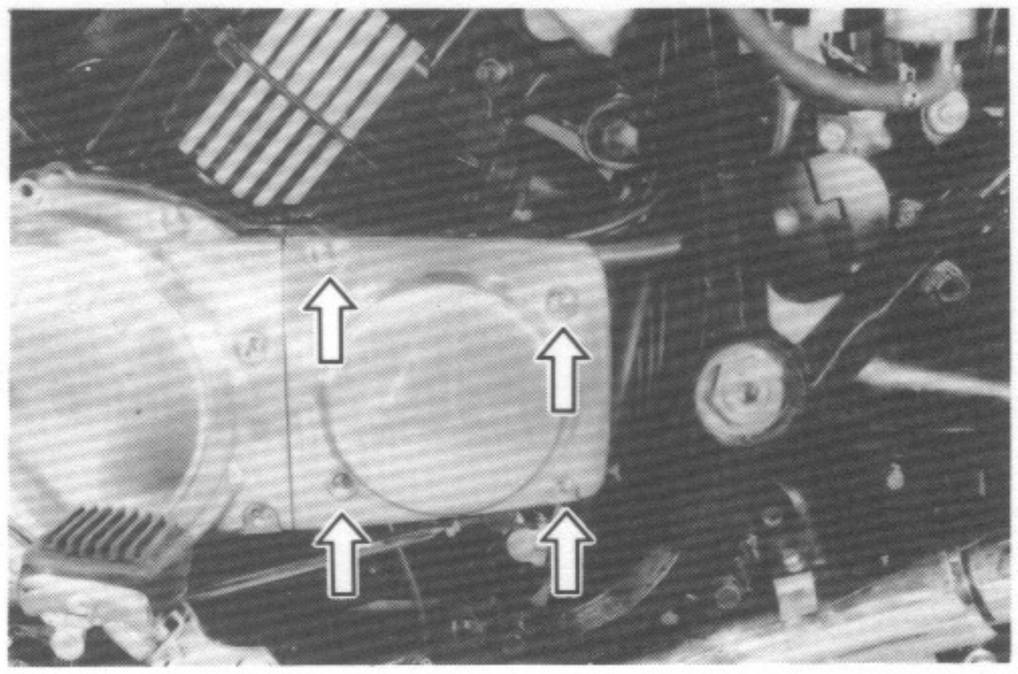
- Disconnect the rear brake cable.

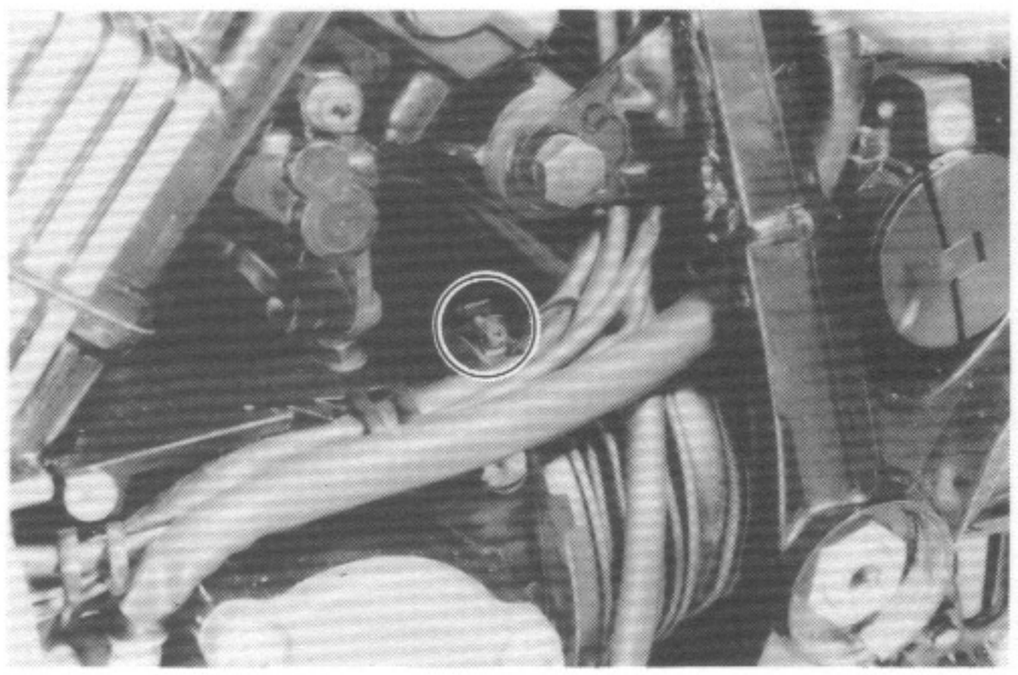


- Remove the final gear case.

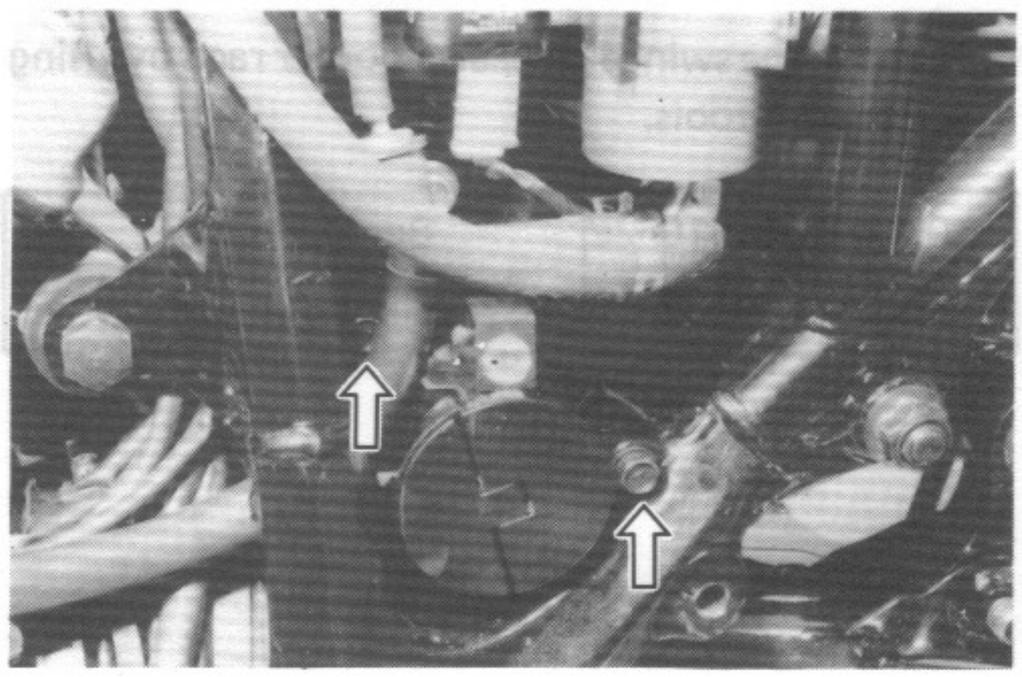


- Remove the secondary gearcase cover.
- Loosen the drive shaft boot clamp screw.

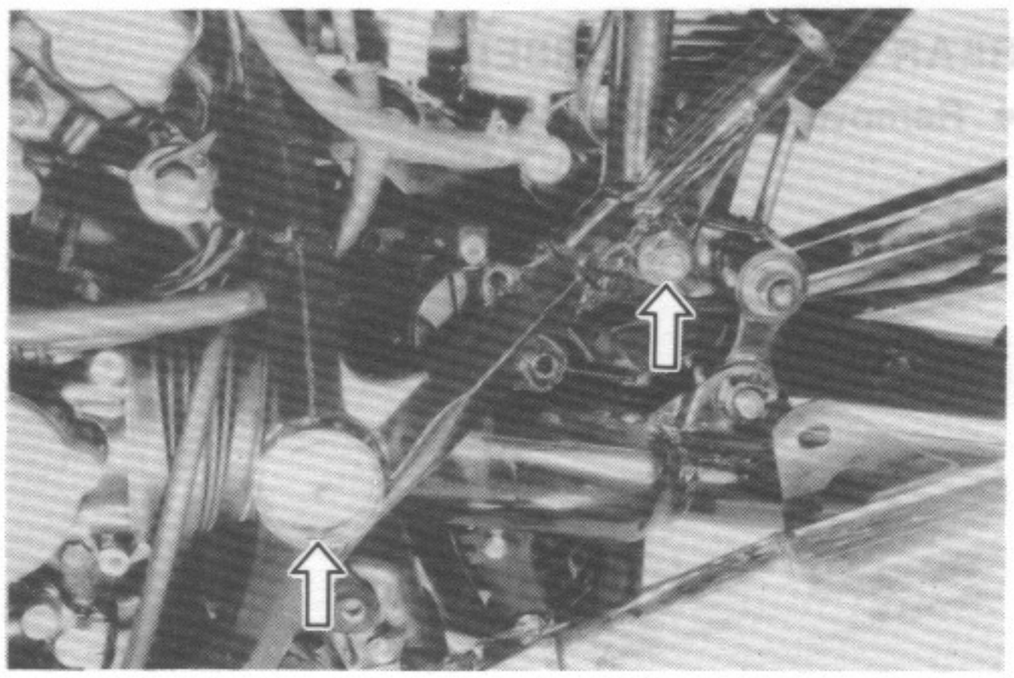




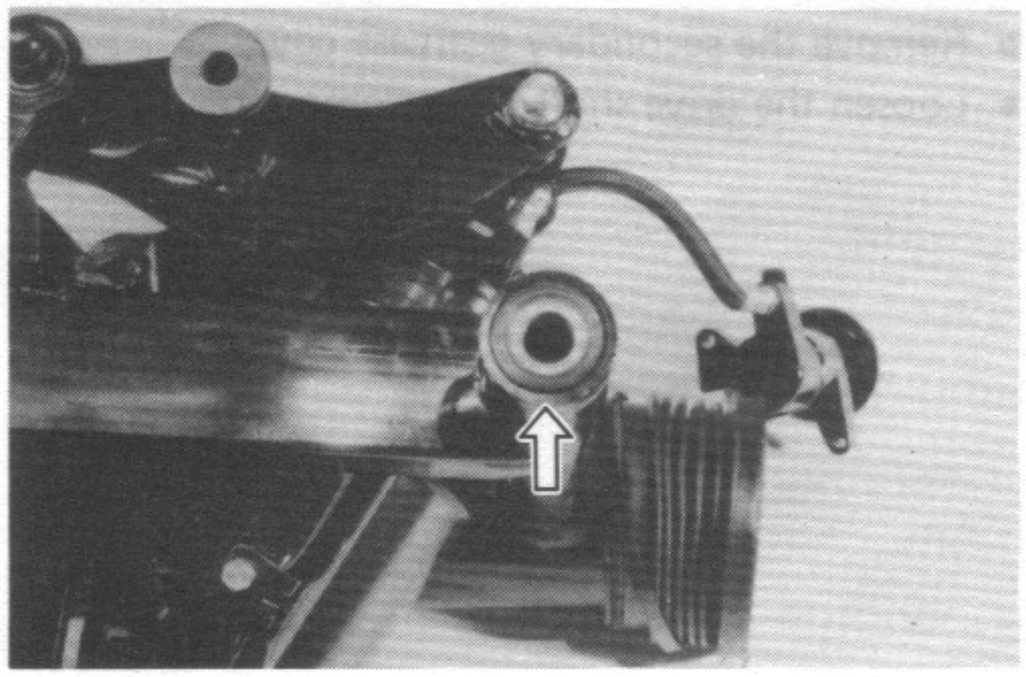
- Take off the spring pre-load adjuster by removing the securing bolts.



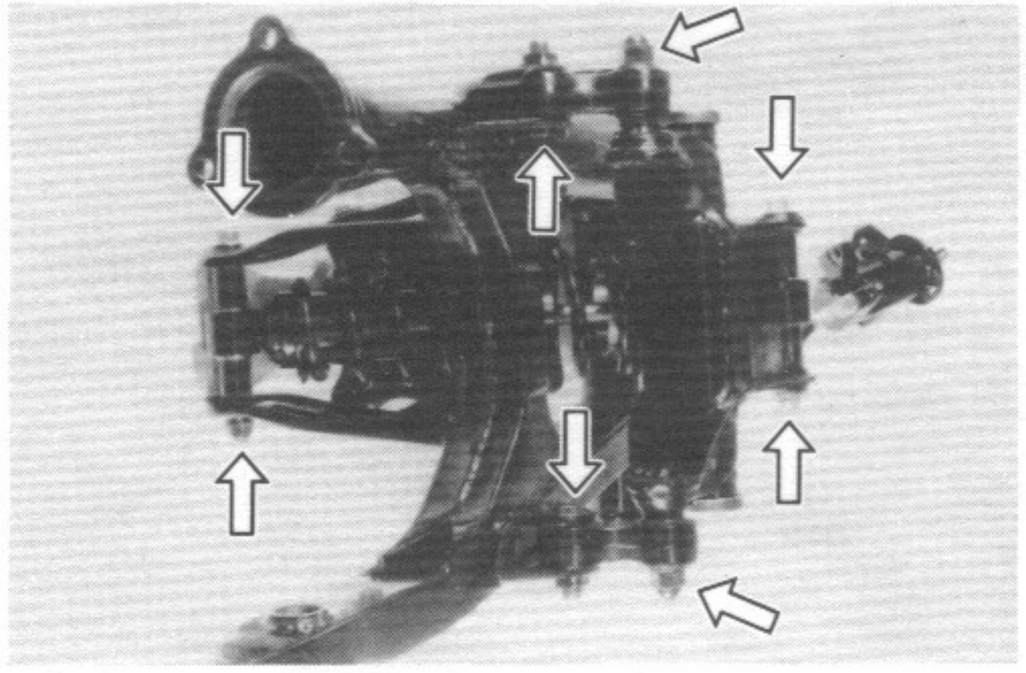
- Remove the swingarm pivot covers. (Right and left)
- Loosen the cushion lever center bolt and swing arm bearing holder bolt lock nuts.
- Remove the cushion lever center bolt and bearing holder bolts.
- Take off the swingarm.



- Remove swingarm bearing.

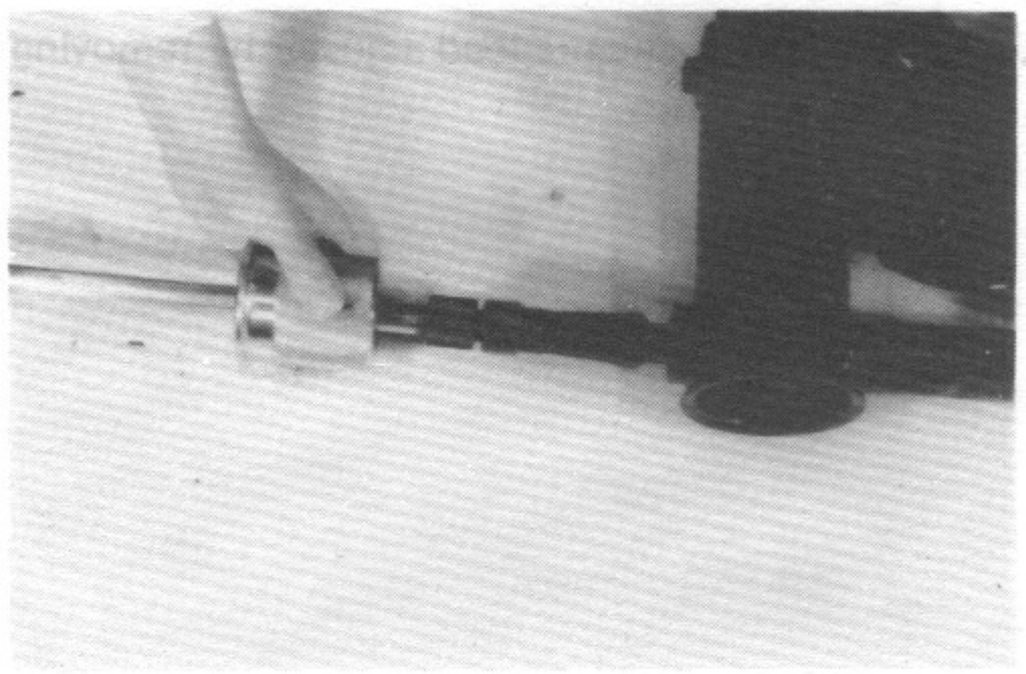


- Loosen and remove the bolts and nuts.



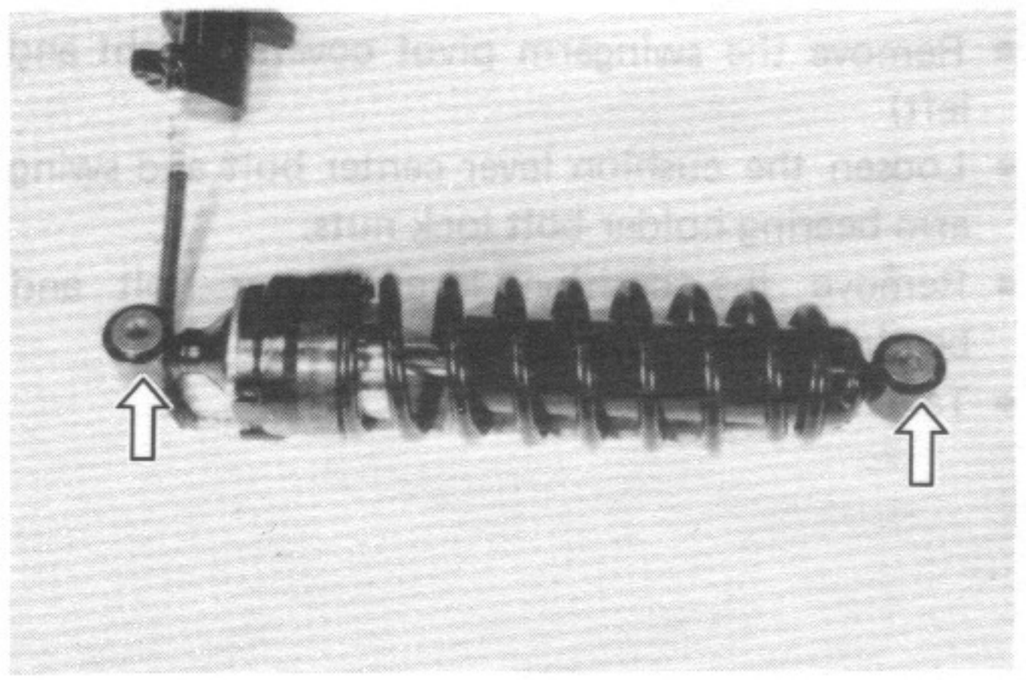
- Remove the swingarm bearing outer race by using the special tools.

09941 - 64510	Bearing puller
09930 - 30102	Sliding shaft

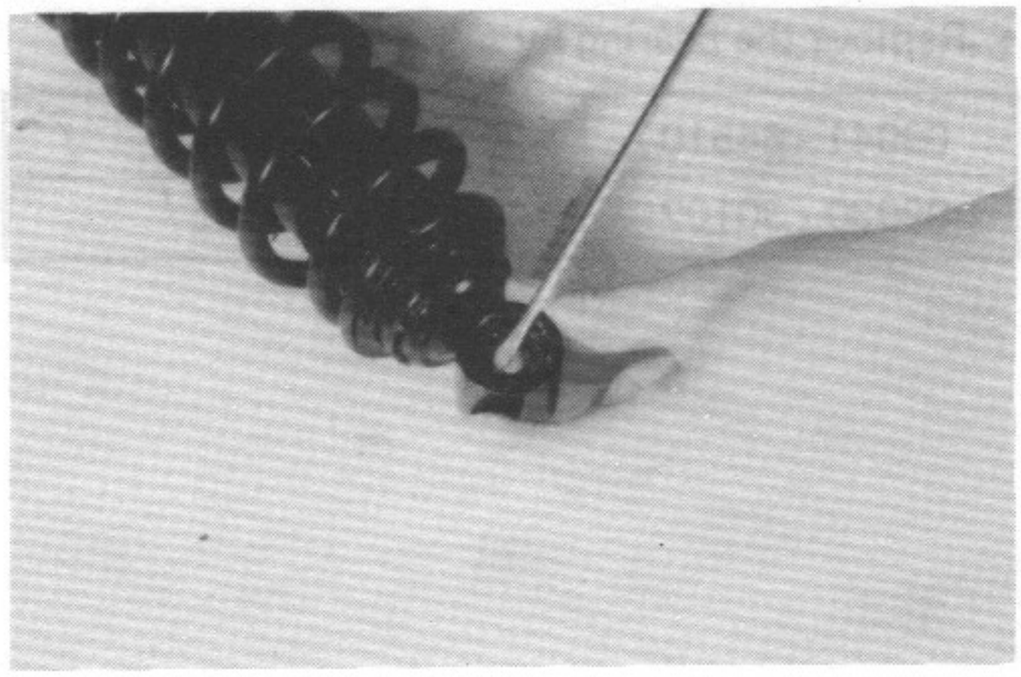


REAR SHOCK ABSORBER

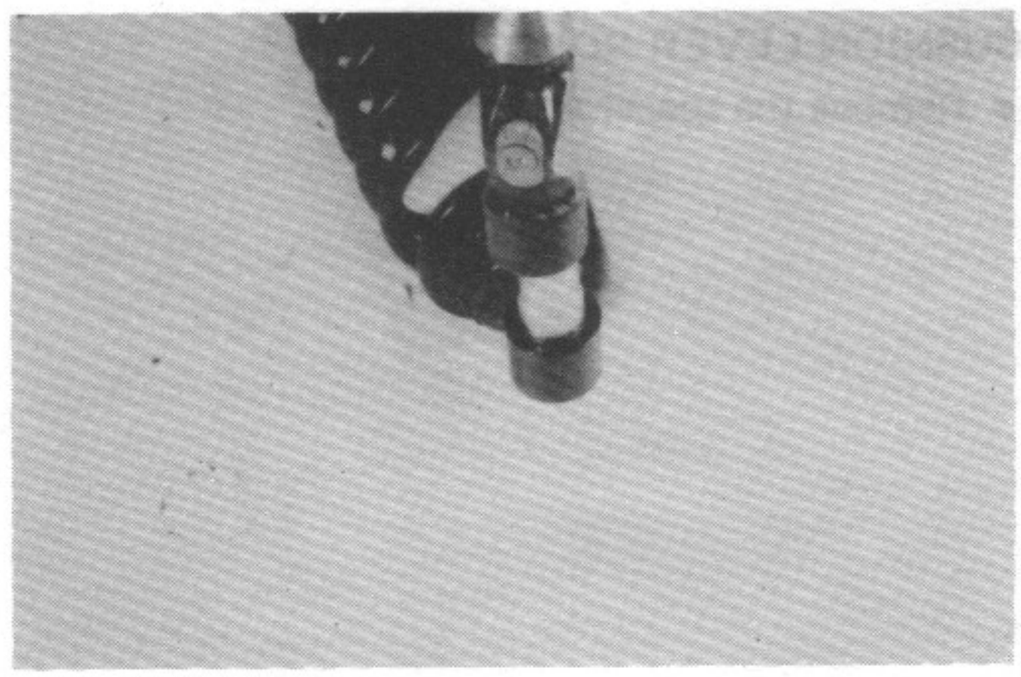
- Remove the spacer and dust seal.



- Remove the ring.

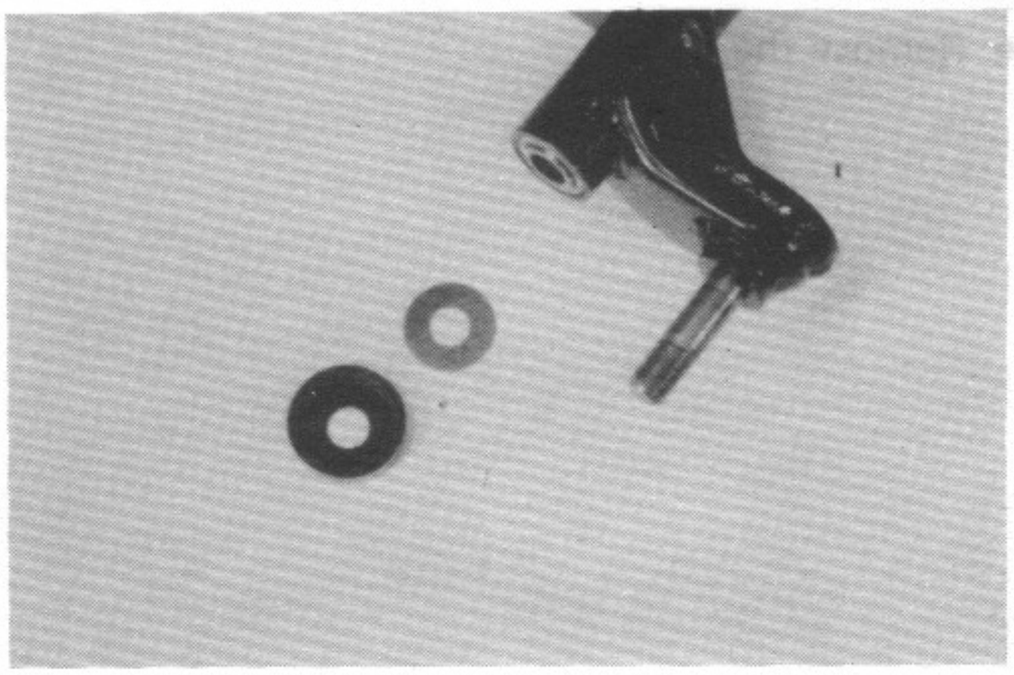


- Remove the bearing by using the appropriate socket as shown in the photograph.

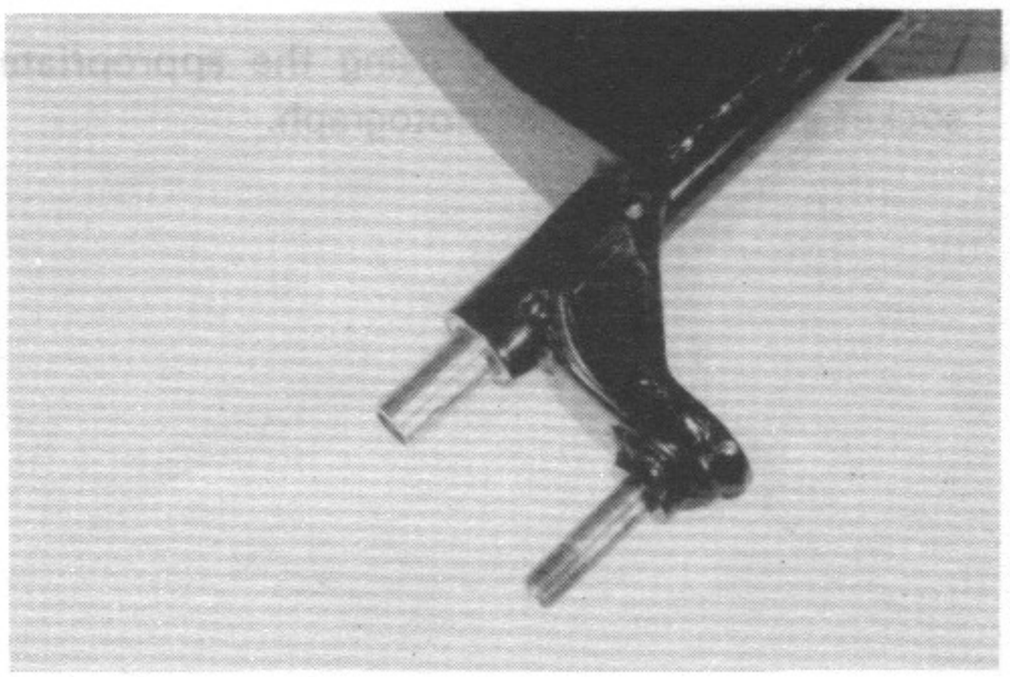


CUSHION LEVER

- Remove the dust seal and washer.

