

SUZUKI

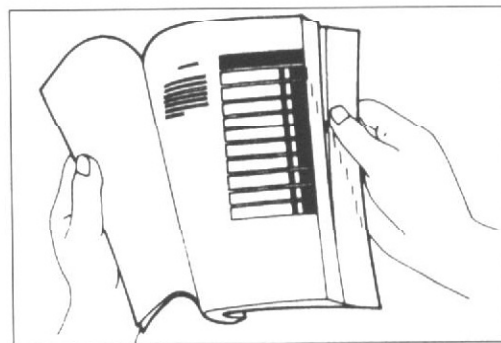
DR-Z400

M.Y 2000-2007

SERVICE MANUAL

HOW TO USE THIS MANUAL TO LOCATE WHAT YOU ARE LOOKING FOR:

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



COMPONENT PARTS AND WORK TO BE DONE

Under the name of each system or unit there is an exploded view which provides work instructions and other service information (e.g., tightening torque, lubricating points, and locking agent points).

Example: Front wheel


① Front axle
 ② Odometer gearbox
 ③ Bearing (R)
 ④ Front wheel
 ⑤ Spacer
 ⑥ Bearing (L)
 ⑦ Dust seal
 ⑧ Brake disc
 ⑨ Spacer
 ⑩ Washer

(A) Front axle nut
 (B) Brake disc mounting bolt

| ITEM | N·m | kgf-m | lb-ft |
|------|-----|-------|-------|
| (A) | 42 | 4.2 | 30.5 |
| (B) | 10 | 1.0 | 7.0 |

SYMBOLS

Listed in the table below are the symbols indicating instructions and other information necessary for servicing. The meaning of each symbol is also included in the table.

| SYMBOL | DEFINITION | SYMBOL | DEFINITION |
|---|---|---|---|
|  | Torque control required. Data beside it indicates specified torque. |  | Apply THREAD LOCK "1342". 99000-32050 |
|  | Indicates service data. |  | Apply or use brake fluid. |
|  | Apply oil. Use engine oil unless otherwise specified. |  | Measure in voltage range. |
|  | Apply molybdenum oil solution. (mixture of engine oil and SUZUKI MOLY PASTE in a ratio of 1:1) |  | Measure in resistance range. |
|  | Apply SUZUKI SUPER GREASE "A". 99000-25030 (For USA) 99000-25010 (For the other countries) |  | Measure in current range. |
|  | Apply SUZUKI SILICONE GREASE. 99000-25100 |  | Measure in diode test range. |
|  | Apply SUZUKI MOLY PASTE. 99000-25140 |  | Measure in continuity test range. |
|  | Apply SUZUKI BOND "1207B". 99104-31140 (For USA) 99000-31140 (For the other countries) |  | Use special tool. |
|  | Apply SUZUKI BOND "1215". 99000-31110 (Except USA) |  | Use engine coolant. 99000-99032-11X (Except USA) |
|  | Apply THREAD LOCK SUPER "1303". 99000-32030 |  | Use fork oil. 99000-99001-SS5 |
|  | Apply THREAD LOCK SUPER "1322". 99000-32110 (Except USA) | | |

GENERAL INFORMATION

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WARNING/CAUTION/NOTE

Please read this manual and follow its instructions carefully. To emphasize special information, the symbol and the words WARNING, CAUTION and NOTE have special meanings. Pay special attention to the messages highlighted by these signal words.

▲ WARNING

Indicates a potential hazard that could result in death or injury.

▲ CAUTION

Indicates a potential hazard that could result in motorcycle damage.

NOTE:

Indicates special information to make maintenance easier or instructions clearer.

Please note, however, that the warnings and cautions contained in this manual cannot possibly cover all potential hazards relating to the servicing, or lack of servicing, of the motorcycle. In addition to the WARNINGS and CAUTIONS stated, you must use good judgement and basic mechanical safety principles. If you are unsure about how to perform a particular service operation, ask a more experienced mechanic for advice.

GENERAL PRECAUTIONS

▲ WARNING

- * Proper service and repair procedures are important for the safety of the service mechanic and the safety and reliability of the motorcycle.
- * When two or more persons work together, pay attention to the safety of each other.
- * When it is necessary to run the engine indoors, make sure that exhaust gas is forced outdoors.
- * When working with toxic or flammable materials, make sure that the area you work in is well ventilated and that you follow all of the manufacturer's instructions.
- * Never use gasoline as a cleaning solvent.
- * To avoid getting burned, do not touch the engine, engine oil, radiator, and exhaust system until they have cooled.
- * After servicing the fuel, oil, engine coolant, exhaust or brake systems, check all of the lines, and fittings related to the system for leaks.

⚠ CAUTION

- * If parts replacement is necessary, replace the parts with SUZUKI Genuine Parts or their equivalent.
- * When removing parts that are to be reused, keep them arranged in an orderly manner so that they may be reinstalled in the proper order.
- * Be sure to use special tools when instructed.
- * Make sure that all parts used in reassembly are clean. Lubricate them when specified.
- * Use the specified lubricants, bonds, or sealants.
- * When removing the battery, disconnect the \ominus battery lead wire first, then the \oplus battery lead wire.
- * When reconnecting the battery, connect the \oplus battery lead wire first, then the \ominus battery lead wire. Finally, cover the \oplus battery terminal with the terminal cover.
- * When performing service to electrical parts, disconnect the \ominus battery lead wire, unless the service procedure requires the battery power.
- * When tightening cylinder head and crankcase nuts and bolts, tighten the larger sizes first. Always tighten the nuts and bolts from the inside working out, diagonally and to the specified torque.
- * Whenever you remove oil seals, gaskets, packing, O-rings, self-locking nuts, locking washers, cotter pins, circlips, and other specified parts, be sure to replace them with new ones. Also, before installing these new parts, be sure to remove any left over material from the mating surfaces.
- * Never reuse a circlip. When installing a new circlip, take care not to expand the end gap larger than required to slip the circlip over the shaft. After installing a circlip, always ensure it is completely seated in its groove and securely fitted.
- * Use a torque wrench to tighten fasteners to the specified torque. Wipe off grease and oil if a thread is smeared with them.
- * After reassembling, check parts for tightness and proper operation.

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

SUZUKI DR-Z400



RIGHT SIDE



LEFT SIDE

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

SERIAL NUMBER LOCATION

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



FUEL, OIL, AND ENGINE COOLANT RECOMMENDATIONS

FUEL (FOR USA AND CANADA)

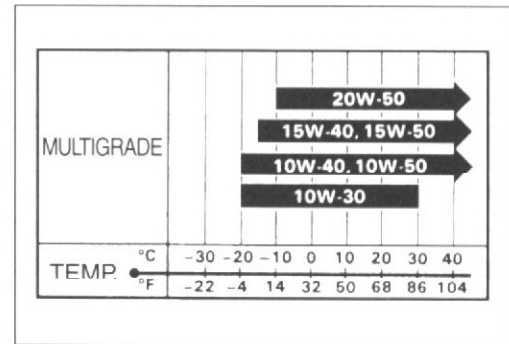
- Use only unleaded gasoline of at least 87 pump octane ($\frac{R+M}{2}$) method or 91 octane or higher rated by the Research Method.
- SUZUKI recommends that customers use alcohol-free unleaded gasoline whenever possible.
- Use of blended gasoline containing MTBE (Methyl Tertiary Butyl Ether) is permitted.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

FUEL (FOR THE OTHER COUNTRIES)

Use unleaded gasoline that is graded 91 octane or higher by the Research Method.

ENGINE OIL

SUZUKI recommends the use of SUZUKI PERFORMANCE 4 MOTOR OIL to ensure longer service life of your motorcycle. Use only oils which are rated SF or SG under the API service classification. The recommended viscosity is SAE 10W-40. If an SAE 10W-40 motor oil is not available, select an alternative according to the following chart.



BRAKE FLUID

BF Specification and classification: DOT 4

⚠ WARNING

- * This motorcycle uses a glycol-based brake fluid. Do not use or mix other types of brake fluid such as silicone-based and petroleum-based fluids for refilling the system, otherwise serious damage will result to the brake system.
- * Do not use any brake fluid taken from old, used, or unsealed containers.
- * Do not reuse brake fluid left over from the last servicing or which has been stored for a long period of time.

FRONT FORK OIL

Use SUZUKI FORK OIL SS-05 or an equivalent fork oil.

ENGINE COOLANT

Since antifreeze also has corrosion- and rust-inhibiting properties, always use engine coolant containing antifreeze, even if the atmospheric temperature does not go below the freezing point.

Use an antifreeze designed for aluminum radiators. SUZUKI recommends the use of SUZUKI COOLANT antifreeze. If this is not available, use an equivalent antifreeze for aluminum radiators.

Mix only distilled water with the antifreeze. Other types of water can corrode and clog the aluminum radiator.

Mix distilled water and antifreeze at a ratio of 50:50 – 40:60.

For more information, refer to page 5-4 in the Cooling System section.

⚠ CAUTION

The percentage of antifreeze in the coolant should be between 50 to 60%. If the percentage of antifreeze is above or below this range the coolant's frost protection and rust-inhibiting capabilities will be reduced. Always keep the antifreeze content above 50% even if the atmospheric temperature does not go below the freezing point.

BREAK-IN PROCEDURES

During manufacturing only the best possible materials are used and all machined parts are finished to a very high standard. 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. Refer to the following break-in engine speed recommendations.

- Keep to these brake-in throttle positions during the break-in period.

Break-in throttle position

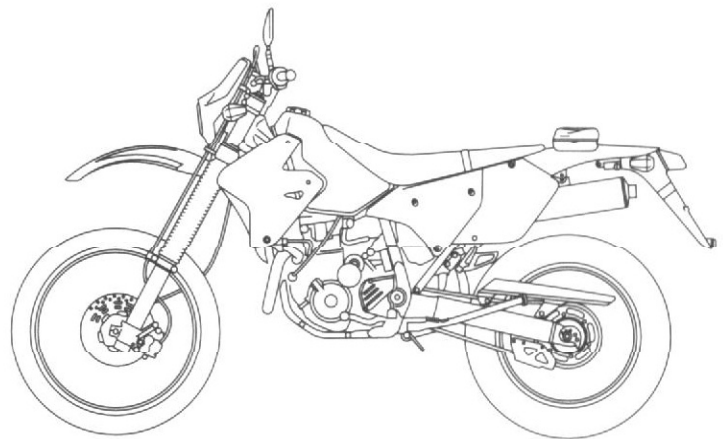
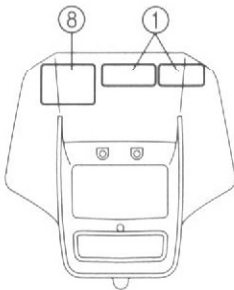
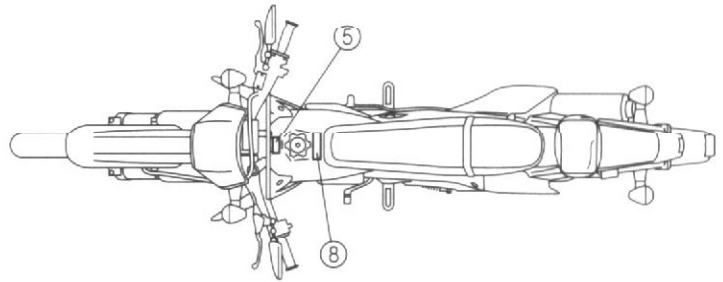
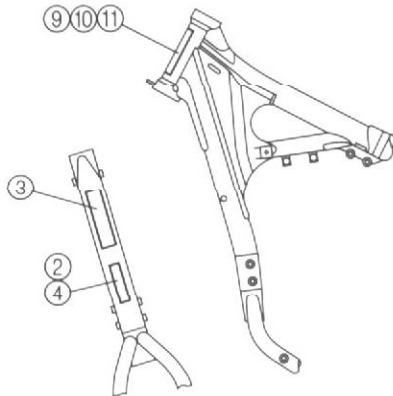
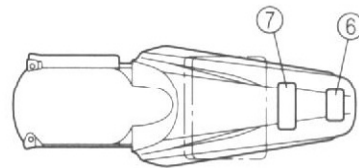
Initial 800 km (500 miles): Less than 1/2 throttle

Up to 1 600 km (1 000 miles): Less than 3/4 throttle

- Upon reaching an odometer reading of 1 600 km (1 000 miles) you can subject the motorcycle to full throttle operation for short periods of time.

INFORMATION LABELS

| NO | LABEL or PLATE NAME | APPLIED SPECIFICATION | | | | | |
|----|-------------------------|-----------------------|------|------|------|------|------|
| | | E-02 | E-03 | E-19 | E-28 | E-33 | E-54 |
| ① | Engine starting label | ○ | ○ | ○ | ○ | ○ | ○ |
| ② | Noise label | — | ○ | — | — | ○ | — |
| ③ | Information label | — | ○ | — | — | ○ | — |
| ④ | ICES Canada label | — | — | — | ○ | — | — |
| ⑤ | Fuel caution label | ○ | — | — | — | — | — |
| ⑥ | Manual notice label | — | ○ | — | — | ○ | — |
| ⑦ | Tire air pressure label | ○ | ○ | ○ | ○ | ○ | ○ |
| ⑧ | Warning safety label | ○ | ○ | ○ | ○ | ○ | ○ |
| ⑨ | ID plate | ○ | — | ○ | — | — | ○ |
| ⑩ | Safety plate | — | ○ | — | — | ○ | — |
| ⑪ | Compliance label | — | — | — | ○ | — | — |



SPECIFICATIONS

DIMENSIONS AND DRY MASS

| | |
|------------------------|--------------------|
| Overall length | 2 310 mm (90.9 in) |
| Overall width | 875 mm (34.4 in) |
| Overall height | 1 240 mm (48.8 in) |
| Wheelbase | 1 485 mm (58.5 in) |
| Ground clearance | 300 mm (11.8 in) |
| Seat height | 935 mm (36.8 in) |
| Dry mass | 132 kg (291 lbs) |

ENGINE

| | |
|---------------------------|-----------------------------------|
| Type | Four-stroke, liquid-cooled, DOHC |
| Number of cylinders | 1 |
| Bore | 90.0 mm (3.543 in) |
| Stroke | 62.6 mm (2.465 in) |
| Piston displacement | 398 cm ³ (24.3 cu. in) |
| Compression ratio | 11.3 : 1 |
| Carburetor | MIKUNI BSR36 |
| Air cleaner | Polyurethane foam element |
| Starter system | Electric |
| Lubrication system | Dry sump |

TRANSMISSION

| | |
|-------------------------------|-----------------------|
| Clutch | Wet multi-plate type |
| Transmission | 5-speed constant mesh |
| Gearshift pattern | 1-down, 4-up |
| Primary reduction ratio | 2.960 (74/25) |
| Final reduction ratio | 2.933 (44/15) |
| Gear ratios, Low | 2.285 (32/14) |
| 2nd | 1.733 (26/15) |
| 3rd | 1.375 (22/16) |
| 4th | 1.090 (24/22) |
| Top | 0.863 (19/22) |
| Drive chain | RK520KZO, 112 links |

CHASSIS

| | |
|-------------------------|---|
| Front suspension | Telescopic, coil spring, oil damped, spring preload fully adjustable, compression damping force 11-way adjustable |
| Rear suspension | Link type, coil spring, oil damped, spring preload fully adjustable, compression damping force 26-way adjustable |
| Front fork stroke | 288 mm (11.3 in) |
| Rear wheel travel | 295 mm (11.6 in) |
| Caster | 27° 10' |
| Trail | 107 mm (4.21 in) |
| Steering angle | 45° (right & left) |
| Turning radius | 2.2 m (7.2 ft) |
| Front brake | Disc brake |
| Rear brake | Disc brake |
| Front tire size | 80/100-21 51P |
| Rear tire size | 120/90-18 65P |

ELECTRICAL

| | |
|-----------------------------|---------------------------------|
| Ignition type | Electronic ignition (CDI) |
| Ignition timing | 7° BTDC at 1 500 r/min |
| Spark plug | NGK: CR8E DENSO: U24ESR-N |
| Generator | Three-phase A.C. generator |
| Fuse | 20 A |
| Battery | 12 V 23.4 kC (6.5 Ah)/10 HR |
| Headlight | 12 V 60/55 W |
| Position light | 12 V 4 W For E-02, 19, 54 |
| Brake light/taillight | 12 V 21/5 W |
| Turn signal light | 12 V 21 W |

CAPACITIES

| | |
|------------------------------------|--|
| Fuel tank, including reserve | 9.5 L (2.5 US gal, 2.1 Imp gal) For E-33 |
| | 10.0 L (2.6 US gal, 2.2 Imp gal) For the other countries |
| reserve | 2.3 L (0.6 US gal, 0.5 Imp gal) |
| Engine oil, oil change | 1 700 ml (1.8 US qt, 1.5 Imp qt) |
| oil and filter change | 1 800 ml (1.9 US qt, 1.6 Imp qt) |
| engine overhaul | 1 900 ml (2.0 US qt, 1.7 Imp qt) |
| Front fork oil | 709 ml (24.0 US oz, 25.0 Imp oz) |
| Engine coolant | 1 250 ml (1.3 US qt, 1.1 Imp qt) |

NOTE:

These specifications are subject to change without notice.

COUNTRY AND AREA CODES

The following are codes and their applicable country or area.

| CODE | COUNTRY OR AREA |
|------|------------------|
| E-02 | UK |
| E-03 | USA |
| E-19 | EU |
| E-28 | Canada |
| E-33 | California (USA) |
| E-54 | Israel |

PERIODIC MAINTENANCE

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PERIODIC MAINTENANCE SCHEDULE

The chart below lists the recommended intervals for all the required periodic service work necessary to keep the motorcycle operating at peak performance and economy. Maintenance intervals are expressed in terms of kilometers, miles and months, and are dependent on whichever comes first.

NOTE:

More frequent servicing may be performed on motorcycles that are used under severe conditions.

PERIODIC MAINTENANCE CHART

| Item | Interval | | 1 000 | 6 000 | 12 000 | 18 000 | 24 000 |
|---|----------|-------|--|-------|--------|--------|--------|
| | km | miles | 600 | 4 000 | 7 500 | 11 000 | 15 000 |
| | months | | 1 | 6 | 12 | 18 | 24 |
| Air cleaner | | | – | I | I | R | I |
| Exhaust pipe nut and bolt and muffler nut and bolts | | | T | – | T | – | T |
| Tappet clearance | | | – | – | – | – | I |
| Spark plug | | | – | I | R | I | R |
| Spark arrester (For E-03, 28, 33) | | | – | C | C | C | C |
| Fuel line | | | – | I | I | I | I |
| | | | Replace every four years. | | | | |
| Engine oil | | | R | R | R | R | R |
| Engine oil filter | | | R | – | – | R | – |
| Engine oil hoses | | | I | I | I | I | I |
| Carburetor | | | I | I | I | I | I |
| Engine coolant | | | Replace every two years. | | | | |
| Radiator hose | | | – | I | I | I | I |
| Clutch | | | – | I | I | I | I |
| Drive chain | | | I | I | I | I | I |
| | | | Lubricate every 1 000 km (600 miles) | | | | |
| Brakes | | | I | I | I | I | I |
| Brakes fluid | | | – | I | I | I | I |
| Brake hoses | | | – | I | I | I | I |
| | | | Replace every two years. | | | | |
| | | | Replace every four years. | | | | |
| Tires | | | – | I | I | I | I |
| Spoke nipples | | | I | I | I | I | I |
| Steering | | | I | – | I | – | I |
| Front fork | | | – | – | I | – | I |
| Rear suspension | | | – | – | I | – | I |
| Evaporative emission control system (For E-33) | | | Inspect every 12 000 km (7 500 miles) Replace vapor hoses every four years. | | | | |
| PAIR (Air supply) system (For E-02, 19, 54) | | | – | – | I | – | I |
| Chassis nuts and bolts | | | T | T | T | T | T |

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

R = Replace

T = Tighten

C = Clean

MAINTENANCE AND TUNE-UP PROCEDURES

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

AIR CLEANER

**Inspect every 6 000 km (4 000 miles, 6 months).
Replace every 18 000 km (11 000 miles, 18 months).**

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

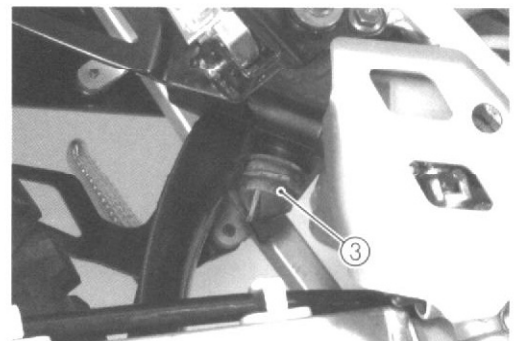
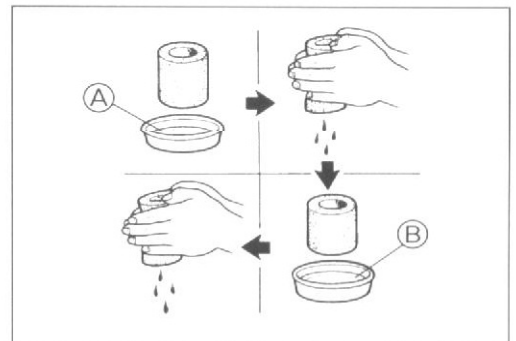
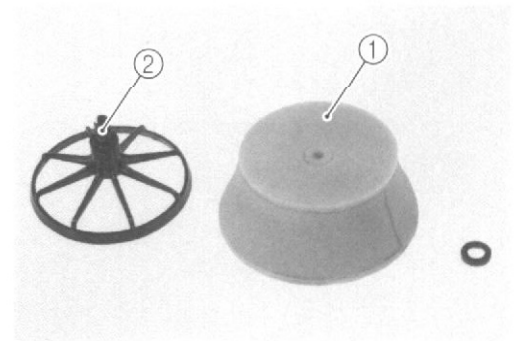
- Remove the left frame cover. (☞ 6-2)
- Remove the air cleaner element.
- Separate the polyurethane foam element ① and element frame ②.
- Fill a wash pan of a proper size with a nonflammable cleaning solvent. Immerse the air cleaner element in the cleaning solvent and wash it.
- Press the air cleaner element between the palms of both hands to remove the excess solvent: do not twist or wring the element or it will tear.
- Immerse the element in motor oil, and then squeeze out the excess oil leaving the element slightly wet.

- Ⓐ Nonflammable cleaning solvent
- Ⓑ Motor oil SAE #30 or SAE 10W-40

⚠ CAUTION

- * Inspect the air cleaner element for tears. A torn element must be replaced.
- * The surest way to accelerate engine wear is to operate the engine without the element or with one that is torn. Make sure that the air cleaner element is in good condition at all times. Life of the engine depends largely on this component!

- Remove the drain plug ③ to allow any water to drain out.

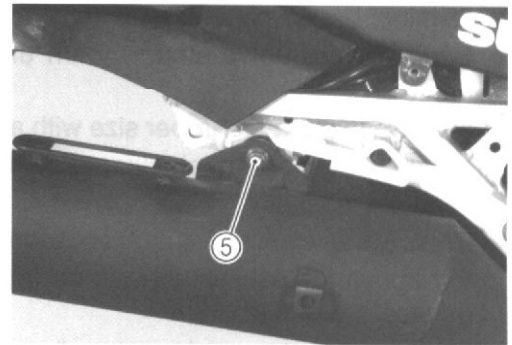
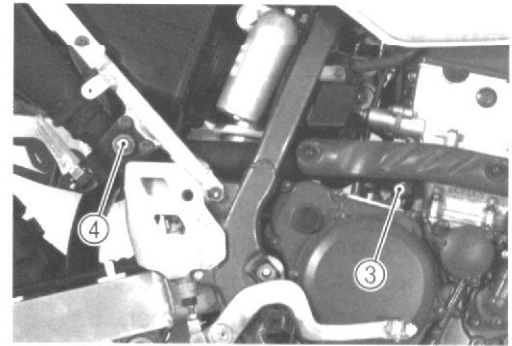
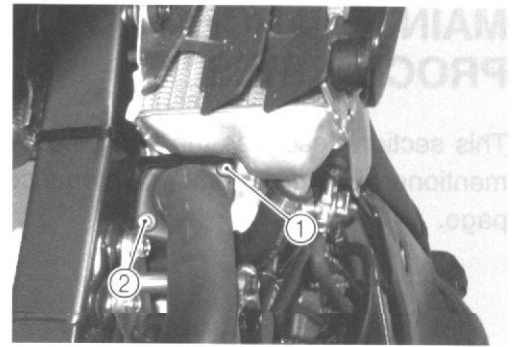


EXHAUST PIPE NUT AND BOLT AND MUFFLER NUT AND BOLTS

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

- Remove the right frame cover. (☞ 6-2)
- Tighten the exhaust pipe nut ①, exhaust pipe bolt ②, muffler connection bolt ③, muffler mounting bolt ④, and muffler mounting nut ⑤ to the specified torque.