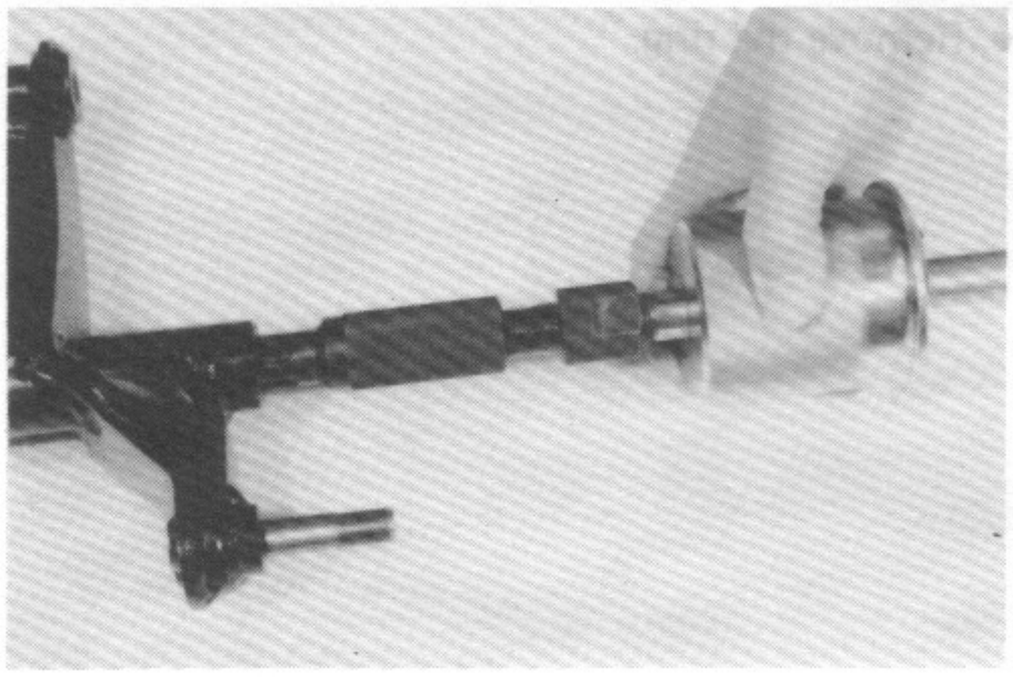


- Remove the spacer.



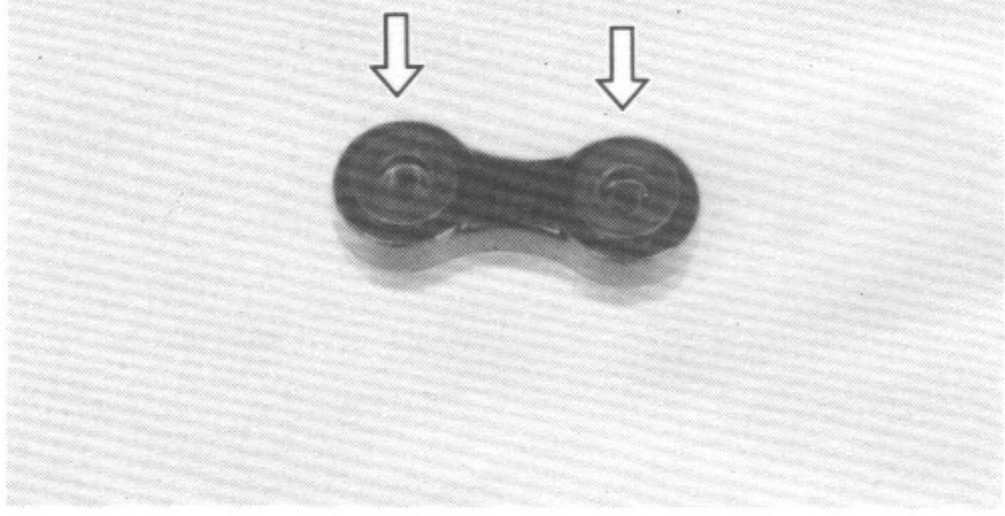
- Remove the bearing by using the special tool.

09941 - 64510	Bearing puller
09930 - 30102	Sliding shaft

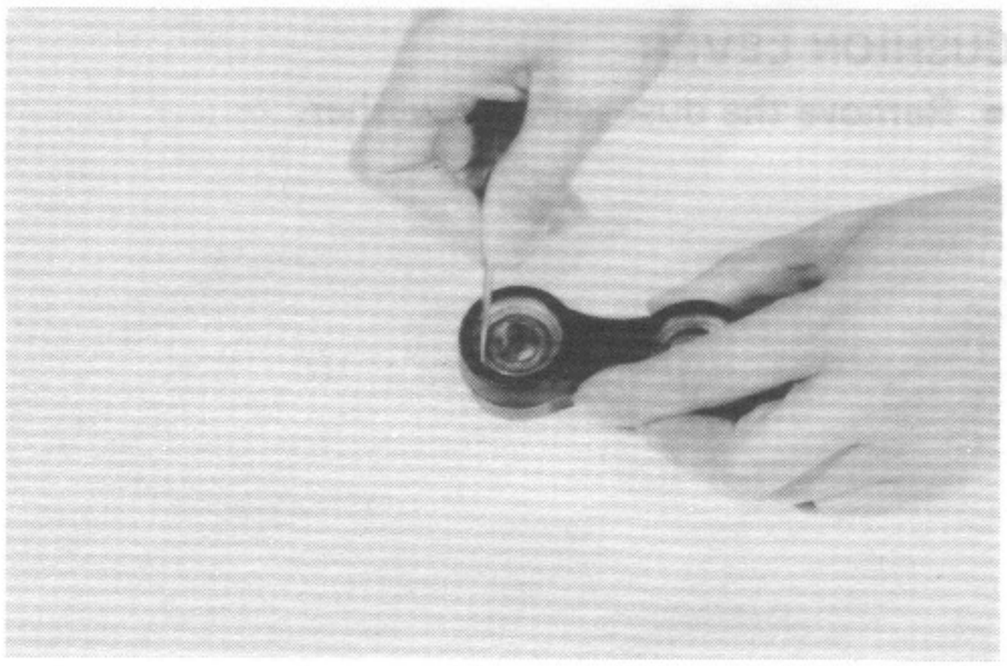


CUSHION LEVER ROD

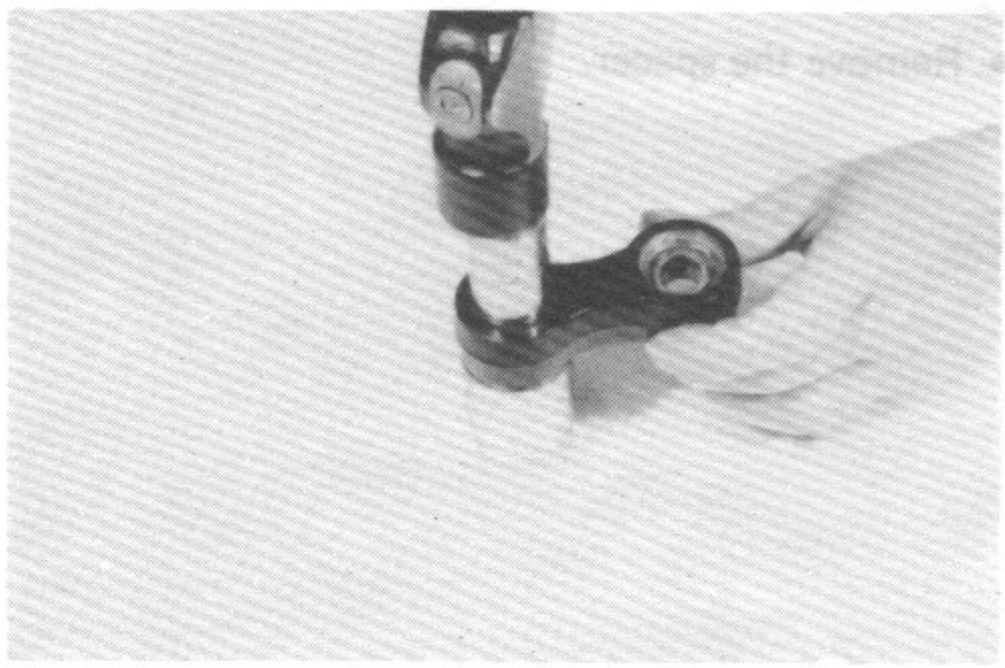
- Remove the spacer and dust seal.



- Remove the ring.



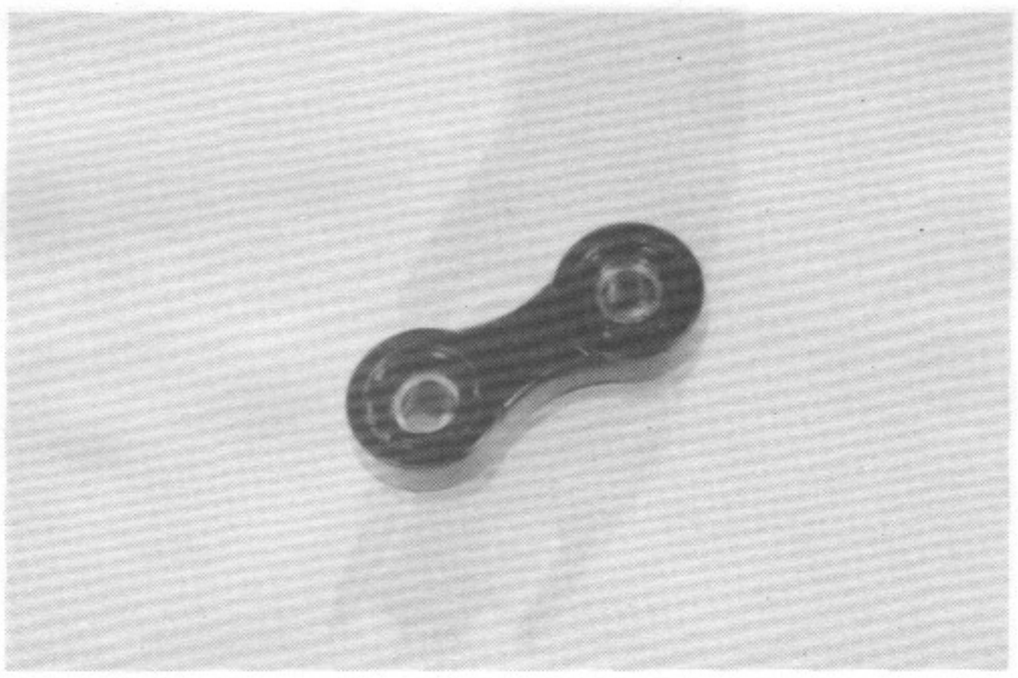
- Remove the bearing by using the appropriate socket as shown in the photograph.

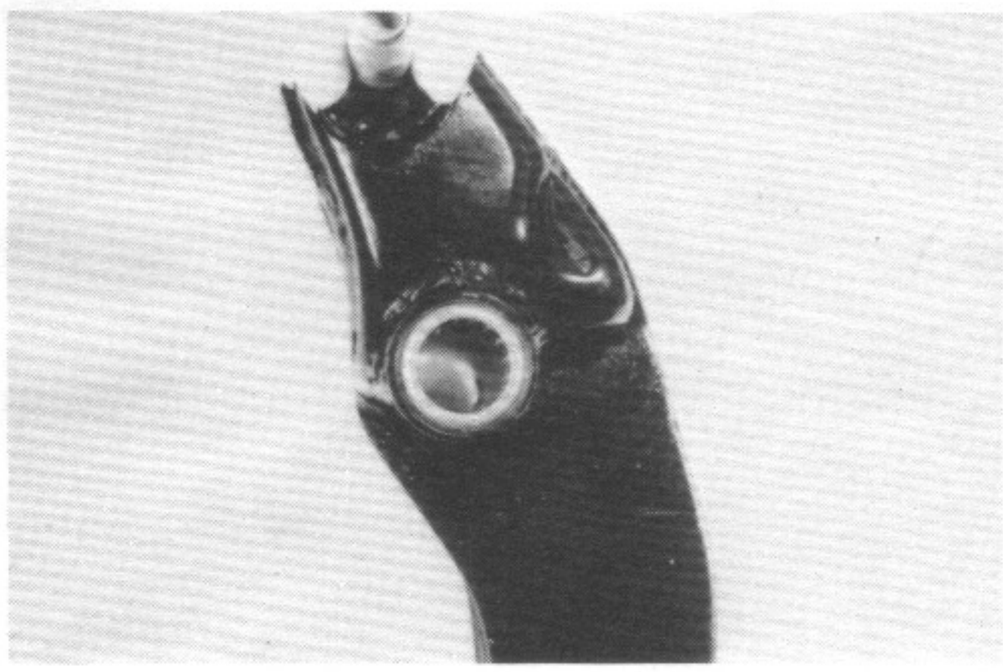


INSPECTION

BEARING

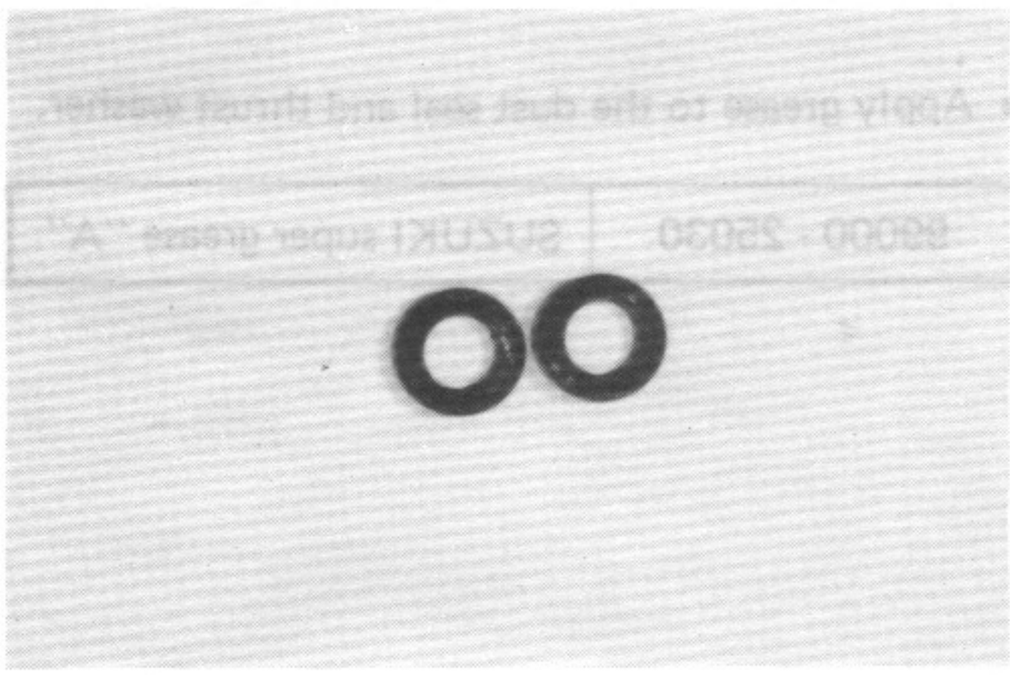
Inspect the play of bearing by hand while fixing it in the rear shock, cushion lever or cushion lever rod.





DUST SEAL

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

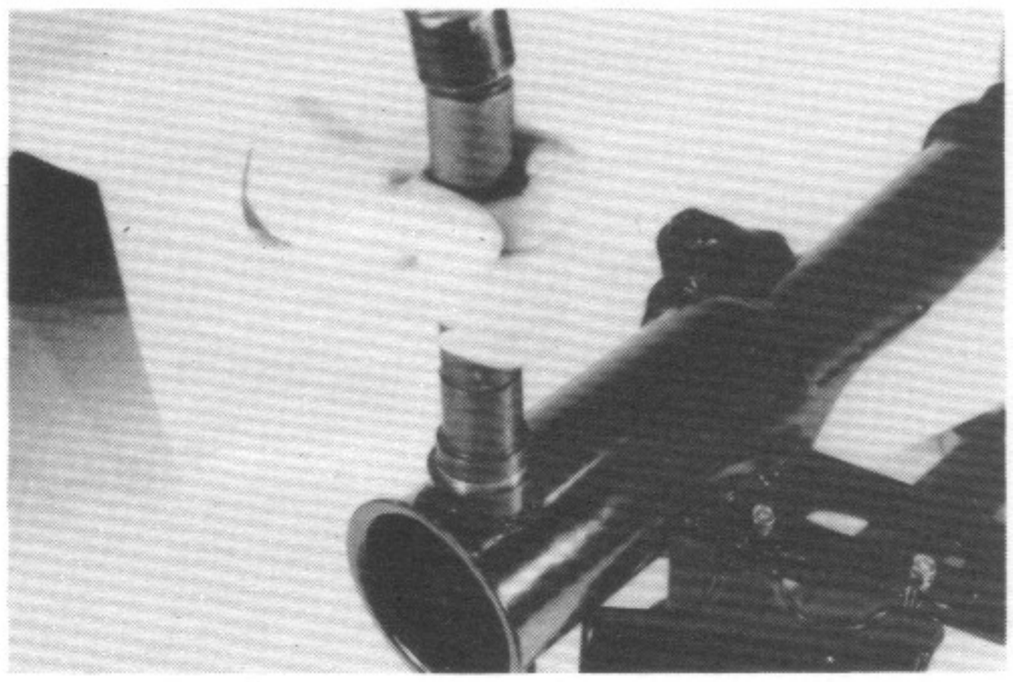


REASSEMBLY

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 in the bearing outer race.

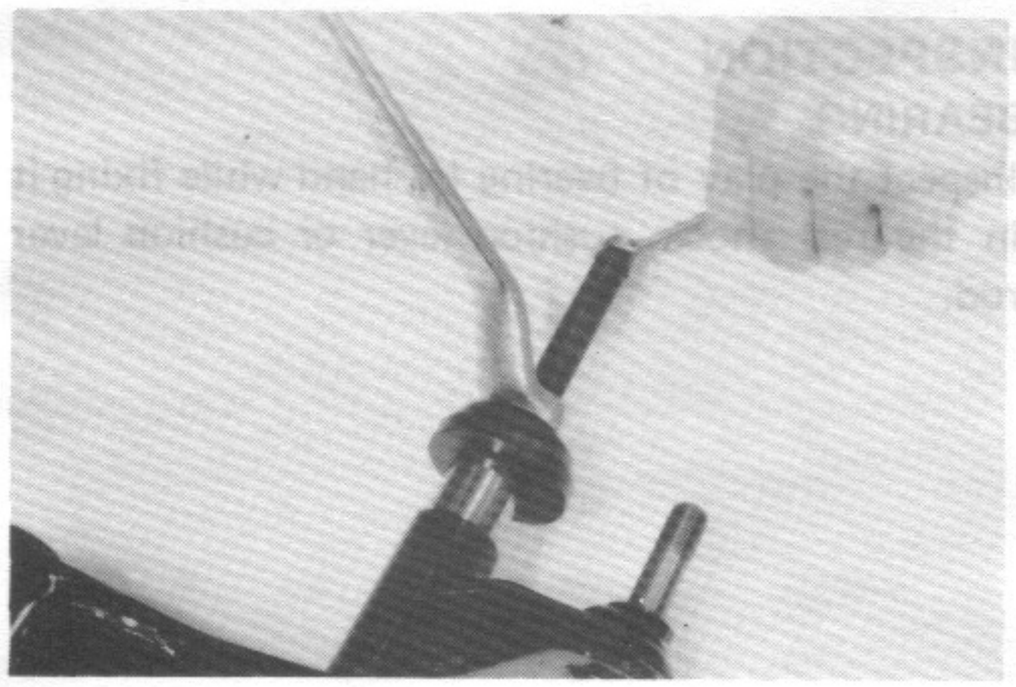


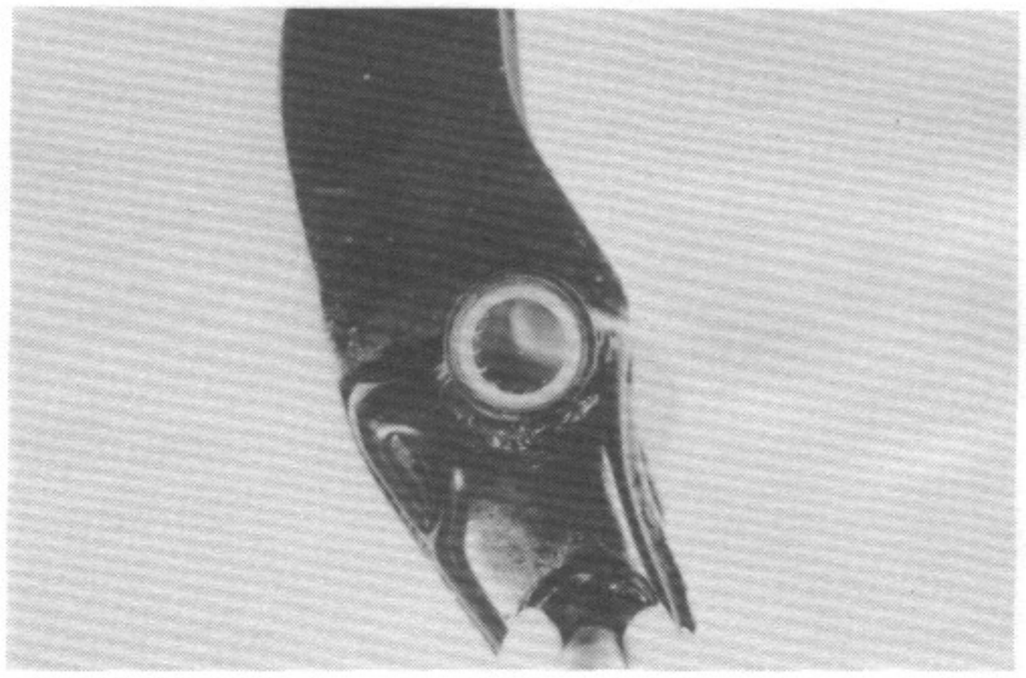
CUSHION LEVER BEARING

- Install the bearing to the cushion lever by using the special tool.

09924 - 84510	Bearing installer set

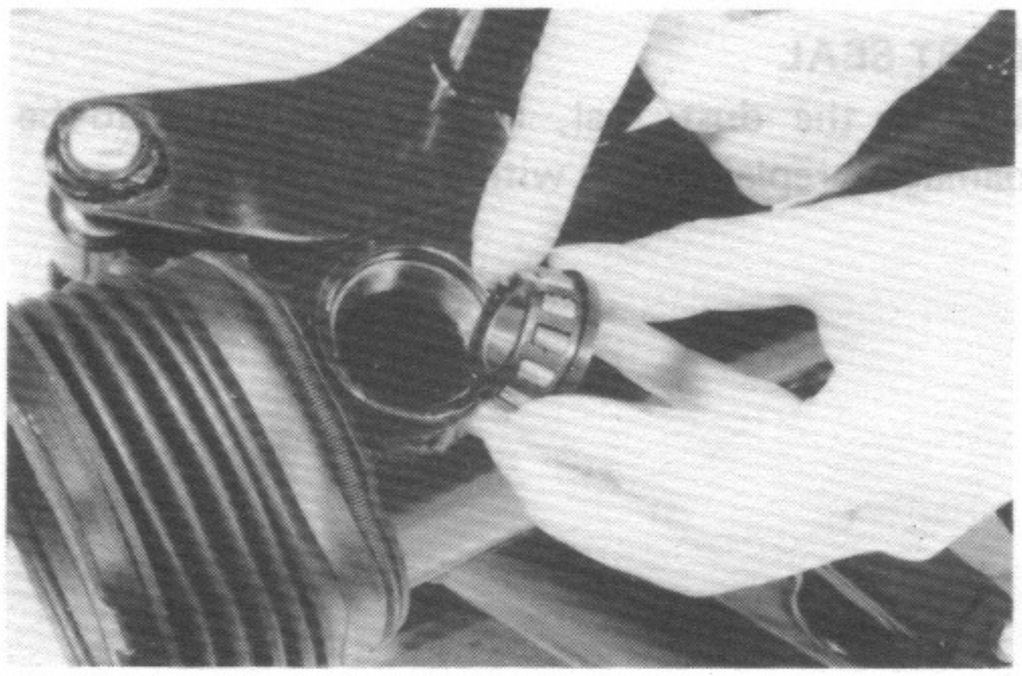
NOTE:
When install the bearing, stamped mark of bearing is positioned outside.

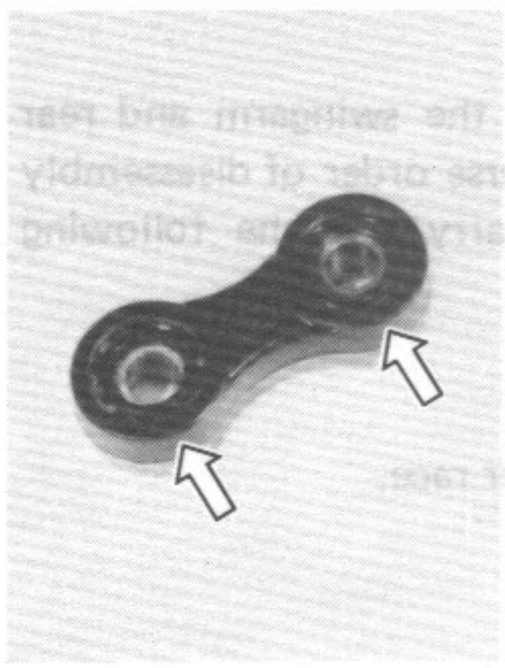


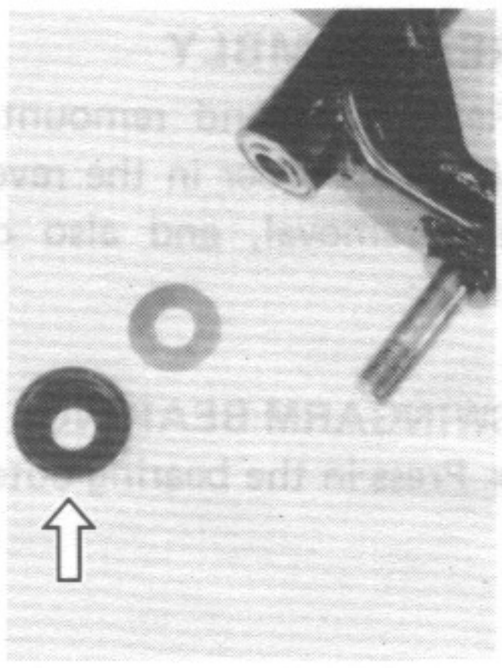


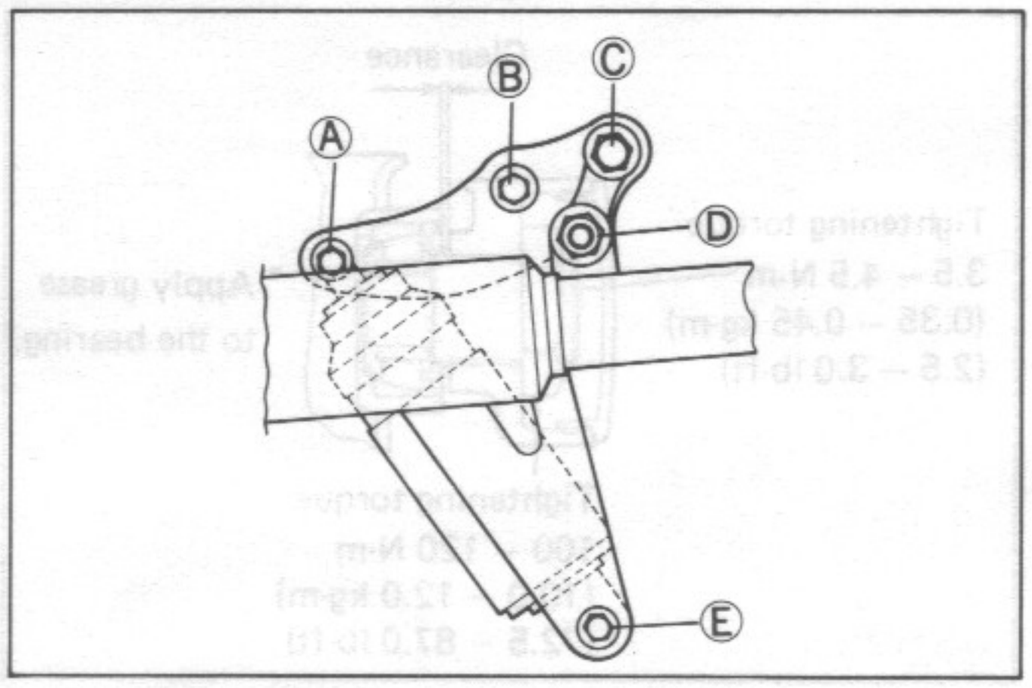
- Apply grease to the dust seal and thrust washer.

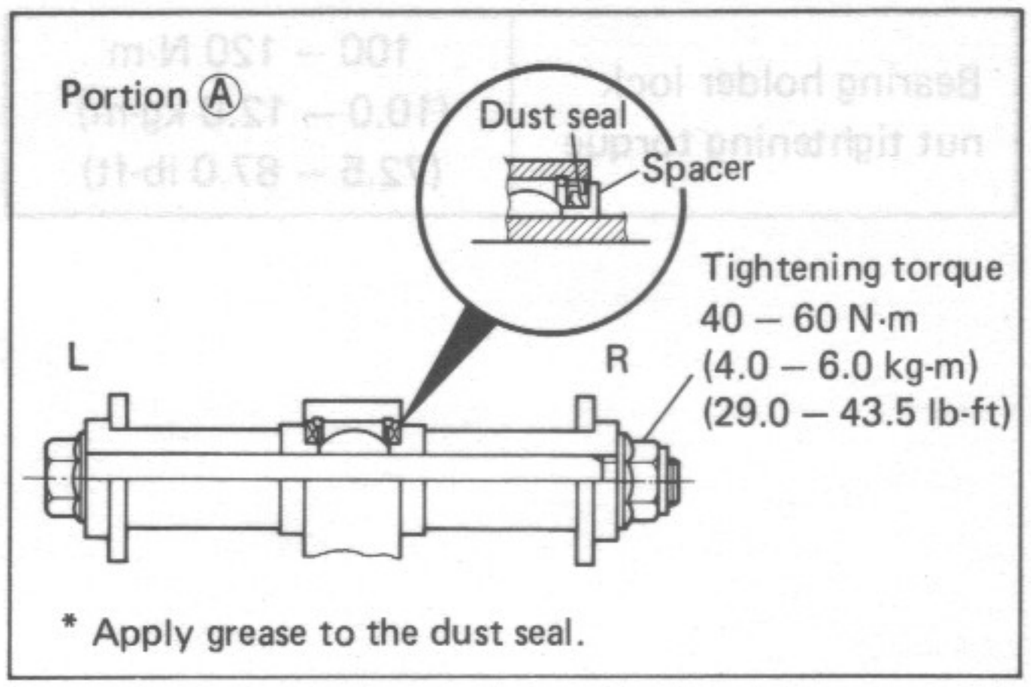
99000 - 25030	SUZUKI super grease "A"

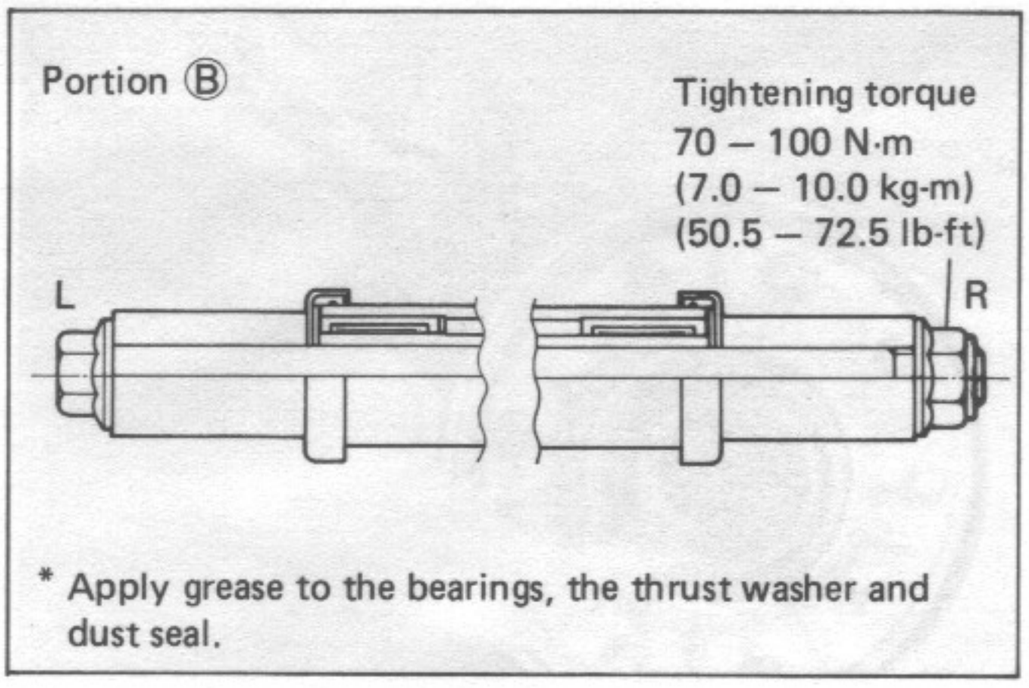


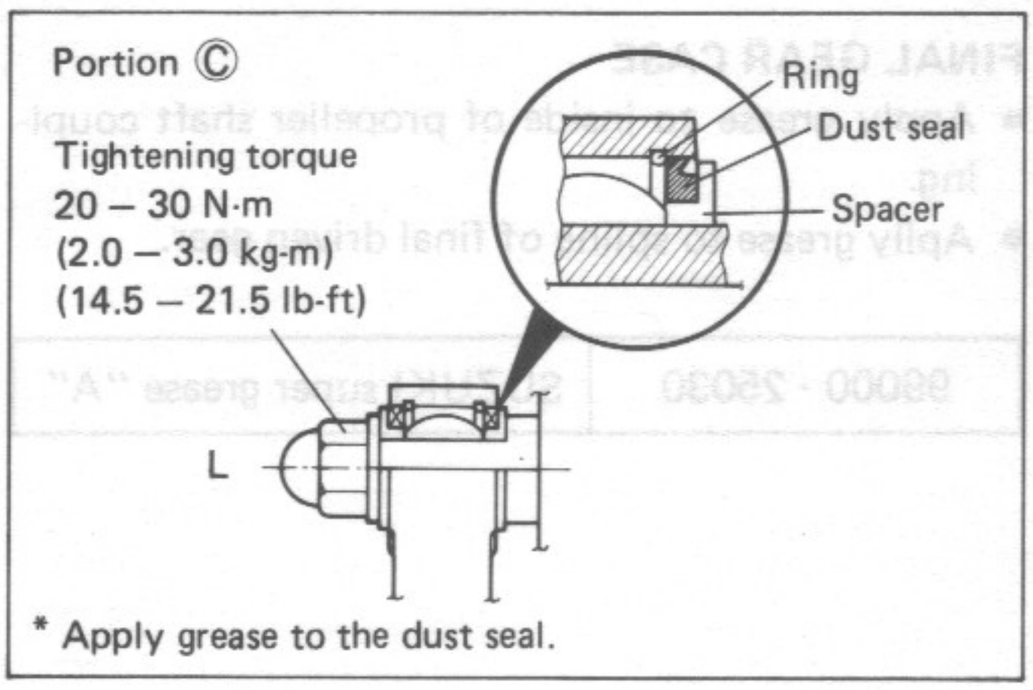


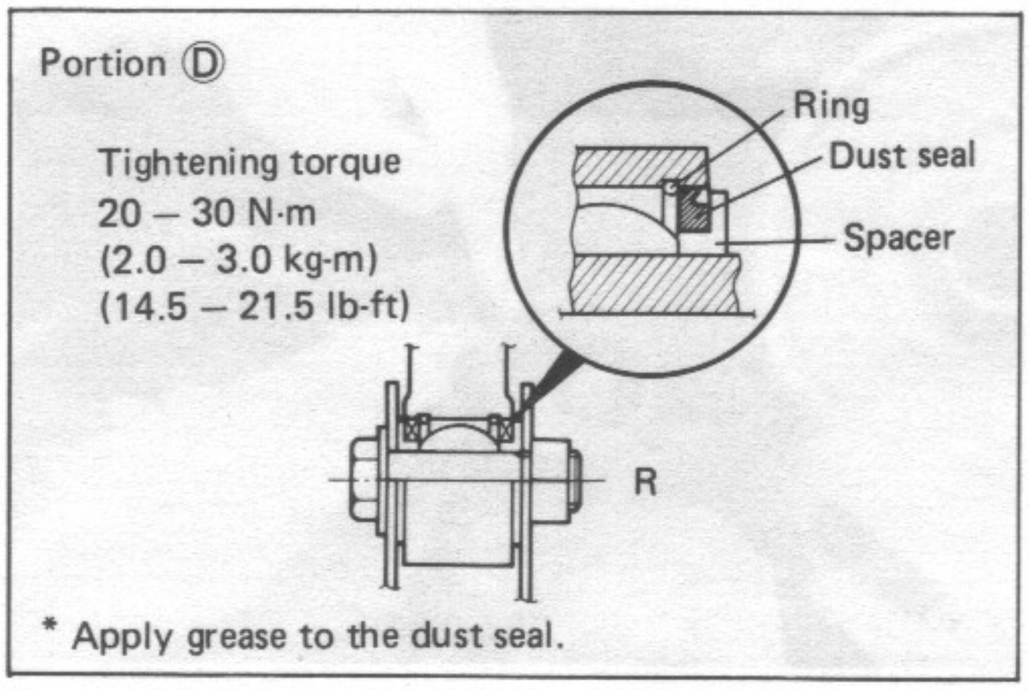


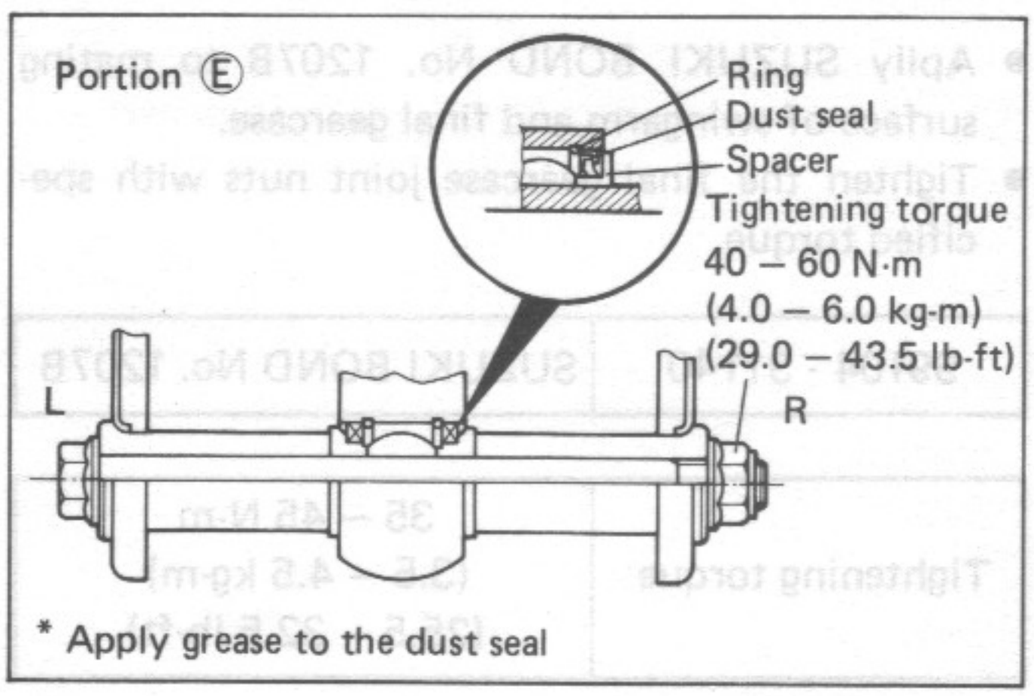










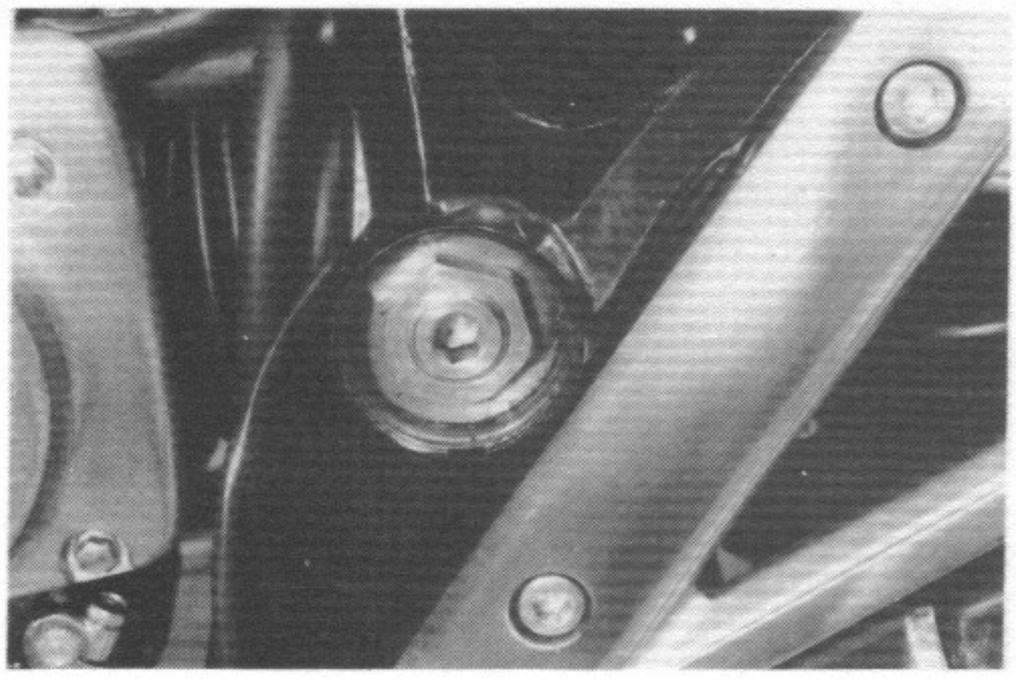


BEARING HOLDER BOLT

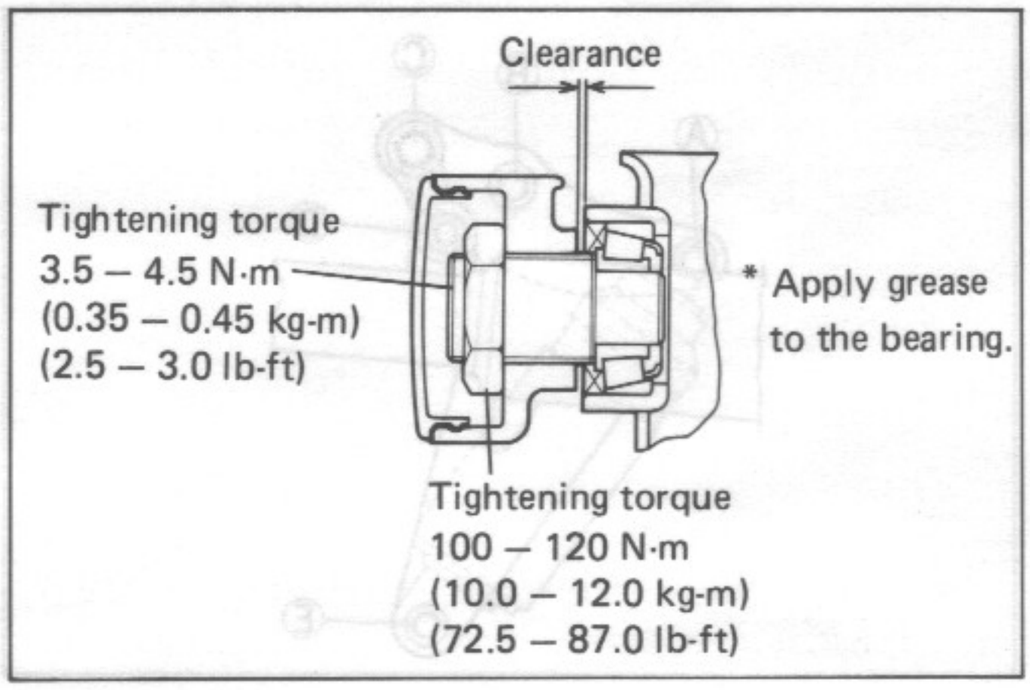
- Tighten both bearing holder bolts with specified torque and tighten the lock nuts.

CAUTION:
Both sides of the clearance between the frame and swingarm should be even.

Bearing holder bolt tightening torque	3.5 – 4.5 N·m (0.35 – 0.45 kg-m) (2.5 – 3.0 lb-ft)



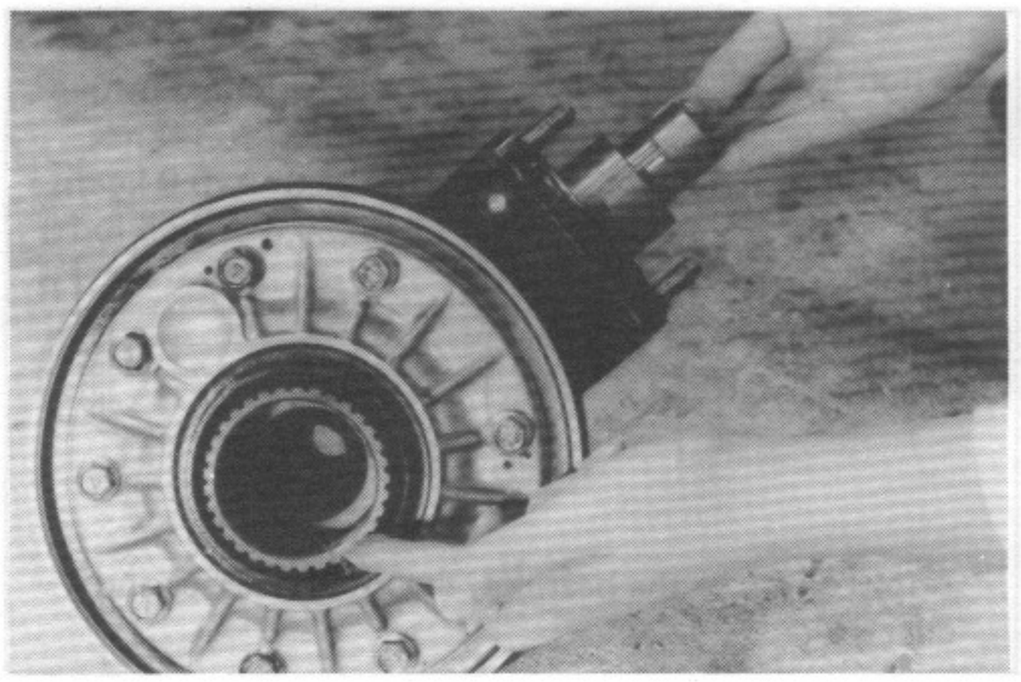
Bearing holder lock nut tightening torque	100 – 120 N·m (10.0 – 12.0 kg-m) (72.5 – 87.0 lb-ft)



FINAL GEAR CASE

- Apply grease to inside of propeller shaft coupling.
- Aplly grease to spline of final driven gear.

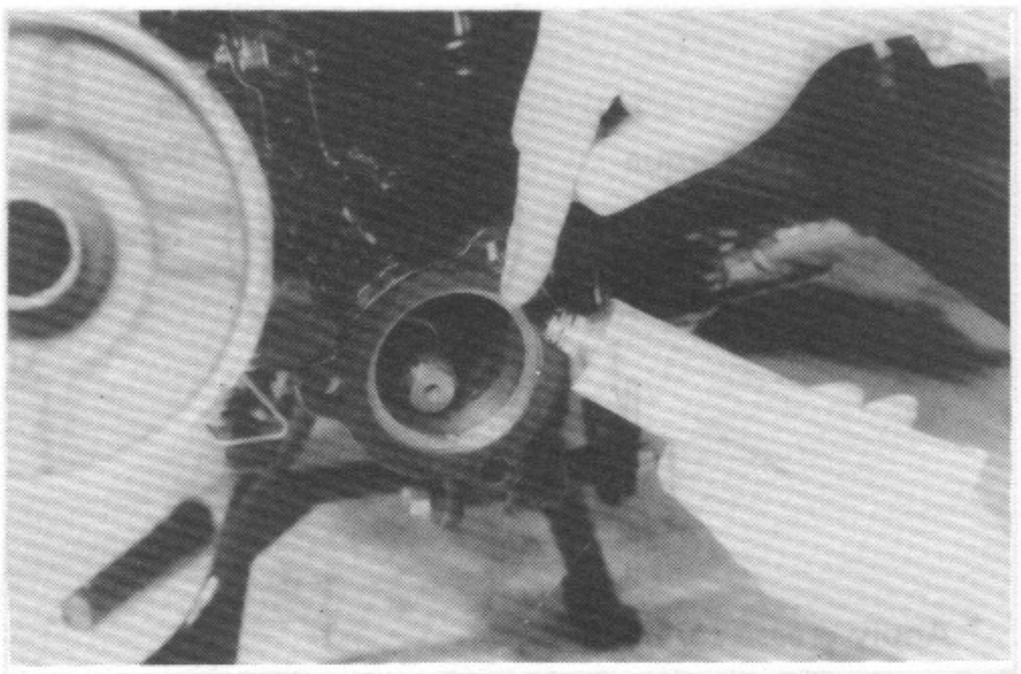
99000 - 25030	SUZUKI super grease "A"



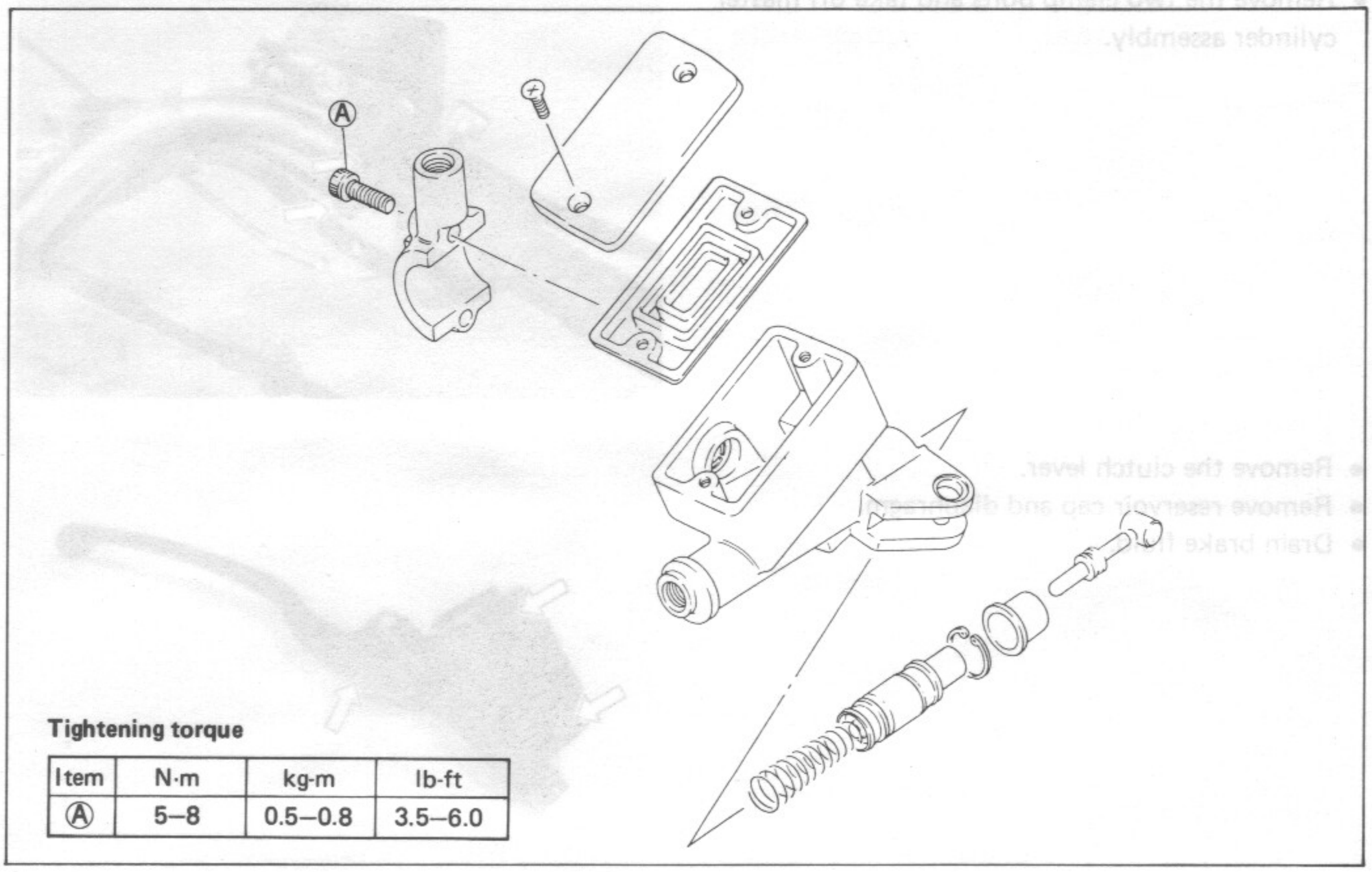
- Aplly SUZUKI BOND No. 1207B to mating surface of swingarm and final gearcase.
- Tighten the final gearcase joint nuts with specified torque.

99104 - 31140	SUZUKI BOND No. 1207B

Tightening torque	35 – 45 N·m (3.5 – 4.5 kg-m) (25.5 – 32.5 lb-ft)



CLUTCH MASTER CYLINDER

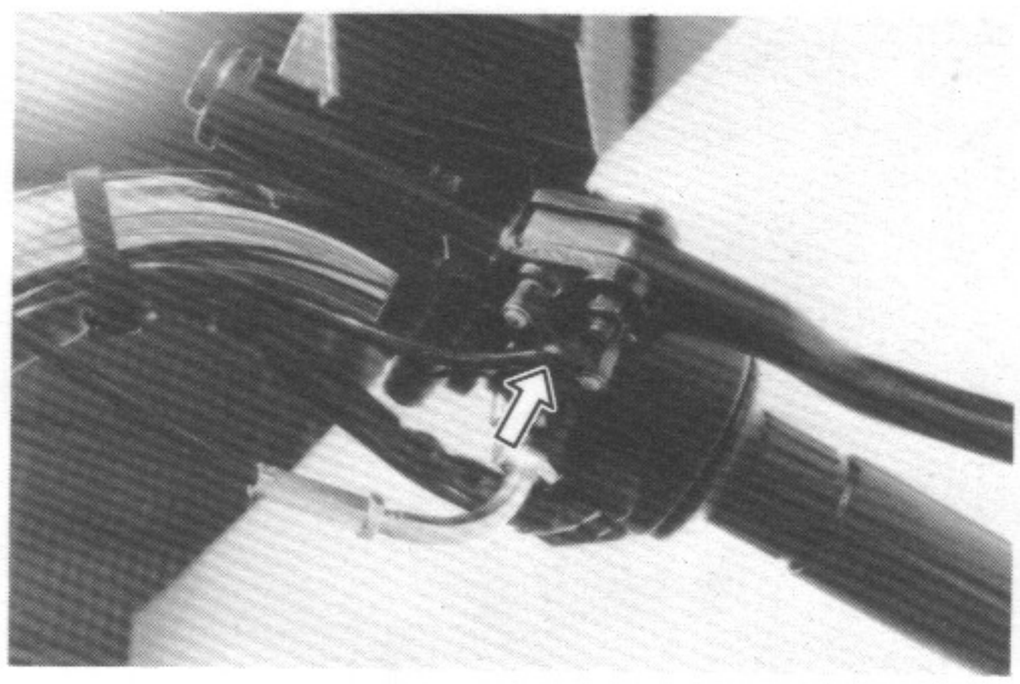


Tightening torque

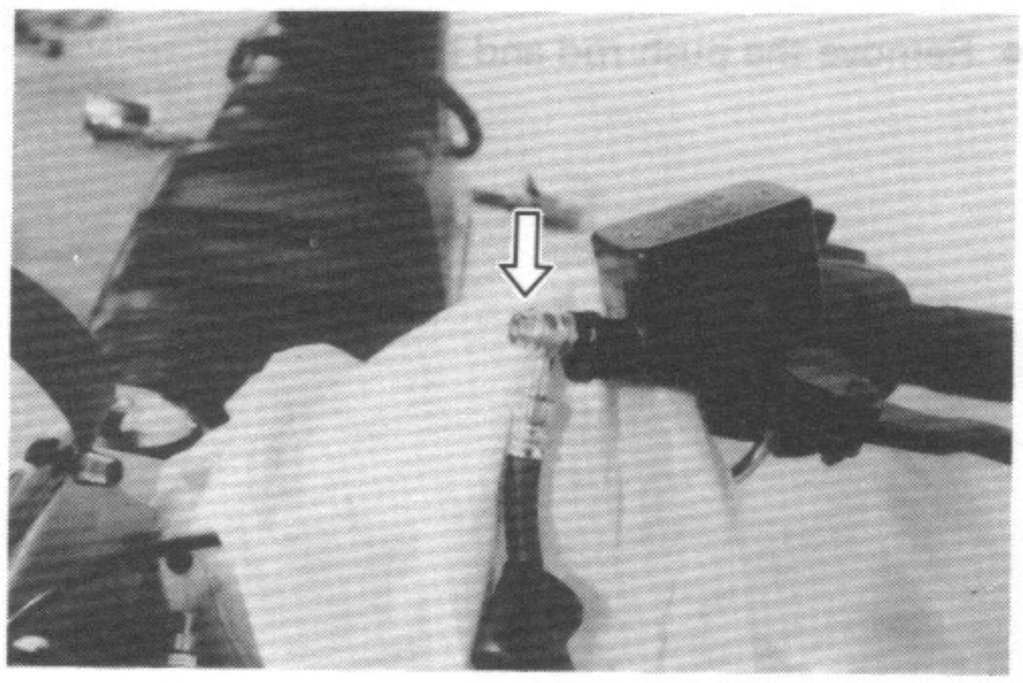
Item	N·m	kg-m	lb-ft
Ⓐ	5–8	0.5–0.8	3.5–6.0

REMOVAL AND DISASSEMBLY

- Take off the starter interlock switch.