- 🔧 Exhaust pipe nut and bolt: 23 N·m (2.3 kgf·m, 16.5 lb·ft)
- Muffler connection bolt: 20 N·m (2.0 kgf·m, 14.5 lb·ft)
- Muffler mounting nut and bolt:
23 N·m (2.3 kgf·m, 16.5 lb·ft)



TAPPET CLEARANCE

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

INSPECTION

- Remove the fuel tank. (☞ 4-2)
- Drain the engine oil. (☞ 2-11)
- Disconnect the spark plug cap and remove the spark plug. (☞ 2-9 and 2-10)
- Loosen the horn mounting bracket bolt.
- Remove the cylinder head cover.

The tappet clearance specification is different for both intake and exhaust valves.

Tappet clearance adjustment must be checked and adjusted: 1) at the time of periodic inspection, 2) when the valve mechanism is serviced, and 3) when the camshafts are removed for servicing.

NOTE:

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

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

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

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

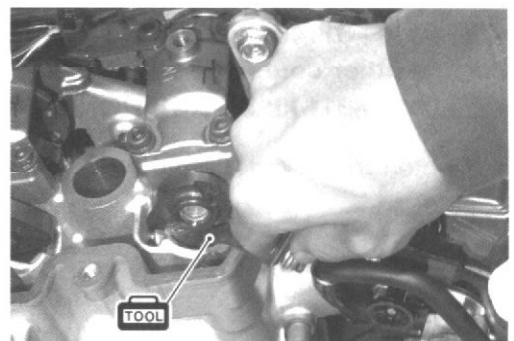
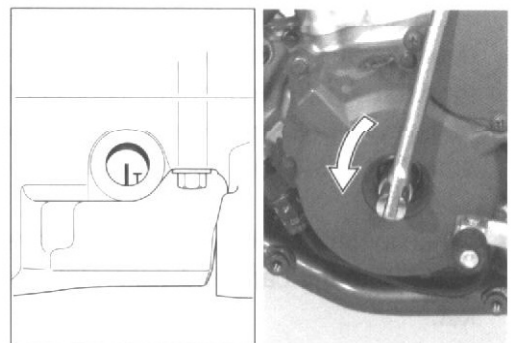
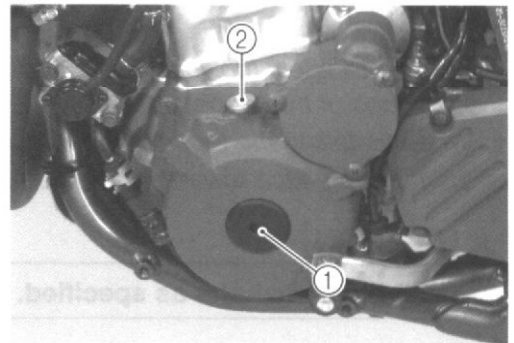
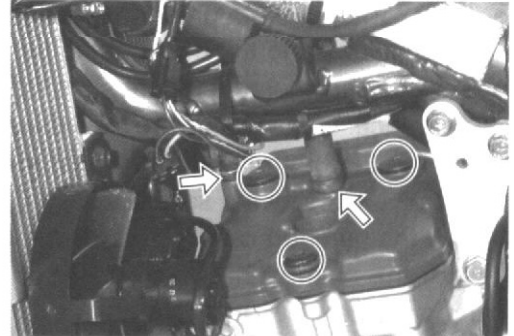
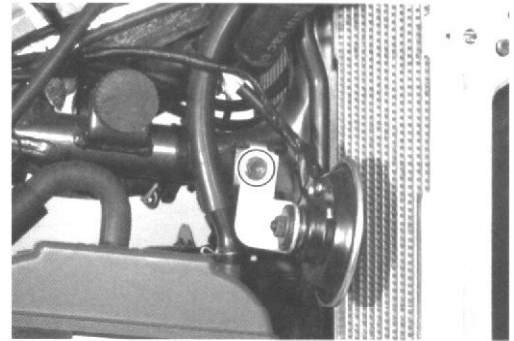
TOOL 09900-20803: Thickness gauge

DATA Tappet clearance (when cold)

IN: 0.10 – 0.20 mm (0.0039 – 0.0079 in)

EX: 0.20 – 0.30 mm (0.0079 – 0.0118 in)

Note: In this photo the Suzuki mechanic is checking the valve tappet clearance on the EXHAUST STROKE! Ignore this picture!



ADJUSTMENT

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

- Remove the intake or exhaust camshafts. (🔧 3-12)
- Remove the tappet and shim by hand or with a magnet. (🔧 3-22)

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

Refer to the tappet shim selection table for details.

NOTE:

- * Be sure to apply molybdenum oil solution to the top and bottom faces of the tappet shim.
- * When installing the tappet shim, make sure that the side with the numbers face towards the tappet.

⚠ CAUTION

Install the camshafts as specified. (🔧 3-61 to 3-63)

- After replacing the tappet shim and camshafts, rotate the crankshaft so that the tappet is depressed fully (this will squeeze out any oil trapped between the tappet shim and the tappet that could cause an incorrect measurement). After rotating the crankshaft, check the tappet clearance again to make sure that it is within specification.
- When installing the cylinder head cover, apply SUZUKI BOND "1207B" to the cam end caps of the cylinder head cover gasket.

For USA

🔧 1207B 99104-31140: SUZUKI BOND "1207B"

For the other countries

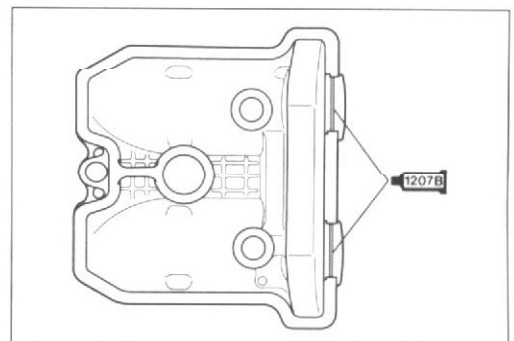
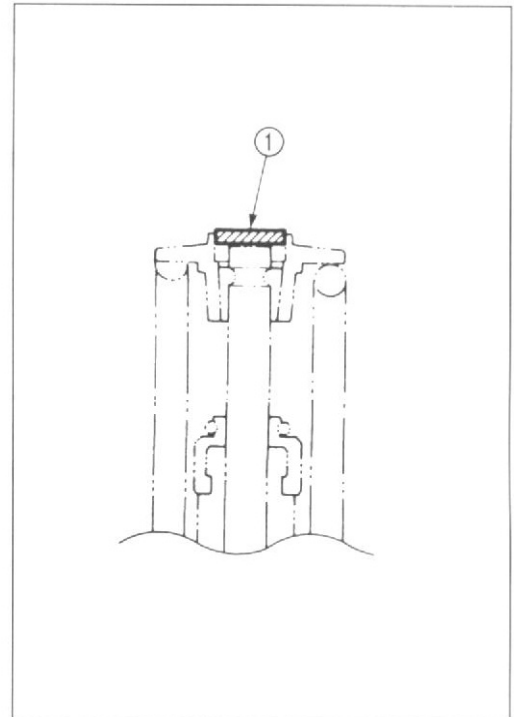
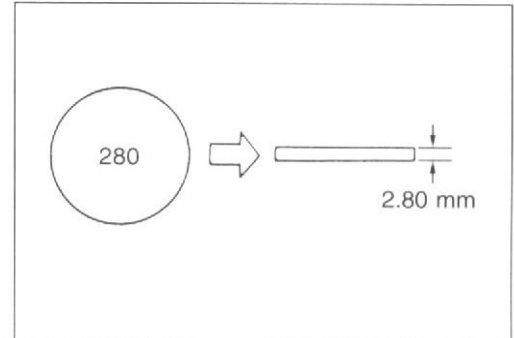
🔧 1207B 99000-31140: SUZUKI BOND "1207B"

- Tighten the cylinder head cover bolts to specification in two stages.

🔧 Cylinder head cover bolt

Initial: 10 N·m (1.0 kgf·m, 7.0 lb·ft)

Final: 14 N·m (1.4 kgf·m, 10.0 lb·ft)



INTAKE SIDE

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

TAPPET SHIM SET NO. (12800-41810)

| MEASURED TAPPET CLEARANCE (mm) | SPECIFIED CLEARANCE/NO ADJUSTMENT REQUIRED | | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------------------------|--|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|--|
| | 230 | 235 | 240 | 245 | 250 | 255 | 260 | 265 | 270 | 275 | 280 | 285 | 290 | 295 | 300 | 305 | 310 | 315 | 320 | 325 | 330 | 335 | 340 | 345 | 350 | |
| 0.00-0.04 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0.05-0.09 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0.10-0.20 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0.21-0.25 | 2.40 | 2.45 | 2.50 | 2.55 | 2.60 | 2.65 | 2.70 | 2.75 | 2.80 | 2.85 | 2.90 | 2.95 | 3.00 | 3.05 | 3.10 | 3.15 | 3.20 | 3.25 | 3.30 | 3.35 | 3.40 | 3.45 | 3.50 | 3.50 | 3.50 | |
| 0.26-0.30 | 2.45 | 2.50 | 2.55 | 2.60 | 2.65 | 2.70 | 2.75 | 2.80 | 2.85 | 2.90 | 2.95 | 3.00 | 3.05 | 3.10 | 3.15 | 3.20 | 3.25 | 3.30 | 3.35 | 3.40 | 3.45 | 3.50 | 3.50 | 3.50 | 3.50 | |
| 0.31-0.35 | 2.50 | 2.55 | 2.60 | 2.65 | 2.70 | 2.75 | 2.80 | 2.85 | 2.90 | 2.95 | 3.00 | 3.05 | 3.10 | 3.15 | 3.20 | 3.25 | 3.30 | 3.35 | 3.40 | 3.45 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | |
| 0.36-0.40 | 2.55 | 2.60 | 2.65 | 2.70 | 2.75 | 2.80 | 2.85 | 2.90 | 2.95 | 3.00 | 3.05 | 3.10 | 3.15 | 3.20 | 3.25 | 3.30 | 3.35 | 3.40 | 3.45 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | |
| 0.41-0.45 | 2.60 | 2.65 | 2.70 | 2.75 | 2.80 | 2.85 | 2.90 | 2.95 | 3.00 | 3.05 | 3.10 | 3.15 | 3.20 | 3.25 | 3.30 | 3.35 | 3.40 | 3.45 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | |
| 0.46-0.50 | 2.65 | 2.70 | 2.75 | 2.80 | 2.85 | 2.90 | 2.95 | 3.00 | 3.05 | 3.10 | 3.15 | 3.20 | 3.25 | 3.30 | 3.35 | 3.40 | 3.45 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | |
| 0.51-0.55 | 2.70 | 2.75 | 2.80 | 2.85 | 2.90 | 2.95 | 3.00 | 3.05 | 3.10 | 3.15 | 3.20 | 3.25 | 3.30 | 3.35 | 3.40 | 3.45 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | |
| 0.56-0.60 | 2.75 | 2.80 | 2.85 | 2.90 | 2.95 | 3.00 | 3.05 | 3.10 | 3.15 | 3.20 | 3.25 | 3.30 | 3.35 | 3.40 | 3.45 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | |
| 0.61-0.65 | 2.80 | 2.85 | 2.90 | 2.95 | 3.00 | 3.05 | 3.10 | 3.15 | 3.20 | 3.25 | 3.30 | 3.35 | 3.40 | 3.45 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | |
| 0.66-0.70 | 2.85 | 2.90 | 2.95 | 3.00 | 3.05 | 3.10 | 3.15 | 3.20 | 3.25 | 3.30 | 3.35 | 3.40 | 3.45 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | |
| 0.71-0.75 | 2.90 | 2.95 | 3.00 | 3.05 | 3.10 | 3.15 | 3.20 | 3.25 | 3.30 | 3.35 | 3.40 | 3.45 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | |
| 0.76-0.80 | 2.95 | 3.00 | 3.05 | 3.10 | 3.15 | 3.20 | 3.25 | 3.30 | 3.35 | 3.40 | 3.45 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | |
| 0.81-0.85 | 3.00 | 3.05 | 3.10 | 3.15 | 3.20 | 3.25 | 3.30 | 3.35 | 3.40 | 3.45 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | |
| 0.86-0.90 | 3.05 | 3.10 | 3.15 | 3.20 | 3.25 | 3.30 | 3.35 | 3.40 | 3.45 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | |
| 0.91-0.95 | 3.10 | 3.15 | 3.20 | 3.25 | 3.30 | 3.35 | 3.40 | 3.45 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | |
| 0.96-1.00 | 3.15 | 3.20 | 3.25 | 3.30 | 3.35 | 3.40 | 3.45 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | |
| 1.01-1.05 | 3.20 | 3.25 | 3.30 | 3.35 | 3.40 | 3.45 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | |
| 1.06-1.10 | 3.25 | 3.30 | 3.35 | 3.40 | 3.45 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | |
| 1.11-1.15 | 3.30 | 3.35 | 3.40 | 3.45 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | |
| 1.16-1.20 | 3.35 | 3.40 | 3.45 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | |
| 1.21-1.25 | 3.40 | 3.45 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | |
| 1.26-1.30 | 3.45 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | |
| 1.31-1.35 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | |
| 1.36-1.40 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | |

How to use this chart:

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

Example:

Tappet clearance is 0.23 mm
Present shim size 2.70 mm
Shim size to be used 2.80 mm

EXHAUST SIDE

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

TAPPET SHIM SET NO.(12800-41810)

| MEASURED TAPPET CLEARANCE (mm) | SUFFIX NO. | SPECIFIED CLEARANCE NO ADJUSTMENT REQUIRED | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------------------------|------------|--|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| | | 230 | 235 | 240 | 245 | 250 | 255 | 260 | 265 | 270 | 275 | 280 | 285 | 290 | 295 | 300 | 305 | 310 | 315 | 320 | 325 | 330 | 335 | 340 | 345 | 350 |
| 0.00-0.04 | | 2.30 | 2.35 | 2.40 | 2.45 | 2.50 | 2.55 | 2.60 | 2.65 | 2.70 | 2.75 | 2.80 | 2.85 | 2.90 | 2.95 | 3.00 | 3.05 | 3.10 | 3.15 | 3.20 | 3.25 | 3.30 | 3.35 | 3.40 | 3.45 | 3.50 |
| 0.05-0.08 | | 2.30 | 2.35 | 2.40 | 2.45 | 2.50 | 2.55 | 2.60 | 2.65 | 2.70 | 2.75 | 2.80 | 2.85 | 2.90 | 2.95 | 3.00 | 3.05 | 3.10 | 3.15 | 3.20 | 3.25 | 3.30 | 3.35 | 3.40 | 3.45 | 3.50 |
| 0.10-0.14 | | 2.30 | 2.35 | 2.40 | 2.45 | 2.50 | 2.55 | 2.60 | 2.65 | 2.70 | 2.75 | 2.80 | 2.85 | 2.90 | 2.95 | 3.00 | 3.05 | 3.10 | 3.15 | 3.20 | 3.25 | 3.30 | 3.35 | 3.40 | 3.45 | 3.50 |
| 0.15-0.19 | | 2.30 | 2.35 | 2.40 | 2.45 | 2.50 | 2.55 | 2.60 | 2.65 | 2.70 | 2.75 | 2.80 | 2.85 | 2.90 | 2.95 | 3.00 | 3.05 | 3.10 | 3.15 | 3.20 | 3.25 | 3.30 | 3.35 | 3.40 | 3.45 | 3.50 |
| 0.20-0.30 | | 2.40 | 2.45 | 2.50 | 2.55 | 2.60 | 2.65 | 2.70 | 2.75 | 2.80 | 2.85 | 2.90 | 2.95 | 3.00 | 3.05 | 3.10 | 3.15 | 3.20 | 3.25 | 3.30 | 3.35 | 3.40 | 3.45 | 3.50 | 3.50 | 3.50 |
| 0.31-0.38 | | 2.45 | 2.50 | 2.55 | 2.60 | 2.65 | 2.70 | 2.75 | 2.80 | 2.85 | 2.90 | 2.95 | 3.00 | 3.05 | 3.10 | 3.15 | 3.20 | 3.25 | 3.30 | 3.35 | 3.40 | 3.45 | 3.50 | 3.50 | 3.50 | 3.50 |
| 0.36-0.40 | | 2.50 | 2.55 | 2.60 | 2.65 | 2.70 | 2.75 | 2.80 | 2.85 | 2.90 | 2.95 | 3.00 | 3.05 | 3.10 | 3.15 | 3.20 | 3.25 | 3.30 | 3.35 | 3.40 | 3.45 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 |
| 0.41-0.45 | | 2.55 | 2.60 | 2.65 | 2.70 | 2.75 | 2.80 | 2.85 | 2.90 | 2.95 | 3.00 | 3.05 | 3.10 | 3.15 | 3.20 | 3.25 | 3.30 | 3.35 | 3.40 | 3.45 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 |
| 0.46-0.50 | | 2.60 | 2.65 | 2.70 | 2.75 | 2.80 | 2.85 | 2.90 | 2.95 | 3.00 | 3.05 | 3.10 | 3.15 | 3.20 | 3.25 | 3.30 | 3.35 | 3.40 | 3.45 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 |
| 0.51-0.55 | | 2.65 | 2.70 | 2.75 | 2.80 | 2.85 | 2.90 | 2.95 | 3.00 | 3.05 | 3.10 | 3.15 | 3.20 | 3.25 | 3.30 | 3.35 | 3.40 | 3.45 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 |
| 0.56-0.60 | | 2.70 | 2.75 | 2.80 | 2.85 | 2.90 | 2.95 | 3.00 | 3.05 | 3.10 | 3.15 | 3.20 | 3.25 | 3.30 | 3.35 | 3.40 | 3.45 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 |
| 0.61-0.65 | | 2.75 | 2.80 | 2.85 | 2.90 | 2.95 | 3.00 | 3.05 | 3.10 | 3.15 | 3.20 | 3.25 | 3.30 | 3.35 | 3.40 | 3.45 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 |
| 0.66-0.70 | | 2.80 | 2.85 | 2.90 | 2.95 | 3.00 | 3.05 | 3.10 | 3.15 | 3.20 | 3.25 | 3.30 | 3.35 | 3.40 | 3.45 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 |
| 0.71-0.75 | | 2.85 | 2.90 | 2.95 | 3.00 | 3.05 | 3.10 | 3.15 | 3.20 | 3.25 | 3.30 | 3.35 | 3.40 | 3.45 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 |
| 0.76-0.80 | | 2.90 | 2.95 | 3.00 | 3.05 | 3.10 | 3.15 | 3.20 | 3.25 | 3.30 | 3.35 | 3.40 | 3.45 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 |
| 0.81-0.85 | | 2.95 | 3.00 | 3.05 | 3.10 | 3.15 | 3.20 | 3.25 | 3.30 | 3.35 | 3.40 | 3.45 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 |
| 0.86-0.90 | | 3.00 | 3.05 | 3.10 | 3.15 | 3.20 | 3.25 | 3.30 | 3.35 | 3.40 | 3.45 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 |
| 0.91-0.95 | | 3.05 | 3.10 | 3.15 | 3.20 | 3.25 | 3.30 | 3.35 | 3.40 | 3.45 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 |
| 0.96-1.00 | | 3.10 | 3.15 | 3.20 | 3.25 | 3.30 | 3.35 | 3.40 | 3.45 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 |
| 1.01-1.05 | | 3.15 | 3.20 | 3.25 | 3.30 | 3.35 | 3.40 | 3.45 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 |
| 1.06-1.10 | | 3.20 | 3.25 | 3.30 | 3.35 | 3.40 | 3.45 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 |
| 1.11-1.15 | | 3.25 | 3.30 | 3.35 | 3.40 | 3.45 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 |
| 1.16-1.20 | | 3.30 | 3.35 | 3.40 | 3.45 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 |
| 1.21-1.25 | | 3.35 | 3.40 | 3.45 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 |
| 1.26-1.30 | | 3.40 | 3.45 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 |
| 1.31-1.35 | | 3.45 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 |
| 1.36-1.40 | | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 |
| 1.41-1.45 | | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 |
| 1.46-1.50 | | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 | 3.50 |

How to use this chart:

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

Example:

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

SPARK PLUG

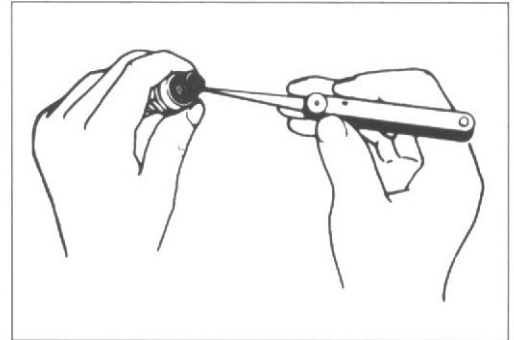
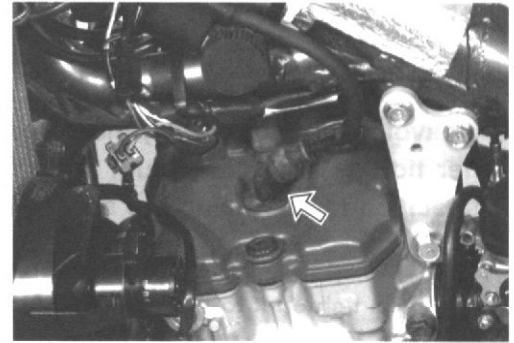
Inspect every 6 000 km (4 000 miles, 6 months).
 Replace every 12 000 km (7 500 miles, 12 months).

- Remove the fuel tank. (🔧 4-2)
- Disconnect the spark plug cap and remove the spark plug.

| | Cold type | Standard | Hot type |
|-------|-----------|----------|----------|
| NGK | CR9E | CR8E | CR7E |
| DENSO | U27ESR-N | U24ESR-N | U22ESR-N |

CARBON DEPOSITS

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

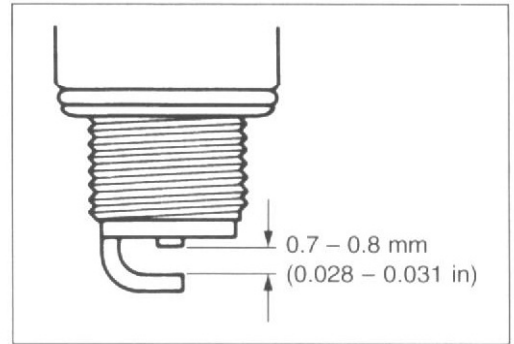


SPARK PLUG GAP

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

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

TOOL 09900-20803: Thickness gauge



ELECTRODE

Check the condition of the electrode.
 If the electrode is extremely worn or burnt, replace the spark plug with a new one.
 Also, replace the spark plug if it has a broken insulator, damaged threads, etc.

⚠ CAUTION

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

SPARK PLUG INSTALLATION

⚠ CAUTION

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

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

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

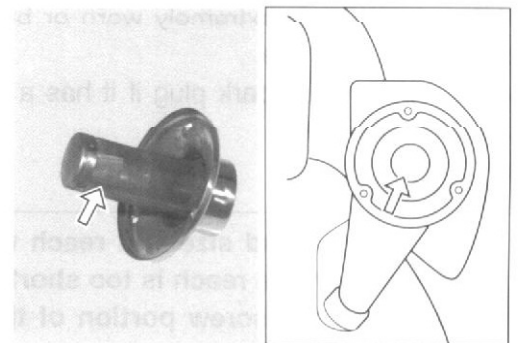
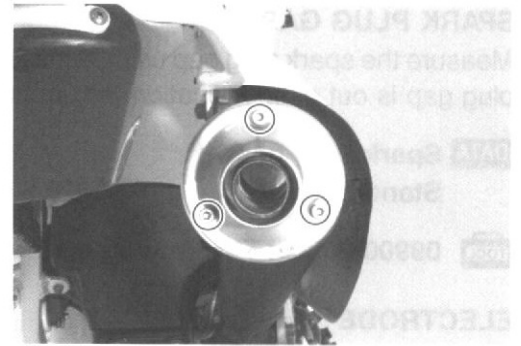
SPARK ARRESTER (FOR E-03, 28, 33)

Clean every 6 000 km (4 000 miles, 6 months).

- Remove the spark arrester.

- Remove the carbon deposits from spark arrester and muffler.
- Tighten the spark arrester bolts to the specified torque.

🔧 Spark arrester bolt: 11 N·m (1.1 kgf-m, 8.0 lb-ft)



FUEL LINE

**Inspect every 6 000 km (4 000 miles, 6 months).
Replace every four years.**

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



ENGINE OIL AND OIL FILTER

ENGINE OIL

Replace initially at 1 000 km (600 miles, 1 month) and every 6 000 km (4 000 miles, 6 months) thereafter.

ENGINE OIL FILTER

Replace initially at 1 000 km (600 miles, 1 month) and every 18 000 km (11 000 miles, 18 months) thereafter.

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

ENGINE OIL REPLACEMENT

- Place an oil pan below the engine, and then drain the oil by removing the engine oil drain plugs (①, ②) and engine oil filler cap ③.
- Tighten the engine oil drain plugs (①, ②) to the specified torque, and then pour the new oil through the oil filler hole. When performing an oil change (without oil filter replacement), the engine will hold about 1.7 L (1.8 US qt, 1.5 Imp qt) of oil. Use an engine oil that meets API service classifications SF or SG and that has a viscosity rating of SAE 10W-40.

Engine oil drain plug

(on the crankcase) ①: 21 N·m (2.1 kgf·m, 15.0 lb·ft)
(on the frame) ②: 18 N·m (1.8 kgf·m, 13.0 lb·ft)

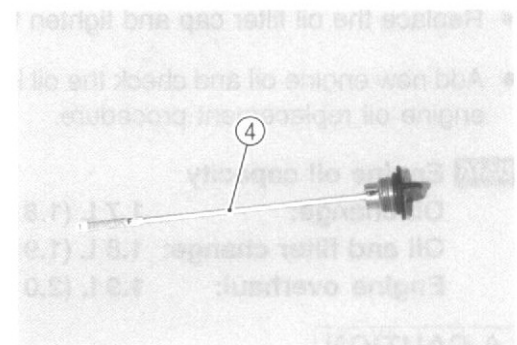
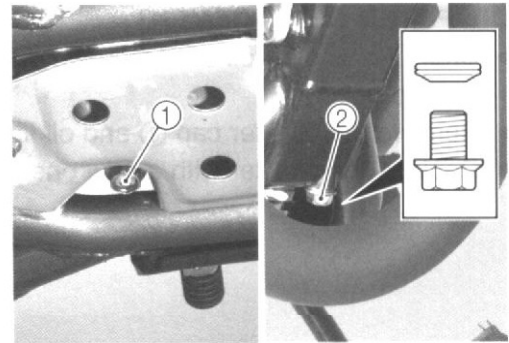
CAUTION

When installing the engine oil drain plug ② with gasket, face the taper of gasket to drain plug as shown.

- Make sure that the engine is cooled.
- Place the motorcycle on level ground and hold it vertically.
- Install the oil filler cap ③.
- Start the engine and allow it to run for three minutes at idling speed.
- Turn off the engine and wait about three minutes, and then check the oil level on the dipstick ④. The oil level should be between the “L” (low) and “F” (full) level lines. If the oil level is lower than the “L” level line, add oil to the “F” level line.

NOTE:

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



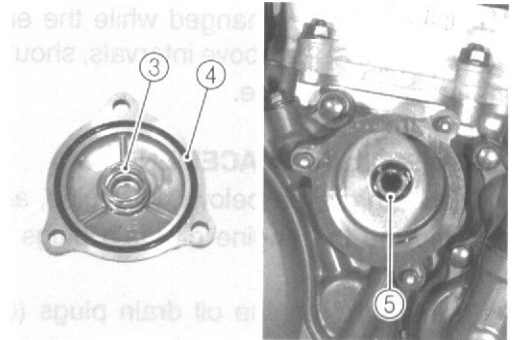
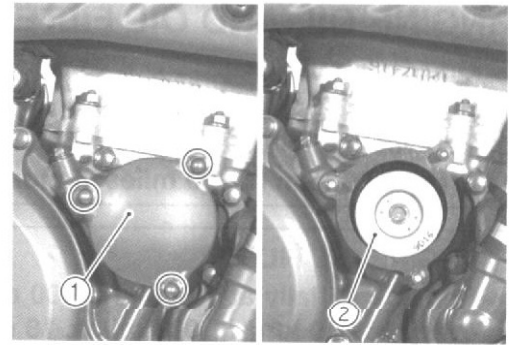
OIL FILTER REPLACEMENT

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

NOTE:

Before replacing the oil filter cap, make sure that the spring ③ and a new O-ring ④ are installed correctly.

- Make sure that the O-ring ⑤ behind the filter is in the correct position.



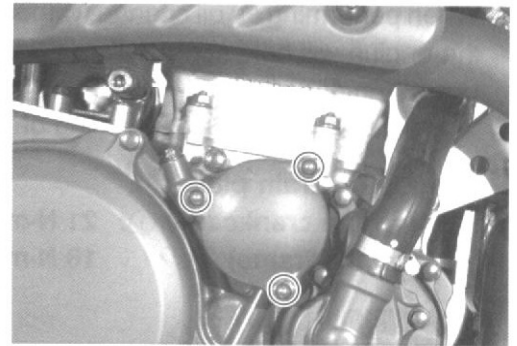
- Replace the oil filter cap and tighten the nut securely.
- Add new engine oil and check the oil level as described in the engine oil replacement procedure.

DATA Engine oil capacity

| | |
|------------------------|-------------------------------|
| Oil change: | 1.7 L (1.8 US qt, 1.5 Imp qt) |
| Oil and filter change: | 1.8 L (1.9 US qt, 1.6 Imp qt) |
| Engine overhaul: | 1.9 L (2.0 US qt, 1.7 Imp qt) |

CAUTION

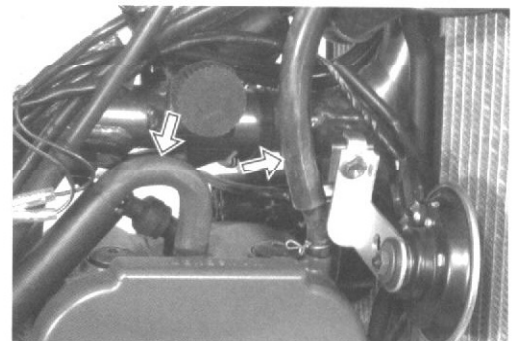
When reassembling the oil filter, make sure that the oil filter is installed as shown above. If the filter is installed improperly, serious engine damage may result.



ENGINE OIL HOSES

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

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



THROTTLE CABLE PLAY (CARBURETOR)

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

- Remove the fuel tank. (☞ 4-2)

A twin throttle cable system is used in this motorcycle. Cable ① is for pulling and cable ② is for returning. To adjust the cable play, adjust the returning cable first and then adjust the pulling cable.

RETURNING CABLE PLAY

The returning cable should be adjusted to have a thread length \textcircled{A} of 3 mm (0.12 in) as shown. If the adjustment is necessary, adjust the thread length in the following way:

- Loosen the locknut ③.
- Turn the nut ④ to obtain the thread length \textcircled{A} of 3 mm (0.12 in).
- Tighten the locknut ③ securely.

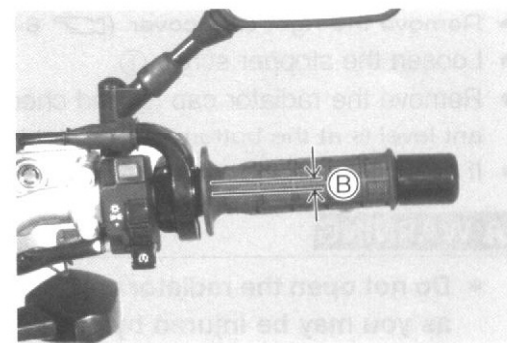
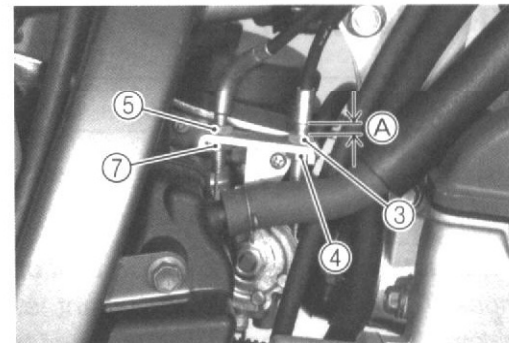
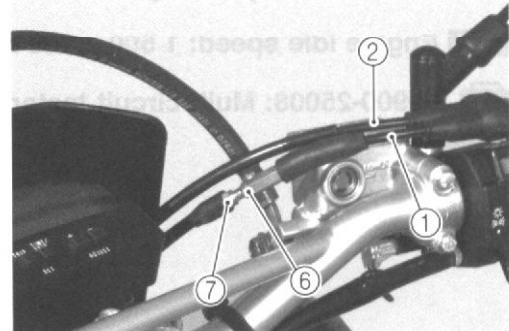
PULLING CABLE PLAY

The pulling cable should be adjusted to have a cable play \textcircled{B} of 2 – 4 mm (0.08 – 0.16 in) as shown. If the adjustment is necessary, adjust the cable play in the following way:

- Loosen the locknuts (⑤, ⑥).
- Turn the adjuster ⑦ or ⑧ to obtain the cable play \textcircled{B} of 2 – 4 mm (0.08 – 0.16 in).
- Tighten the locknuts (⑤, ⑥) securely.

⚠ WARNING

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



ENGINE IDLE SPEED (CARBURETOR)

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

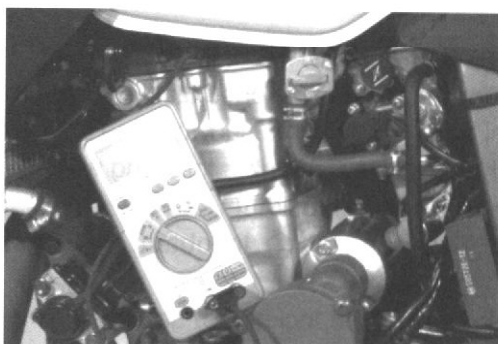
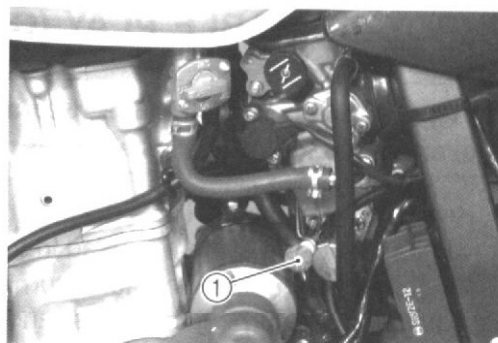
NOTE:

Make this adjustment when the engine is hot.

- Connect the multi circuit tester to the high-tension cord.
- Start the engine and set the engine idle speed between 1 400 and 1 600 r/min by turning the throttle stop screw ①.

DATA Engine idle speed: 1 500 ± 100 r/min

TOOL 09900-25008: Multi circuit tester set



ENGINE COOLANT

Replace every two years.

ENGINE COOLANT LEVEL CHECK

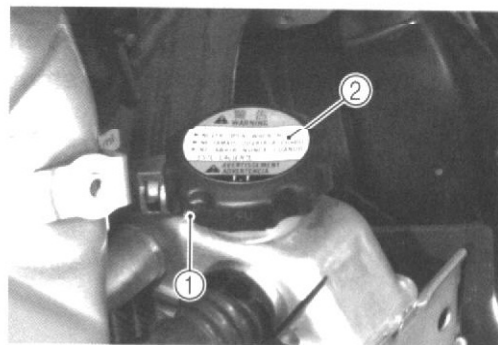
NOTE:

This motorcycle has an overflow tank at the end of the breather hose. Therefore, the engine coolant level may decrease while riding. Check the engine coolant level before every ride.

- Remove the right side cover. (☞ 6-2)
- Loosen the stopper screw ①.
- Remove the radiator cap ② and check that the engine coolant level is at the bottom of the inlet hole.
- If not, replenish the radiator with the specified coolant.

⚠ WARNING

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



ENGINE COOLANT REPLACEMENT

- Remove the right side cover. (☞ 6-2)
- Loosen the stopper screw ①.
- Remove the radiator cap ② and drain plug ③, and then drain the engine coolant.
- Tighten the drain plug ③.
- Pour the specified engine coolant slowly into the radiator.

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

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

Air bleeding the engine coolant circuit

- Bleed air from the air bleeder bolt ④.
- Tighten the air bleeder bolt ④ to the specified torque.

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

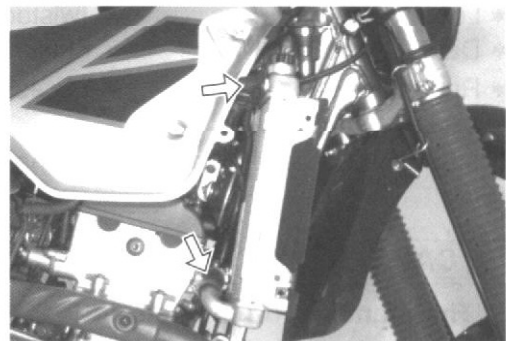
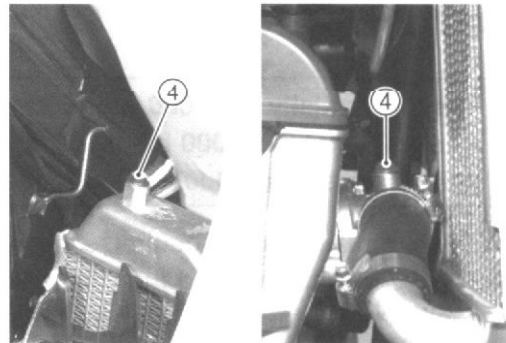
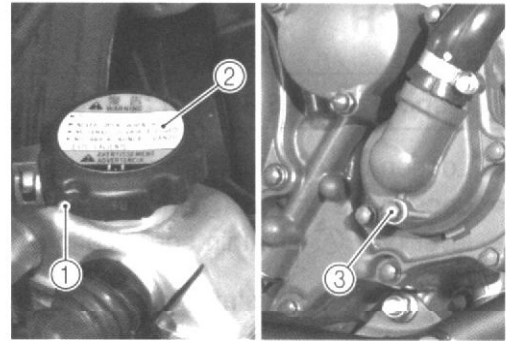
- Add engine coolant up to the radiator inlet.
- Tighten the radiator cap securely.
- After warming up and cooling down the engine, add the specified engine coolant.

📊 Engine coolant capacity:
 1 250 ml (1.3 US qt, 1.1 Imp qt)

RADIATOR HOSES

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

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



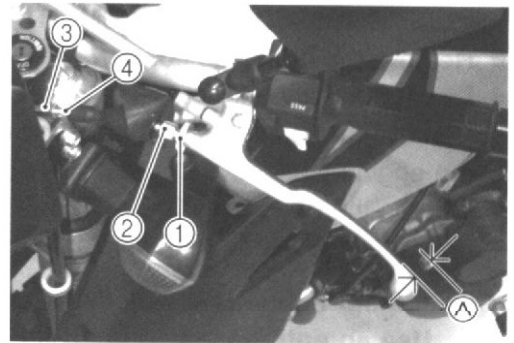
CLUTCH

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

- Loosen the locknut ① and turn the adjuster ② fully in.
- Loosen the locknut ③ and turn the adjuster ④ until the clutch lever play \AA is within specification.

DATA Clutch lever play \AA : 10 – 15 mm (0.4 – 0.6 in)

- Tighten the locknuts.



DRIVE CHAIN

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

With the transmission in neutral, support the motorcycle using a jack or wooden block and turn the rear wheel slowly by hand. Visually inspect the drive chain for the possible damages listed below.

- | | |
|------------------------|---------------------------|
| * Loose pins | * Twisted or seized links |
| * Damaged rollers | * Kinked or binding links |
| * Rusted links | * Excessive wear |
| * Missing O-ring seals | |

If any damages are found, replace the drive chain with a new one.

⚠ CAUTION

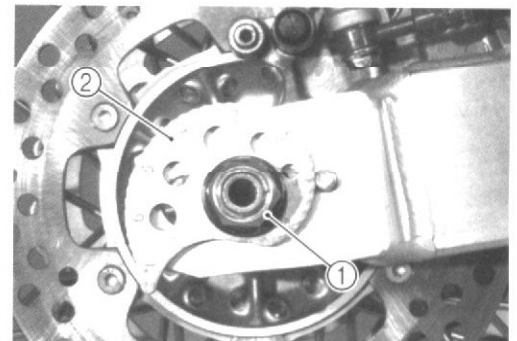
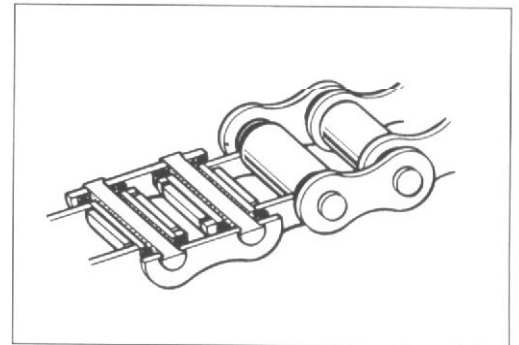
The standard drive chain is RK520KZO. SUZUKI recommends to use this standard drive chain as a replacement.

NOTE:

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

CHECKING AND ADJUSTING

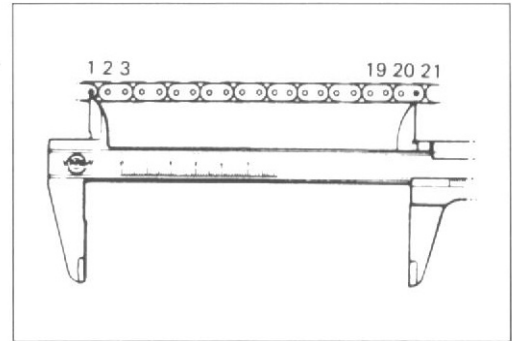
- Remove the cotter pin. (For E-03, 28, 33)
- Remove the rear axle nut ①.
- Tense the drive chain fully by turning both drive chain adjusters ②.



- Count out 21 pins (20-pitch) on the drive chain and measure the distance between the two points. If the distance exceeds the service limit, replace the drive chain with a new one.

TOOL 09900-20103: Vernier calipers

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

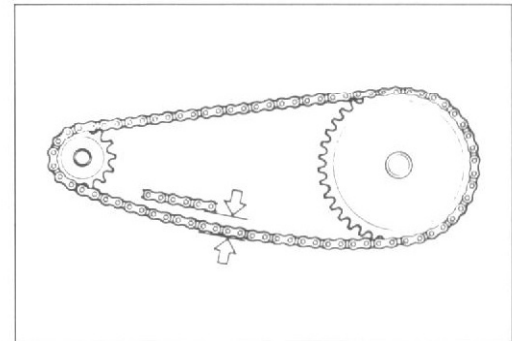
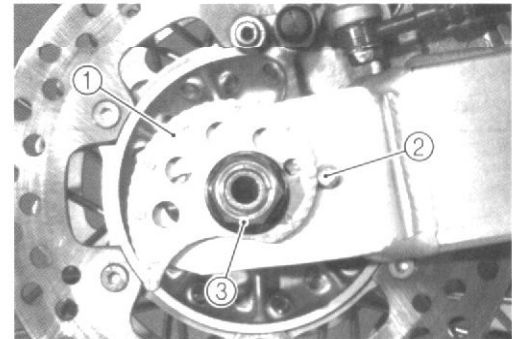


- Place the motorcycle on the side stand.
- Loosen or tighten both chain adjusters (1) until there is 40 – 50 mm (1.6 – 2.0 in) of slack at the middle of the chain between the engine and rear sprockets as shown. The reference marks (2) on both sides of the swingarm and the edge of each chain adjuster must be aligned to ensure that the front and rear wheels are correctly aligned.

DATA Drive chain slack: 40 – 50 mm (1.6 – 2.0 in)

- After adjusting the drive chain, tighten the rear axle nut (3) to the specified torque.

U Rear axle nut:
 100 N·m (10.0 kgf·m, 72.5 lb·ft) .. For E-03, 28, 33
 110 N·m (11.0 kgf·m, 79.5 lb·ft) .. For the other countries



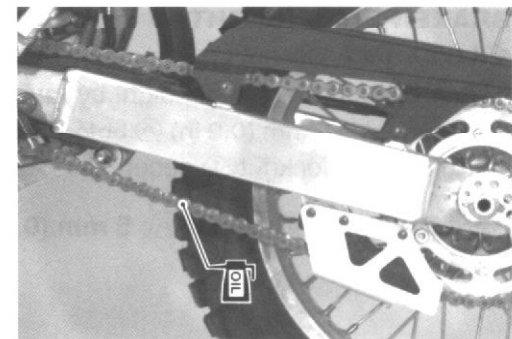
CLEANING AND LUBRICATING

- Clean the drive chain with kerosine. If the drive chain tends to rust quickly, the intervals must be shortened.

CAUTION

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

- After cleaning and drying the chain, oil it with a heavyweight engine oil.



BRAKES

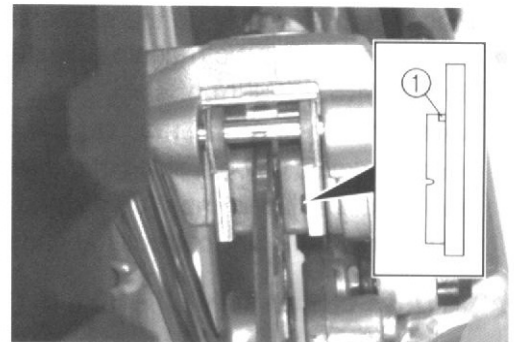
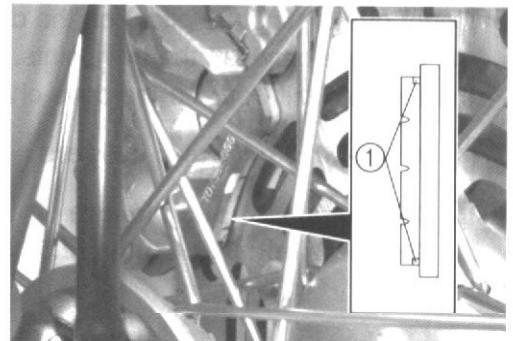
Inspect initially at 1 000 km (600 miles, 1 month) and every 6 000 km (4 000 miles, 6 months) thereafter.

BRAKE PADS

The extent of brake pad wear can be checked by observing the limit line ① on the brake pad. When the wear exceeds the grooved limit line, replace the pads with new ones. (☞ 6-42 and 6-51)

⚠ CAUTION

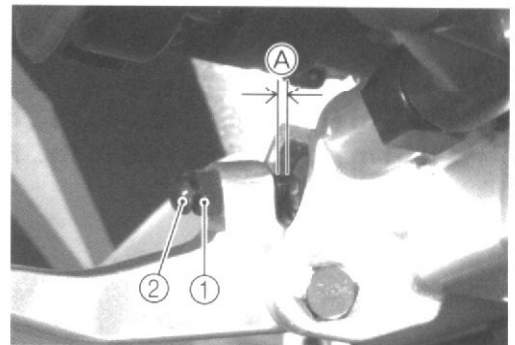
Replace the brake pads as a set, otherwise braking performance will be adversely affected.



BRAKE LEVER PLAY

- Loosen the locknut ①.
- Adjust the brake lever play by turning the adjuster ② until the lever is 0.1 – 0.3 mm (0.004 – 0.010 in) ③.
- Tighten the locknut ① securely.

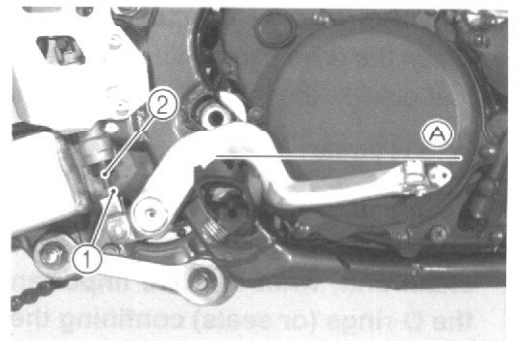
DATA Brake lever play ③: 0.1 – 0.3 mm (0.004 – 0.010 in)



BRAKE PEDAL HEIGHT

- Loosen the locknut ①.
- Adjust the brake pedal height by turning the push rod ② until the pedal is 5 mm (0.2 in) ③ below the top face of the footrest.
- Tighten the locknut ① securely.

DATA Brake pedal height ③: 5 mm (0.2 in)



BRAKE FLUID

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

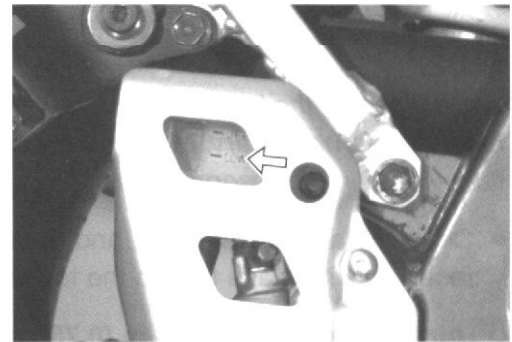
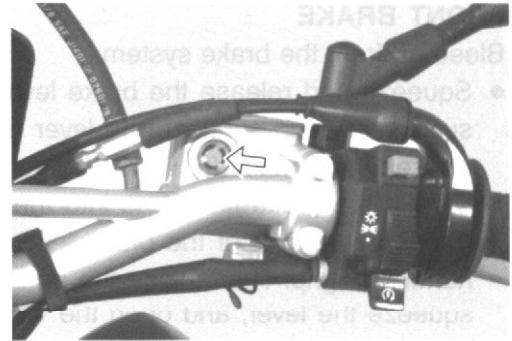
BRAKE FLUID LEVEL

- Keep the motorcycle upright and place the handlebar straight.
- Check the brake fluid level by observing the lower limit line on the front and rear brake fluid reservoir.
- When the brake fluid level is below the lower limit line, add the specified brake fluid to the specified level.