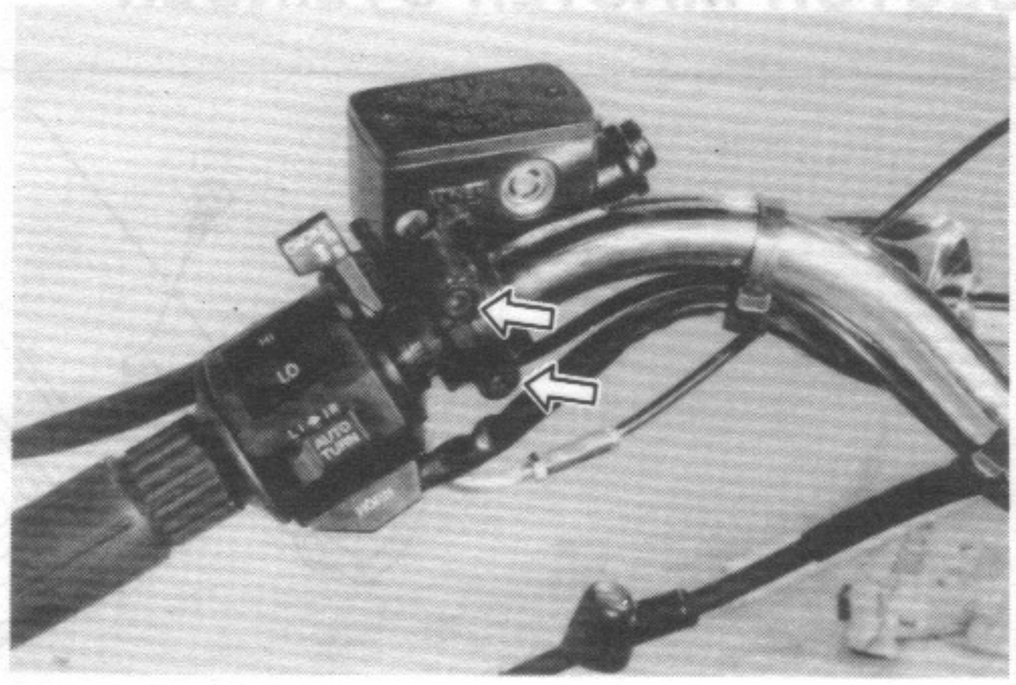


- Place a cloth underneath the union bolt on the master cylinder to catch spilled drops of brake fluid. Unscrew the union bolt and disconnect the clutch hose/master cylinder joint.

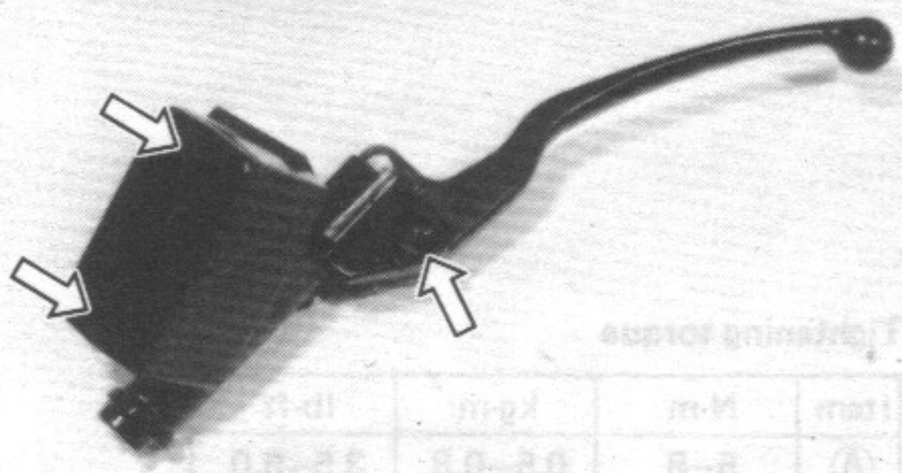


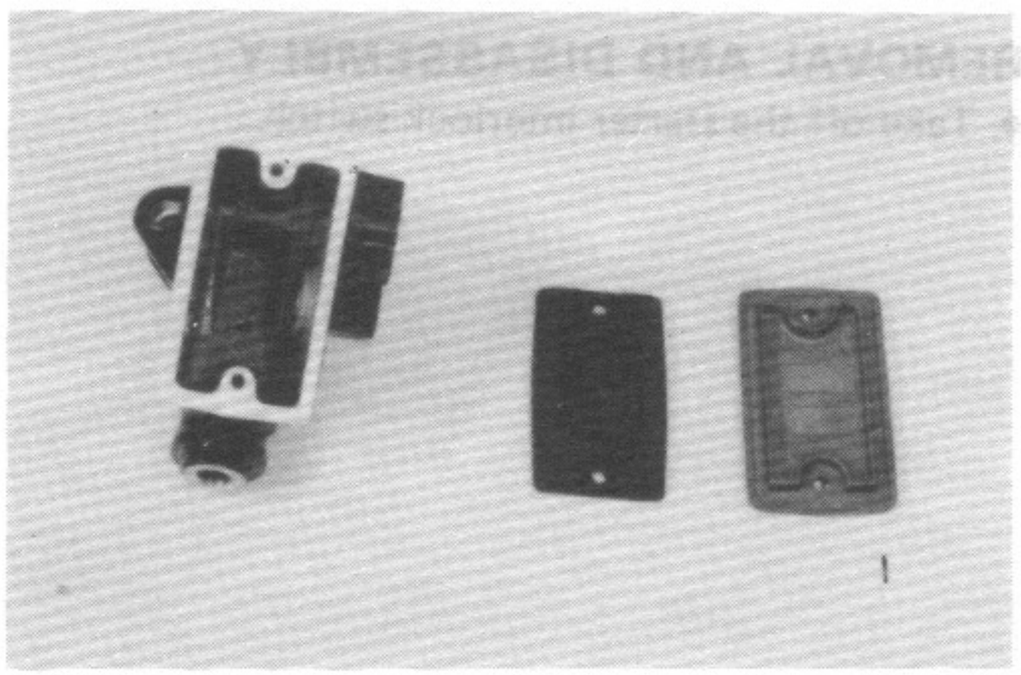
CAUTION:
Completely wipe off any clutch fluid adhering to any part of motorcycle. The fluid reacts chemically with paint, plastics, rubber materials, etc.

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

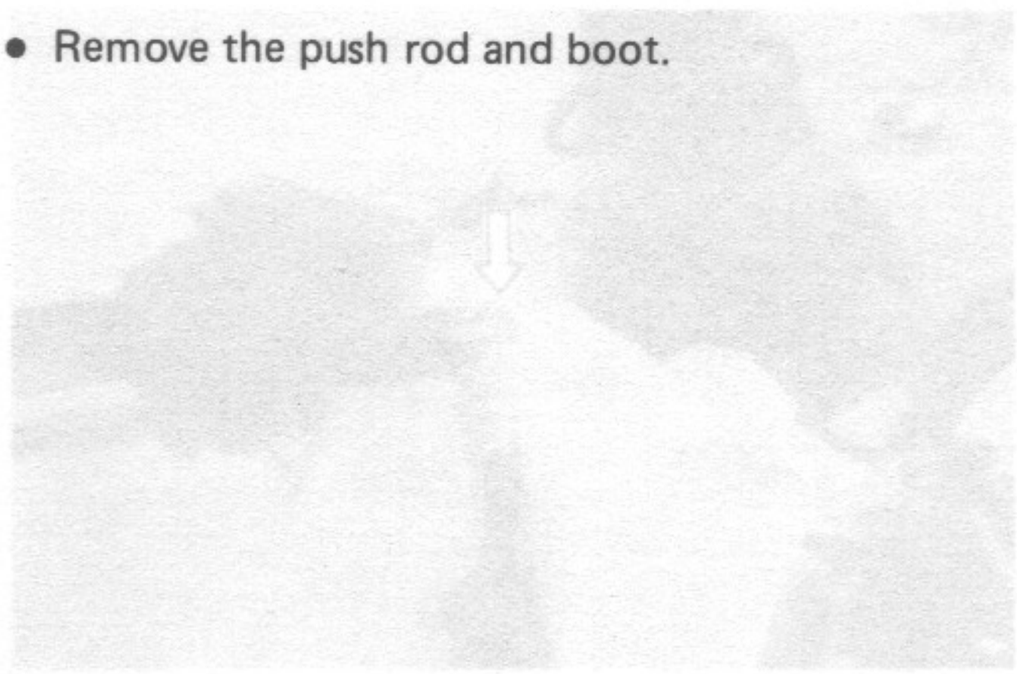


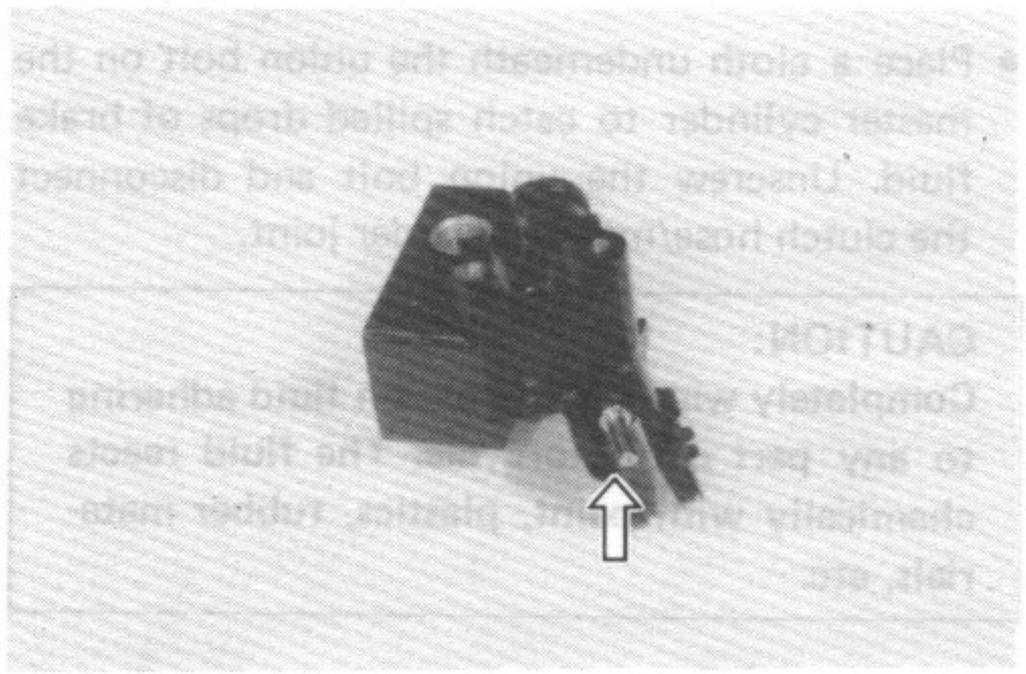
- Remove the clutch lever.
- Remove reservoir cap and diaphragm.
- Drain brake fluid.





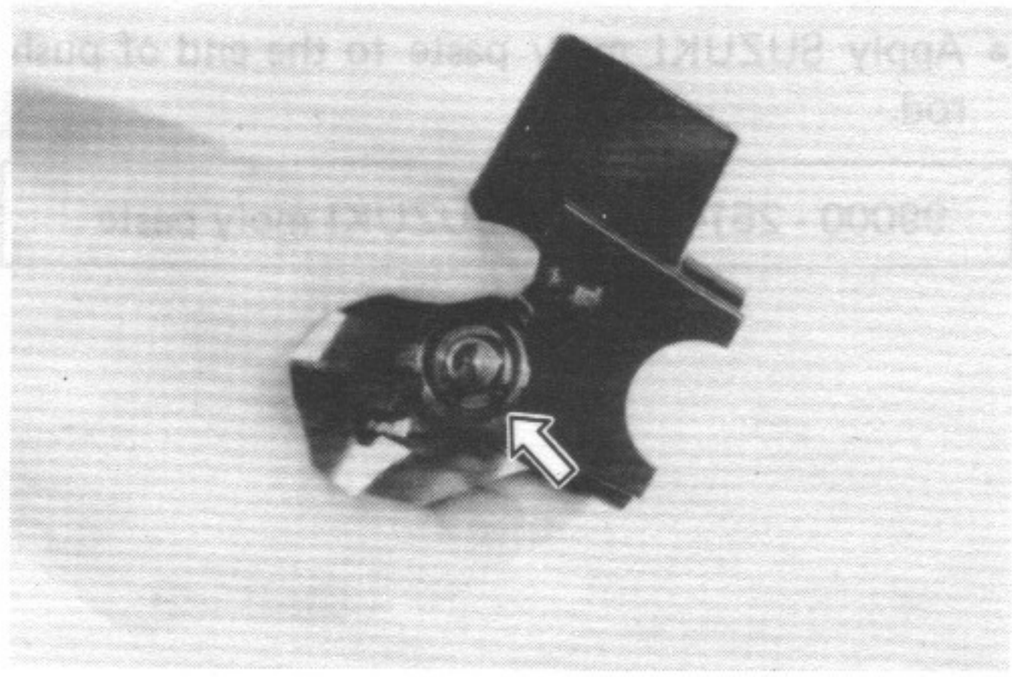
- Remove the push rod and boot.

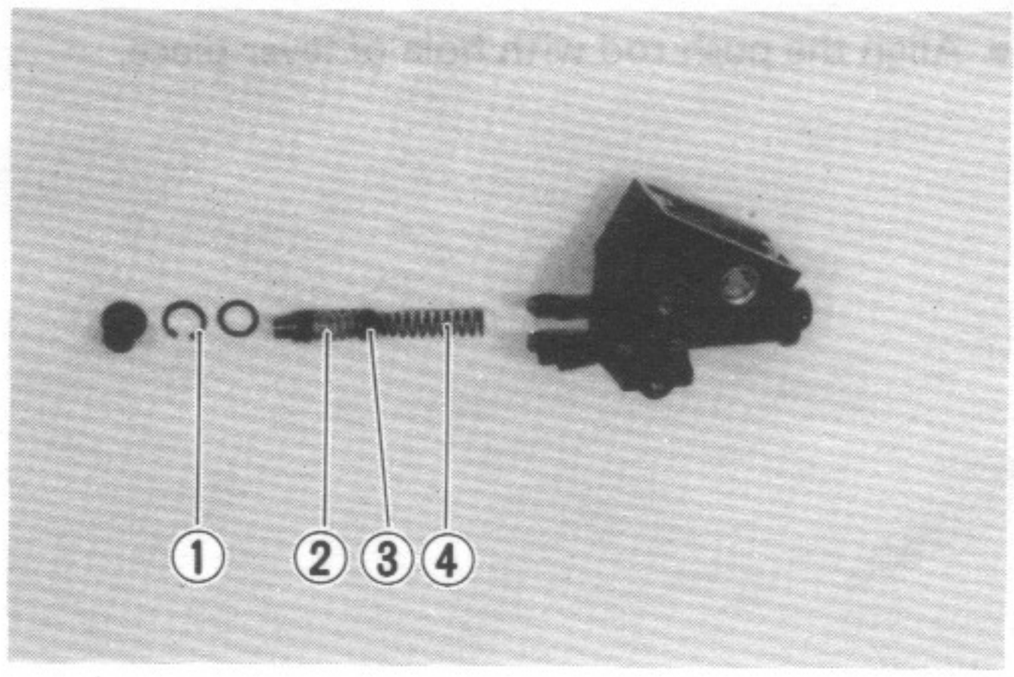




- Remove circlip by using the special tool.
- Remove piston, primary cup and spring.

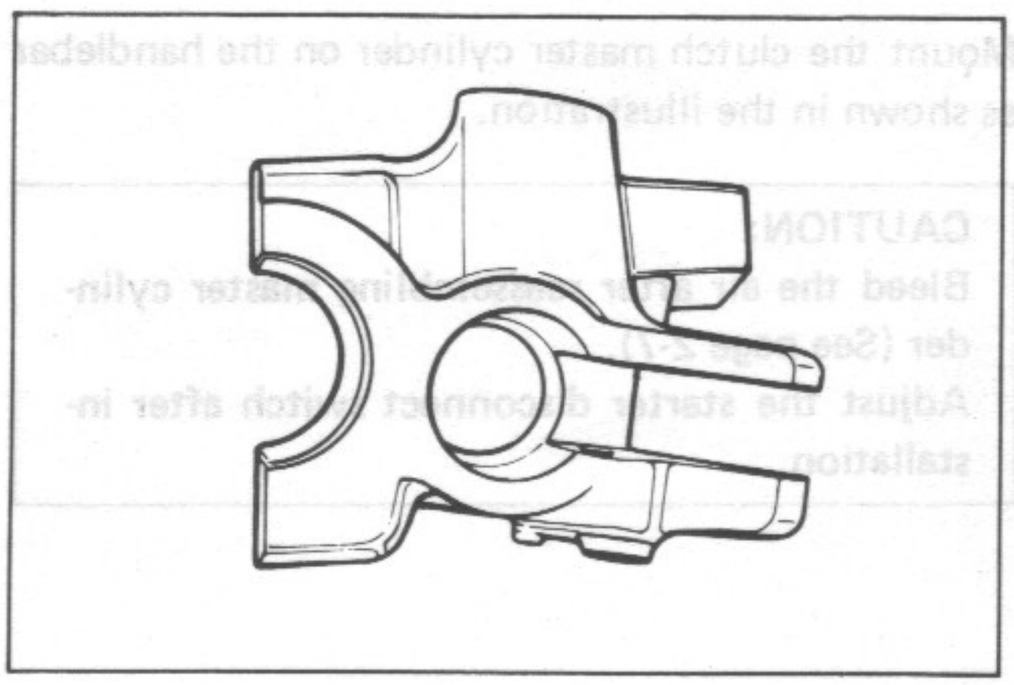
09900 - 06108	Snap ring pliers





MASTER CYLINDER INSPECTION

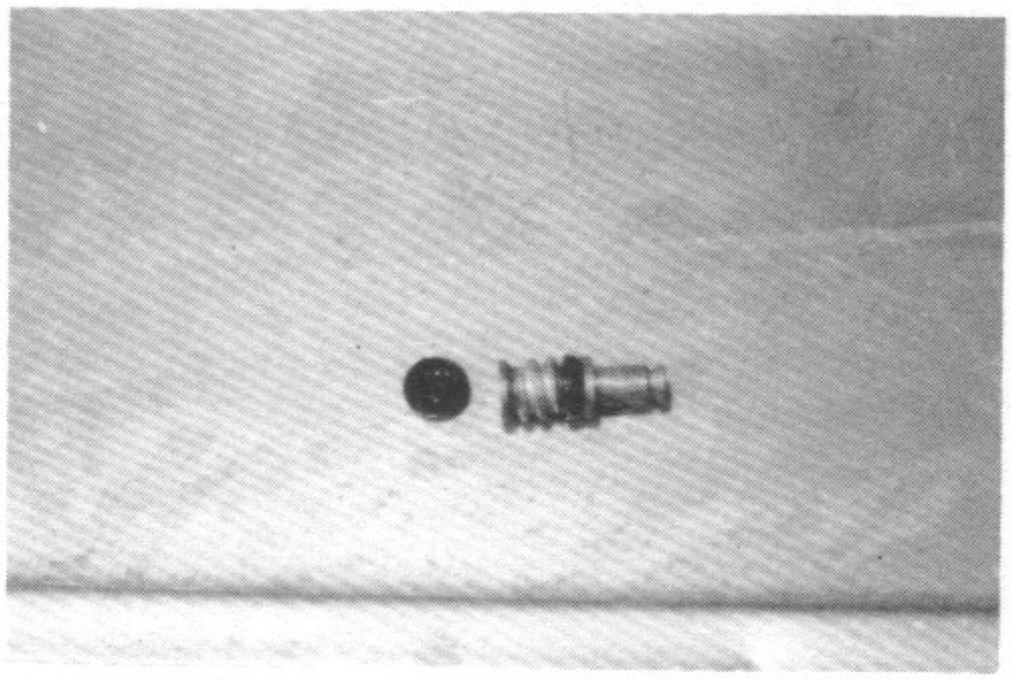
- Inspect the master cylinder bore for any scratches or other damage.
- Inspect the piston surface for scratches or other damage.
- Inspect the primary cup and dust boot for wear or damage.



MASTER CYLINDER REASSEMBLY

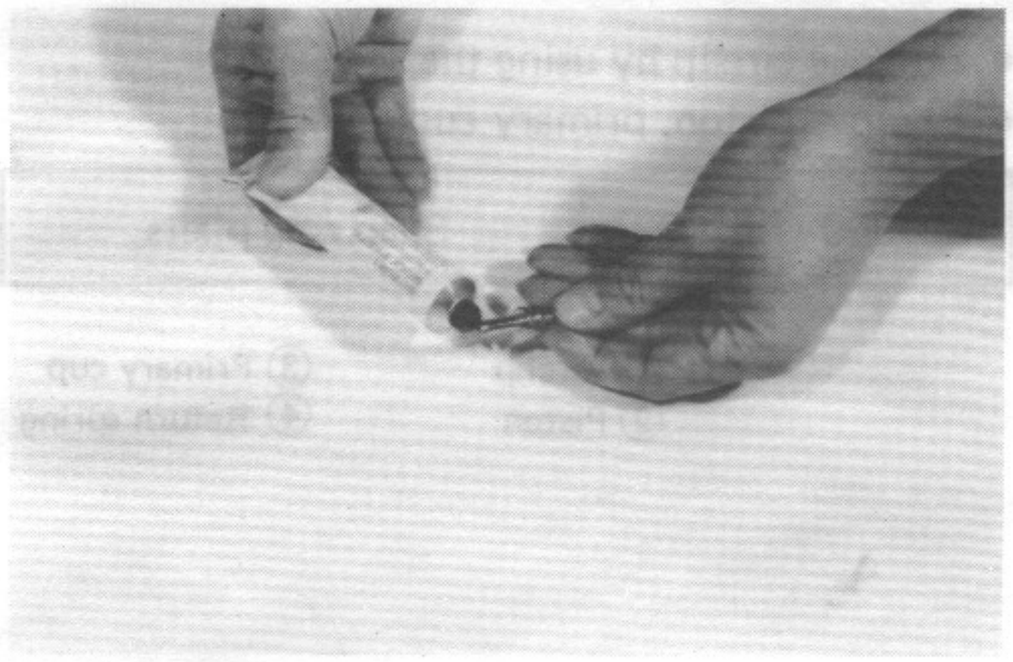
Reassemble and remount the master cylinder in the reverse order of disassembly and removal, and also carry out the following steps:

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.

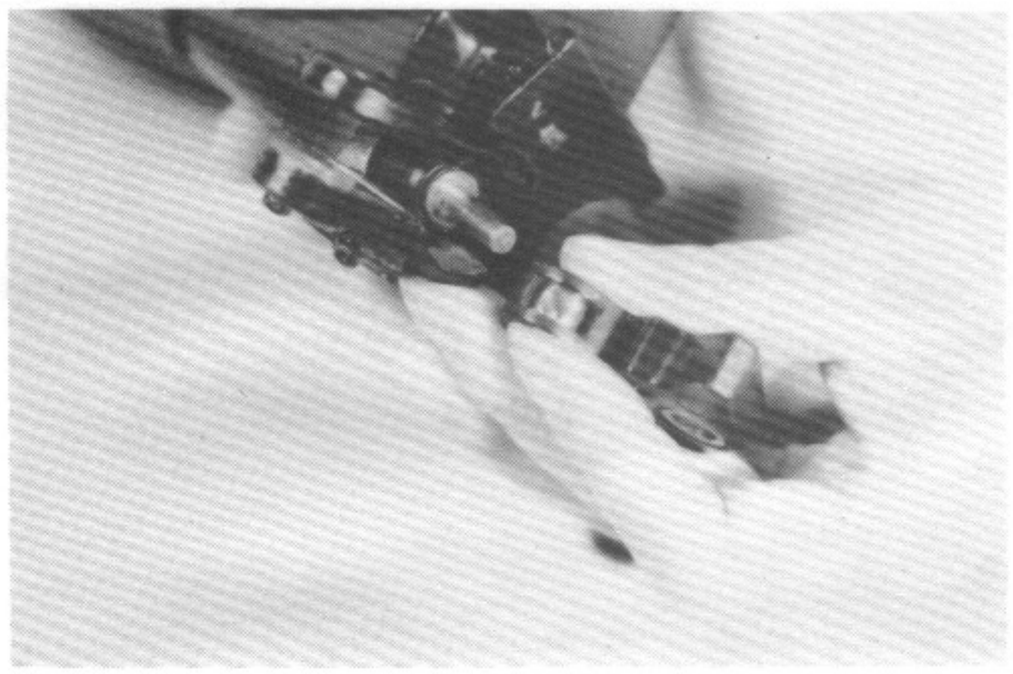


- Apply SUZUKI moly paste to the end of push rod.

99000 - 25140	SUZUKI moly paste

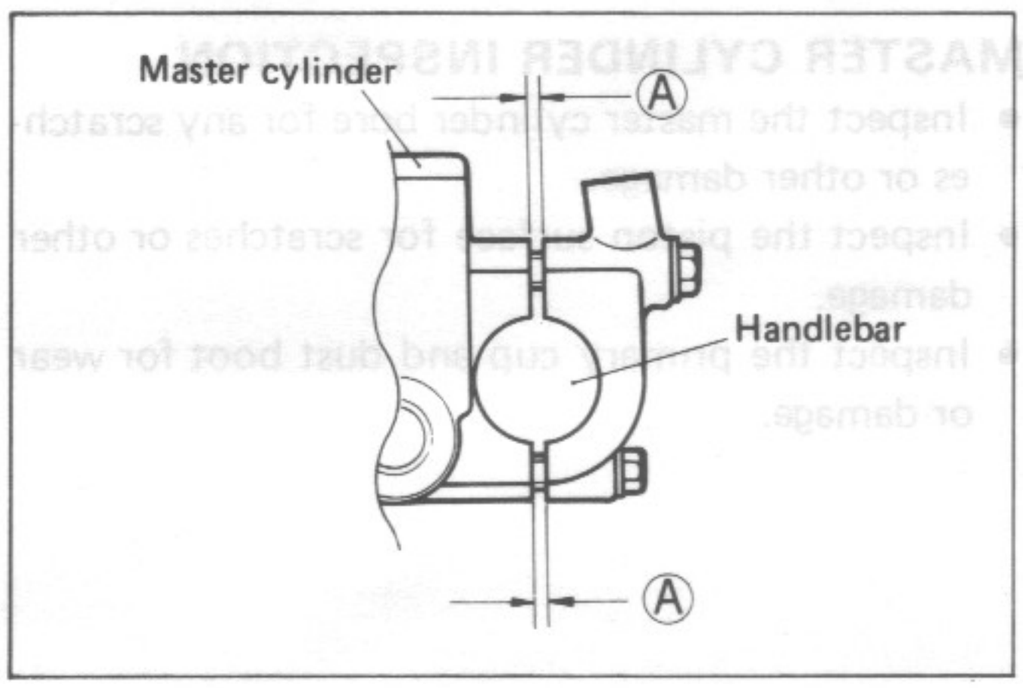


- Align the push rod with hole of lever piece.



Mount the clutch master cylinder on the handlebar as shown in the illustration.

CAUTION:
Bleed the air after reassembling master cylinder (See page 2-7).
Adjust the starter disconnect switch after installation.



SERVICING INFORMATION

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TROUBLESHOOTING

ENGINE

Complaint	Symptom and possible causes	Remedy
Engine will not start, or is hard to start.	**Compression too low**	
	1. Defective lash-adjuster.	Replace.
	2. Trapped air in lash-adjuster.	Bleed air.
	3. Worn valve guides or poor seating of valves.	Adjust.
	4. Valves mistiming.	Repair, or replace.
	5. Piston rings excessively worn.	Replace.
	6. Worn-down cylinder bores.	Replace, or rebore.
	7. Starter motor cranks but too slowly.	Consult "electrical complaints".
	Plugs not sparking	
	1. Fouled sprak plugs.	Clean.
	2. Wet spark plug.	Clean and dry.
	3. Defective ignition coil.	Replace.
	4. Open or short in high-tension cords.	Replace.
	5. Defective signal generator or ignitor unit.	Replace.
	No fuel reaching the carburetors	
	1. Clogged hole in the fuel tank cap.	Clean.
	2. Clogged or defective fuel cock.	Clean or replace.
	3. Defective fuel pump.	Replace.
	4. Defective fuel pump relay.	Replace.
	5. Defective carburetor float valve.	Replace.
	6. Clogged fuel pipe or suction pipe.	Clean.
	7. Defective signal generator/ignition coil/ignitor.	Replace.
Engine stalls easily.	1. Fouled spark plugs.	Clean.
	2. Defective signal generator or ignitor unit.	Replace
	3. Clogged fuel pipe.	Replace.
	4. Defective fuel pump/fuel pump relay	Replace.
	5. Clogged jets in carburetors.	Clean.
	6. Defective lash-adjuster.	Replace.
Noisy engine.	**Excessive valve chatter**	
	1. Trapped air in lash-adjuster.	Bleed air.
	2. Weakened or broken valve springs.	Replace.
	3. Camshaft journal worn and burnt.	Replace.
	Noise appears to come from pistons	
	1. Pistons or cylinders worn down.	Replace.
	2. Combustion chambers fouled with carbon.	Clean.
	3. Piston pins or piston pin bore worn.	Replace.
	4. Piston rings or ring groove worn.	Replace.
	Noise seems to come from timing chain	
	1. Stretched chain.	Replace.
	2. Worn sprockets.	Replace.
	3. Tension adjuster not working.	Replace.
	Noise seems to come from clutch	
	1. Worn splines of countershaft or hub.	Replace.
	2. Worn teeth of clutch plates.	Replace.
	3. Distorted clutch plates, driven and drive.	Replace.
	4. Worn/Damaged clutch push rod bearing	Replace.

Complaint	Symptom and possible causes	Remedy
Noisy engine.	**Noise seems to come from crankshaft**	
	1. Rattling bearings due to wear.	Replace.
	2. Big-end bearings worn and burnt.	Replace.
	3. Journal bearing worn and burnt.	Replace.
	Noise seems to come from transmission	
	1. Gears worn or rubbing.	Replace.
	2. Badly worn splines.	Replace.
	3. Primary gears worn or rubbing.	Replace.
	Noise seems to come from water pump.	
	1. Too much play on pump drive chain	Adjust.
	2. Worn or damaged drive chain/chain tensioner/ sprocket.	Replace.
	3. Impeller touches crankcase.	Replace.
Slipping clutch	1. Weakened clutch springs.	Replace.
	2. Worn or distorted pressure plate.	Replace.
	3. Distorted clutch plates, driven and drive.	Replace.
Dragging clutch	1. Leakage of clutch fluid.	Repair.
	2. Worn or damaged master cylinder/clutch cylinder.	Replace.
	3. Damaged oil seal/clutch hose.	Replace.
	4. Some clutch springs weakened while others are not.	Replace.
	5. Distorted pressure plate or clutch plates.	Replace.
Transmission will not shift	1. Broken gearshift cam.	Replace.
	2. Distorted gearshift forks.	Replace.
	3. Too much play on gearshift lever.	Adjust.
	4. Worn gearshift pawl/guide.	Replace.
Transmission will not shift back.	1. Broken return spring on shift shaft.	Replace.
	2. Shift shafts are rubbing or sticky.	Repair or replace.
Transmission jumps out of gear.	1. Worn shifting gears on drive shaft or countershaft.	Replace.
	2. Distorted or worn gearshift forks.	Replace.
	3. Weakened stopper spring on gearshift stopper.	Replace.
Engine idles poorly.	1. Trapped air in lash-adjuster.	Bleed air.
	2. Poor seating of valves.	Repair or replace.
	3. Defective valve guides.	Replace.
	4. Spark plug gaps too wide.	Adjust.
	5. Defective ignition coil.	Replace.
	6. Defective signal generator or ignitor unit.	Replace.
	7. Float-chamber fuel level out of adjustment in carburetors.	Replace.
	8. Clogged jets or imbalance of carburetors.	Clean or adjust.
	9. Defective fuel pump/fuel pump relay.	Replace.
Engine runs poorly in high-speed range.	1. Valve springs weakened.	Replace.
	2. Trapped air in lash-adjuster.	Bleed air.
	3. Spark plug gaps too narrow.	Adjust.
	4. Clogged jets or imbalance of carburetors.	Clean or adjust.
	5. Defective ignition coil.	Replace.

Complaint	Symptom and possible causes	Remedy
Engine runs poorly in high-speed range.	6. Defective signal generator or ignitor unit.	Replace.
	7. Float-chamber fuel level too low.	Adjust.
	8. Clogged air cleaner element.	Clean.
	9. Clogged fuel pipe, resulting in inadequate fuel supply to carburetors.	Clean, and prime.
	10. Defective fuel pump/fuel pump relay.	Replace.
	11. Defective lash-adjuster.	Replace.
Dirty or heavy exhaust smoke.	1. Too much engine oil in the engine.	Check with level inspection window, drain out excess oil.
	2. Worn piston rings or cylinders.	Replace.
	3. Worn valve guides.	Replace.
	4. Cylinder walls scored or scuffed.	Rebore or replace.
	5. Worn valves stems.	Replace.
	6. Defective stem seal.	Replace.
Engine lacks power.	1. Trapped air in lash-adjuster.	Bleed air.
	2. Weakened valve springs.	Replace.
	3. Defective lash-adjuster.	Replace.
	4. Worn piston rings or cylinders.	Replace.
	5. Poor seating of valves.	Repair.
	6. Spark plug gaps incorrect.	Adjust or replace.
	7. Clogged jets in carburetors.	Clean.
	8. Float-chamber fuel level out of adjustment.	Adjust.
	9. Clogged air cleaner element.	Clean.
	10. Carburetor balancing screw loose.	Retighten and balance the carbs.
	11. Sucking air from intake pipe.	Retighten or replace.
	12. Too much engine oil in the engine.	Drain out excess oil.
	13. Defective fuel pump/fuel pump relay.	Replace.
	14. Defective signal generator/ignitor unit/ignition coil.	Replace.
Engine overheats.	1. Heavy carbon deposit on piston crowns.	Clean.
	2. Not enough oil in the engine.	Add oil.
	3. Defective oil pump or clogged oil circuit.	Replace or clean.
	4. Fuel level too low in float chambers.	Adjust.
	5. Suck air from intake pipes.	Retighten or replace.
	6. Use incorrect engine oil.	Change.
	7. Defective cooling system.	See radiator section.

SHAFT DRIVE

Complaint	Symptom and possible causes	Remedy
Noisy shaft drive	**Noise seems to come from secondary bevel gear and final bevel gear assemblies.**	
	1. Oil level too low.	Refill. (Replace oil seal)
	2. Drive and driven bevel gears damaged or worn.	Replace.
	3. Excessive backlash.	Adjust.
	4. Improper tooth contact.	Adjust.
	5. Damage to bearings.	Replace.
	Noise seems to come from propeller shaft area.	
	1. Propeller shaft universal joint damaged.	Replace.
	2. Propeller shaft splines damaged or worn.	Replace.
	3. Insufficient lubricant.	Refill. (Replace oil seal)
	4. Cam dog contacting surface damaged or worn.	Replace.

Complaint	Symptom and possible causes	Remedy
No power transmitted from engine to rear wheel.	1. Broken propeller shaft. 2. Broken gear teeth. 3. Broken or damaged input/output cam dog.	Replace. Replace. Replace.
Secondary bevel gear and final bevel gear assemblies oil leak	1. Damage to oil seals. 2. Damage to O rings. 3. Loose bolts on secondary gear case and final gear bearing case.	Replace. Replace. Retighten.

CARBURETOR

Complaint	Symptom and possible causes	Remedy
Trouble with starting.	1. Starter jet is clogged. 2. Starter pipe is clogged. 3. Air leaking from a joint between starter body and carburetor. 4. Air leaking from carburetor's joint or vacuum gauge joint. 5. Starter plunger is not operating properly.	Clean. Clean. Check starter body and carburetor for tightness, adjust and replace gasket. Check and adjust. Check and adjust.
Idling or low-speed trouble	1. Pilot jet, pilot air jet are clogged or loose. 2. Air leaking from carburetor's joint, vacuum gauge joint, or starter. 3. Pilot outlet or bypass is clogged. 4. Starter plunger is not fully closed.	Check and clean. Check and adjust. Check and clean. Check and adjust.
Medium- or high-speed trouble.	1. Main jet or main air jet is clogged. 2. Needle jet is clogged. 3. Throttle valve is not operating properly. 4. Filter is clogged. 5. Carburetor balancing screw loose.	Check and clean. Check and clean. Check throttle valve for operation. Check and clean. Retighten and balance the carbs.
Overflow and fuel level fluctuations.	1. Needle valve is worn or damaged. 2. Spring in needle valve is broken. 3. Float is not working properly. 4. Foreign matter has adhered to needle valve. 5. Fuel level is too high or low. 6. Clogged carburetor air vent pipe. 7. Defective fuel pump/fuel pump relay. 8. Defective signal generator/ignitor unit/ignition coil.	Replace. Replace. Check and adjust. Clean. Adjust float height. Clean. Replace. Replace.

RADIATOR

Complaint	Symptom and possible causes	Remedy
Engine overheats.	1. Not enough cooling water.	Add coolant.
	2. Radiator core is clogged with dirt or trashes.	Clean.
	3. Erratic thermostat, stuck in closed position.	Replace.
	4. Faulty cooling fan.	Repair or replace.
	5. Defective thermo-switch.	Replace.
	6. Clogged water passage.	Clean.
	7. Air trapped in the cooling circuit.	Bleed out air.
	8. Defective water pump/pump drive chain.	Replace.
	9. Use incorrect cooling water.	Replace.
Engine overcools.	1. Erratic thermostat, stuck in full-open position.	Replace.
	2. Defective thermo-switch.	Replace.
	3. Extremely cold weather.	Put on the radiator cover.

ELECTRICAL

Complaint	Symptom and possible causes	Remedy
No sparking or poor sparking.	1. Defective ignition coil.	Replace.
	2. Defective spark plugs.	Replace.
	3. Defective signal generator or ignitor unit.	Replace.
Spark plugs soon become fouled with carbon.	1. Mixture too rich.	Adjust carburetors.
	2. Idling speed set too high.	Adjust carburetors.
	3. Incorrect gasoline.	Change.
	4. Dirty element in air cleaner.	Clean.
	5. Spark plugs too cold.	Replace by hot type plugs.
Spark plugs become fouled too soon.	1. Worn piston rings.	Replace.
	2. Pistons or cylinders worn.	Replace.
	3. Excessive clearance of valve stems in valve guides.	Replace.
	4. Worn stem oil seal.	Replace.
Spark plug electrodes overheat or burn.	1. Spark plugs too hot.	Replace by cold type plugs.
	2. The engine overheats.	Tune up.
	3. Defective signal generator or ignitor unit.	Adjust.
	4. Spark plugs loose.	Retighten.
	5. Mixture too lean.	Adjust carburetors.
Generator does not charge.	1. Open or short in lead wires, or loose lead connections.	Repair or replace or retighten.
	2. Shorted, grounded or open generator coils.	Replace.
	3. Shorted or panctured regulator/rectifier.	Replace.
Generator charge, but charging rate is below the specification.	1. Lead wires tend to get shorted or open-circuited or loosely connected at terminals.	Repair, or retighten.
	2. Grounded or open-circuited stator coils of generator.	Replace.
	3. Defective regulator/rectifier.	Replace.
	4. Not enough electrolyte in the battery.	Add distilled water between the level lines.
	5. Defective cell plates in the battery.	Replace the battery.

Complaint	Symptom and possible causes	Remedy
Generator overcharges.	1. Internal short-circuit in the battery. 2. Resistor element in the regulator/rectifier damaged or defective. 3. Regulator/rectifier poorly grounded.	Replace the battery. Replace. Clean and tighten ground connection.
Unstable charging.	1. Lead wire insulation frayed due to vibration, resulting in intermittent shorting. 2. Generator internally shorted. 3. Defective regulator/rectifier.	Repair or replace. Replace. Replace.
Starter button is not effective.	1. Battery run down. 2. Defective switch contacts. 3. Brushes not seating properly on commutator in starter motor. 4. Defective starter relay.	Recharge or replace. Replace. Repair or replace. Replace.

BATTERY

Complaint	Symptom and possible causes	Remedy
"Sulfation", acidic white powdery substance or spots on surfaces of cell plates.	1. Not enough electrolyte 2. Battery case is cracked. 3. Battery has been left in a run-down condition for a long time. 4. Contaminated electrolyte (Foreign matter has enteres the battery and become mixed with the electrolyte.	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. 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.
Battery runs down quickly.	1. The charging method is not correct. 2. Cell plates have lost much of their active material as a result of over-charging. 3. A short-circuit condition exists within the battery due to excessive accumulation of sediments caused by the high electrolyte S.G. 4. Electrolyte S.G. is too low. 5. Contaminated electrolyte. 6. Battery is too old.	Check the generator, regulator/rectifier and circuit connections, and make necessary adjustments to obtain specified charging operation. Replace the battery, and correct the charging system. Replace the battery. Recharge the battery fully and adjust electrolyte S.G. Replace the electrolyte, recharge the battery and then adjust S.G. Replace the battery.

Complaint	Symptom and possible causes	Remedy
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"	1. Charging rate too low or too high. (When not in use, batteries should be recharged at least once a month to avoid sulfation.) 2. Battery electrolyte excessive or insufficient, or its specific gravity too high or too low. 3. The battery left unused for too long in cold climate.	Replace the battery. 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.
Battery discharges too rapidly.	1. Dirty container top and sides. 2. Impurities in the electrolyte or electrolyte S.G. is too high.	Clean. Change the electrolyte by consulting the battery maker's directions.

CHASSIS

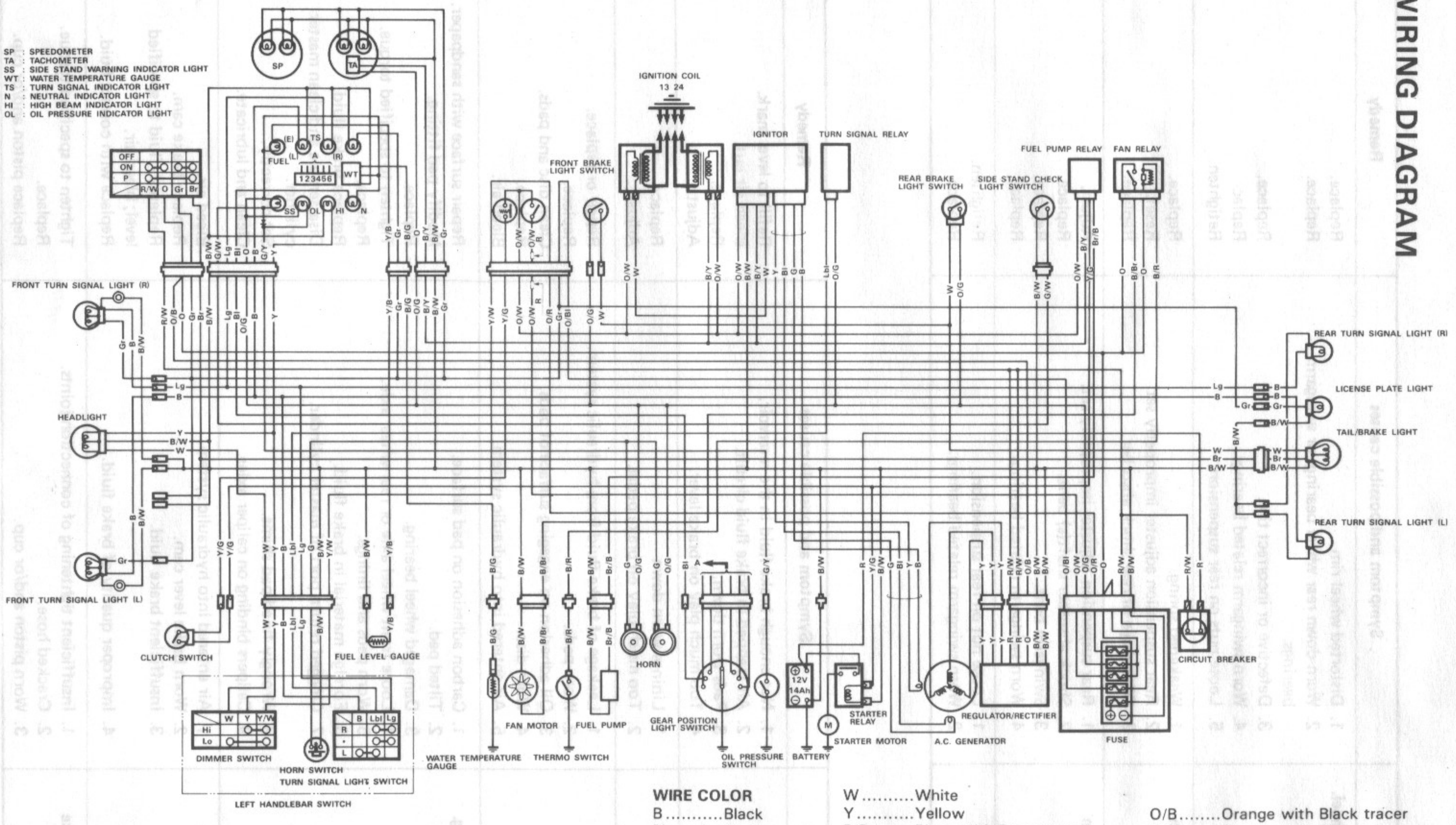
Complaint	Symptom and possible causes	Remedy
Handling feels too heavy.	1. Steering stem nut overtightened. 2. Worn roller bearing or race in steering stem. 3. Distorted steering stem. 4. Not enough pressure in tires. 5. Overtightened steering races.	Adjust. Replace. Replace. Adjust. Adjust.
Steering oscillation.	1. Loss of balance between right and left suspensions. 2. Bent front fork. 3. Bent front axle or crooked tire. 4. Loose steering stem bearings. 5. Worn or incorrect tires or wrong tire pressure.	Adjust. Repair or replace. Replace. Adjust. Adjust or replace.
Wobbly front wheel.	1. Distorted wheel. 2. Worn front wheel bearings. 3. Defective or incorrect tire. 4. Loose nut on axle. 5. Loose nuts on rear shock. 6. Worn swingarm related bearings.	Replace. Replace. Replace. Retighten. Retighten. Replace.
Front suspension too soft.	1. Weakened springs. 2. Not enough fork oil. 3. Not enough fork air. 4. Wrong weight fork oil.	Replace. Refill. Adjust to specification. Replace.
Front suspension too stiff.	1. Fork oil too viscous. 2. Too much fork oil. 3. Fork air too high. 4. Front axle bent. 5. Fork tubes not adjusted evenly in fork stem and steering stem head.	Replace. Remove excess oil. Adjust to specification. Replace. Adjust.
Noisy front suspension.	1. Not enough fork oil. 2. Loose nuts on suspension.	Refill. Retighten.

Complaint	Symptom and possible causes	Remedy
Wobbly rear wheel.	1. Distorted wheel rim. 2. Worn-down rear wheel bearings or swingarm bearings. 3. Defective or incorrect tire. 4. Worn swingarm related bearings. 5. Loose nuts on rear suspension.	Replace. Replace. Replace. Replace. Retighten.
Rear suspension too soft.	1. Weakened spring. 2. Rear suspension adjuster improperly set. 3. Oil leakage of rear shock absorber.	Replace. Reset. Replace.
Rear suspension too stiff.	1. Rear suspension adjuster improperly set. 2. Shock absorber shaft(s) bent. 3. Swingarm bent. 4. Worn swingarm related bearings.	Adjust. Replace. Replace. Replace.
Noisy rear suspension.	1. Loose nut on rear suspension. 2. Worn swingarm related bearings.	Retighten. Replace.

BRAKES

Complaint	Symptom and possible causes	Remedy
Poor braking. (FRONT)	1. Not enough brake fluid in the reservoir. 2. Air trapped in brake fluid circuit. 3. Pads worn down. 4. Too much play on brake lever.	Refill to level mark. Bleed air out. Replace. Adjust.
Poor braking (REAR)	1. Linings worn down 2. Too much play on brake pedal.	Replace. Adjust.
Insufficient brake power.	1. Leakage of brake fluid from hydraulic system. 2. Worn pads. 3. Oil adhesion on engaging surface of pads. 4. Worn disc. 5. Air entered into hydraulic system.	Repair or replace. Replace. Clean disc and pads. Replace. Bleed air.
Brake squeaking.	1. Carbon adhesion on pad surface. 2. Tilted pad. 3. Damaged wheel bearing. 4. Loose front-wheel axle or rear-wheel axle. 5. Worn pads and linings. 6. Foreign material in brake fluid. 7. Clogged return port of master cylinder. 8. Wrongly fixed pad shims. 9. Calipers binding on caliper axles.	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.	1. Air entered into hydraulic system. 2. Worn brake lever cam. 3. Insufficient brake fluid. 4. Improper quality of brake fluid.	Bleed air. Replace brake cam. Replenish fluid to specified level; bleed air. Replace with correct fluid.
Leakage of brake fluid.	1. Insufficient tightening of connection joints. 2. Cracked hose. 3. Worn piston and/or cup.	Tighten to specified torque. Replace. Replace piston and/or cup.