BF Specification and classification: DOT 4

⚠ WARNING

- * The brake system is filled with an glycol-based brake fluid, which is classified DOT 4. Do not use or mix other types of brake fluid, such as silicone-based and petroleum-based brake fluids when refilling the brake system, otherwise serious damage to the brake system will result.
- * Do not use any brake fluid taken from old, used, or unsealed containers.
- * Do not reuse brake fluid left over from the last servicing or which has been stored for a long period of time.
- * When storing brake fluid, be sure to seal the container completely and keep it out of the reach of children.
- * When replenishing brake fluid, be sure not to get any dust or other foreign materials in the fluid.
- * Brake fluid, if it leaks, will interfere with safe running and immediately discolor painted surfaces. Check the brake hoses and hose joints for cracks and oil leakage before riding.



AIR BLEEDING THE BRAKE FLUID CIRCUIT

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

- Fill the master cylinder reservoir to the top of the inspection window. Replace the reservoir cap to prevent dirt from entering.
- Attach a hose to the air bleeder valve, and insert the free end of the hose into a receptacle.

FRONT BRAKE

Bleed air from the brake system.

- Squeeze and release the brake lever several times in rapid succession and squeeze the lever fully without releasing it. Loosen the air bleeder valve by turning it a quarter of a turn so that the brake fluid runs into the receptacle, this will remove the tension of the brake lever causing it to touch the handlebar grip. Then, close the air bleeder valve, pump and squeeze the lever, and open the valve. Repeat this process until the fluid flowing into the receptacle no longer contains air bubbles.

NOTE:

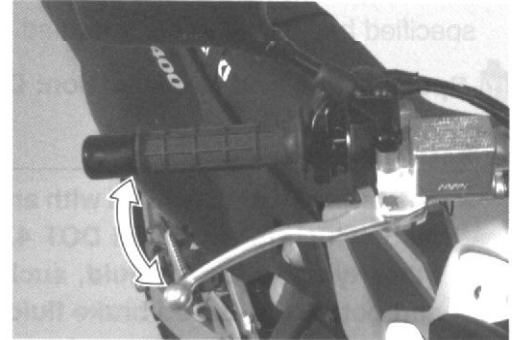
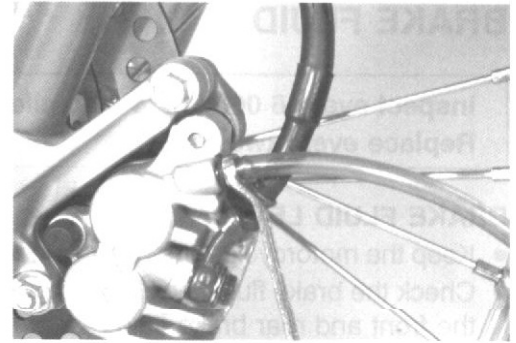
While bleeding the brake system, replenish the brake fluid in the reservoir as necessary. Make sure that there is always some fluid visible in the reservoir.

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

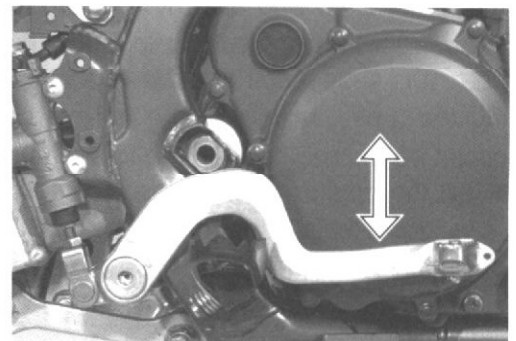
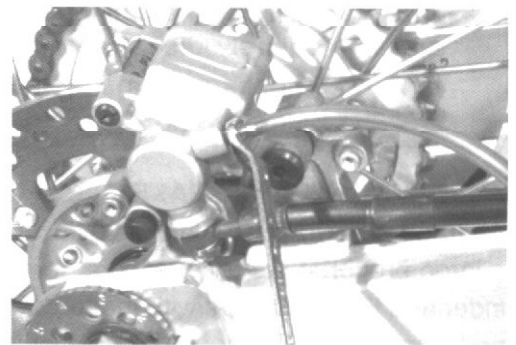
 **Air bleeder valve: 7.5 N·m (0.75 kgf·m, 5.5 lb·ft)**

CAUTION

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

**REAR BRAKE**

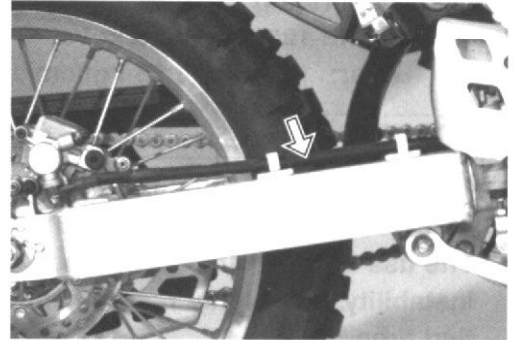
The only difference between bleeding the front and rear brake is that the rear master cylinder is actuated by a pedal.



BRAKE HOSES

**Inspect every 6 000 km (4 000 miles, 6 months).
Replace every four years.**

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



TIRES

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

TIRE TREAD CONDITION

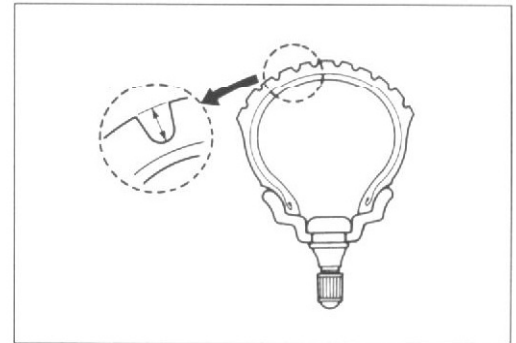
Operating the motorcycle with excessively worn tires will decrease riding stability and consequently invite a dangerous situation. It is highly recommended to replace a tire when the remaining depth of the tire tread reaches the following specification.

TOOL 09900-20805: Tire depth gauge

DATA Tire tread depth

Service Limit: Front 3.0 mm (0.12 in)

Rear 3.0 mm (0.12 in)



TIRE PRESSURE

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

DATA Cold inflation tire pressure

Solo riding

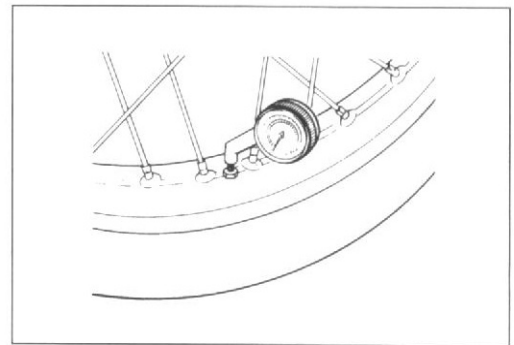
Front: 125 kPa (1.25 kgf/cm², 18 psi)

Rear: 150 kPa (1.50 kgf/cm², 22 psi)

Dual riding

Front: 125 kPa (1.25 kgf/cm², 18 psi)

Rear: 175 kPa (1.75 kgf/cm², 25 psi)



CAUTION

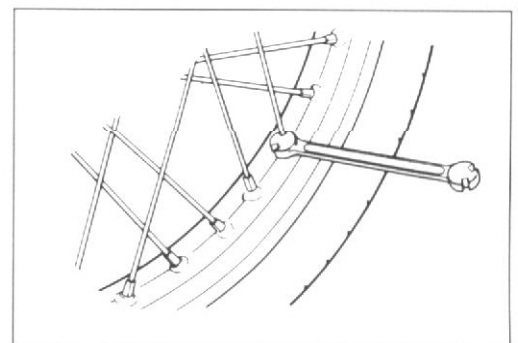
The standard tire fitted on this motorcycle is a 80/100-21 51P for the front and a 120/90-18 65P for the rear. The use of tires other than those specified may cause instability. It is highly recommended to use the specified tires.

SPOKE NIPPLES

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

Make sure that the nipples are tight. If necessary, tighten them with a spoke nipple wrench.

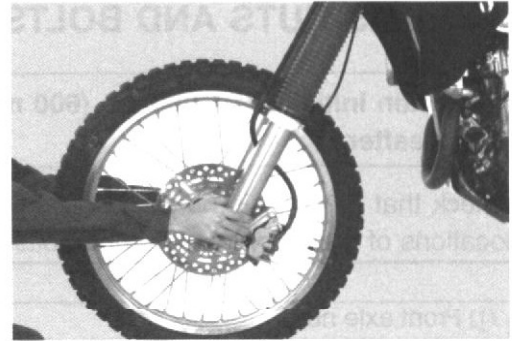
U Spoke nipple: 3.0 N·m (0.3 kgf·m, 2.0 lb·ft)



STEERING

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

The steering should be adjusted properly for smooth turning of the handlebar and safe operation. Overtight steering prevents smooth turning of the handlebar and too loose steering will cause poor stability. Check that there is no play in the front fork. Support the motorcycle so that the front wheel is off the ground. With the wheel facing straight ahead, grasp the lower fork tubes near the axle and pull forward. If play is found, adjust the steering. (🔧 6-22)



FRONT FORK

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

Inspect the front forks for oil leakage, scoring, or scratches on the outer surface of the inner tubes. If any damages are found, replace the front fork with a new one. (🔧 6-11 to 6-16)

REAR SUSPENSION

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

Inspect the rear shock absorber for oil leakage and damage. If any damages are found, replace the rear shock absorber with a new one.

EVAPORATIVE EMISSION CONTROL SYSTEM (FOR E-33)

**Inspect every 12 000 km (7 500 miles, 12 months).
Replace vapor hoses every four years.**

PAIR (AIR SUPPLY) SYSTEM (FOR E-02, 19, 54)

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

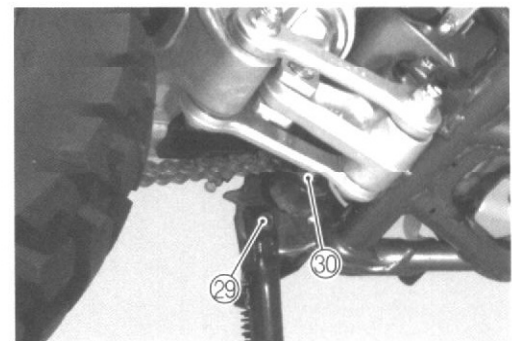
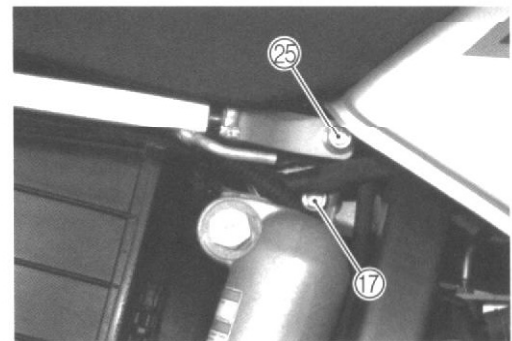
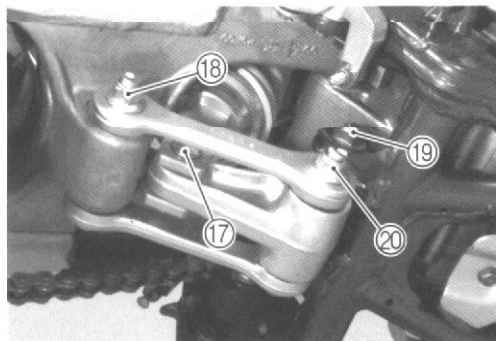
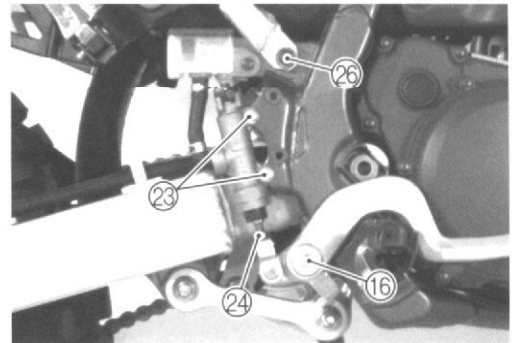
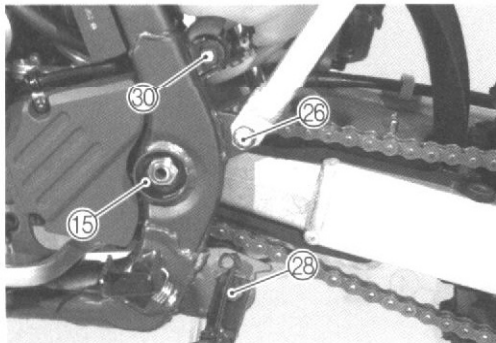
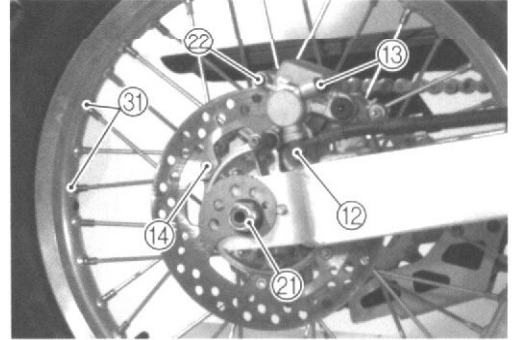
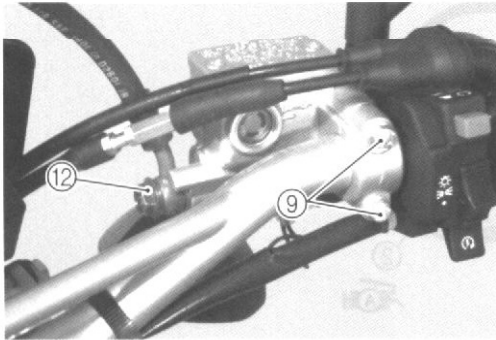
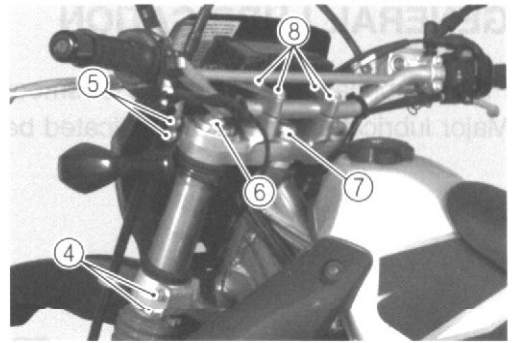
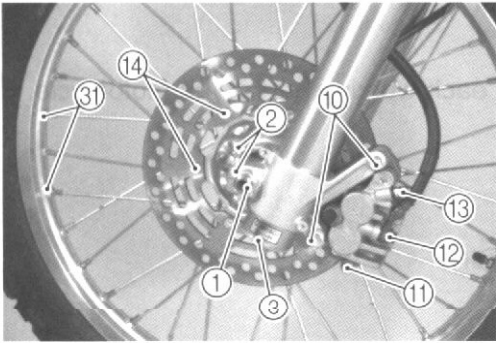
(🔧 3-65 and 3-66)

CHASSIS NUTS AND BOLTS

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

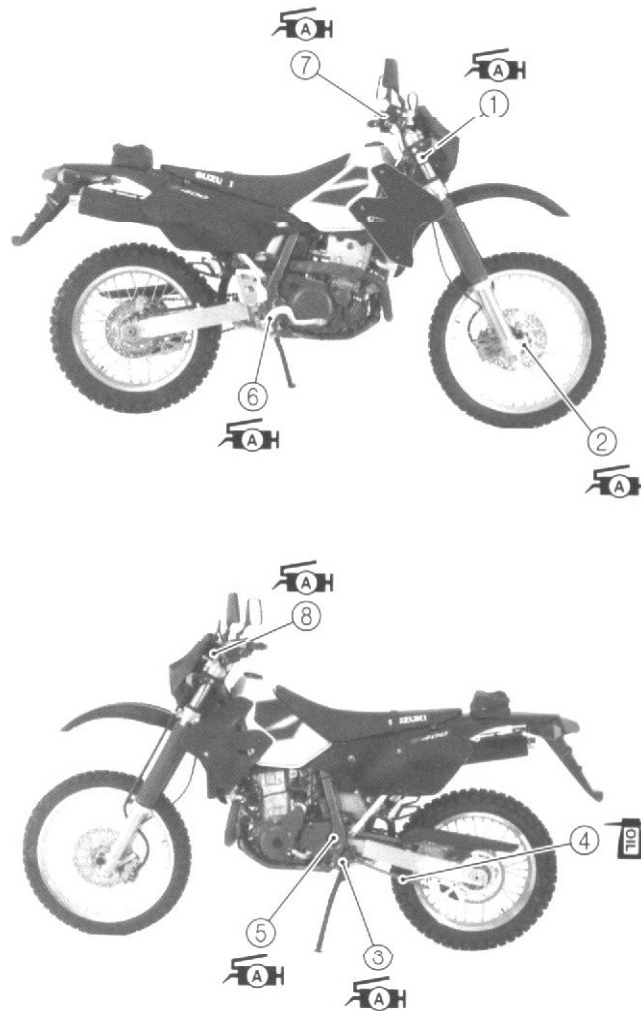
Check that all chassis nuts and bolts are tightened to their specified torque. (Refer to page 2-25 for the locations of the following nuts and bolts.)

| ITEM | N·m | kgf·m | lb·ft |
|--|---|------------|--------------|
| ① Front axle nut | 42 | 4.2 | 30.5 |
| ② Front axle pinch bolt | 18 | 1.8 | 13.0 |
| ③ Front fork damper rod bolt | 80 | 8.0 | 58.0 |
| ④ Front fork lower clamp bolt | 32 | 3.2 | 23.0 |
| ⑤ Front fork upper clamp bolt | 30 | 3.0 | 21.5 |
| ⑥ Front fork cap bolt | 23 | 2.3 | 16.5 |
| ⑦ Steering stem head nut | 90 | 9.0 | 65.0 |
| ⑧ Handlebar clamp bolt | 23 | 2.3 | 16.5 |
| ⑨ Front brake master cylinder mounting bolt | 10 | 1.0 | 7.0 |
| ⑩ Front brake caliper mounting bolt | 26 | 2.6 | 19.0 |
| ⑪ Front brake pad mounting pin | 18 | 1.8 | 13.0 |
| ⑫ Brake hose union bolt (front & rear) | 23 | 2.3 | 16.5 |
| ⑬ Brake air bleeder valve (front & rear) | 7.5 | 0.75 | 5.5 |
| ⑭ Brake disc mounting bolt (front & rear) | 10 | 1.0 | 7.0 |
| ⑮ Swingarm pivot nut | 77 | 7.7 | 55.5 |
| ⑯ Rear brake pedal bolt | 29 | 2.9 | 21.0 |
| ⑰ Rear shock absorber mounting nut (upper & lower) | 55 | 5.5 | 40.0 |
| ⑱ Cushion rod mounting nut | 100 | 10.0 | 72.5 |
| ⑲ Cushion lever mounting nut (front) | 100 | 10.0 | 72.5 |
| ⑳ Cushion lever mounting nut (center) | 100 | 10.0 | 72.5 |
| ㉑ Rear axle nut | For E-03, 28, 33 For the other countries | 100 110 | 72.5 79.5 |
| ㉒ Rear brake pad mounting pin | 18 | 1.8 | 13.0 |
| ㉓ Rear brake master cylinder mounting bolt | 10 | 1.0 | 7.0 |
| ㉔ Rear brake rod locknut | 18 | 1.8 | 13.0 |
| ㉕ Seat rail mounting nut (upper) | 35 | 3.5 | 25.5 |
| ㉖ Seat rail mounting bolt (lower) | 35 | 3.5 | 25.5 |
| ㉗ Rear sprocket nut | 30 | 3.0 | 21.5 |
| ㉘ Side-stand bolt | 50 | 5.0 | 36.0 |
| ㉙ Side-stand nut | 55 | 5.5 | 40.0 |
| ㉚ Drive chain roller mounting bolt (upper & lower) | 40 | 4.0 | 29.0 |
| ㉛ Spoke nipple | 3 | 0.3 | 2.0 |



GENERAL LUBRICATION

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



- | | |
|-----------------------------------|-----------------------|
| ① Speedometer cable | ⑤ Swingarm pivot |
| ② Speedometer gearbox | ⑥ Brake pedal pivot |
| ③ Sidestand pivot and spring hook | ⑦ Brake lever holder |
| ④ Drive chain | ⑧ Clutch lever holder |

NOTE:

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

COMPRESSION PRESSURE CHECK

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

DATA Compression pressure

Standard: 950 kPa (9.5 kgf/cm², 135 psi)
(Automatic decompression actuated)

Low compression pressure can indicate any of the following conditions:

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

NOTE:

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

COMPRESSION TEST PROCEDURE

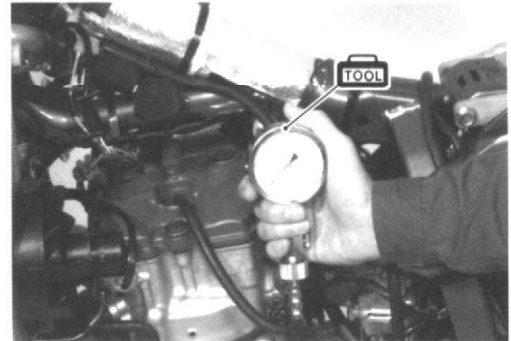
NOTE:

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

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

- Remove the spark plug. (MP 2-9)
- Install the compression gauge and adaptor in the spark plug hole. Make sure that the connection is tight.
- Keep the throttle grip in the fully open position.
- Press the starter button and crank the engine for a few seconds.
- Record the maximum gauge reading as the cylinder compression.

TOOL 09915-64510: Compression gauge set
09915-63310: Adaptor



OIL PRESSURE CHECK

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

DATA Oil pressure:

Above 40 kPa (0.4 kgf/cm², 5.7 psi) at 3 000 r/min, oil temperature at 60°C (140 °F)
Below 140 kPa (1.4 kgf/cm², 19.9 psi)

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

LOW OIL PRESSURE

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

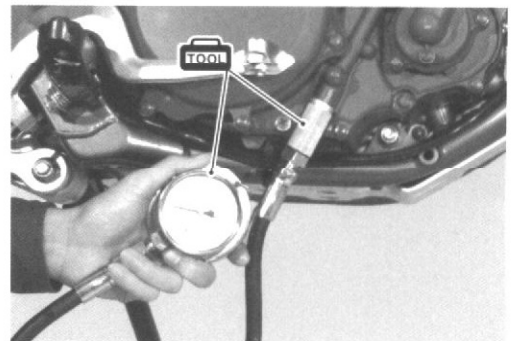
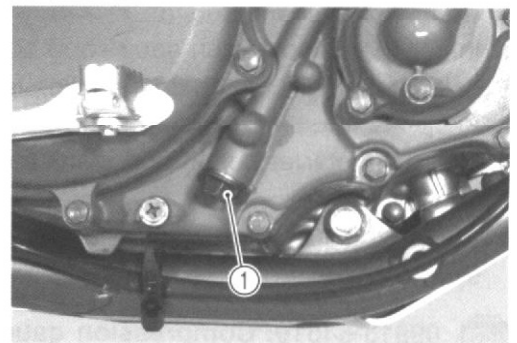
HIGH OIL PRESSURE

- * Engine oil viscosity is too high
- * Clogged oil passage
- * Combination of the above items

OIL PRESSURE TEST PROCEDURE

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

TOOL 09915-74510: Oil pressure gauge
09915-70610: Adapter



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ENGINE COMPONENTS REMOVABLE WITH ENGINE IN PLACE

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

ENGINE LEFT SIDE

| PARTS | REMOVAL | INSTALLATION |
|---------------------------|---------|--------------|
| Engine sprocket | 3-6 | 3-9 |
| Starter drive/driven gear | 3-14 | 3-57 |
| Neutral switch | 3-14 | 3-57 |
| Generator rotor | 3-19 | 3-51 |
| Starter clutch | 3-19 | 3-51 |

ENGINE RIGHT SIDE

| PARTS | REMOVAL | INSTALLATION |
|--|---------|--------------|
| Exhaust pipe/muffler | 3-5 | 3-10 |
| Oil filter | 3-14 | — |
| Clutch pressure plate, drive plates, and driven plates | 3-16 | 3-56 |
| Clutch sleeve hub | 3-16 | 3-56 |
| Primary driven gear assembly | 3-17 | 3-56 |
| Oil pump idle/driven gear | 3-17 | 3-54 |
| Oil pump | 3-18 | 3-54 |
| Gearshift shaft | 3-18 | 3-54 |
| Gearshift cam driven gear | 3-18 | 3-53 |
| Balancer drive/driven gear | 3-19 | 3-52 |

ENGINE CENTER

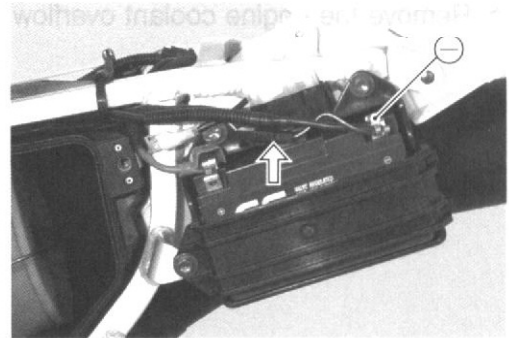
| PARTS | REMOVAL | INSTALLATION |
|---|---------|--------------|
| Carburetor | 4-6 | 4-12 |
| Starter motor | 3-4 | — |
| Cam chain tension adjuster | 3-11 | 3-64 |
| Cylinder head cover | 3-11 | 3-63 |
| Camshaft/automatic decompression assembly | 3-12 | 3-61 |
| Cylinder head | 3-13 | 3-60 |
| Cylinder | 3-13 | 3-60 |
| Piston | 3-13 | 3-59 |
| Cam chain | 3-17 | 3-55 |

ENGINE REMOVAL AND REMOUNTING

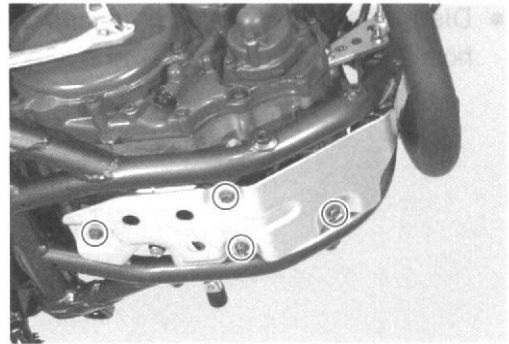
ENGINE REMOVAL

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

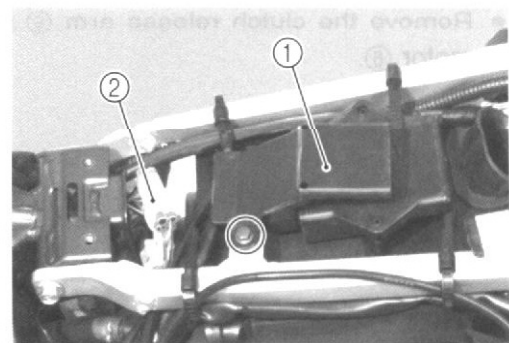
- Remove the seat, side covers, and frame covers. (☞ 6-2)
- Drain the engine oil. (☞ 2-11)
- Remove the carburetor. (☞ 4-6)
- Remove the radiator. (☞ 5-6 and 5-7)
- Disconnect the ⊖ battery lead wire and engine ground coupler.



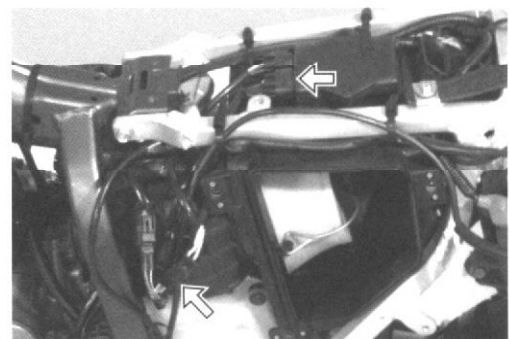
- Remove the engine plate.



- Remove the CDI unit cover ① and disconnect the neutral switch coupler ②.



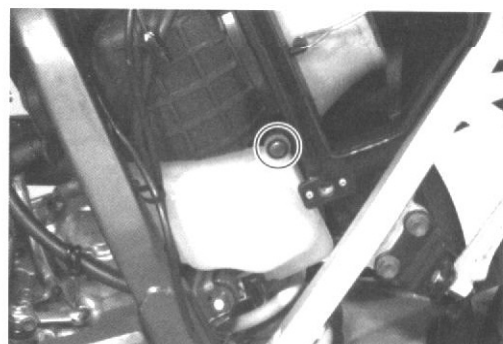
- Disconnect the generator couplers.



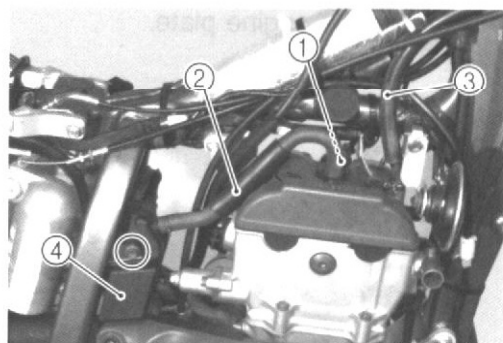
- Remove the regulator/rectifier.



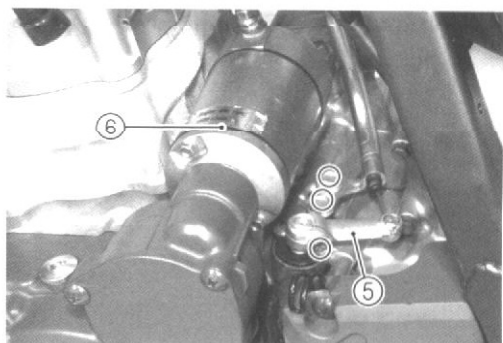
- Remove the engine coolant overflow tank mounting bolt.



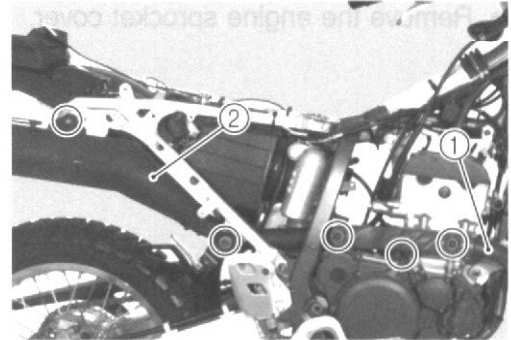
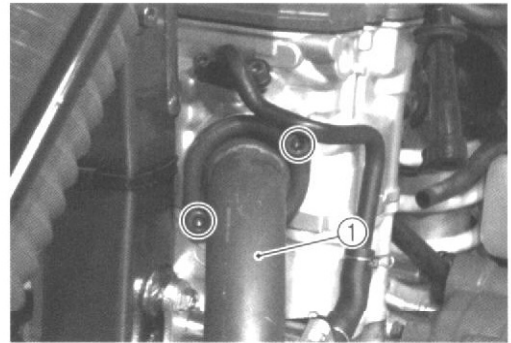
- Disconnect the spark plug cap ①, engine oil breather hose ②, engine oil hose ③, and remove the engine oil tank ④.



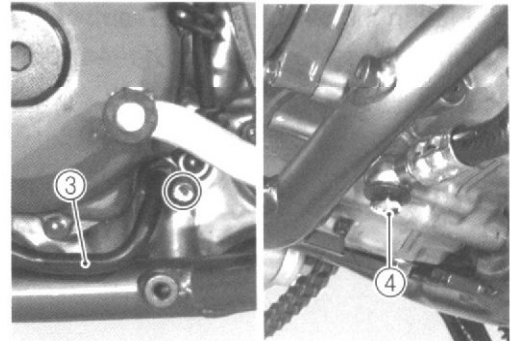
- Remove the clutch release arm ⑤ and remove the starter motor ⑥.



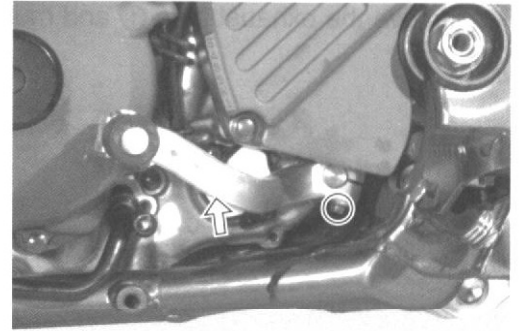
- Remove the exhaust pipe ① and muffler ②.



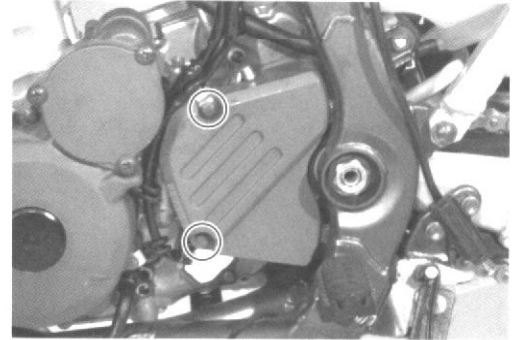
- Disconnect the engine oil pipe ③ and engine oil hose union bolt ④.



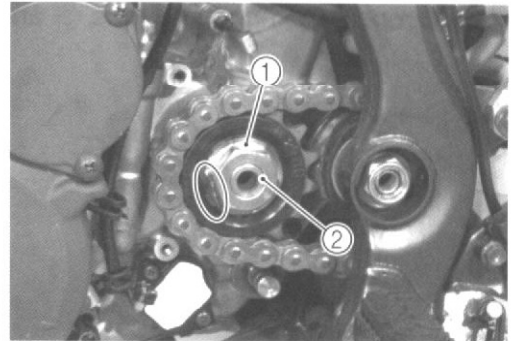
- Remove the gearshift lever.



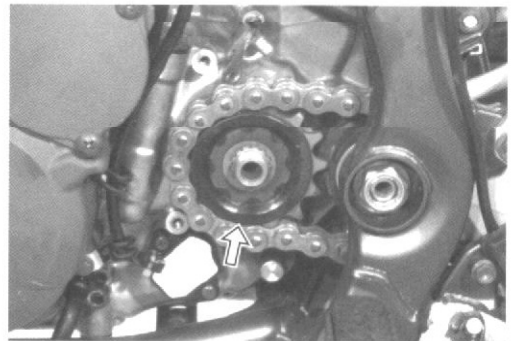
- Remove the engine sprocket cover.



- Flatten the washer ① and remove the engine sprocket nut ② while pressing down on the rear brake pedal.



- Remove the engine sprocket



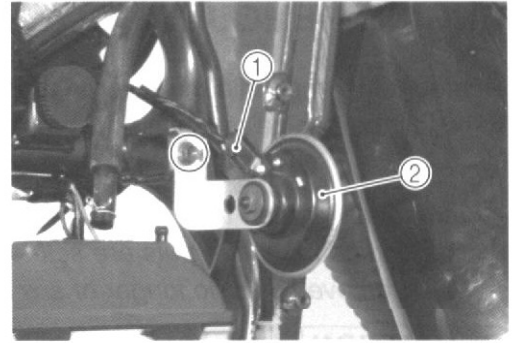
- Remove the cotter pins and brake pedal.

CAUTION

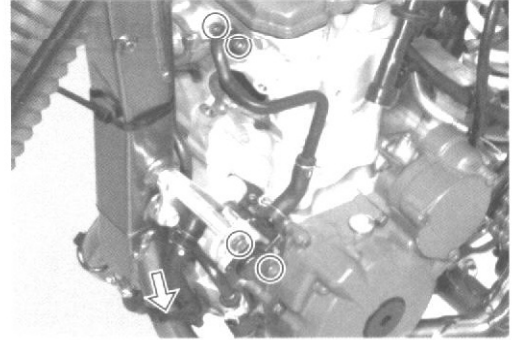
Replace the removed cotter pins with new ones.



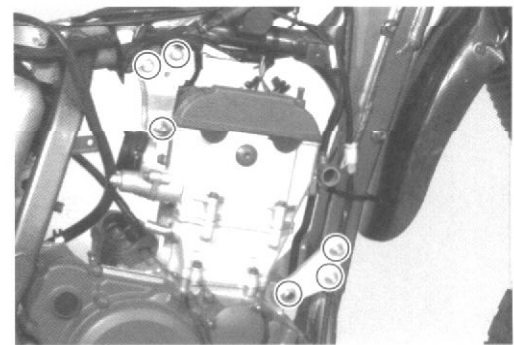
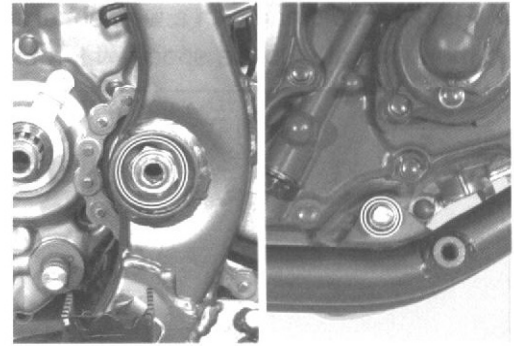
- Disconnect the horn coupler ① and remove the horn ②.



- Remove the PAIR (air supply) valve assembly. (For E-02, 19, 54)



- Remove the engine from the frame.



ENGINE REMOUNTING

Remount the engine in the reverse order of engine removal.

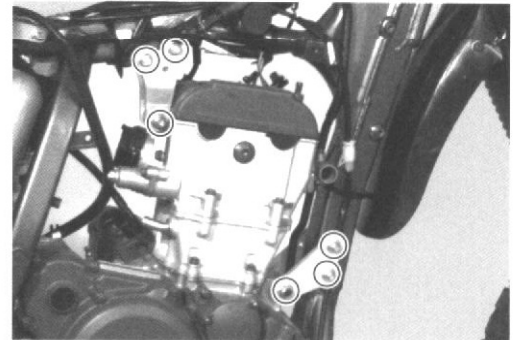
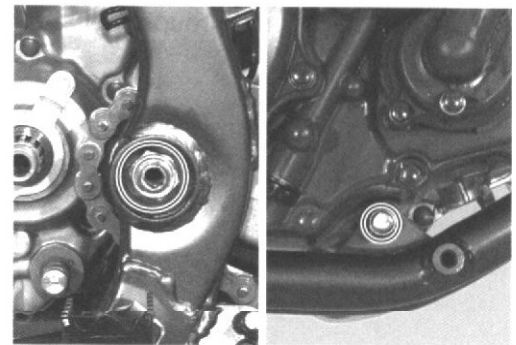
- Install the engine mounting nuts and bolts.

NOTE:

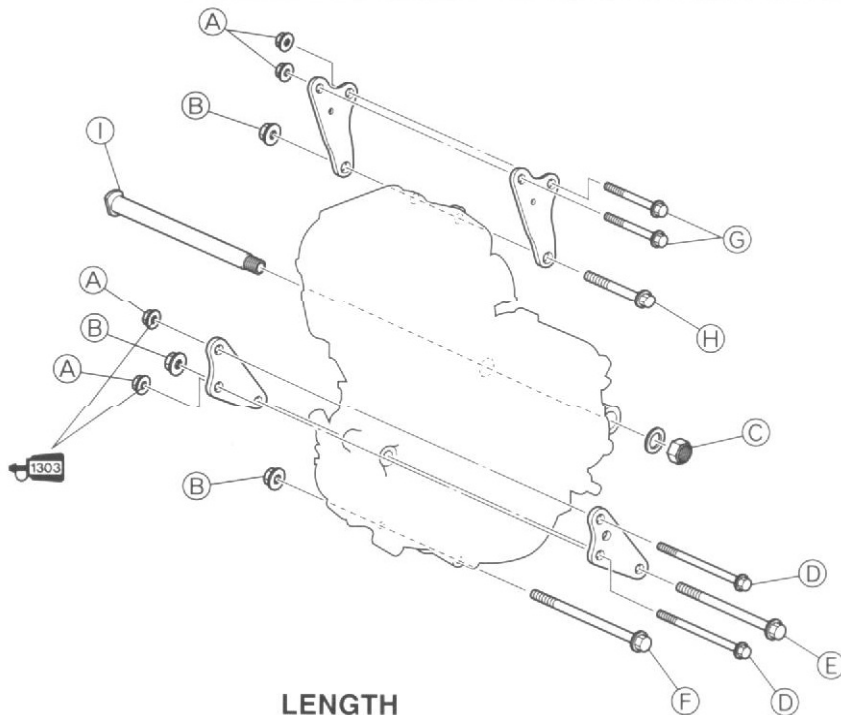
- * Temporarily tighten the nuts at this stage.
- * The engine mounting nuts are self-locking. Once the nut has been removed, it is no longer of any use.

CAUTION

Replace the engine mounting nuts with new ones.



- Hold the bolthead with a wrench, and then tighten the engine mounting nuts to the specified torque.



LENGTH

| | |
|----------|--------------------------------|
| Bolt (D) | 90 mm (3.5 in) |
| Bolt (E) | 90 mm (3.5 in)...E-02, 19, 54 |
| | 100 mm (3.9 in)...E-03, 28, 33 |
| Bolt (F) | 115 mm (4.5 in) |
| Bolt (G) | 50 mm (2.0 in) |
| Bolt (H) | 50 mm (2.0 in) |
| Bolt (I) | 245 mm (9.6 in) |



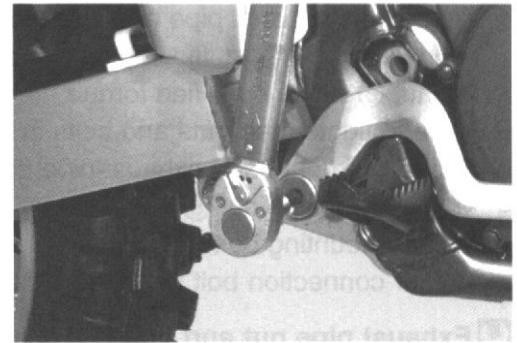
| ITEM | N-m | kgf-m | lb-ft |
|------|-----|-------|-------|
| (A) | 40 | 4.0 | 29.0 |
| (B) | 66 | 6.6 | 47.5 |
| (C) | 77 | 7.7 | 55.5 |

- Tighten the brake pedal bolt to the specified torque.

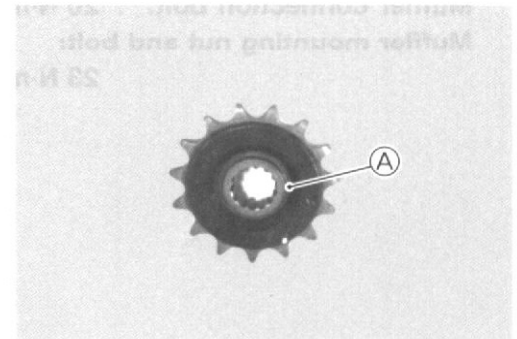
🔧 Brake pedal bolt: 29 N·m (2.9 kgf-m, 21.0 lb-ft)

NOTE:

After installing the brake pedal, install the new cotter pins into the brake pedal bolt and pin.



- Install the engine sprocket, with side **A** of the sprocket facing toward the engine.



- Tighten the engine sprocket nut to the specified torque.

🔧 Engine sprocket nut: 110 N·m (11.0 kgf-m, 79.5 lb-ft)

NOTE:

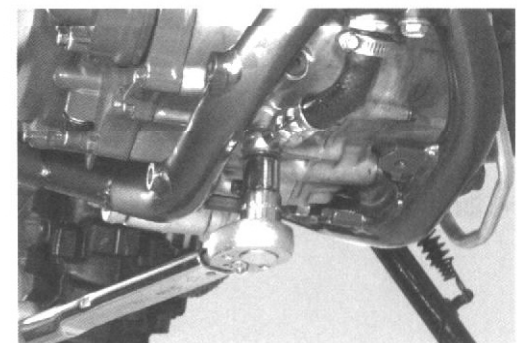
When tightening the engine sprocket nut, depress the brake pedal.

- Bend the washer securely.



- Tighten the engine oil hose union bolt to the specified torque.

🔧 Engine oil hose union bolt: 23 N·m (2.3 kgf-m, 16.5 lb-ft)

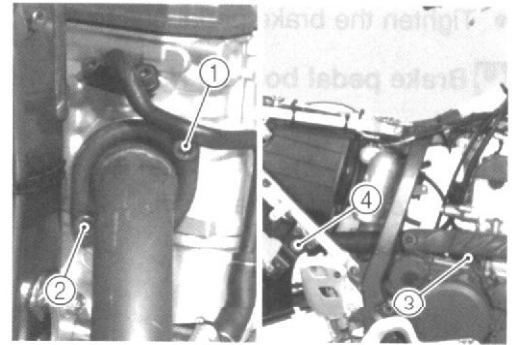


- Tighten the exhaust pipe nut ①, exhaust pipe bolt ②, muffler connection bolt ③, muffler mounting bolt ④, and muffler mounting nut ⑤ to the specified torque.

Be sure to tighten the nuts and bolts in the following order.

- Exhaust pipe nut and exhaust pipe bolt (①, ②)
- Muffler mounting nut ⑤
- Muffler mounting bolt ④
- Muffler connection bolt ③

- 🔧 **Exhaust pipe nut and bolt : 23 N·m (2.3 kgf-m, 16.5 lb-ft)**
Muffler connection bolt: 20 N·m (2.0 kgf-m, 14.5 lb-ft)
Muffler mounting nut and bolt:
23 N·m (2.3 kgf-m, 16.5 lb-ft)



- Pour 1.9 L (2.0 US qt, 1.7 Imp qt) of an API service classified SF or SG engine oil that has a viscosity rating of SAE 10W-40, into the oil filler hole, located in the frame, after overhauling it.
- Start the engine and allow it to run for about three minutes at idle speed.
- Turn off the engine and wait about three minutes, and then check the oil level on the dipstick.



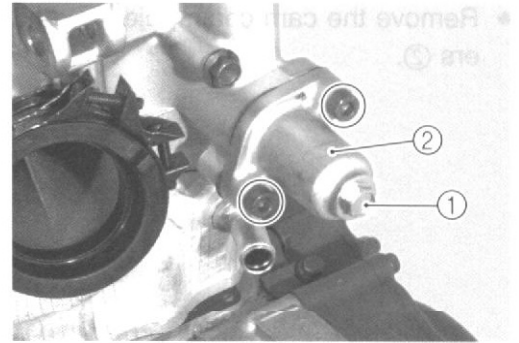
DATA Engine oil capacity

- Oil change: 1.7 L (1.8 US qt, 1.5 Imp qt)
- Oil and filter change: 1.8 L (1.9 US qt, 1.6 Imp qt)
- Engine overhaul: 1.9 L (2.0 US qt, 1.7 Imp qt)

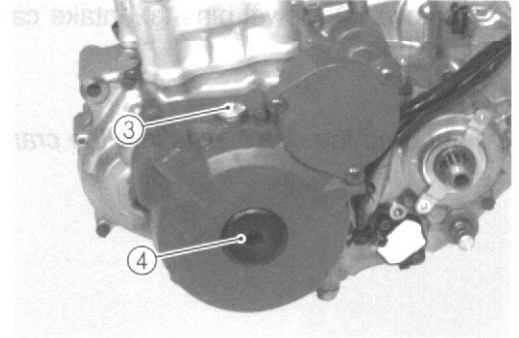
- Adjust the following items to specification.
- * Throttle cable play 🛠️ 2-13
- * Engine idle speed 🛠️ 2-14
- * Brake pedal 🛠️ 2-18

ENGINE DISASSEMBLY

- Remove the cap bolt ① and cam chain tension adjuster ②.



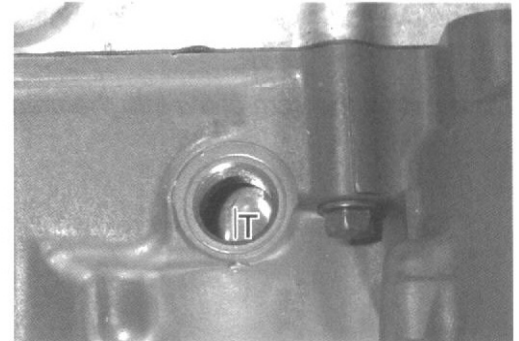
- Remove the top-dead-center (TDC) plug ③ and generator cover cap ④.



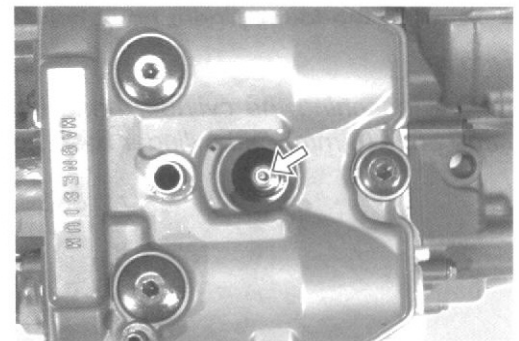
- Turn the generator rotor until the “T” line on the generator rotor is aligned with the center of the hole in the generator cover.

NOTE:

When removing the cylinder head cover, the piston must be at TDC of the compression stroke.



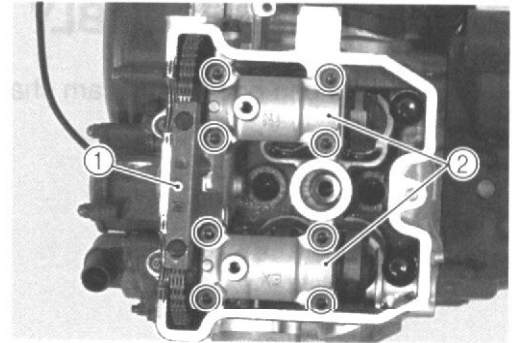
- Remove the spark plug.