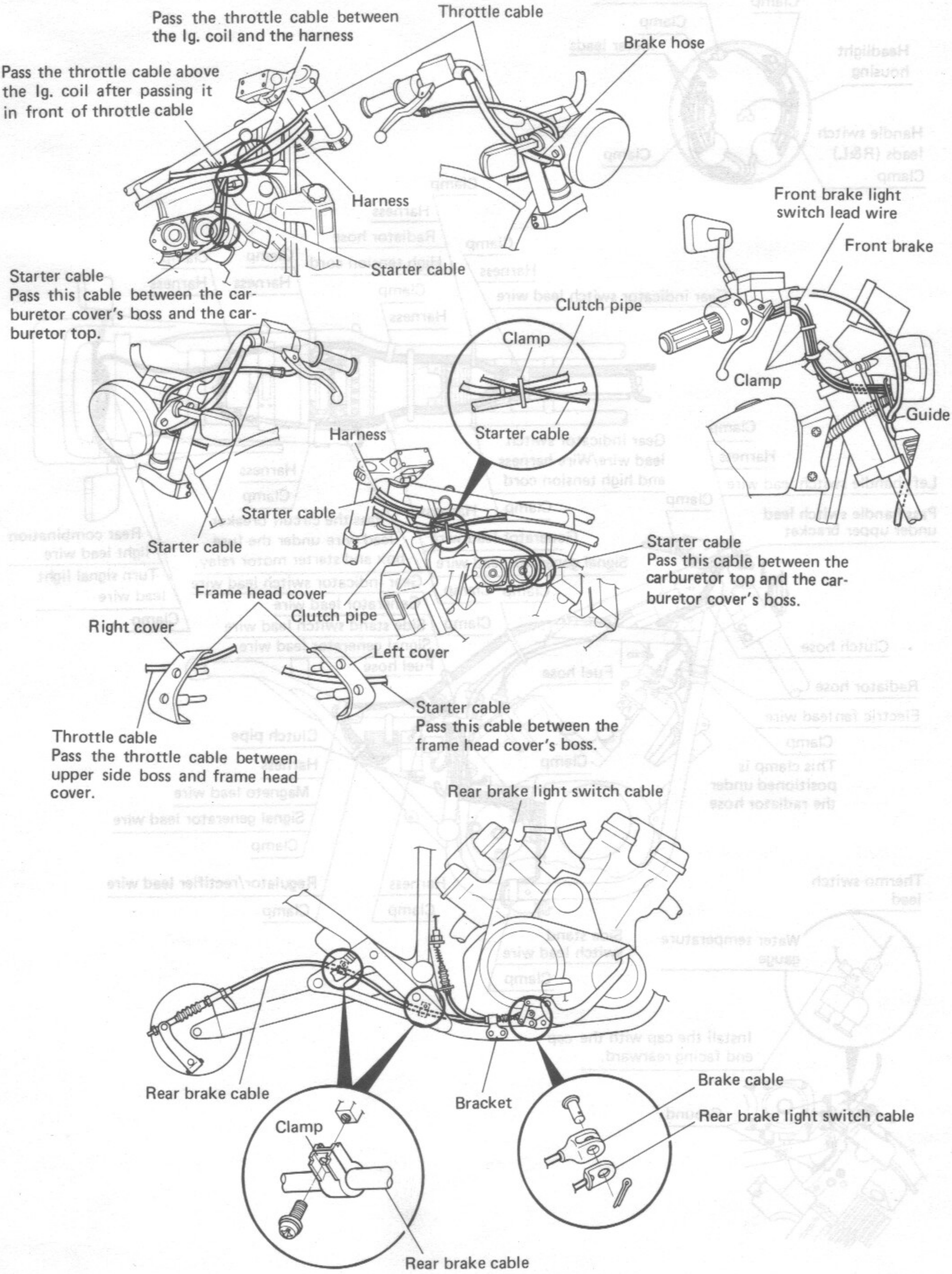
WIRING DIAGRAM

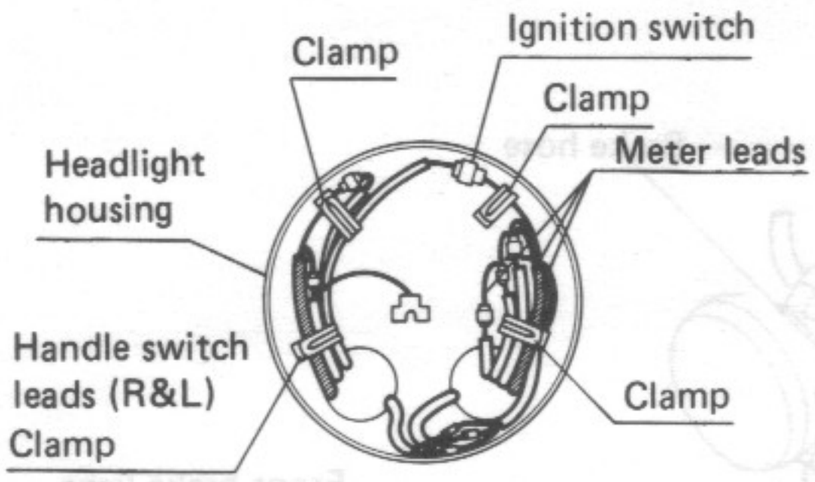


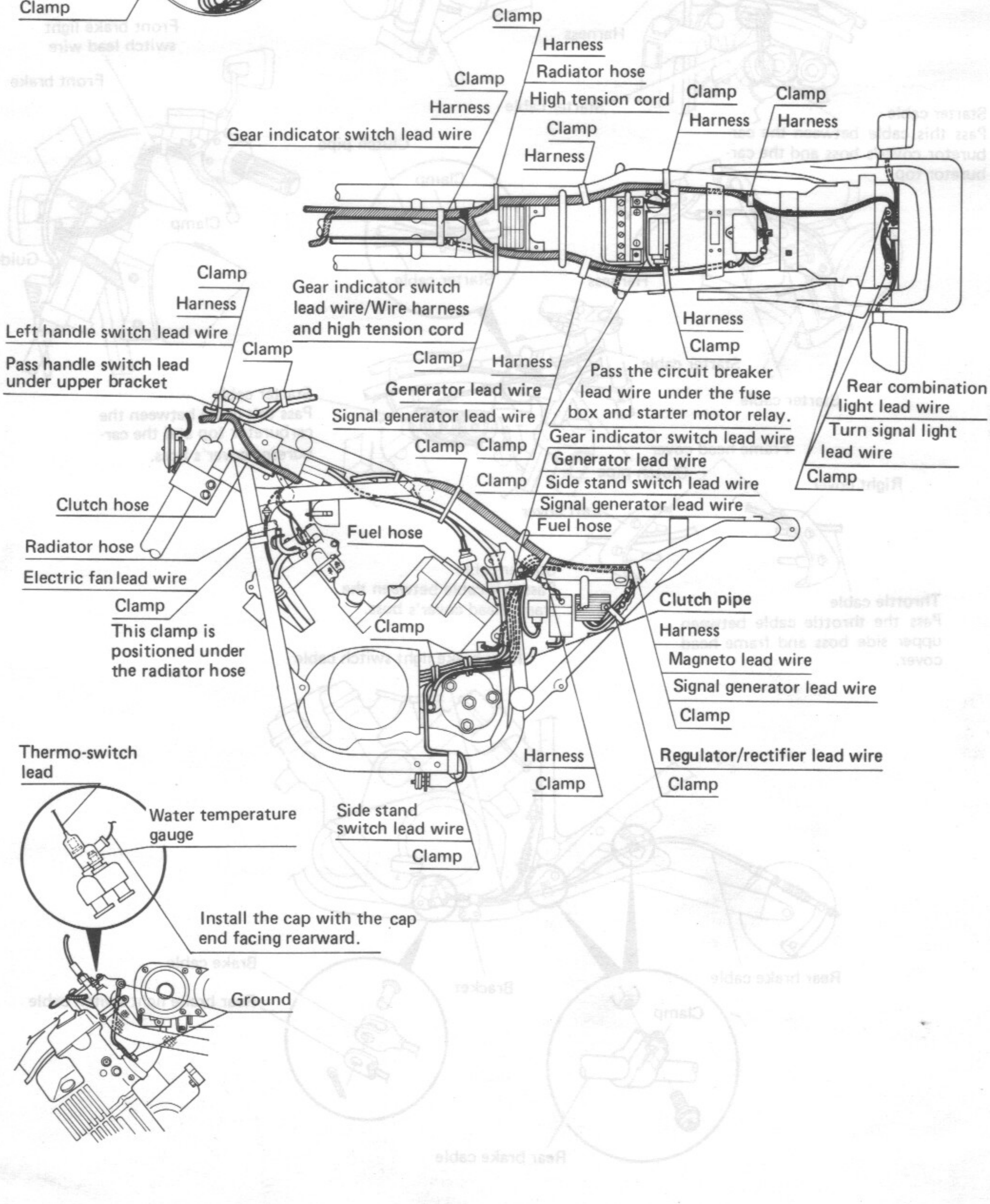
WIRE COLOR

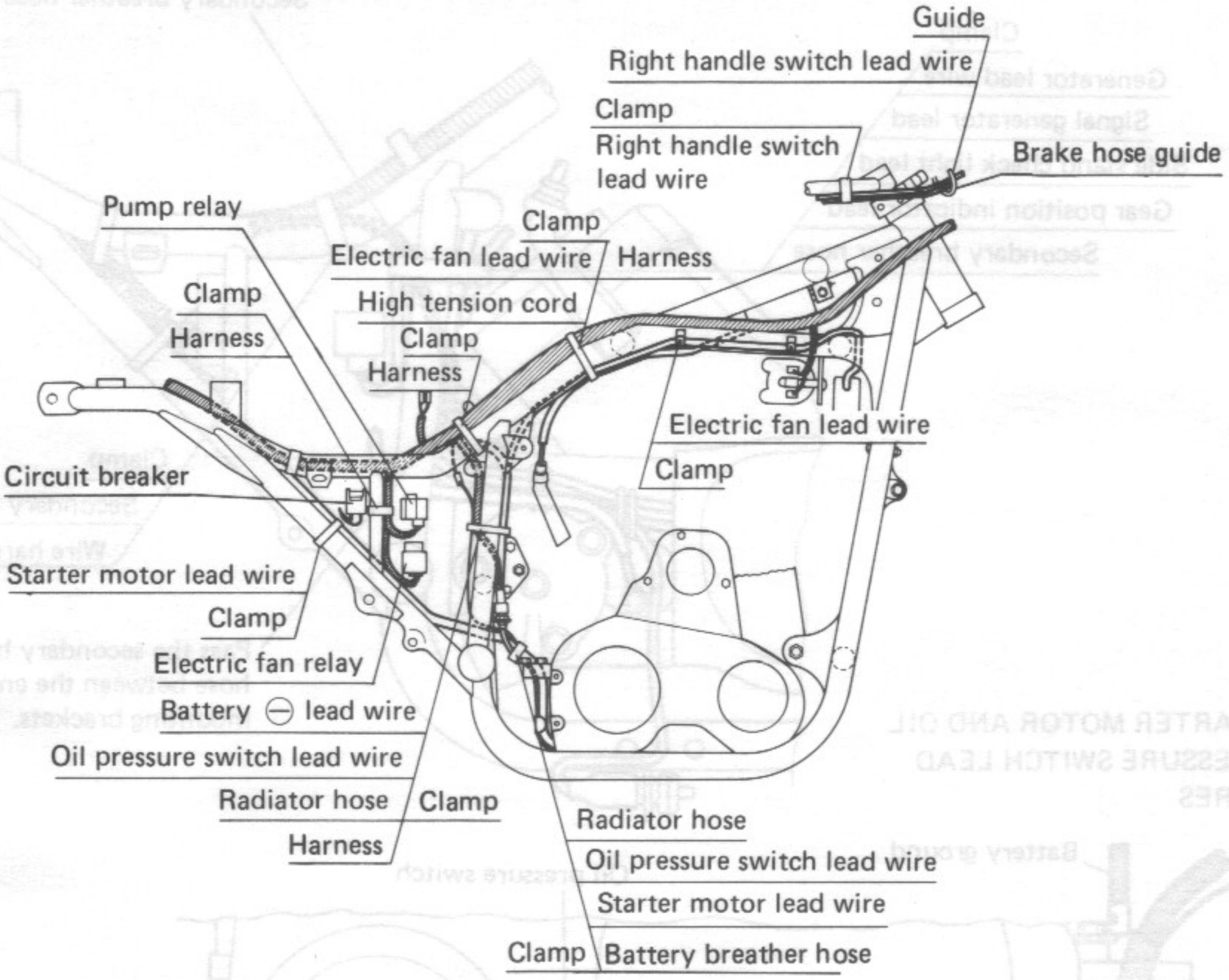
B .....Black	W .....White
Bl .....Blue	Y .....Yellow
Br .....Brown	B/Br .....Black with Brown tracer
G .....Green	B/G .....Black with Green tracer
Gr .....Gray	B/R .....Black with Red tracer
Lbl .....Light blue	B/W .....Black with White tracer
Lg .....Light green	B/Y .....Black with Yellow tracer
O .....Orange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

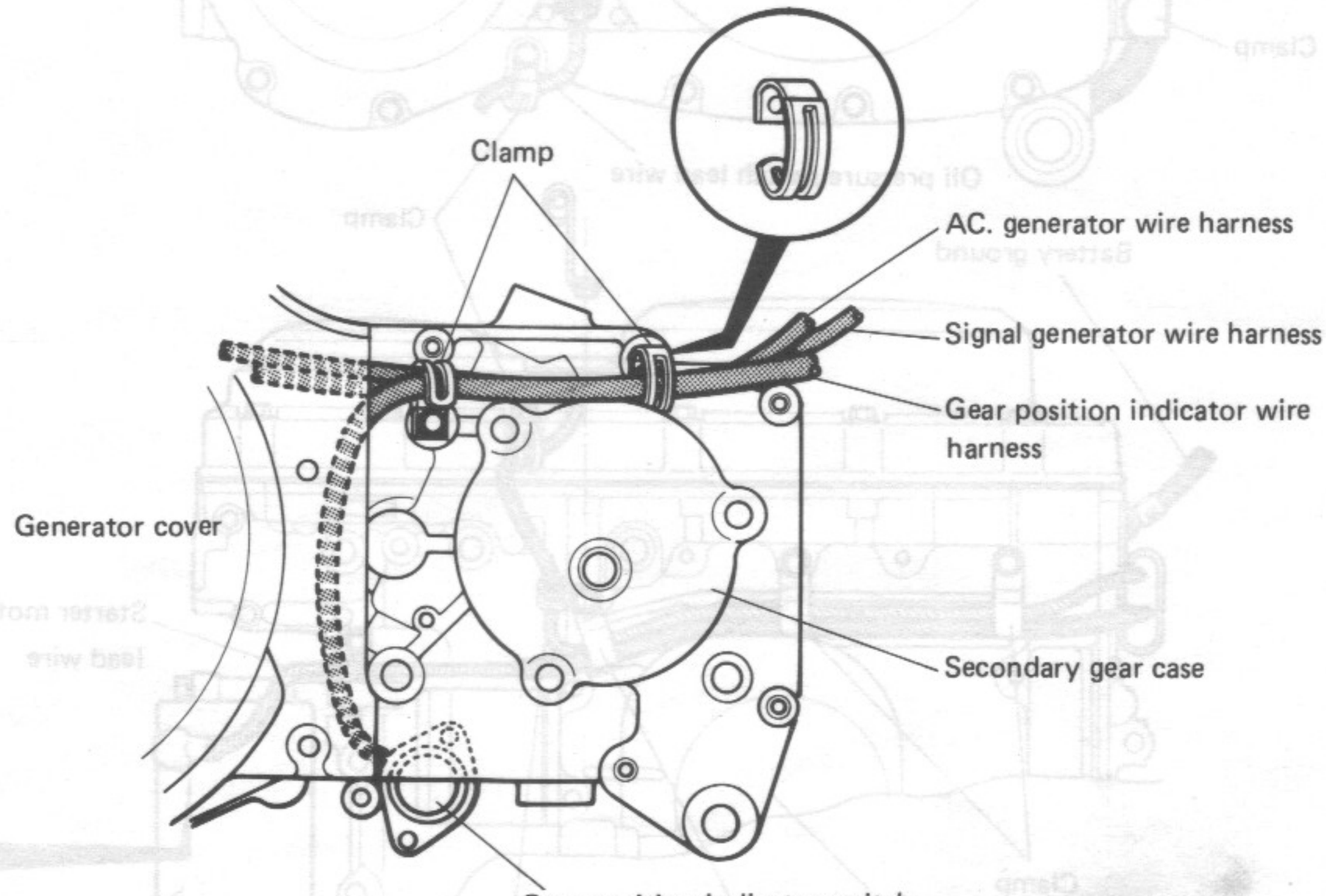
CABLE, HARNESS AND HOSE ROUTING



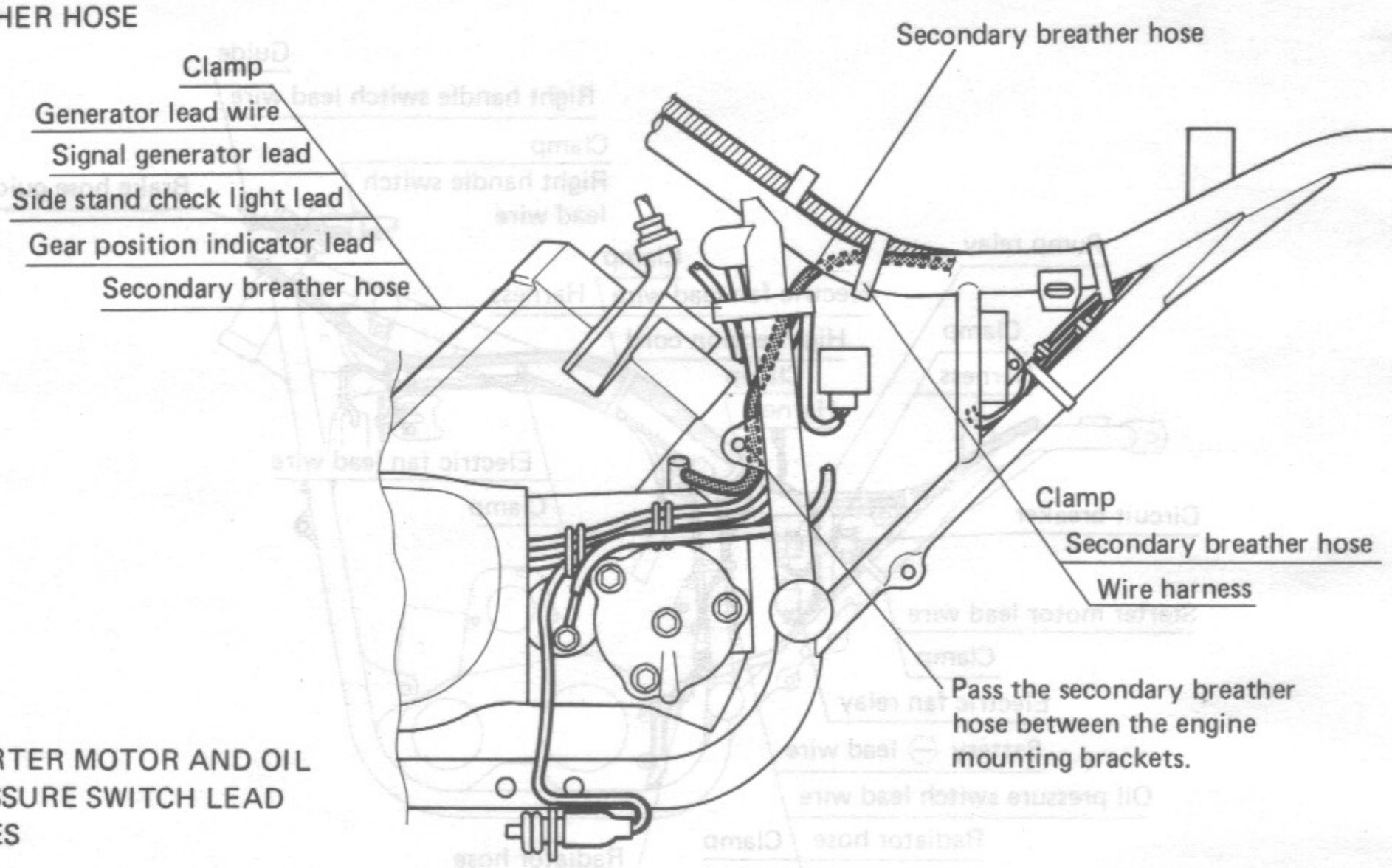

Clamp
Ignition switch
Clamp
Meter leads
Headlight housing
Handle switch leads (R&L)
Clamp
Clamp


Clamp
Harness
Radiator hose
High tension cord
Clamp
Harness
Gear indicator switch lead wire
Clamp
Harness
Clamp
Harness
Clamp
Harness
Left handle switch lead wire
Pass handle switch lead under upper bracket
Clamp
Gear indicator switch lead wire/Wire harness and high tension cord
Clamp
Harness
Generator lead wire
Signal generator lead wire
Clamp
Clamp
Clamp
Pass the circuit breaker lead wire under the fuse box and starter motor relay.
Gear indicator switch lead wire
Generator lead wire
Side stand switch lead wire
Signal generator lead wire
Fuel hose
Rear combination light lead wire
Turn signal light lead wire
Clamp
Clutch hose
Radiator hose
Electric fan lead wire
Clamp
This clamp is positioned under the radiator hose
Fuel hose
Clamp
Clutch pipe
Harness
Magneto lead wire
Signal generator lead wire
Clamp
Harness
Clamp
Regulator/rectifier lead wire
Clamp
Side stand switch lead wire
Clamp
Thermo-switch lead
Water temperature gauge
Install the cap with the cap end facing rearward.
Ground

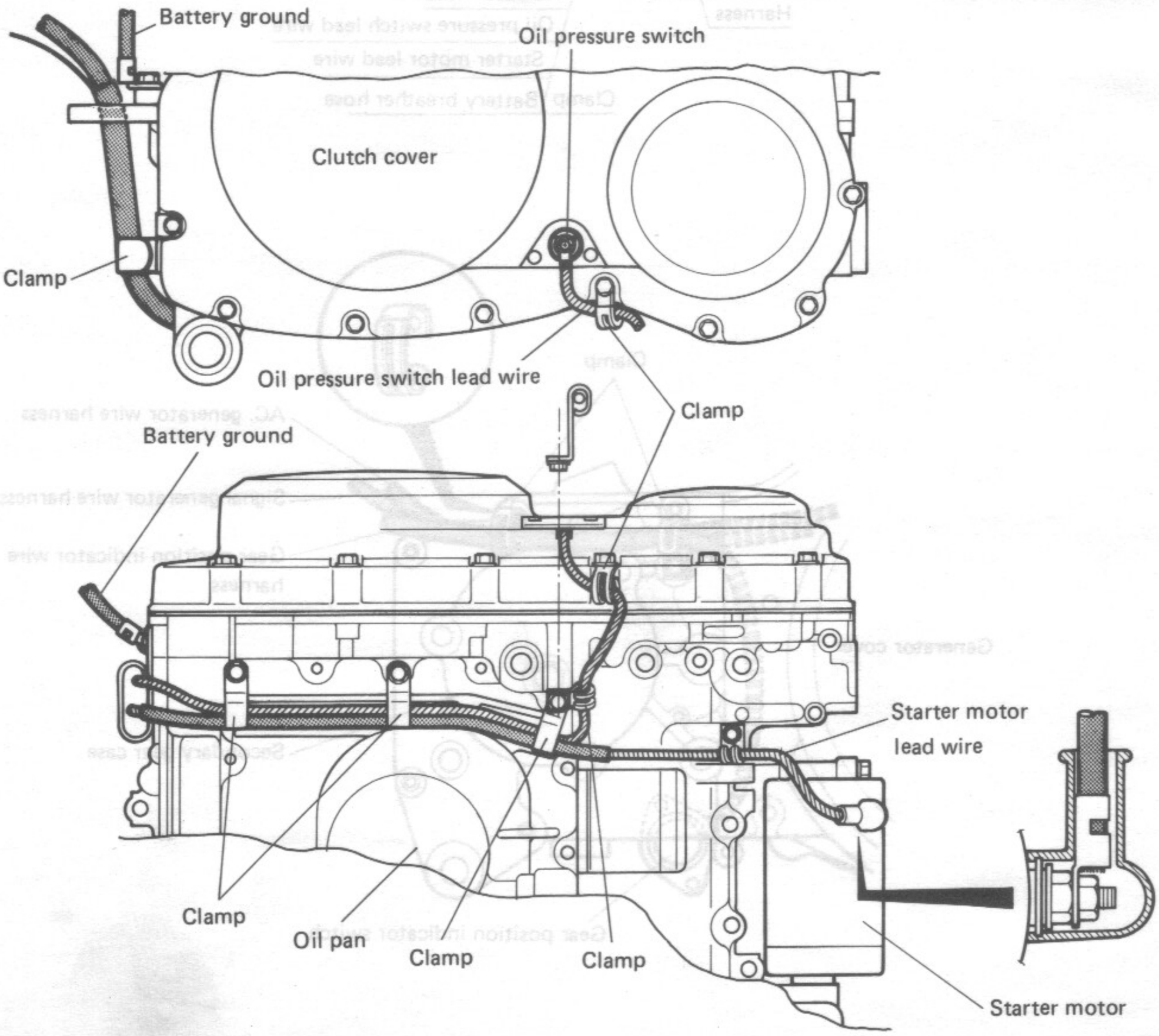

Guide
Right handle switch lead wire
Clamp
Right handle switch lead wire
Brake hose guide
Pump relay
Clamp
Electric fan lead wire
Harness
Clamp
High tension cord
Harness
Clamp
Harness
Electric fan lead wire
Clamp
Circuit breaker
Starter motor lead wire
Clamp
Electric fan relay
Battery ⊖ lead wire
Oil pressure switch lead wire
Radiator hose
Clamp
Harness
Radiator hose
Oil pressure switch lead wire
Starter motor lead wire
Clamp
Battery breather hose


Clamp
AC. generator wire harness
Signal generator wire harness
Gear position indicator wire harness
Generator cover
Secondary gear case
Gear position indicator switch