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



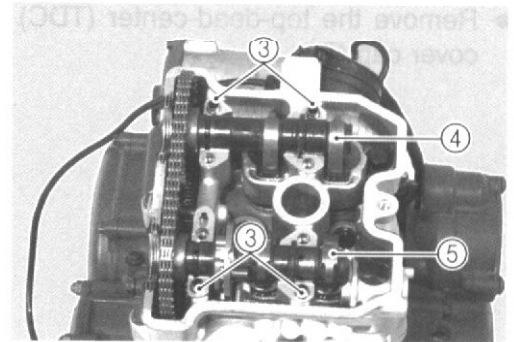
- Remove the cam chain guide ① and camshaft journal holders ②.



- Remove the dowel pins ③, intake camshaft ④ and exhaust camshaft ⑤.

NOTE:

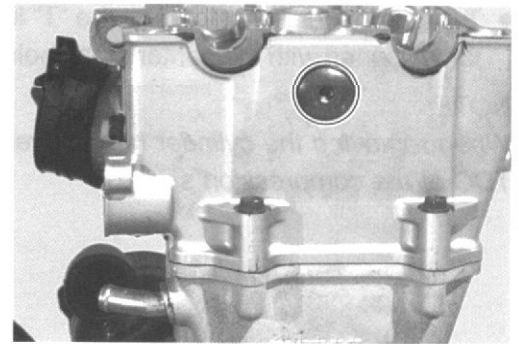
Do not drop the dowel pins into the crankcase.



- Remove the cylinder head side bolt.

NOTE:

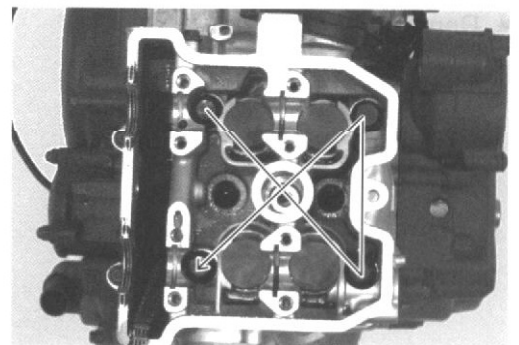
Do not drop the cam chain into the crankcase.



- Remove the four cylinder head bolts in diagonal stages.

NOTE:

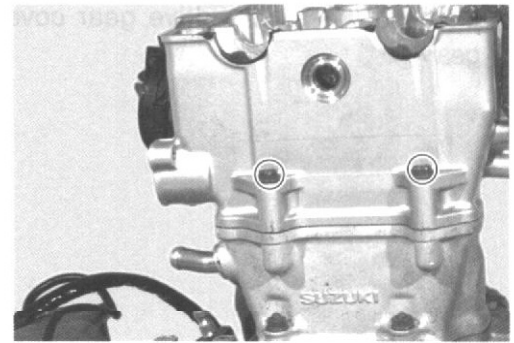
Before loosening the cylinder head bolts, loosen the cylinder head bolts (6 mm) and cylinder base nuts.



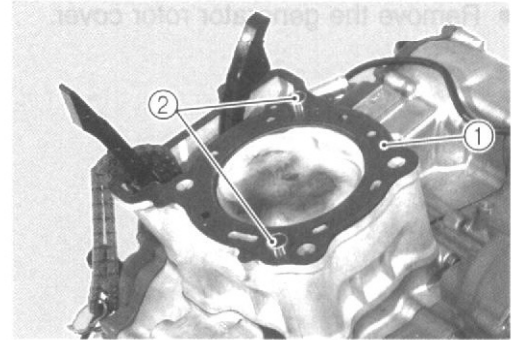
- Remove the cylinder head bolts, and then remove the cylinder head.

NOTE:

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



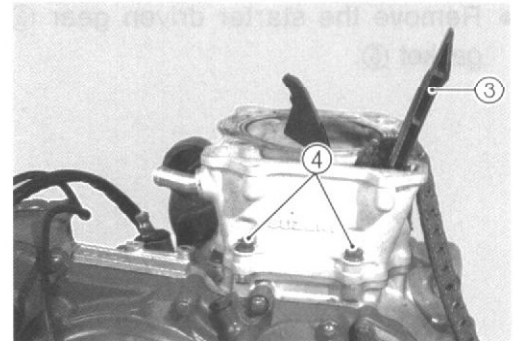
- Remove the cylinder head gasket ① and dowel pins ②.



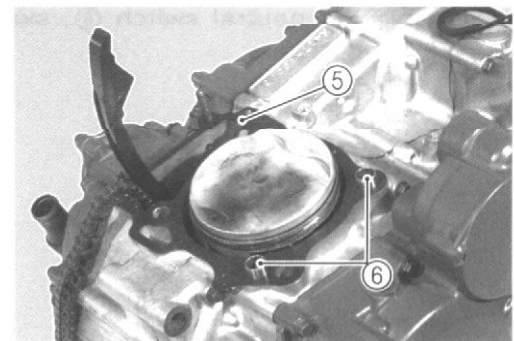
- Remove the cam chain guide ③.
- Remove the cylinder base nuts ④, and then remove the cylinder.

NOTE:

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



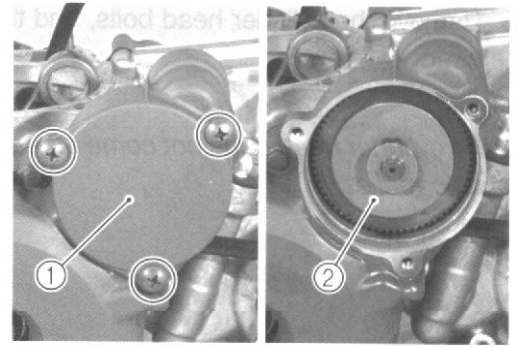
- Remove the cylinder gasket ⑤ and dowel pins ⑥.



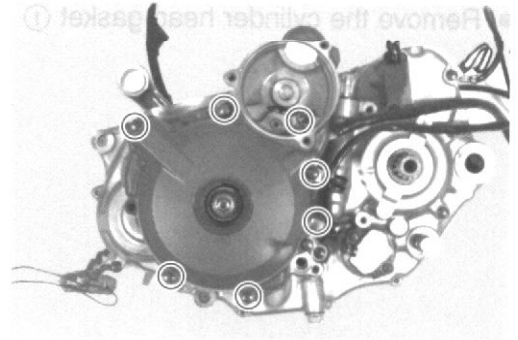
- Place a clean rag over the cylinder base to prevent the piston pin circlip from dropping into the crankcase.
- Remove the piston pin circlip.
- Draw out the piston pin and remove the piston.



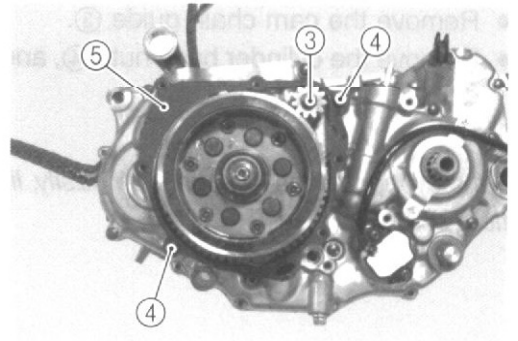
- Remove the starter drive gear cover ① and starter drive gear ②.



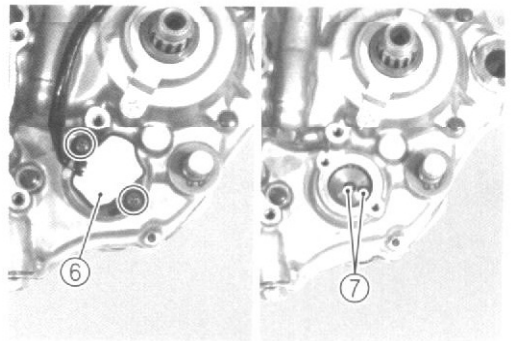
- Remove the generator rotor cover.



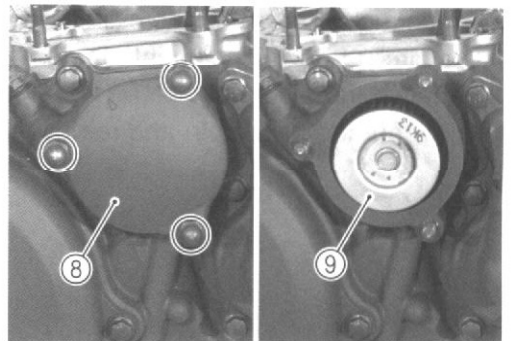
- Remove the starter driven gear ③, dowel pins ④, and gasket ⑤.



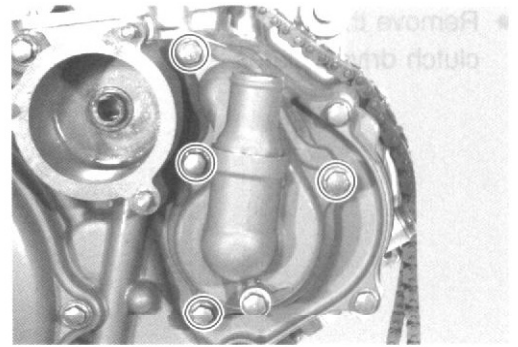
- Remove the neutral switch ⑥, switch contacts ⑦, and springs.



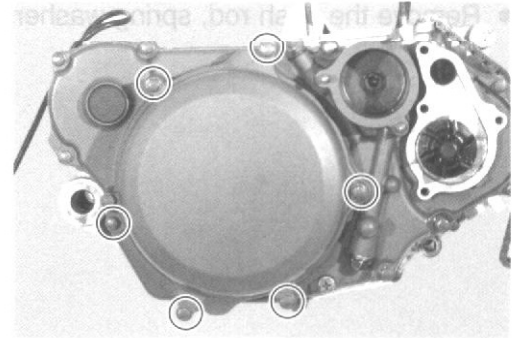
- Remove the oil filter cap ⑧ and oil filter ⑨.



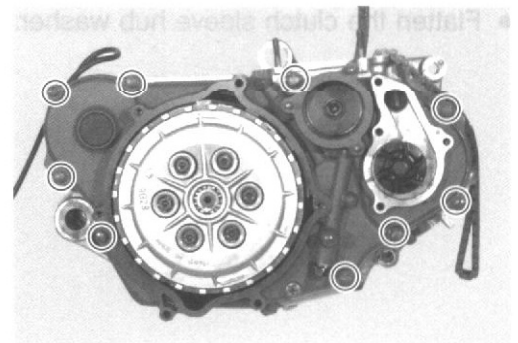
- Remove the water pump cover.



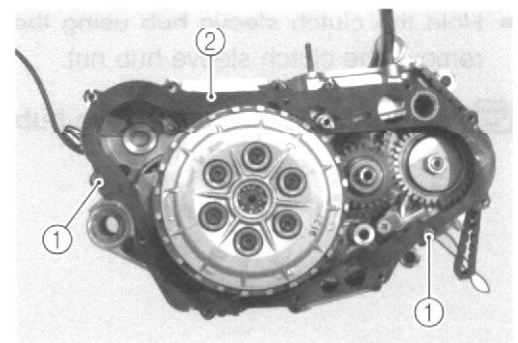
- Remove the clutch cover.



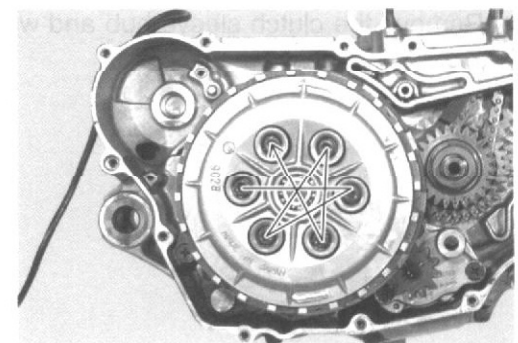
- Remove the right crankcase cover.



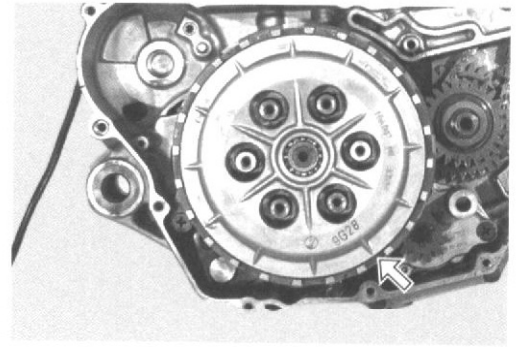
- Remove the dowel pins ① and gasket ②.



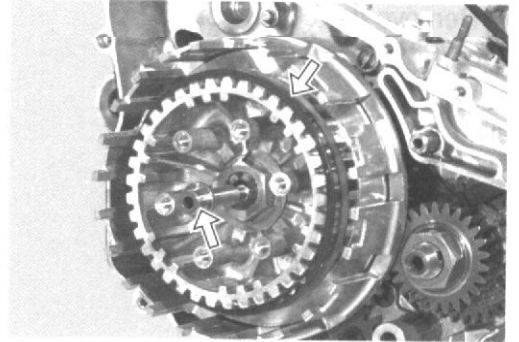
- Loosen the clutch spring set bolts working in diagonal stages, and then remove them when they are fully loosened.



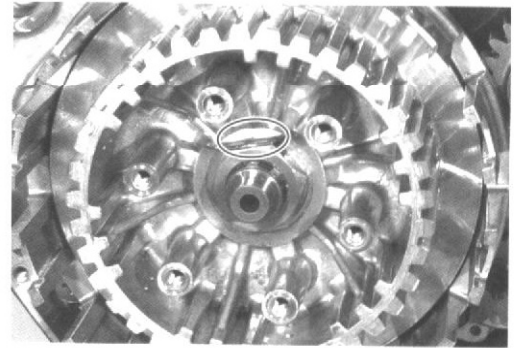
- Remove the clutch pressure plate, clutch drive plates, and clutch driven plates.



- Remove the push rod, spring washer, and spring washer seat.

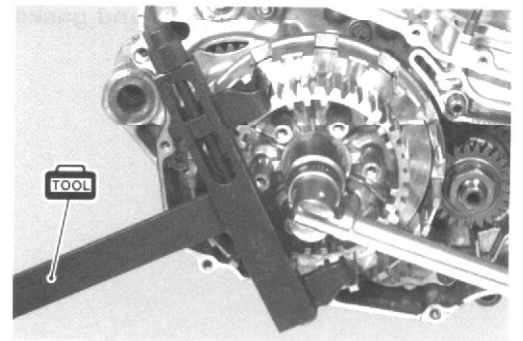


- Flatten the clutch sleeve hub washer.

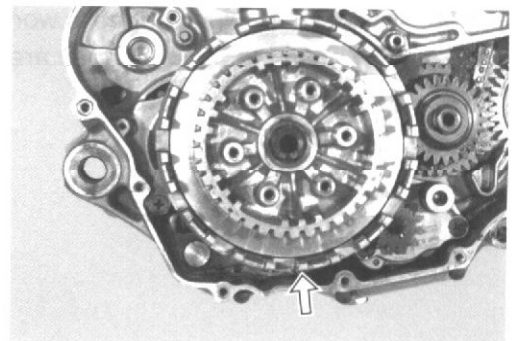


- Hold the clutch sleeve hub using the special tool, and then remove the clutch sleeve hub nut.

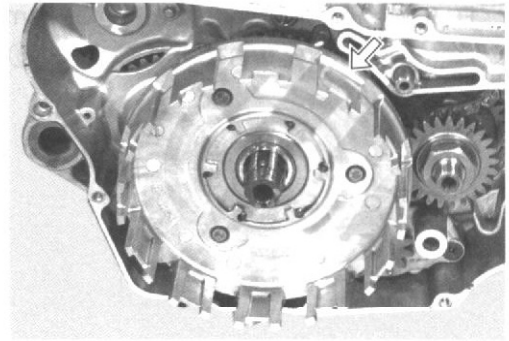
 **09920-53740: Clutch sleeve hub holder**



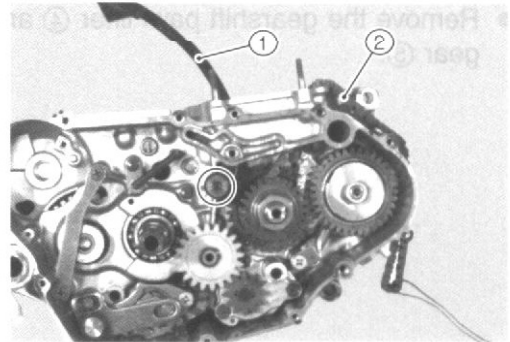
- Remove the clutch sleeve hub and washer.



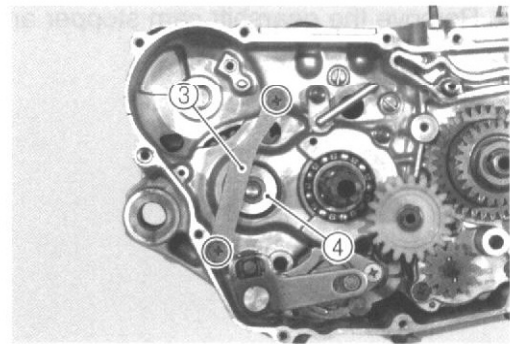
- Remove the primary driven gear assembly and collar.



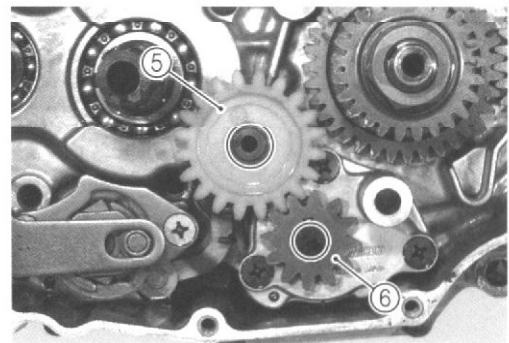
- Remove the cam chain tensioner ① and cam chain ②.



- Remove the retainer ③ and spacer ④.



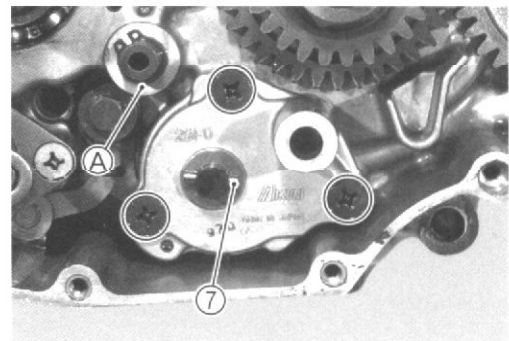
- Remove the oil pump idle gear ⑤ and oil pump driven gear ⑥.



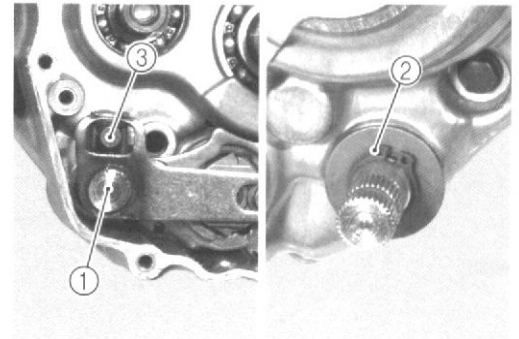
- Remove the pin ⑦ and oil pump assembly.

⚠ CAUTION

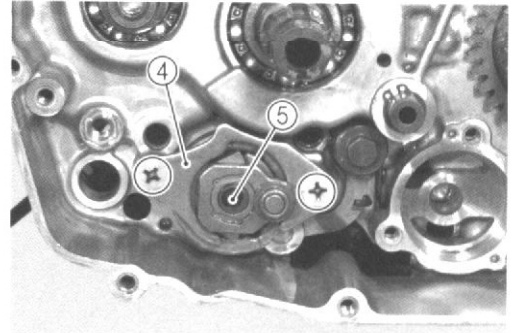
Do not remove the circlip (A), before separating the crankcase to prevent the oil pump idle gear shaft from dropping into the crankcase.



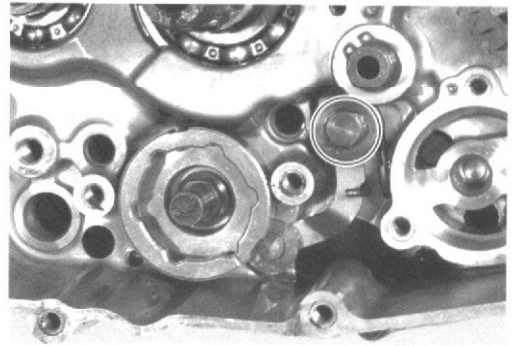
- Remove the gearshift shaft ① by removing the circlip ②.
- Remove the gearshift arm stopper ③.



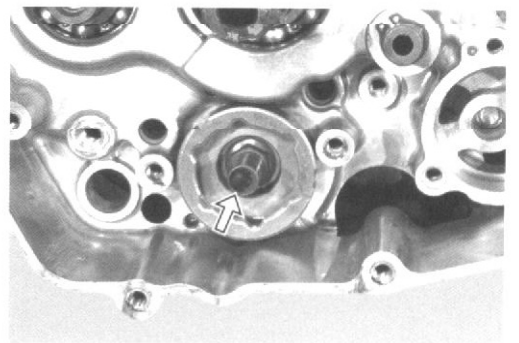
- Remove the gearshift pawl lifter ④ and gearshift cam driven gear ⑤.



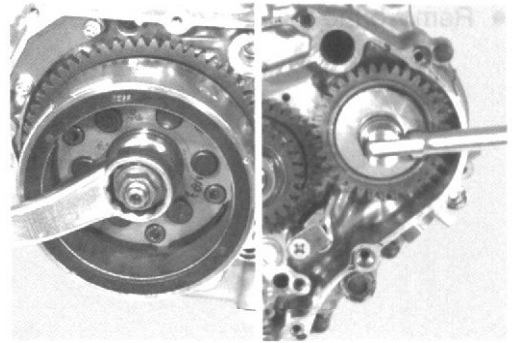
- Remove the gearshift cam stopper arm.



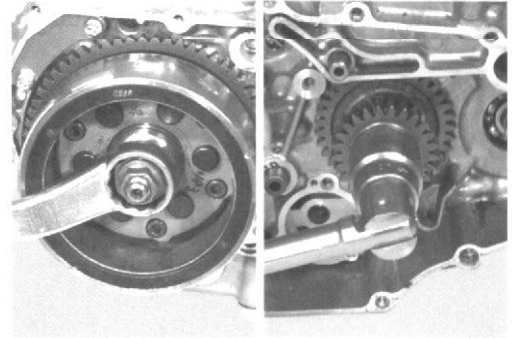
- Remove the gearshift cam driven gear bolt.



- Hold the generator rotor using a 26 mm offset wrench, and then remove the balancer driven gear nut.
- Remove the plate, balancer driven gear, and key.



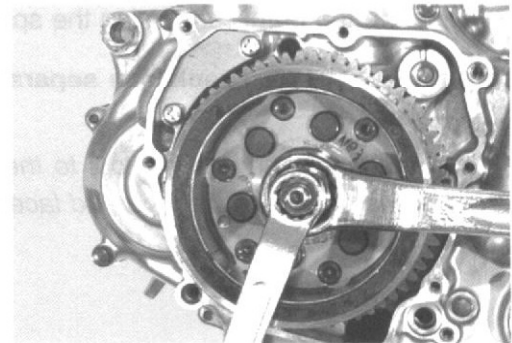
- Hold the generator rotor using a 26 mm offset wrench, and then remove the primary drive gear nut.
- Remove the washer, primary drive gear, pin, key, and balancer drive gear.



CAUTION

The primary drive gear nut has left-hand threads.

- Hold the generator rotor using a 26 mm offset wrench, and then remove the generator rotor nut.

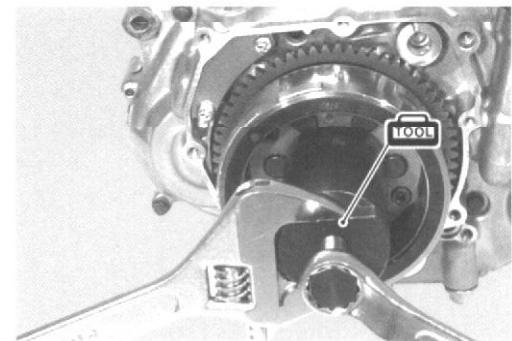


- Remove the generator rotor using the special tool.

TOOL 09930-31921: Rotor remover

NOTE:

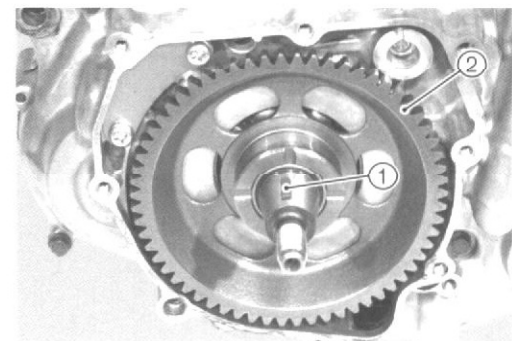
Do not use the rotor remover attachment to remove the generator rotor, since it will not fit on the end of the crankshaft. As an alternative, temporarily install the generator rotor nut to the crankshaft, and then remove the generator rotor using the special tool.



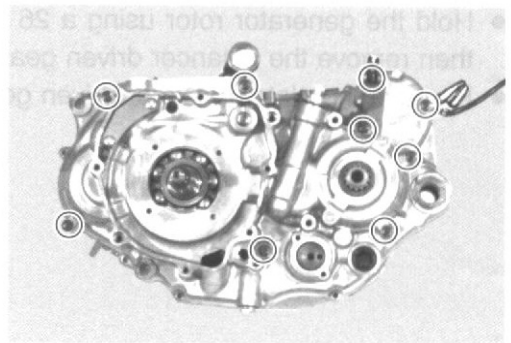
CAUTION

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

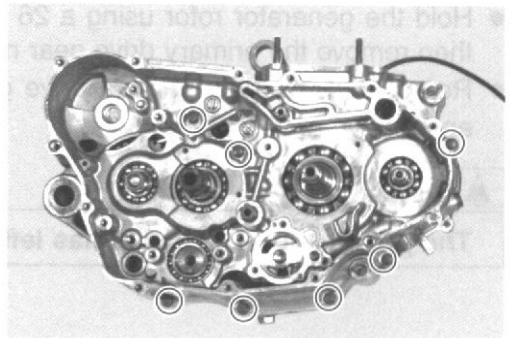
- Remove the key ① and starter clutch gear ②.



- Remove the left crankcase securing bolts.



- Remove the right crankcase securing bolts.

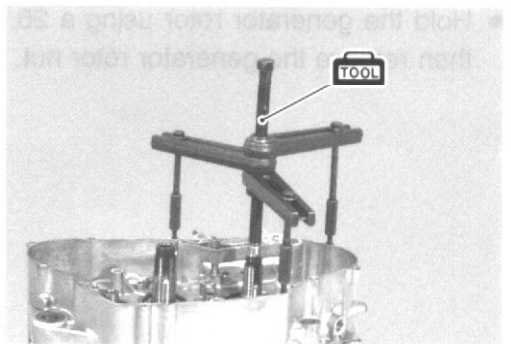


- Separate the crankcase using the special tool.

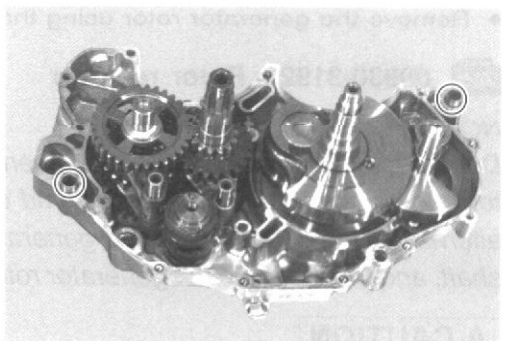
TOOL 09920-13120: Crankcase separating tool

NOTE:

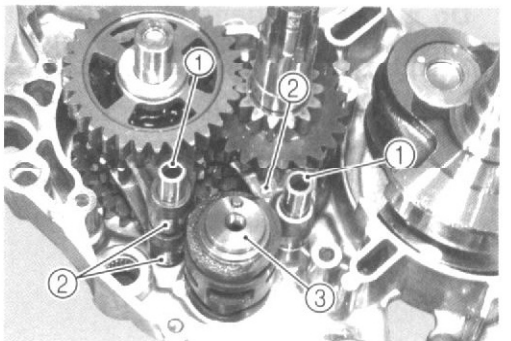
Fit the crankcase separating tool to the right side, so that the tool plate is paralleled with the end face of the crankcase.



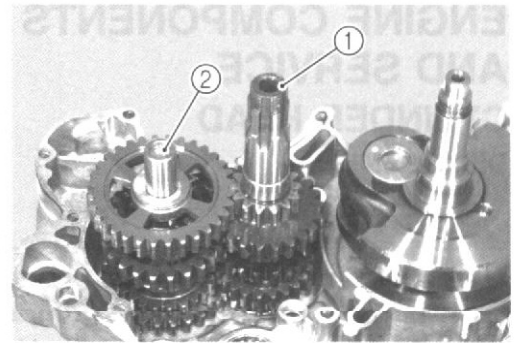
- Remove the dowel pins.



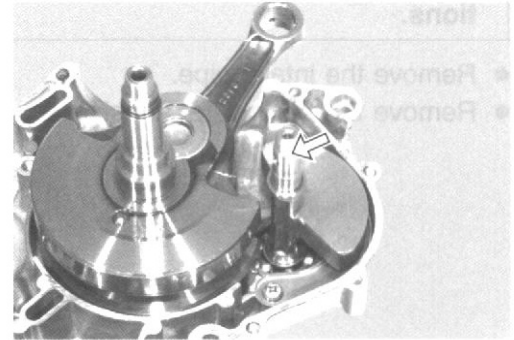
- Remove the gearshift fork shafts ①, gearshift forks ②, and gearshift cam ③.



- Remove the countershaft assembly ① and driveshaft assembly ②.

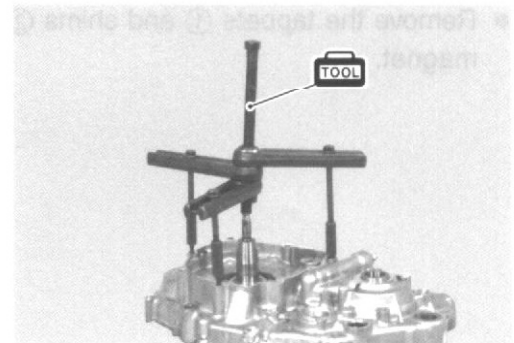


- Remove the balancer shaft.

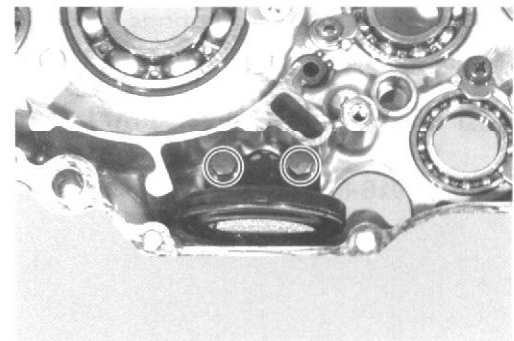


- Remove the crankshaft from the crankcase using the special tool.

 **09920-13120: Crankcase separating tool**



- Remove the oil sump filter.



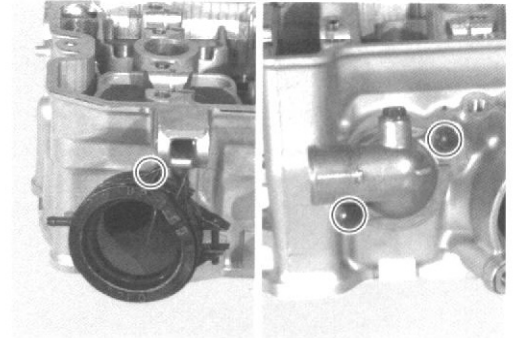
ENGINE COMPONENTS INSPECTION AND SERVICE

CYLINDER HEAD DISASSEMBLY

⚠ CAUTION

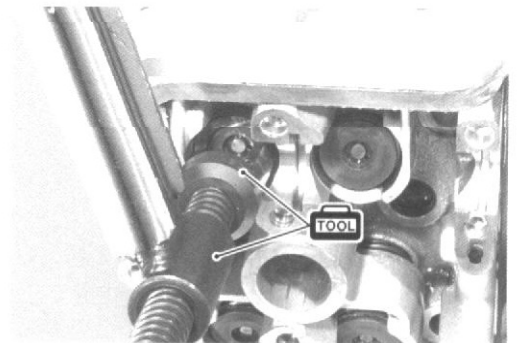
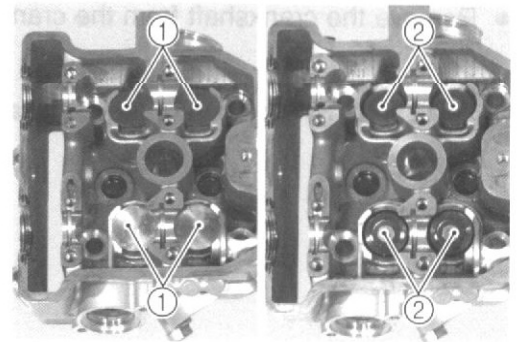
Identify the position of each removed part. Organize the parts in their respective groups (i.e., exhaust or intake) so that they can be installed in their original positions.

- Remove the intake pipe.
 - Remove the thermostat housing and thermostat.
-
- Remove the tappets ① and shims ② by hand or by using a magnet.

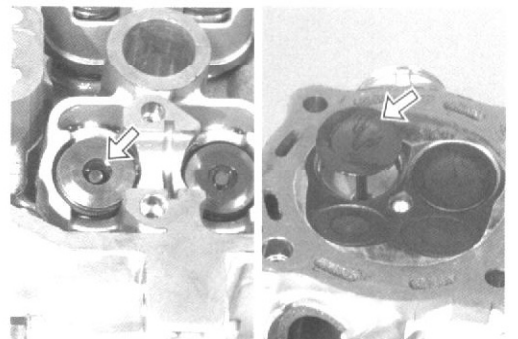


- Compress the valve springs, and then remove the valve cot-ters from the valve stem using the special tools.

TOOL 09916-14510: Valve spring compressor
09916-14910: Attachment
09916-84511: Tweezers



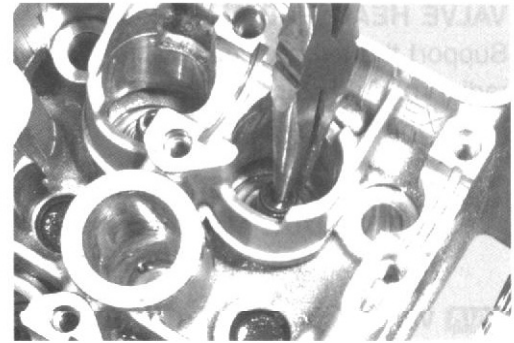
- Remove the valve spring retainer and valve springs.
- Remove the valve from the other side.



- Remove the oil seal with long-nose pliers.
- Remove the valve spring seat.

NOTE:

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

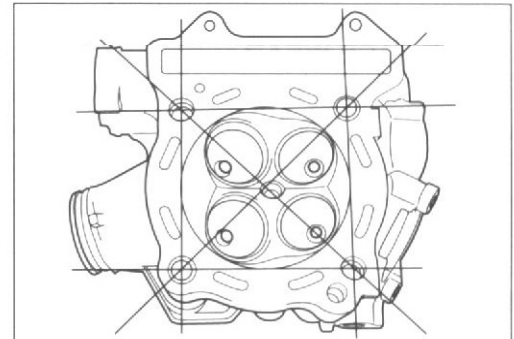
**CYLINDER HEAD DISTORTION**

Decarbonize the combustion chamber.

Check the gasket surface of the cylinder head for distortion using a straightedge and thickness gauge. Take clearance readings at several places. If any clearance reading exceeds the service limit, replace the cylinder head with a new one.

TOOL 09900-20803: Thickness gauge

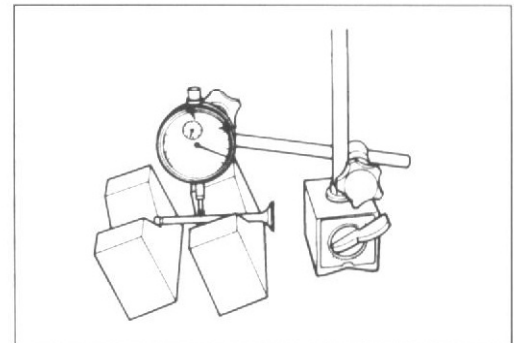
DATA Cylinder head distortion
Service Limit: 0.05 mm (0.002 in)

**VALVE STEM RUNOUT**

Support the valve using V-blocks and measure the valve stem runout using the dial gauge, as shown. If the runout exceeds the service limit, replace the valve with a new one.

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

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

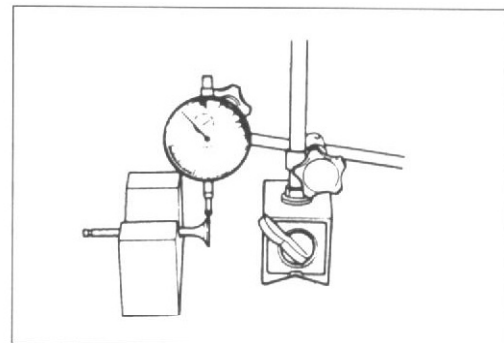


VALVE HEAD RADIAL RUNOUT

Support the valve using a V-block and measure the valve head radial runout using the dial gauge, as shown. If the runout exceeds the service limit, replace the valve with a new one.

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

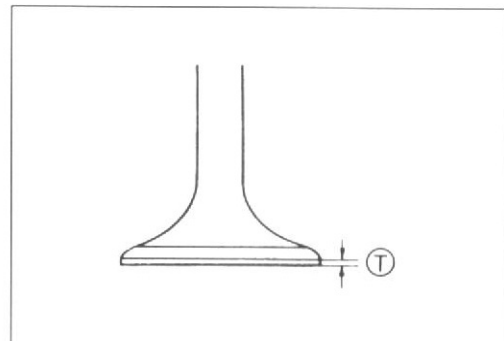
DATA Valve head radial runout
 Service Limit: 0.03 mm (0.001 in)

**VALVE FACE WEAR**

Visually inspect each valve face for wear or damage. If any abnormal wear is found, replace the respective valve with a new one. Measure the valve face thickness $\text{\textcircled{T}}$. If the valve face thickness is not within the specified value, replace the valve with a new one.

- TOOL** 09900-20101: Vernier calipers

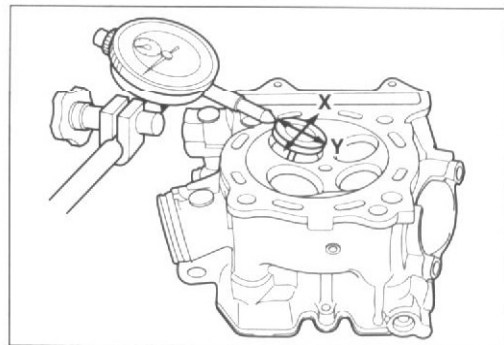
DATA Valve face thickness $\text{\textcircled{T}}$
 Service Limit: 0.5 mm (0.02 in)

**VALVE STEM DEFLECTION**

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

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

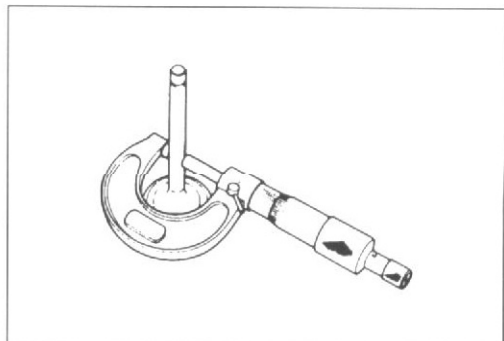
DATA Valve stem deflection
 Service Limit: 0.35 mm (0.014 in)

**VALVE STEM WEAR**

Measure the valve stem outside diameter using the micrometer. If the outside diameter is not within the specified value, replace the valve with a new one. If the valve stem outside diameter is within specification, but the valve stem deflection is not, replace the valve guide with a new one. After replacing the valve or valve guide, check the deflection.

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

DATA Valve stem O.D.
 Standard:
 IN: 4.975 – 4.990 mm (0.1959 – 0.1965 in)
 EX: 4.955 – 4.970 mm (0.1951 – 0.1957 in)



VALVE GUIDE SERVICING

- Drive the valve guide out toward the camshaft side using the valve guide remover.

TOOL 09916-44310: Valve guide remover/installer

NOTE:

- * *Discard the removed valve guide.*
 - * *Only oversized valve guides are available as replacement parts.*
- Refinish the valve guide holes in the cylinder head using the valve guide reamer and handle

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

- Oil the stem hole of each valve guide and drive the guide into the guide hole using the valve guide installer and attachment.

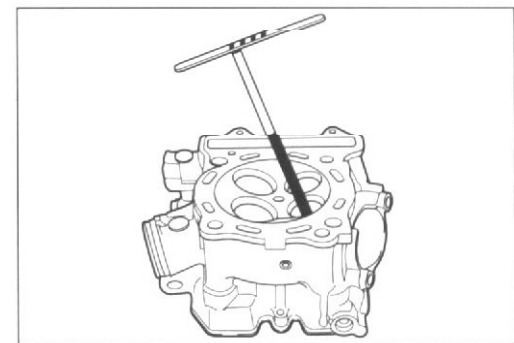
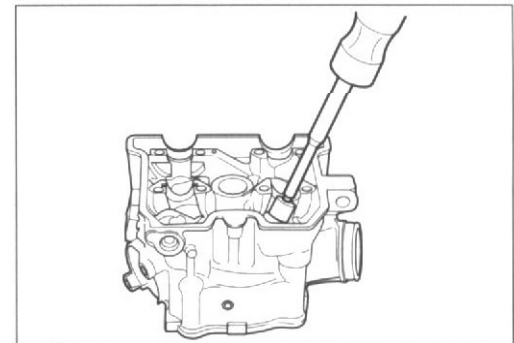
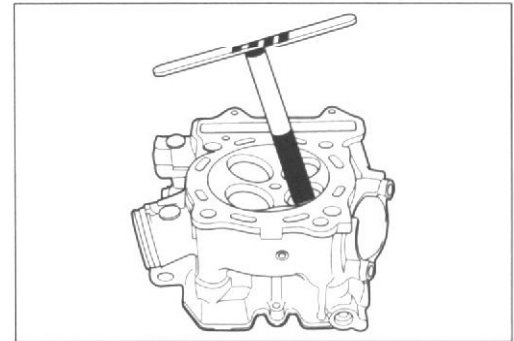
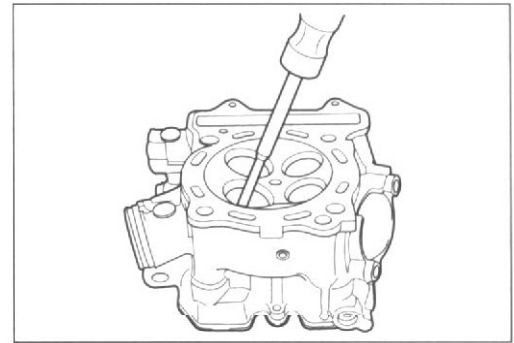
TOOL 09916-44310: Valve guide remover/installer
09916-53360: Valve guide installer attachment

CAUTION

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

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

TOOL 09916-34570: Valve guide reamer (5.0 mm)
09916-34542: Reamer handle



VALVE SEAT WIDTH

- Coat the valve seat uniformly with prussian blue. Install the valve and attach a valve lapper onto it. Tap the coated seat with the valve face in a rotating manner, in order to obtain a clear impression of the seating contact.

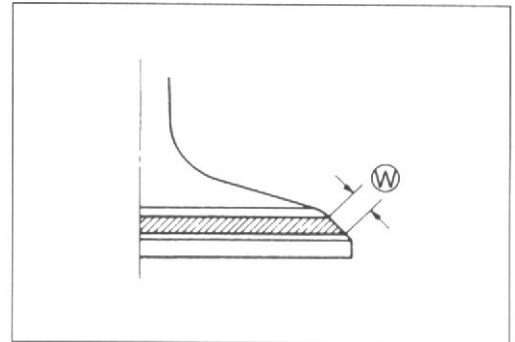
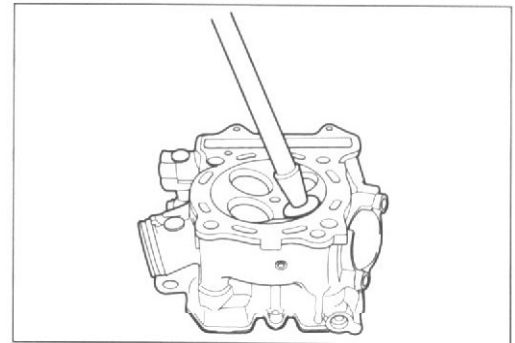
TOOL 09916-10911: Valve lapper set

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

DATA Valve seat width W

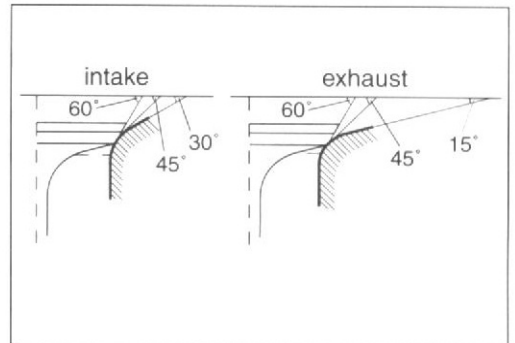
Standard: 0.9 – 1.1 mm (0.035 – 0.043 in)

If the valve seat is out of specification, re-cut the seat.



VALVE SEAT SERVICING

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



| | Intake | Exhaust |
|-----|--------|---------|
| 45° | N-128 | N-128 |
| 15° | — | N-121 |
| 30° | N-128 | — |
| 60° | N-114 | N-114 |

For USA

- TOOL Valve seat cutter: N-114, N-121, and N-128**
- Solid pilot: N-100-5.0**

For the other countries

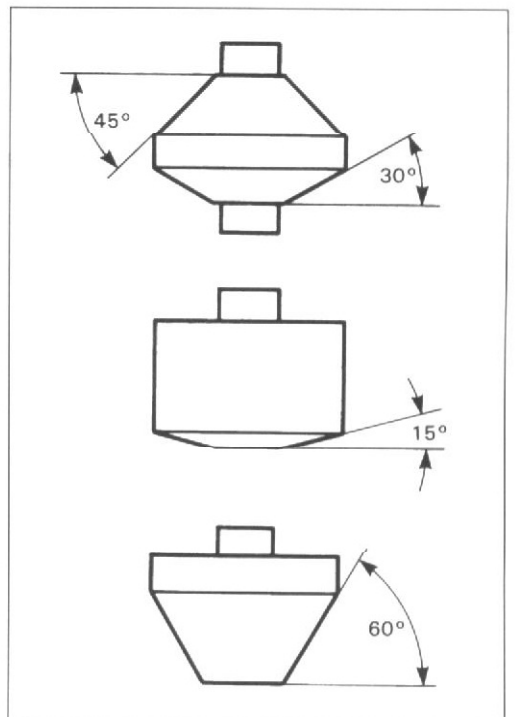
- TOOL 09916-21110: Valve seat cutter set**
- 09916-22420: Cutter N-128**
- 09916-22430: Cutter N-114**
- 09916-20610: Cutter N-121**
- 09916-24311: Solid pilot N-100-5.0**

NOTE:

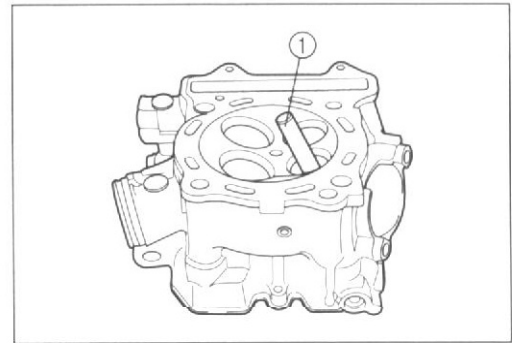
Use the solid pilot N-100-5.0 along with the valve seat cutters N-114, N-121, and N-128.

CAUTION

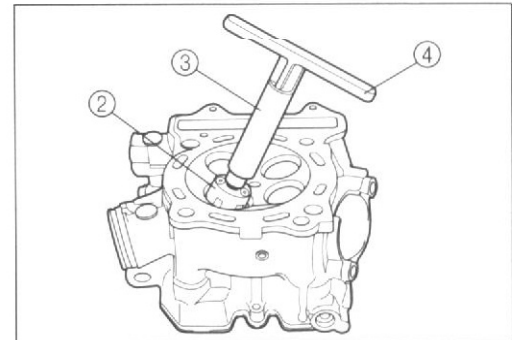
The valve seat contact area must be inspected after each cut.



- When installing the solid pilot ①, rotate it slightly.

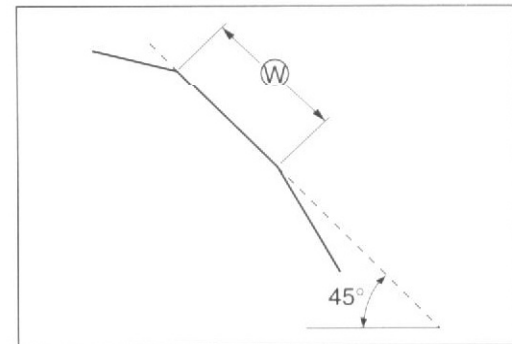


- Seat the pilot snugly. Install the 45° cutter ②, attachment ③, and T-handle ④.