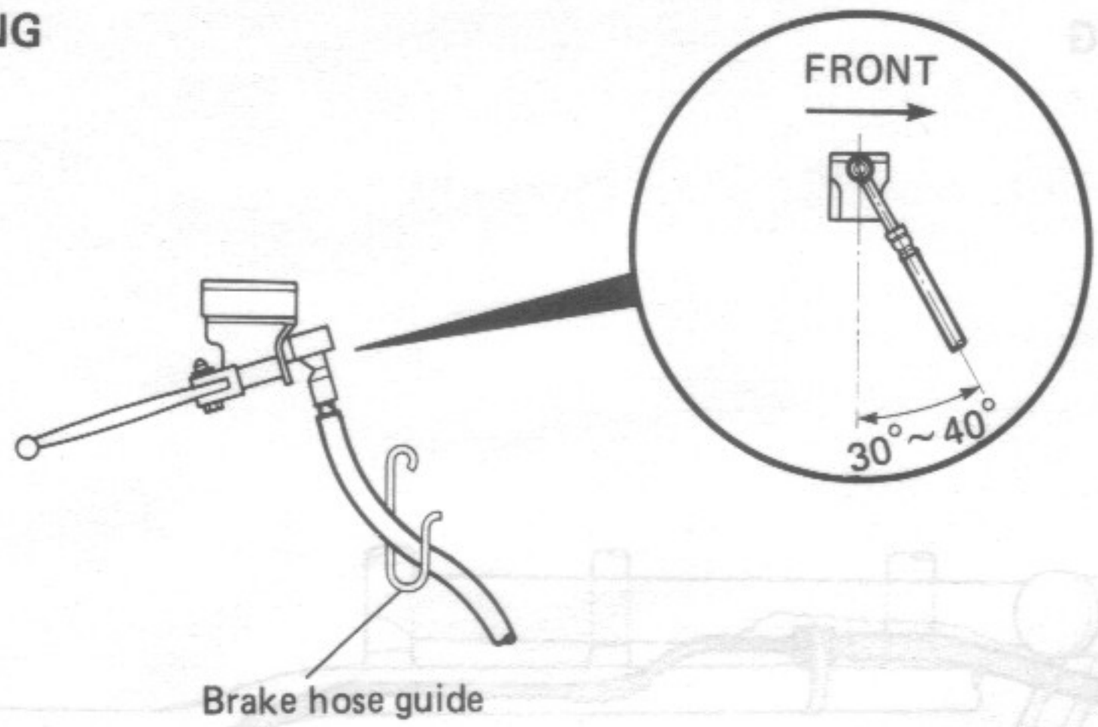
SECONDARY GEAR CASE BREATHER HOSE

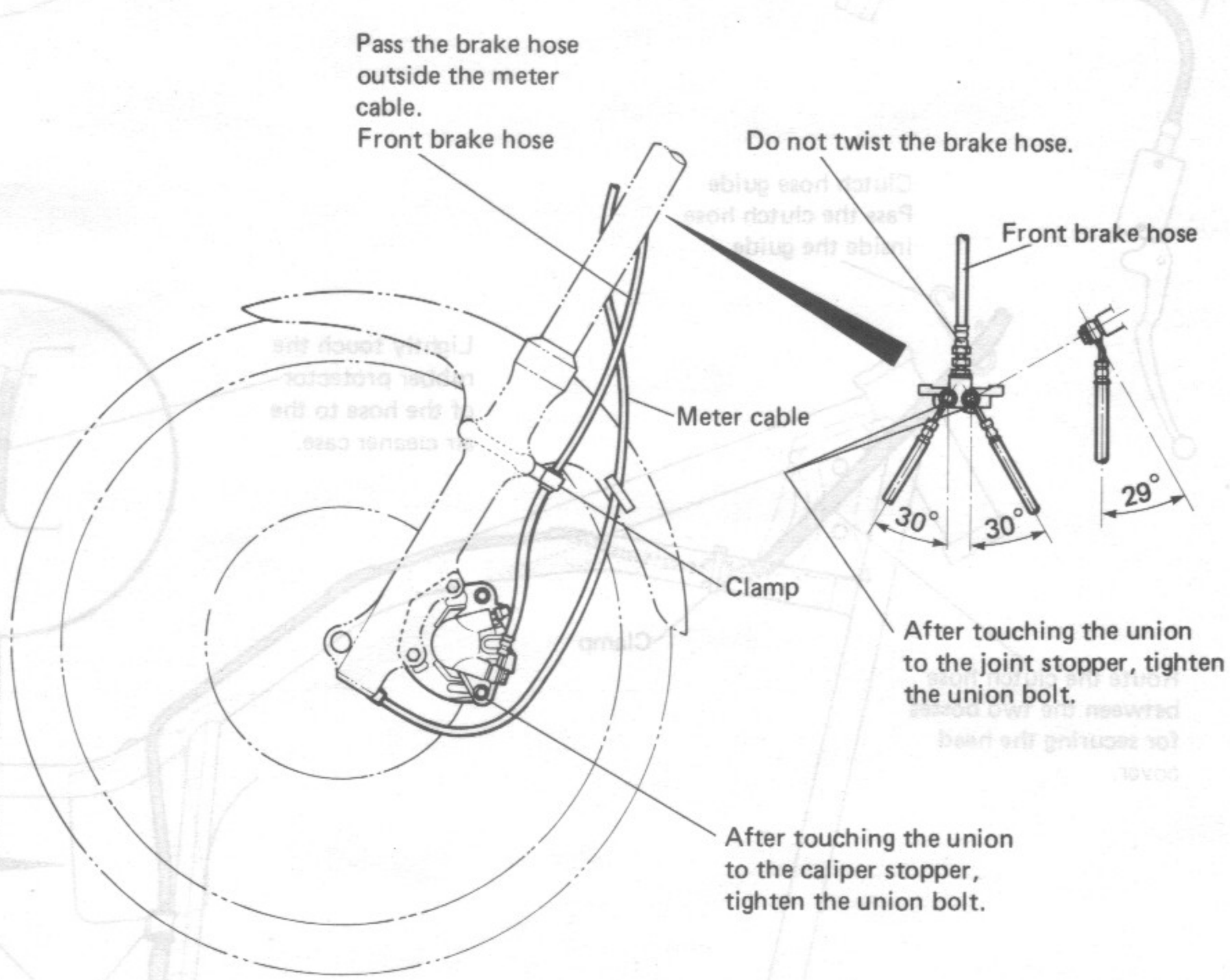


STARTER MOTOR AND OIL PRESSURE SWITCH LEAD WIRES



BRAKE HOSE ROUTING

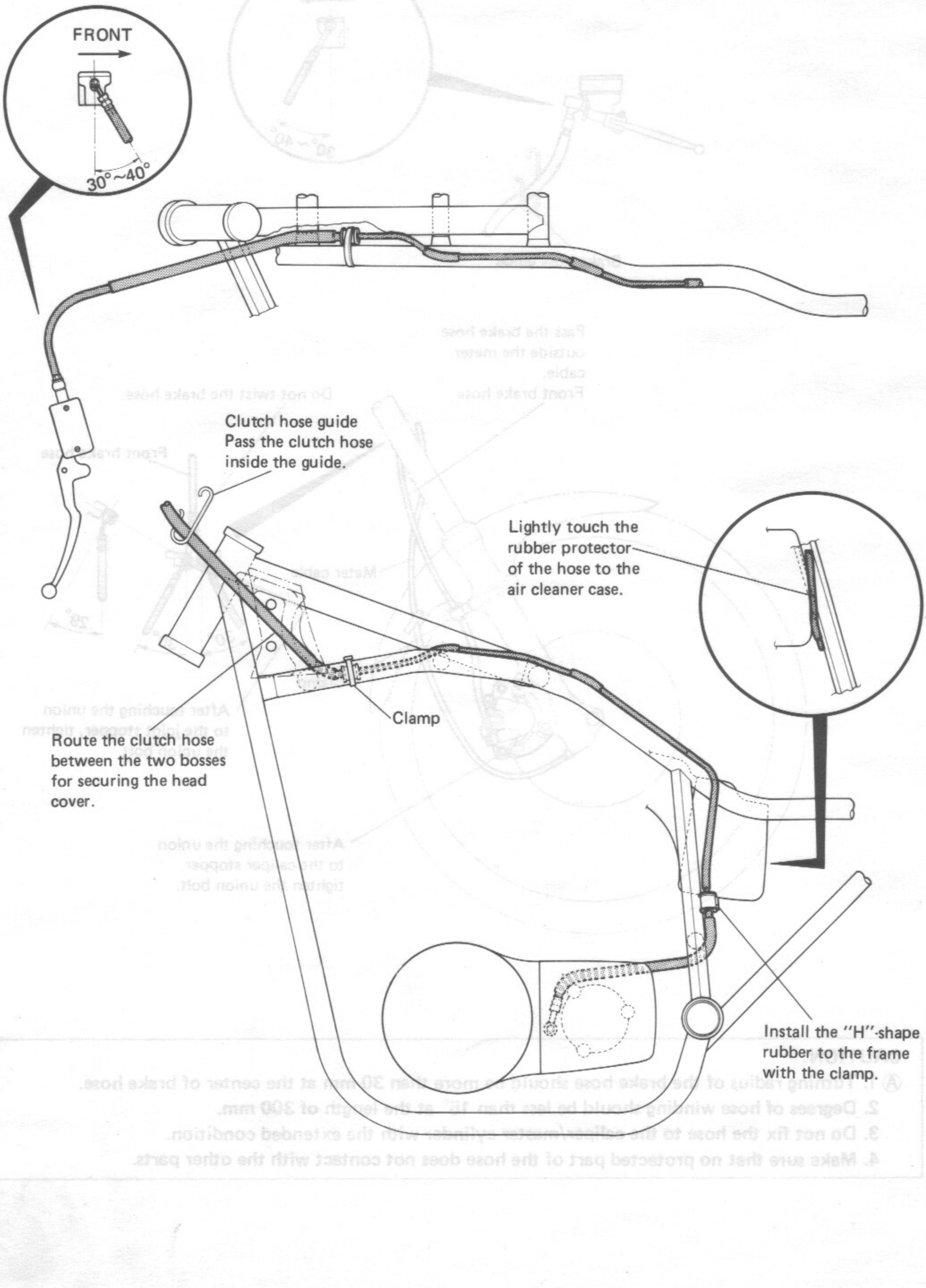




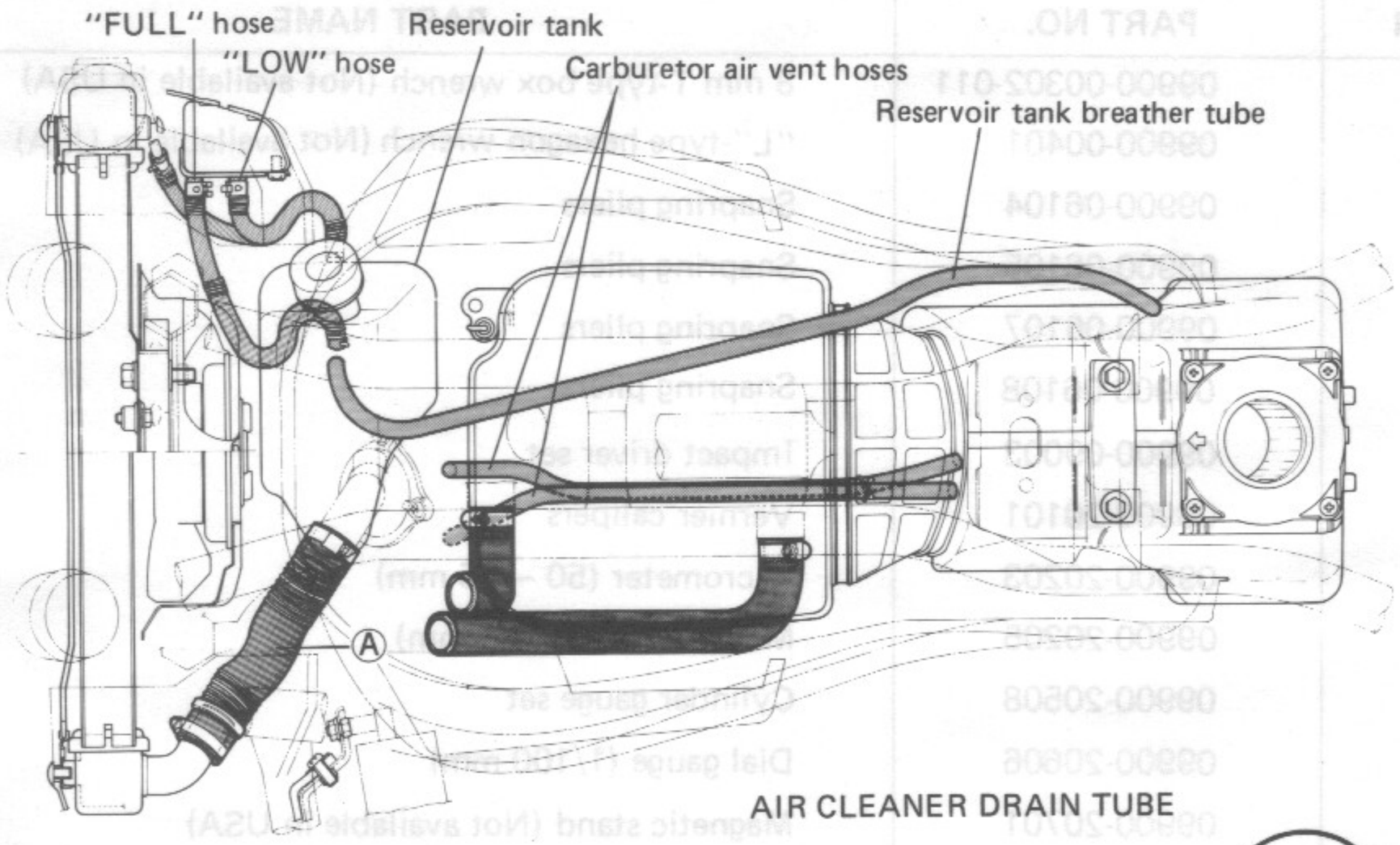
CAUTION:

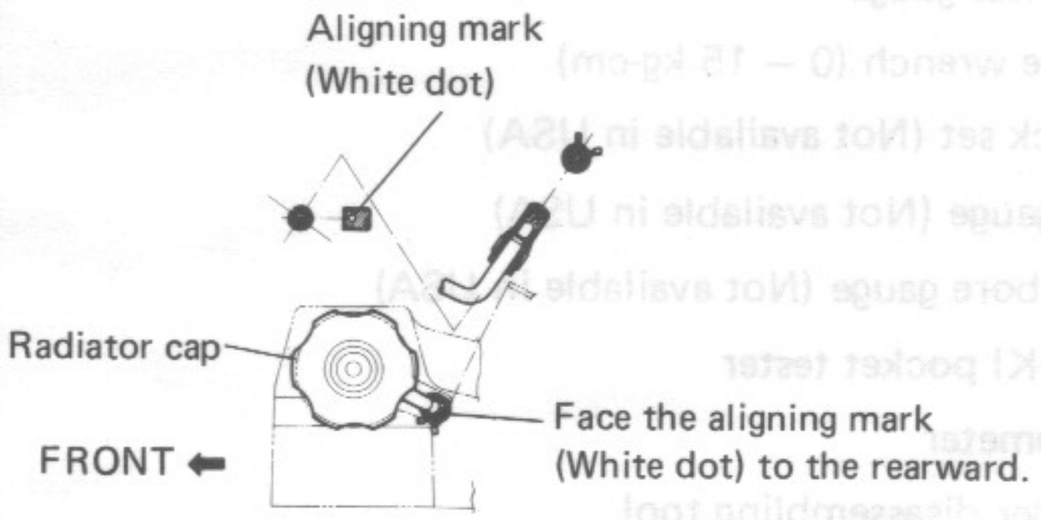
Ⓐ **1. Turning radius of the brake hose should be more than 30 mm at the center of brake hose.**
2. Degrees of hose winding should be less than 15° at the length of 300 mm.
3. Do not fix the hose to the caliper/master cylinder with the extended condition.
4. Make sure that no protected part of the hose does not contact with the other parts.

CLUTCH HOSE ROUTING

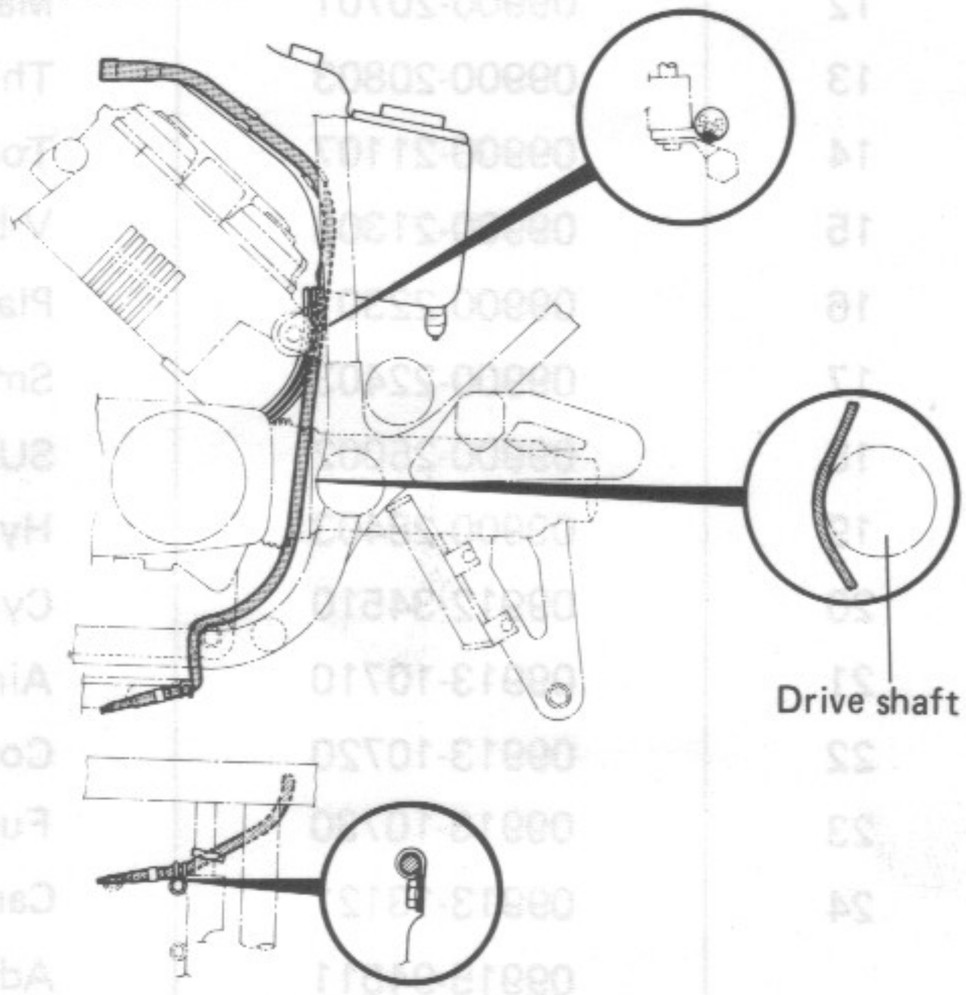


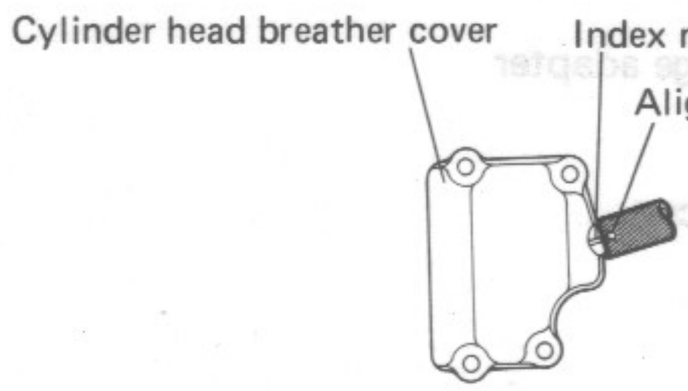
WATER HOSE ROUTING

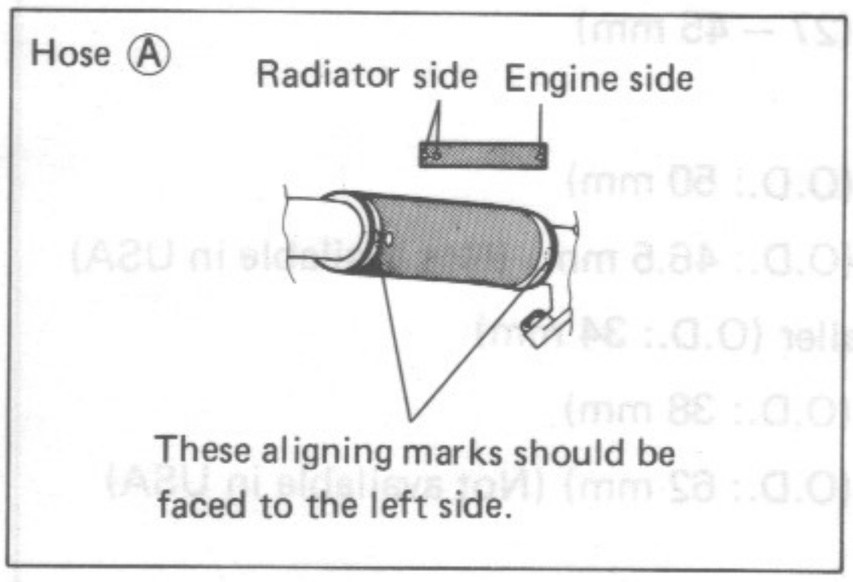


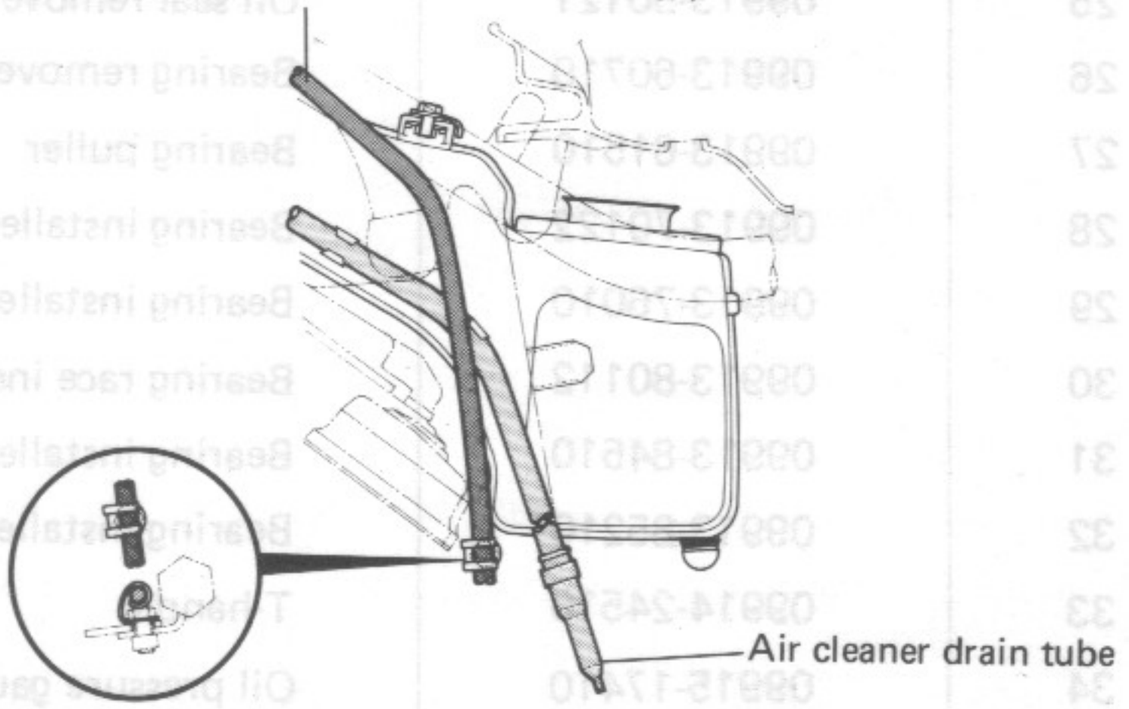


AIR CLEANER DRAIN TUBE







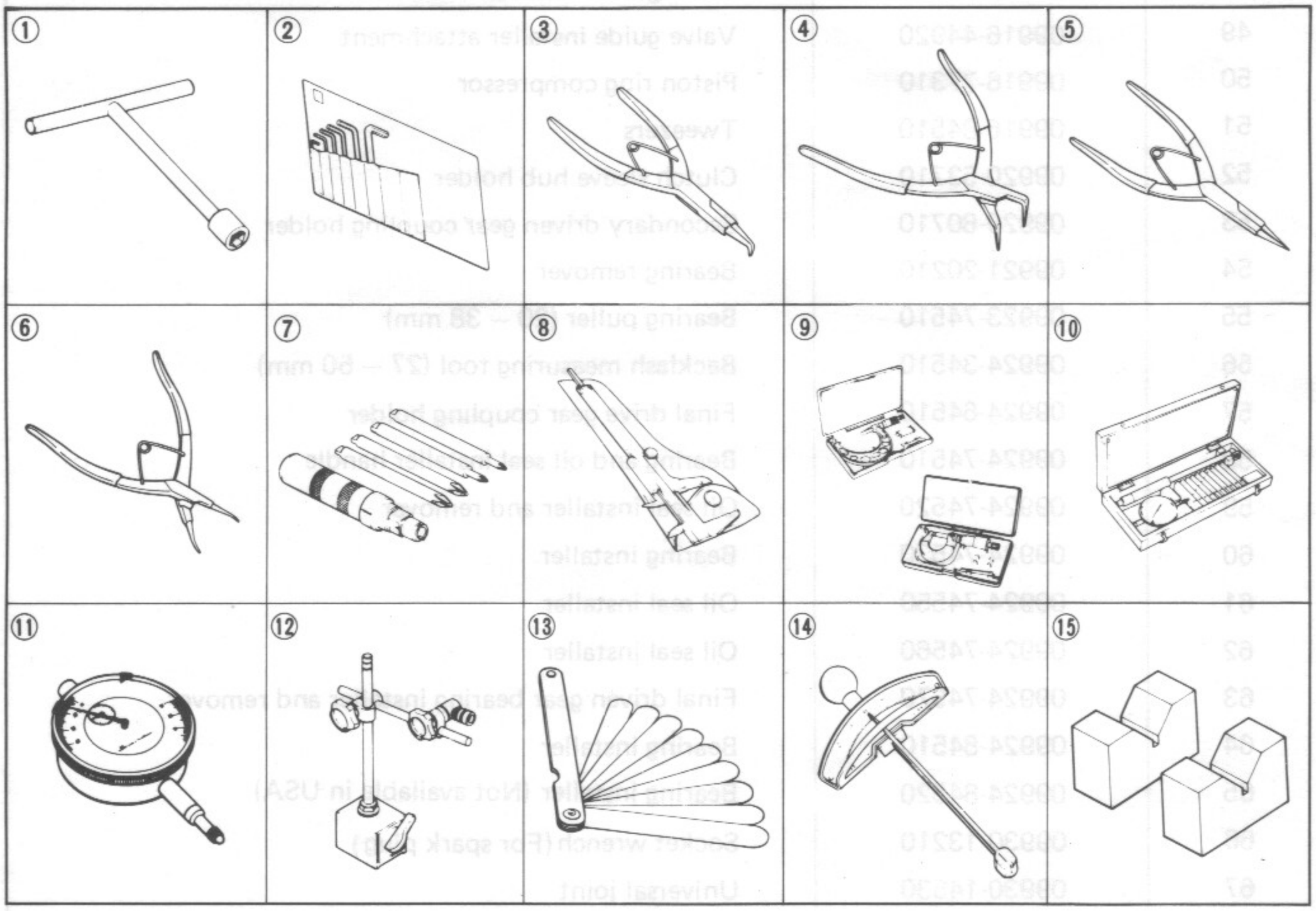


SPECIAL TOOLS

ITEM	PART NO.	PART NAME
1	09900-00302-011	8 mm T-type box wrench (Not available in USA)
2	09900-00401	"L"-type hexagon wrench (Not available in USA)
3	09900-06104	Snapring pliers
4	09900-06105	Snapring pliers
5	09900-06107	Snapring pliers
6	09900-06108	Snapring pliers
7	09900-09003	Impact driver set
8	09900-20101	Vernier calipers
9	09900-20203	Micrometer (50 – 75 mm)
	09900-20205	Micrometer (0 – 25 mm)
10	09900-20508	Cylinder gauge set
11	09900-20606	Dial gauge (1/100 mm)
12	09900-20701	Magnetic stand (Not available in USA)
13	09900-20803	Thickness gauge
14	09900-21107	Torque wrench (0 – 15 kg-cm)
15	09900-21303	V-block set (Not available in USA)
16	09900-22301	Plastigauge (Not available in USA)
17	09900-22403	Small bore gauge (Not available in USA)
18	09900-25002	SUZUKI pocket tester
19	09900-28403	Hydrometer
20	09912-34510	Cylinder disassembling tool
21	09913-10710	Air bleeding tool
22	09913-10720	Compression gauge adapter
23	09913-10730	Fuel level gauge
24	09913-13121	Carburetor balancer
	09915-94511	Adapter
25	09913-50121	Oil seal remover
26	09913-60710	Bearing remover (27 – 45 mm)
27	09913-61510	Bearing puller
28	09913-70122	Bearing installer (O.D.: 50 mm)
29	09913-76010	Bearing installer (O.D.: 46.5 mm) (Not available in USA)
30	09913-80112	Bearing race installer (O.D.: 34 mm)
31	09913-84510	Bearing installer (O.D.: 38 mm)
32	09913-85210	Bearing installer (O.D.: 62 mm) (Not available in USA)
33	09914-24510	T-handle
34	09915-17410	Oil pressure gauge adaptor

ITEM	PART NO.	PART NAME
35	09915-24550	Adaptor socket 12.7 x 6.3 mm (Not available in USA)
36	09915-64510	Compression gauge
37	09915-74510	Oil pressure gauge
38	09915-77330	Oil pressure gauge (meter 0 – 10 kg/cm^2)
39	09916-14510	Valve lifter
40	09916-14910	Valve lifter attachment
41	99103-45012-003	Valve seat cutter (N-116)
42	99103-45012-006	Adapter (N-503-1)
43	99103-45012-005	Solid pilot (N-100-10)
44	99103-45010-006	T-handle (N-503)
45	09916-34541	Reamer handle
46	09916-34550	Valve guide reamer (5.5 mm)
47	09916-34580	Valve guide hole reamer (10.8 mm)
48	09916-44910	Valve guide remover
49	09916-44920	Valve guide installer attachment
50	09916-77310	Piston ring compressor
51	09916-84510	Tweezers
52	09920-53710	Clutch sleeve hub holder
53	09920-80710	Secondary driven gear coupling holder
54	09921-20210	Bearing remover
55	09923-74510	Bearing puller (20 – 38 mm)
56	09924-34510	Backlash measuring tool (27 – 50 mm)
57	09924-64510	Final drive gear coupling holder
58	09924-74510	Bearing and oil seal installer handle
59	09924-74520	Oil seal installer and remover
60	09924-74530	Bearing installer
61	09924-74550	Oil seal installer
62	09924-74560	Oil seal installer
63	09924-74570	Final driven gear bearing installer and remover
64	09924-84510	Bearing installer
65	09924-84520	Bearing installer (Not available in USA)
66	09930-13210	Socket wrench (For spark plug)
67	09930-14530	Universal joint
68	09930-30102	Sliding shaft
69	09930-30720	Rotor remover
70	09930-40113	Rotor and sprocket holder
71	09940-14911	Bearing nut socket wrench

ITEM	PART NO.	PART NAME
72	09940-34520	"T" handle
73	09940-34581	Attachment "F"
74	09940-44120	Air pressure gauge
75	09940-50112	Fork oil seal installer
76	09941-34513	Bearing installer
77	09941-50110	Bearing remover (Not available in USA)
78	09941-54911	Bearing race remover
79	09941-64510	Bearing and oil seal remover (30 – 45 mm)
80	09941-74910	Steering bearing installer
81	09941-84510	Bearing race remover
82	09943-74111	Fork oil level gauge



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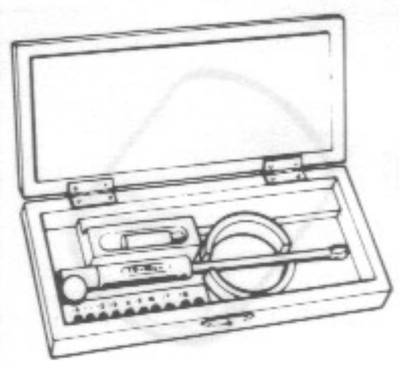

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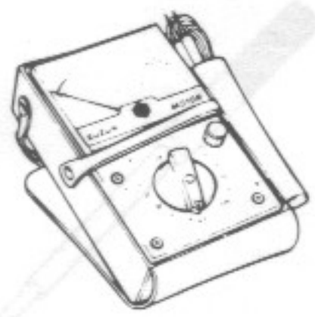

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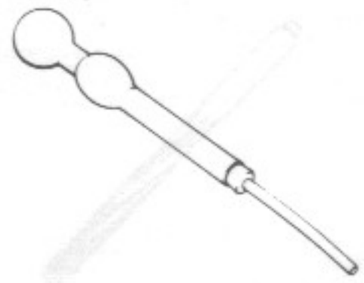

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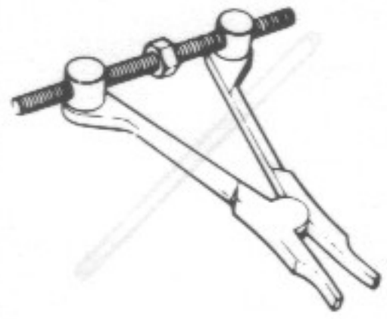

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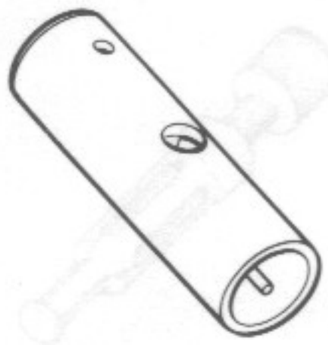

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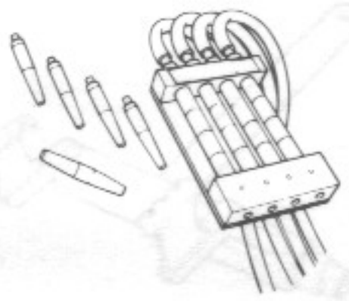

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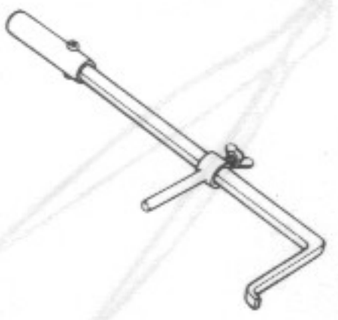

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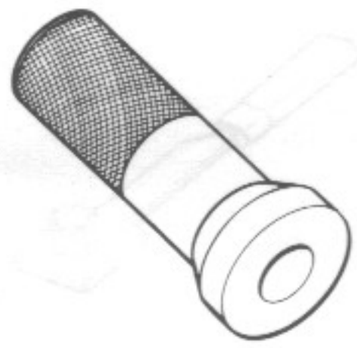

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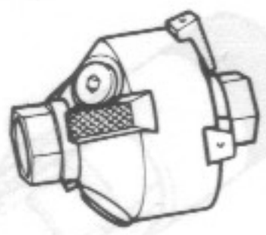

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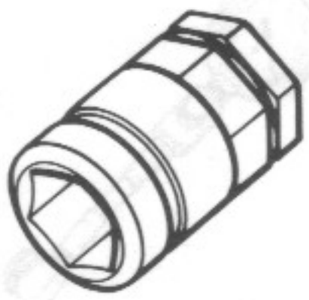

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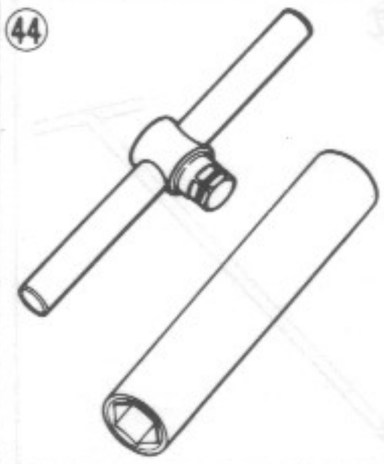

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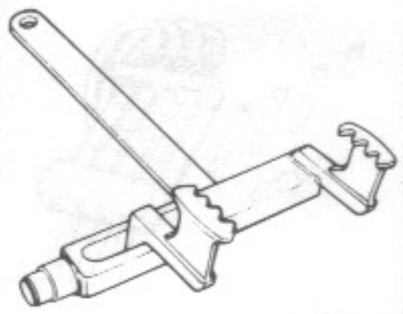
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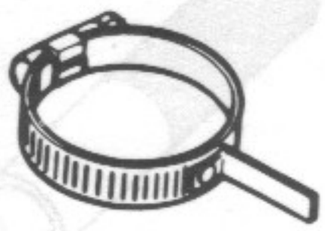
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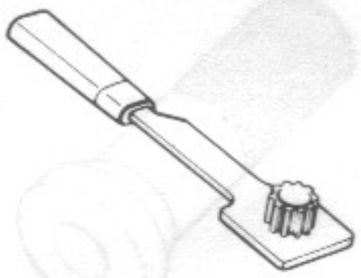
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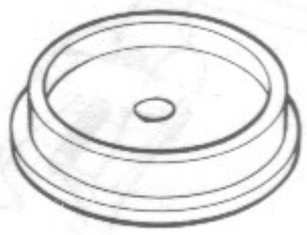
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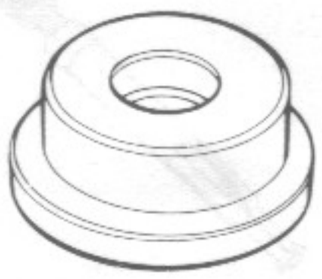
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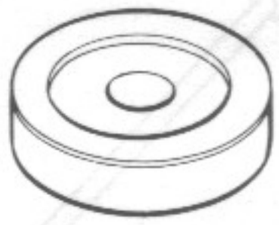
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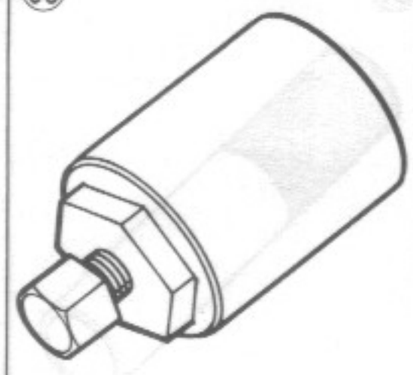
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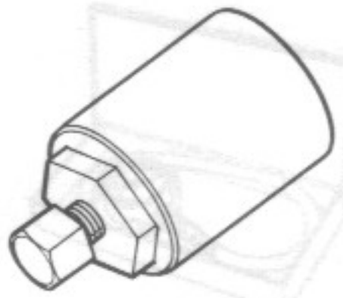
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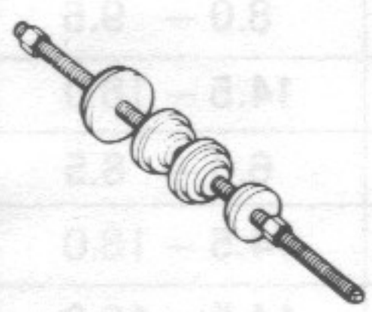
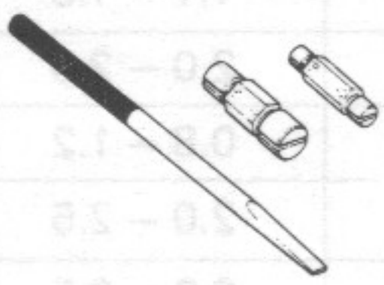
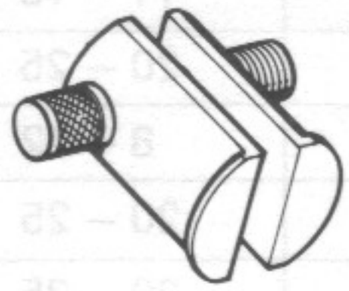
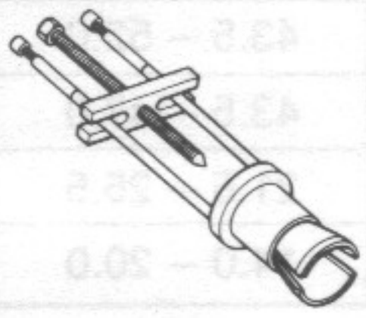
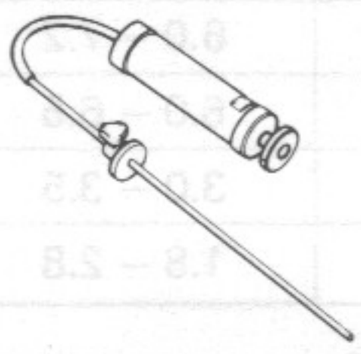
⑦⑥ 	⑦⑦ 	⑦⑧ 	⑦⑨	⑧⑩
⑧① 	⑧② 			

TIGHTENING TORQUE

ENGINE

ITEM		N·m	kg-m	lb-ft
Camshaft journal holder bolt		23 – 27	2.3 – 2.7	16.5 – 19.5
Cylinder head bolt		46 – 51	4.6 – 5.1	33.5 – 37.0
Cylinder head cover bolt		13 – 15	1.3 – 1.5	9.5 – 11.0
Cylinder head nut		8 – 12	0.8 – 1.2	6.0 – 8.5
Con-rod bearing cap bolt		33 – 37	3.3 – 3.7	24.0 – 27.0
Crankcase bolt	12 mm	60 – 70	6.0 – 7.0	43.5 – 50.5
	10 mm	45 – 55	4.5 – 5.5	32.5 – 40.0
	8mm	24	2.4	17.5
	6 mm	13	1.3	9.5
	8 mm Allen bolt	20 – 28	2.0 – 2.8	14.5 – 20.0
	6 mm Allen bolt	12 – 16	1.2 – 1.6	8.5 – 11.5
Neutral stopper housing		18 – 28	1.8 – 2.8	13.0 – 20.0
Oil pressure regulator		25 – 30	2.5 – 3.0	18.0 – 22.0
Oil pan plate bolt		4 – 7	0.4 – 0.7	3.0 – 5.0
Oil pan bolt		8 – 12	0.8 – 1.2	6.0 – 8.5
Rotor bolt		140 – 160	14.0 – 16.0	101.5 – 115.5
Oil pump bolt		7 – 9	0.7 – 0.9	5.0 – 6.5
Idler shaft driven sprocket bolt		55 – 65	5.5 – 6.5	40.0 – 47.0
Water pump bolt		7 – 11	0.7 – 1.1	5.0 – 8.0
Water pump drive sprocket bolt		80 – 110	8.0 – 11.0	58.0 – 79.5
Water pump chain tensioner bolt		12 – 17	1.2 – 1.7	8.5 – 12.5
Clutch sleeve hub nut		50 – 70	5.0 – 7.0	36.0 – 50.5

ITEM		N·m	kg-m	lb-ft
Clutch spring bolt		11 – 13	1.1 – 1.3	8.0 – 9.5
Cam chain tensioner bolt		20 – 25	2.0 – 2.5	14.5 – 18.0
Chain tensioner adjuster		8 – 12	0.8 – 1.2	6.0 – 8.5
Cam chain tensioner spring holder		20 – 25	2.0 – 2.5	14.5 – 18.0
Exhaust pipe clamp bolt		20 – 25	2.0 – 2.5	14.5 – 18.0
Muffler mounting bolt		27 – 43	2.7 – 4.3	19.5 – 31.0
Radiator mounting bolt		7 – 9	0.7 – 0.9	5.0 – 6.5
Engine mounting bolt		60 – 72	6.0 – 7.2	43.5 – 52.0
Down tube mounting bolt (Refer to page 3-11)	④	60 – 65	6.0 – 6.5	43.5 – 47.0
	⑤	30 – 35	3.0 – 3.5	21.5 – 25.5
Engine mounting bracket bolt		18 – 28	1.8 – 2.8	14.0 – 20.0

SHAFT DRIVE

ITEM	N·m	kg-m	lb-ft
Secondary driven bevel gear shaft nut	90 – 110	9.0 – 11.0	65.0 – 79.5
Secondary driven bevel gear housing bolt	18 – 28	1.8 – 2.8	13.0 – 20.0
Secondary drive bevel gear cover bolt	18 – 28	1.8 – 2.8	13.0 – 20.0
Secondary gear case bolt	18 – 28	1.8 – 2.8	13.0 – 20.0
Final drive bevel gear shaft nut	90 – 110	9.0 – 11.0	65.0 – 79.5
Final driven gear bearing retainer screw	8 – 10	0.8 – 1.0	6.0 – 7.0
Final gear bearing case bolt	20 – 26	2.0 – 2.6	14.5 – 19.0
Final drive bevel gear housing nut	35 – 45	3.5 – 4.5	25.5 – 32.5

CHASSIS

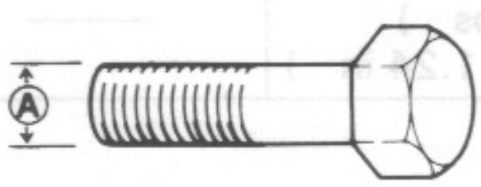
ITEM	N·m	kg-m	lb-ft
Steering stem head bolt	20 – 30	2.0 – 3.0	14.5 – 21.5
Steering stem head clamp bolt	15 – 25	1.5 – 2.5	11.0 – 18.0
Front fork upper clamp bolt	20 – 30	2.0 – 3.0	14.5 – 21.5
Front fork lower clamp bolt	15 – 25	1.5 – 2.5	11.0 – 18.0
Front fork cap bolt	15 – 30	1.5 – 3.0	11.0 – 21.5
Front fork damper rod bolt	32 – 42	3.2 – 4.2	23.0 – 30.5
Front axle nut	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 caliper mounting bolt	25 – 40	2.5 – 4.0	18.0 – 29.0
Front caliper axle bolt	15 – 20	1.5 – 2.0	11.0 – 14.5
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
Handlebar clamp bolt	12 – 20	1.2 – 2.0	8.5 – 14.5
Front brake master cylinder mounting bolt	5 – 8	0.5 – 0.8	3.5 – 6.0

ITEM	N·m	kg-m	lb-ft
Clutch master cylinder mounting bolt	5 – 8	0.5 – 0.8	3.5 – 6.0
Front disc bolt	20 – 30	2.0 – 3.0	14.5 – 21.5
Rear axle nut	50 – 80	5.0 – 8.0	36.0 – 58.0
Rear axle clamp bolt	25 – 35	2.5 – 3.5	18.0 – 25.5
Rear torque stop bolt	80 – 110	8.0 – 11.0	58.0 – 79.5
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
Swing arm bearing holder bolt	3.5 – 4.5	0.35 – 0.45	2.5 – 3.0
Swing arm bearing holder bolt lock nut	100 – 120	10.0 – 12.0	72.5 – 87.0
Rear unit fitting nut (Upper, Lower)	40 – 60	4.0 – 6.0	29.0 – 43.5
Cushion lever nut	70 – 100	7.0 – 10.0	50.5 – 72.5
Rear cushion rod-nut (Upper, Lower)	20 – 30	2.0 – 3.0	14.5 – 21.5
Rear wheel driven joint bolt	8 – 12	0.8 – 1.2	6.0 – 8.5
Final case joint nut	35 – 45	3.5 – 4.5	25.5 – 32.5

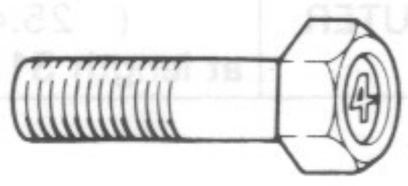
TIGHTENING TORQUE CHART

For other bolts and nuts not listed above, refer to this chart:

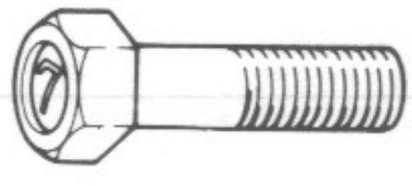
Bolt Diameter Ⓐ (mm)	Conventional or "4" marked bolt			"7" marked bolt		
	N·m	kg-m	lb-ft	N·m	kg-m	lb-ft
4	1.0 – 2.0	0.1 – 0.2	0.7 – 1.5	1.5 – 3.0	0.15 – 0.3	1.0 – 2.0
5	2.0 – 4.0	0.2 – 0.4	1.5 – 3.0	3.0 – 6.0	0.3 – 0.6	2.0 – 4.5
6	4.0 – 7.0	0.4 – 0.7	3.0 – 5.0	8.0 – 12.0	0.8 – 1.2	6.0 – 8.5
8	10.0 – 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 – 40.8	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.	26.0 (1.02)	———
		EX.	23.0 (0.91)	———
Valve lift	Front side	IN.	7.10 (0.280)	———
	Rear side		7.75 (0.305)	
	Front & Rear side	EX.	6.75 (0.266)	———
Lash-adjuster plunger stroke		0—0.2 (0—0.008)		———
Valve guide to valve stem clearance		IN.	0.020—0.047 (0.0008—0.0019)	0.35 (0.014)
		EX.	0.035—0.062 (0.0014—0.0024)	0.35 (0.014)
Valve guide I.D.		IN. & EX.	5.500—5.512 (0.2165—0.2170)	———
Valve stem O.D.		IN.	5.465—5.480 (0.2152—0.2157)	———
		EX.	5.450—5.465 (0.2146—0.2152)	———
Valve stem runout		IN. & EX.	———	0.05 (0.002)
Valve head thickness		IN. & EX.	———	0.5 (0.02)
Valve stem end length		IN. & EX.	———	3.3 (0.13)
Valve seat width		IN. & EX.	0.9—1.1 (0.035—0.043)	———
Valve head radial runout		IN. & EX.	———	0.03 (0.001)
Valve spring free length (IN. & EX.)		INNER	———	31.7 (1.25)
		OUTER	———	35.5 (1.40)
Valve spring tension (IN. & EX.)		INNER	5.1—6.1 kg (11.2—13.4 lbs) at length 28 mm (1.10 in)	———
		OUTER	11.5—13.3 kg (25.4—29.3 lbs) at length 31.5 mm (1.24 in)	———

CAMSHAFT + CYLINDER HEAD

Unit: mm (in)

ITEM		STANDARD		LIMIT
Cam height	Front side	IN.	32.711—32.751 (1.2878—1.2894)	32.42 (1.276)
	Rear side		33.049—33.089 (1.3011—1.3027)	32.75 (1.289)
	Front & Rear side	EX.	32.470—32.510 (1.2783—1.2799)	32.17 (1.267)
Camshaft journal oil clearance		IN. & EX.	0.032—0.066 (0.0013—0.0026)	0.150 (0.0059)
Camshaft journal holder I.D.		IN. & EX.	22.012—22.025 (0.8666—0.8671)	———
Camshaft journal O.D.		IN. & EX.	21.959—21.980 (0.8645—0.8654)	———
Camshaft runout		IN. & EX.	———	0.10 (0.004)
Cam chain 20-pitch length		———		161.0 (6.34)
Cam chain pin (at aligning mark)		Front	18th pin	———
		Rear	18th pin	———
Idler chain 20-pitch length		———		161.0 (6.34)
Idler chain pin (at aligning mark)		29th pin		———
Cylinder head distortion		———		0.10 (0.004)

CYLINDER + PISTON + PISTON RING

Unit: mm (in)

ITEM	STANDARD	LIMIT
Compression pressure	11—15 kg/cm² (156—213 psi)	9 kg/cm² (128 psi)
Compression pressure difference	———	2 kg/cm² (28 psi)
Piston to cylinder clearance	0.050—0.060 (0.0020—0.0024)	0.120 (0.0047)
Cylinder bore	69.000—69.015 (2.7165—2.7171)	69.080 (2.7197)
Piston diam.	68.945—68.960 (2.7144—2.7150) Measure at 15 mm (0.6 in) from the skirt end.	68.880 (2.7118)
Cylinder distortion	———	0.10 (0.004)
Piston ring free end gap	1st N Apporx. 8.5 (0.33)	6.8 (0.27)
	2nd N Approx. 10.5 (0.41)	8.4 (0.33)
Piston ring end gap	1st & 2nd 0.10—0.35 (0.004—0.014)	0.70 (0.028)
Piston ring to groove clearance	1st ———	0.18 (0.007)
	2nd ———	0.15 (0.006)

ITEM		STANDARD	LIMIT
Piston ring groove width	1st	1.01—1.03 (0.0398—0.0406)	———
	2nd	1.21—1.23 (0.0476—0.0484)	———
	Oil	2.51—2.53 (0.0988—0.0996)	———
Piston ring thickness	1st	0.975—0.990 (0.0384—0.0390)	———
	2nd	1.170—1.190 (0.0461—0.0469)	———
Piston pin bore		18.002—18.008 (0.7087—0.7090)	18.030 (0.7098)
Piston pin O.D.		17.996—18.000 (0.7085—0.7087)	17.980 (0.7079)

CONROD + CRANKSHAFT

Unit: mm (in)

ITEM		STANDARD	LIMIT
Conrod small end I.D.		18.010—18.018 (0.7091—0.7094)	18.040 (0.7102)
Conrod big end side clearance		0.10—0.25 (0.004—0.010)	0.30 (0.012)
Conrod big end width		19.95—20.00 (0.785—0.787)	———
Crank pin width		40.10—40.15 (1.579—1.581)	———
Conrod big end oil clearance		0.032—0.056 (0.0013—0.0022)	0.090 (0.0035)
Crank pin O.D.		35.976—36.000 (1.4164—1.4173)	———
Crankshaft journal oil clearance		0.020—0.044 (0.0008—0.0017)	0.080 (0.0031)
Crankshaft journal O.D.		39.976—40.000 (1.5739—1.5748)	———
Crankshaft thrust bearing thickness	Left side	2.850—3.000 (0.1122—0.1181)	———
	Right side	2.925—2.950 (0.1152—0.1161)	———
Crankshaft thrust clearance		0.045—0.100 (0.0018—0.0039)	———
Crankshaft journal holder width		24.05—24.13 (0.947—0.950)	———
Crankshaft journal width		30.00—30.05 (1.181—1.183)	———
Crankshaft runout		———	0.05 (0.002)

OIL PUMP + FUEL PUMP + WATER PUMP

Unit: mm (in)

ITEM	STANDARD	LIMIT
Oil pump reduction ratio	2.005 (74/39 x 37/35)	———
Oil pressure (at 60°C, 140°F)	Above 4.5 kg/cm² (64 psi) Below 7.5 kg/cm² (107 psi) at 3 000 r/min.	———
Fuel pump discharge	Over 500 ml/min.	———
Fuel pump resistance	1—2 Ω	———
Water pump drive chain slack	3—5 (0.1—0.2)	———
Water pump drive chain 10-pitch length	———	64.7 (2.55)

CLUTCH

Unit: mm (in)

ITEM	STANDARD	LIMIT
Drive plate thickness	2.45—2.75 (0.096—0.108)	2.15 (0.085)
Drive plate claw width	15.8—16.0 (0.62—0.63)	15.0 (0.59)
Driven plate distortion	———	0.1 (0.004)
Clutch spring free length	———	34.0 (1.34)
Clutch master cylinder bore	14.000—14.043 (0.5512—0.5529)	———
Clutch master cylinder piston diam.	13.957—13.984 (0.5495—0.5506)	———
Clutch release cylinder bore	38.100—38.162 (1.5000—1.5024)	———
Clutch release cylinder piston diam.	38.042—38.075 (1.4977—1.4990)	———

THERMOSTAT + RADIATOR + FAN

ITEM		STANDARD	LIMIT
Thermostat valve opening temperature		75.0 ± 1.5°C (167 ± 2.7°F)	———
Thermostat valve lift		Over 8 mm (0.3 in) at 90°C (194°F)	———
Radiator cap valve release pressure		0.90 ± 0.15 kg/cm², (12.8 ± 2.1 psi, 90 ± 15 kPa)	
Electric fan thermo-switch operating temperature	ON	105 ± 3°C (221 ± 5.4°F)	———
	OFF	Approx. 98°C (208.4°F)	———
Electric fan relay resistance		Approx. 70 Ω	———
Thermo-gauge resistance		27.4 Ω at 100°C (212°F)	———

TRANSMISSION

Unit: mm (in)

ITEM	STANDARD	LIMIT
Primary reduction ratio	1.897 (74/39)	———
Secondary reduction ratio	1.066 (16/15)	———
Final reduction ratio	3.090 (34/11)	———

ITEM		STANDARD	LIMIT
Gear ratios	Low	2.500 (35/14)	———
	2nd	1.777 (32/18)	———
	3rd	1.391 (32/23)	———
	4th	1.153 (30/26)	———
	5ht	0.960 (24/25)	———
	Top	0.806 (25/31)	———
Shift fork to groove clearance		0.10—0.30 (0.004—0.012)	0.50 (0.020)
Shift fork groove width		5.5—5.6 (0.217—0.220)	———
Shift fork thickness		5.3—5.4 (0.209—0.213)	———

SHAFT DRIVE

Unit: mm (in)

ITEM		STANDARD	LIMIT
Secondary bevel gear backlash		0.05—0.32 (0.002—0.013)	———
Final bevel gear backlash	Drive side	0.03—0.64 (0.001—0.025)	———
	Driven side	0.02—0.35 (0.0008—0.0138)	
Secondary drive bevel gear preload		3—5 kg-cm (2.6—4.4 lb-in)	———
Secondary driven bevel gear preload		4—7 kg-cm (3.5—6.1 lb-in)	———
Final drive bevel gear preload		4—7 kg-cm (3.5—6.1 lb-in)	———

CARBURETOR

ITEM		SPECIFICATION
Carburetor type		MIKUNI BDS33SS
Bore size		33 mm (1.30 in)
I.D. No.		07A10
Idle r/min.		1 100 ± 100 r/min.
Fuel level		17.0 ± 0.5 mm (0.67 ± 0.02 in)
Float height		11.5 ± 1.0 mm (0.45 ± 0.04 in)
Main jet	(M.J.)	Nos.1 & 3 #92.5, Nos.2 & 4 #90
Main air jet	(M.A.J.)	0.6 mm
Jet needle	(J.N.)	Nos.1 & 3 5T05 Nos.2 & 4 5T01
Needle jet	(N.J.)	Y-6
Throttle valve	(Th.V.)	# 120
Pilot jet	(P.J.)	# 25
By pass	(B.P.)	0.9 mm, 0.8 mm, 0.8 mm
Pilot outlet	(P.O.)	0.7 mm
Valve seat	(V.S.)	1.5 mm

ITEM		SPECIFICATION
Starter jet	(G.S.)	# 32.5
Pilot screw	(P.S.)	PRE-SET
Pilot air jet	(P.A.J.)	PRE-SET
Throttle cable play		2–3 mm (0.08–0.12 in)
Choke cable play		0.5–1.0 mm (0.02–0.04 in)

ELECTRICAL

Unit: mm (in)

ITEM			SPECIFICATION	NOTE
Ignition timing			10° B.T.D.C. Below 1 500 ± 250 r/min. and 35° B.T.D.C. Above 3 500 ± 250 r/min.	
Firing order			1 · 4 · 3 · 2	
Spark plug	Type		NGK: D8EA N.D.: X24ES-U	
	Gap		0.6–0.7 (0.024–0.028)	
Spark performance			Over 8 (0.3) at 1 atm.	
Signal coil resistance			90–140 Ω	G – BI, B – Y
Ignition coil resistance	Primary		3–5 Ω	⊕ tap- ⊖ tap
	Secondary		10–20 kΩ	Plug cap– Plug cap
Generator no-load voltage			More than 65 V (AC) at 5 000 r/min.	
Regulated voltage			14–15 V at 5 000 r/min.	
Starter motor	Brush length MITSUBA		Limit: 6 (0.24)	
	Commutator under cut		Limit: 0.2 (0.008)	
Starter relay resistance			3–5 Ω	
Battery	Type designation		YB14L-B2 or FB14L-B2	
	Capacity		12V50.4kC(14Ah)/10HR	
	Standard electrolyte S.G.		1.28 at 20°C (68°F)	
Fuse size	Headlight		10 A	
	Signal		10 A	
	Ignition		10 A	
	Tail		10 A	
	Power Source		10 A	
Circuit breaker			30 A	

WATTAGE

Unit: W

ITEM		SPECIFICATION
Headlight	HI	60
	LO	55

ITEM	SPECIFICATION
Tail/Brake light	8/23
Turn signal light	23
Speedometer light	3.4
Tachometer light	3.4
Fuel level indicator light	3
Turn signal indicator light	3
High beam indicator light	1.7
Neutral indicator light	3
Oil pressure indicator light	3
Side stand check light	3
Temperature meter light	3.4
License plate 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	Above 15 (0.6)		———
Brake drum I.D.	Rear	———	180.7 (7.11)
Brake lining thickness	———		1.5 (0.06)
Brake disc thickness	Front	5.0 ± 0.20 (0.20 ± 0.008)	4.5 (0.18)
Brake disc runout	———		0.30 (0.012)
Master cylinder bore	Front	15.870—15.913 (0.6248—0.6265)	———
Master cylinder piston diam.	Front	15.827—15.854 (0.6231—0.6242)	———
Brake caliper cylinder bore	Front	38.180—38.256 (1.5031—1.5061)	———
Brake caliper piston diam.	Front	38.098—38.148 (1.4999—1.5019)	———
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	110/80-19 59H	———
	Rear	140/80-16 68H	———
Tire tread depth	Front	———	1.6 (0.06)
	Rear	———	2.0 (0.08)

SUSPENSION

Unit: mm (in)

ITEM	STANDARD	LIMIT	NOTE
Front fork stroke	160 (6.3)	———	
Front fork spring free length	———	433 (17.0)	
Front fork oil level	142 (5.6)	———	
Front fork air pressure	30 kPa 0.3 kg/cm², 4.3 psi	———	
Rear wheel travel	115 (4.5)	———	
Swing arm pivot shaft runout	———	0.3 (0.012)	

TIRE PRESSURE

COLD INFLATION TIRE PRESSURE	SOLO RIDING			DUAL RIDING		
	kPa	kg/cm²	psi	kPa	kg/cm²	psi
FRONT	200	2.0	28	225	2.25	32
REAR	225	2.25	32	280	2.8	40

FUEL + OIL + COOLING SOLUTION

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	13.0 L (3.4/2.9 US/Imp gal)		
reserve	3.0 L (3.2/2.6 US/Imp qt)		
Engine oil type and grade	SAE 10W/40, API SE or SF		
Engine oil capacity	Change	3 200 ml (3.4/2.8 US/Imp qt)	
	Filter change	3 700 ml (3.9/3.3 US/Imp qt)	
	Overhaul	4 200 ml (4.4/3.7 US/Imp qt)	
Front fork oil type	Fork oil #15		
Front fork oil capacity (each leg)	479 ml (16.2/16.9 US/Imp oz)		
Propeller shaft oil capacity	90 ml (3.0/3.2 US/Imp oz)		
Bevel gear and propeller shaft oil type	SAE 90 hypoid gear oil with GL-5 under API classification		
Bevel gear oil capacity	Secondary	180—200 ml (6.1/6.3 – 6.8/7.0 US/Imp oz)	
	Final	170—190 ml (5.7/6.0 – 6.4/6.7 US/Imp oz)	
Brake and clutch fluid type	DOT 3 or DOT 4		
Cooling solution including reservoir tank	3 500 ml (3.7/3.1 US/Imp qt)		
reservoir tank	450 ml (0.5/0.4 US/Imp qt)		

Prepared by

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