INITIAL SEAT CUT

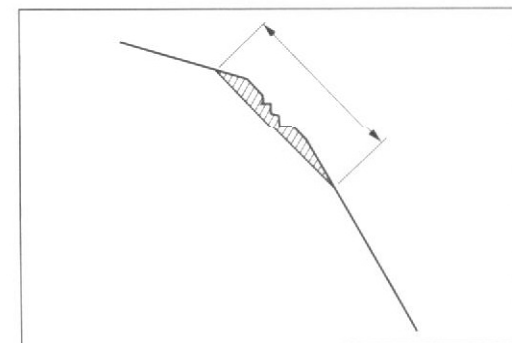
- Descal and clean up the seat using the 45° cutter. Rotate the cutter one or two turns.
- Measure the valve seat width W after every cut.



- If the valve seat is pitted or burned, use the 45° cutter to condition the seat some more.

NOTE:

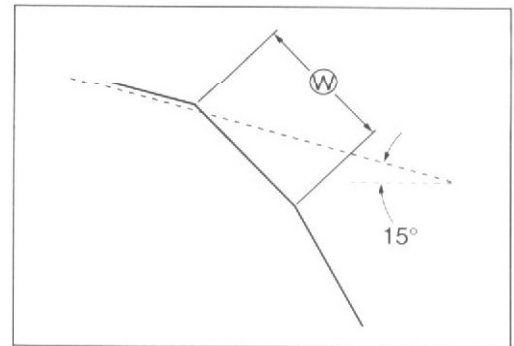
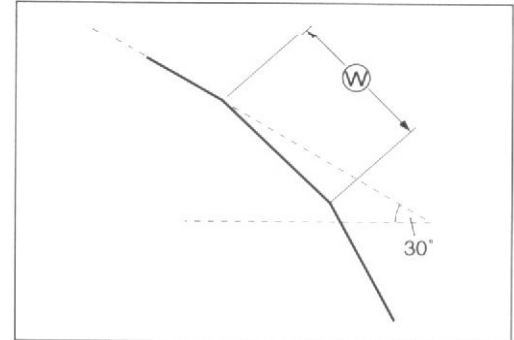
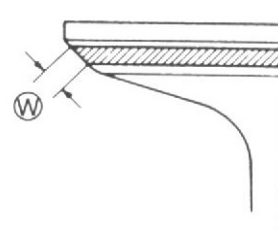
Cut only the minimum amount necessary from the seat to prevent the possibility of the tappet shim replacement.



TOP NARROWING CUT

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

Contact area too high and too wide on face of valve

**FINAL SEAT CUT**

- If the contact area is too low or too narrow, use the 60° cutter to raise and widen the contact area. If the contact area is too high or too wide, use the 15° cutter to lower and narrow it to the correct width.
- After the desired seat position and width is achieved, use the 60° cutter very lightly to clean up any burrs caused by the previous cutting operations.

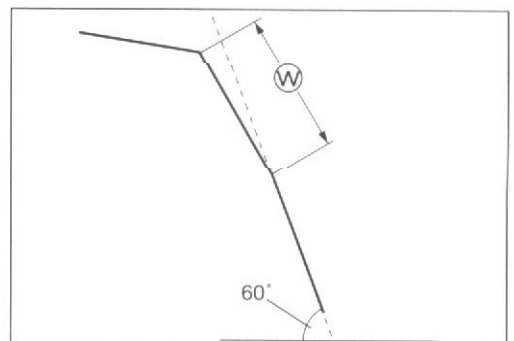
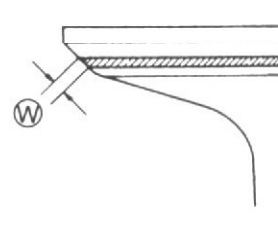
⚠ CAUTION

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

NOTE:

After servicing the valve seats, be sure to check the tappet clearance after the cylinder head has been installed. (🔧 2-5 to 2-8)

Contact area too low and too narrow on face of valve



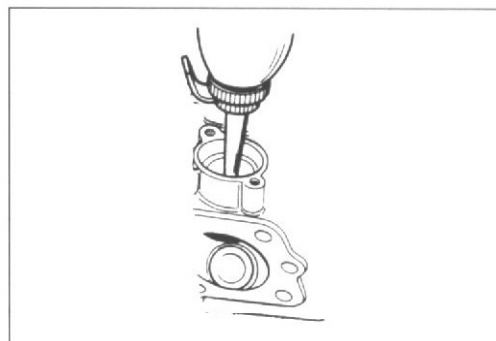
VALVE SEAT SEALING CONDITION INSPECTION

With the valve and valve spring assembled, pour a small quantity of gasoline into the intake or exhaust port.

Check that no gasoline leaks through the valve seat. If leakage is found, correct the sealing surface.

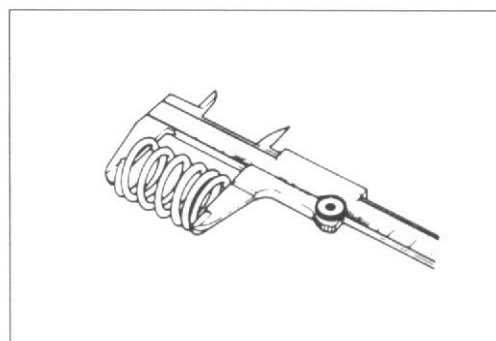
⚠ WARNING

**Gasoline is highly flammable and explosive.
Keep heat, sparks, and flames away from gasoline.**

**VALVE SPRING**

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

Check the valve springs for proper strength by measuring their free length and also by the force required to compress them. If the spring length is less than the service limit or if the force required to compress the valve spring is not within specification, replace both the inner and outer springs as a set.

**DATA** Valve spring free length (IN & EX)

Service Limit:

INNER: 32.6 mm (1.28 in)

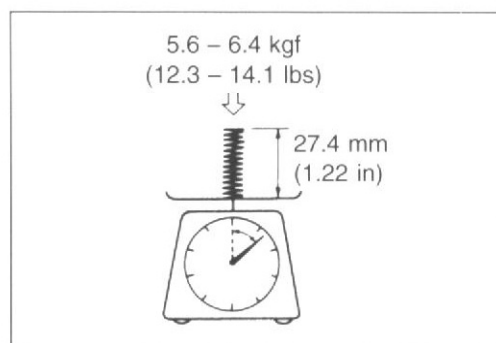
OUTER: 36.3 mm (1.43 in)

DATA Valve spring tension (IN & EX)

Standard:

**INNER: 56 – 64 N (5.6 – 6.4 kgf) /27.4 mm
(12.3 – 14.1 lbs/1.08 in)**

**OUTER: 126 – 145 N (12.6 – 14.5 kgf) /30.9 mm
(27.7 – 32.0 lbs/1.22 in)**



REASSEMBLY

- Install each valve spring seat.
- Apply molybdenum oil solution to each oil seal and press-fit them into position.

⚠ CAUTION

Do not reuse the oil seals.

- Apply molybdenum oil solution to the valve as shown, and then insert them into the valve guides.

⚠ CAUTION

When inserting each valve into the valve guides, make sure not to damage the lip of the oil seal.

- Install the valve spring with the smaller pitch **(A)** facing the cylinder head.

(B) Larger pitch

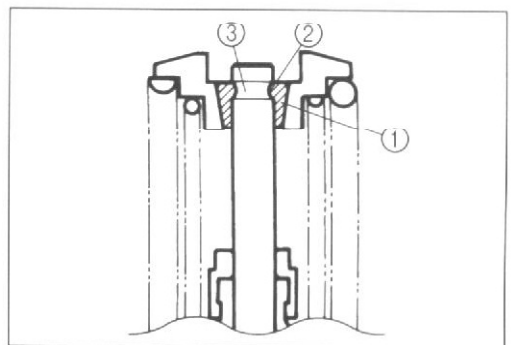
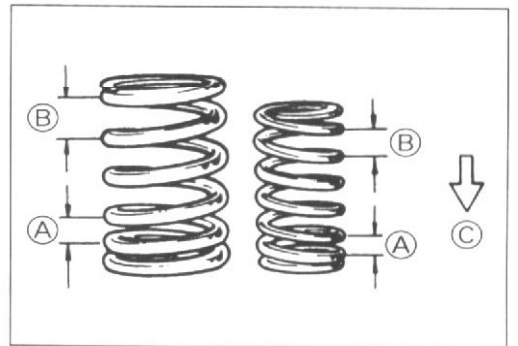
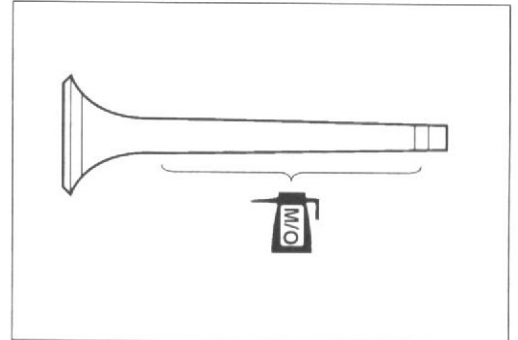
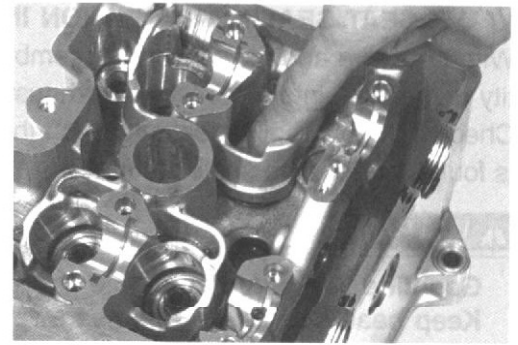
(C) Down

- Install the valve spring retainer by pressing down the spring using the valve lifter. Fit the cotter halves to the stem end and release the lifter to allow the cotter **(1)** to wedge between the retainer and the valve stem. Make sure that the rounded lip **(2)** of the cotter fits snugly into the groove **(3)** in the stem end.

- TOOL** 09916-14510: Valve spring compressor
- 09916-14910: Attachment
- 09916-84511: Tweezers

⚠ CAUTION

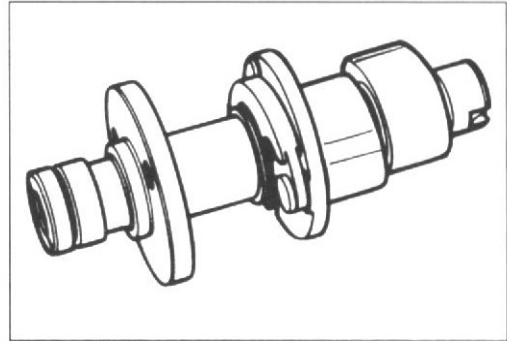
Be sure to install all of the parts in their original positions.



CAMSHAFT/AUTOMATIC DECOMPRESSION ASSEMBLY

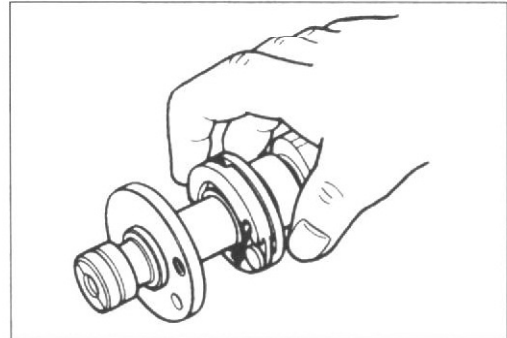
⚠ CAUTION

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



AUTOMATIC DECOMPRESSION

Move the automatic decompression weight by hand to inspect if it is operating smoothly. If the automatic decompression weight does not operate smoothly, replace it with a new one.



CAM WEAR

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

Measure the cam height \oplus using the micrometer. If the cams are worn to the service limit, replace the camshaft with new a one.

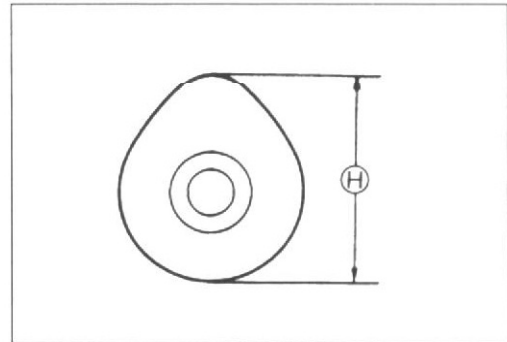
TOOL 09900-20202: Micrometer (25 – 50 mm)

DATA Cam height \oplus

Service Limit:

IN: 36.190 mm (1.4240 in)

EX: 35.490 mm (1.3972 in)



CAMSHAFT JOURNAL WEAR

Measure the oil clearance, with the camshaft installed, using the plastigauge.

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

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

Tighten the camshaft journal holder bolts evenly and in diagonal stages to the specified torque.

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

NOTE:

Do not rotate the camshaft with the plastigauge in place.

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

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

- TOOL** 09900-22403: Small bore gauge

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

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

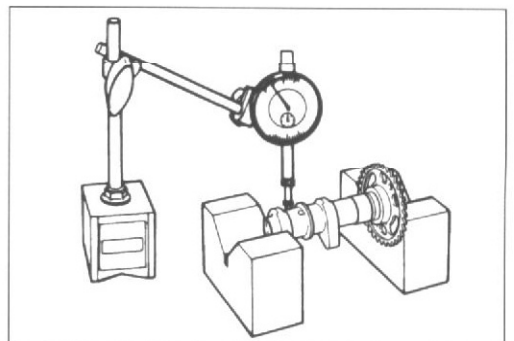
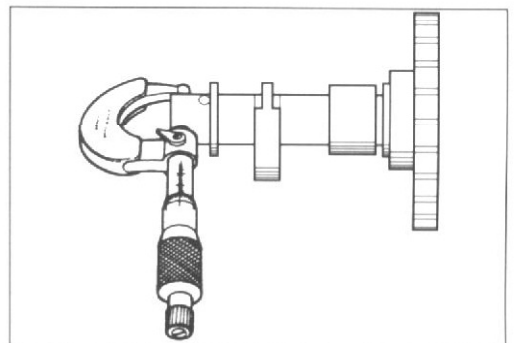
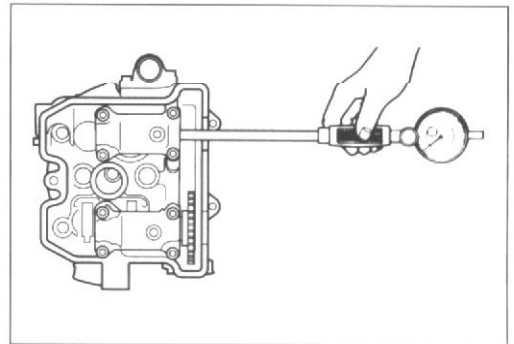
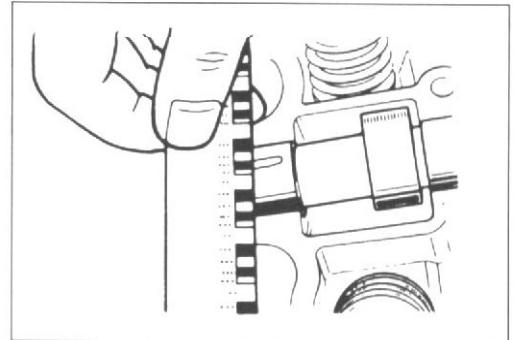
- DATA** Camshaft journal O.D. (IN & EX)
Standard: 21.972 – 21.993 mm (0.8653 – 0.8659 in)

CAMSHAFT RUNOUT

Support the valve using V-blocks and measure the camshaft runout using the dial gauge. If the runout exceeds the service limit, replace the camshaft with a new one.

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

- DATA** Camshaft runout
Service Limit: 0.10 mm (0.004 in)



CYLINDER

CYLINDER DISTORTION

Check the gasket surface of the cylinder block for distortion using a straightedge and thickness gauge. Take clearance readings at several places. If any clearance reading exceeds the service limit, replace the cylinder block with a new one.

TOOL 09900-20803: Thickness gauge

DATA Cylinder distortion

Service Limit: 0.05 mm (0.002 in)

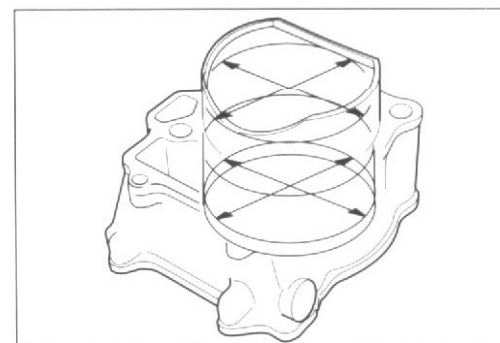
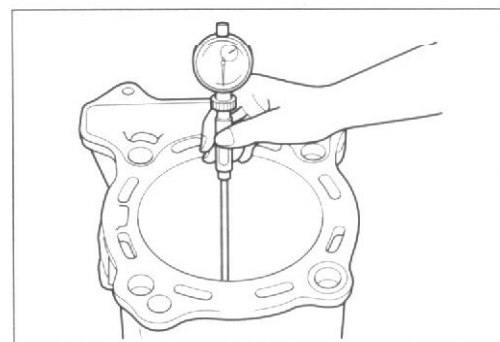
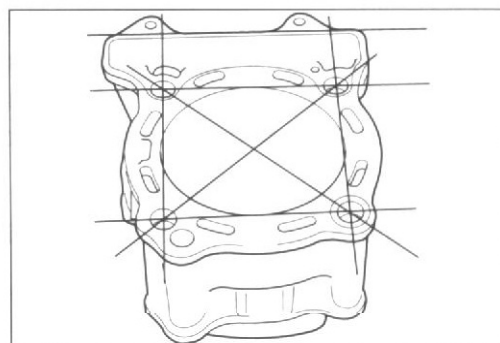
CYLINDER BORE

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

TOOL 09900-20508: Cylinder gauge set

DATA Cylinder bore

Standard: 90.000 – 90.015 mm (3.5433 – 3.5439 in)



PISTON AND PISTON RING

PISTON DIAMETER

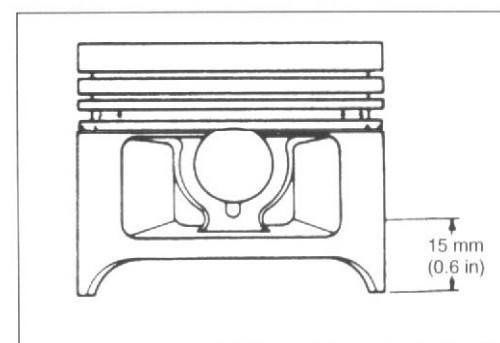
Measure the piston diameter using the micrometer at 15 mm (0.6 in) from the skirt end.

If the piston diameter is less than the service limit, replace the piston with a new one.

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

DATA Piston diameter

Service Limit: 89.880 mm (3.5386 in)



PISTON-RING-TO-GROOVE CLEARANCE

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

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

DATA Piston-ring-to-groove clearance
Service Limit:

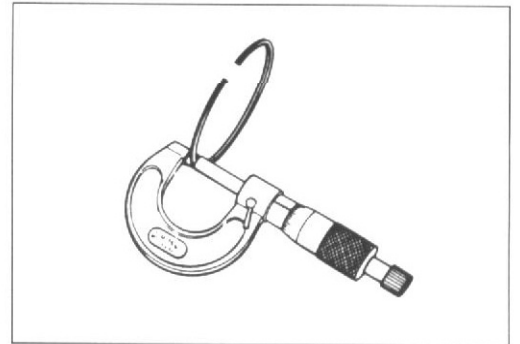
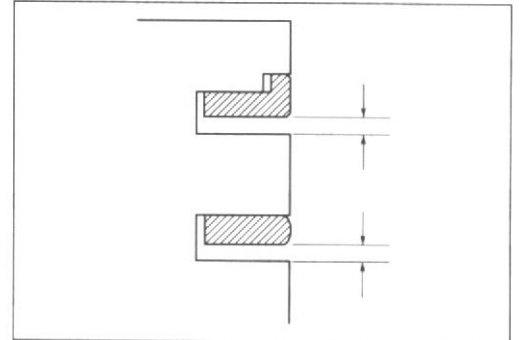
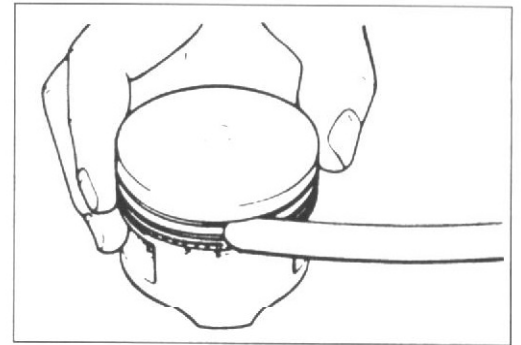
1st: 0.18 mm (0.0071 in)
2nd: 0.15 mm (0.0059 in)

DATA Piston ring groove width
Standard:

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

DATA Piston ring thickness
Standard:

1st: 0.71 – 0.76 mm (0.0280 – 0.0299 in)
1.08 – 1.10 mm (0.0425 – 0.0433 in)
2nd: 0.77 – 0.79 mm (0.0303 – 0.0311 in)

**PISTON RING FREE END GAP AND PISTON RING END GAP**

Measure the piston ring free end gap using the vernier calipers, first, and then fit the piston ring squarely into the cylinder and measure the piston ring end gap using the thickness gauge. If any measurement exceeds the service limit, replace the piston ring with a new one.

TOOL 09900-20101: Vernier calipers

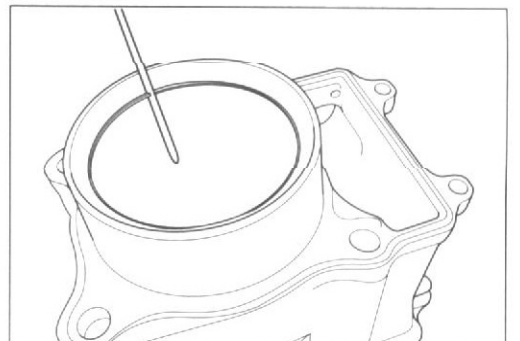
DATA Piston ring free end gap
Service Limit:

1st: 5.5 mm (0.22 in)
2nd: 9.2 mm (0.36 in)

TOOL 09900-20803: Thickness gauge

DATA Piston ring end gap
Service Limit:

1st: 0.50 mm (0.020 in)
2nd: 0.50 mm (0.020 in)



PISTON PIN AND PIN BORE

Measure the piston pin bore diameter using the small bore gauge. If the diameter exceeds the service limit, replace the piston with a new one.

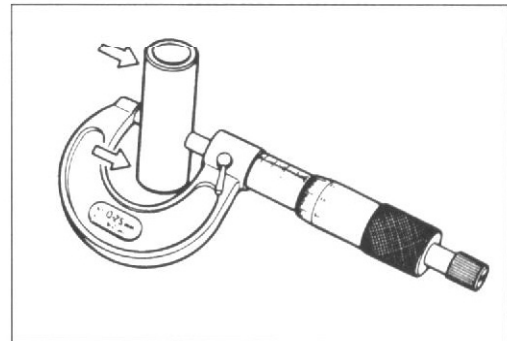
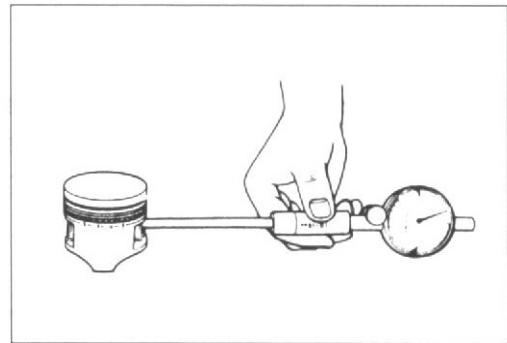
- TOOL** 09900-20602: Dial gauge (1/1000 mm)
09900-22403: Small bore gauge (18 – 35 mm)

- DATA** Piston pin bore
Service Limit: 20.030 mm (0.7886 in)

Measure the piston pin outside diameter at three positions using the micrometer. If any measurement exceeds the service limit, replace the piston pin with a new one.

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

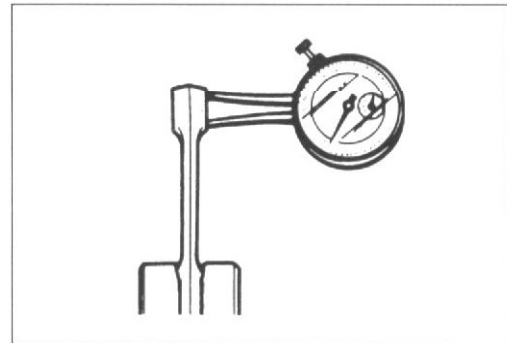
- DATA** Piston pin O.D.
Service Limit: 19.980 mm (0.7866 in)

**CONROD****CONROD SMALL END I.D.**

Measure the conrod small end inside diameter using the small bore gauge.

If the conrod small end inside diameter exceeds the service limit, replace the conrod with a new one.

- TOOL** 09900-20605: Dial calipers
DATA Conrod small end I.D.
Service Limit: 20.040 mm (0.7890 in)

**CONROD DEFLECTION AND BIG END SIDE CLEARANCE**

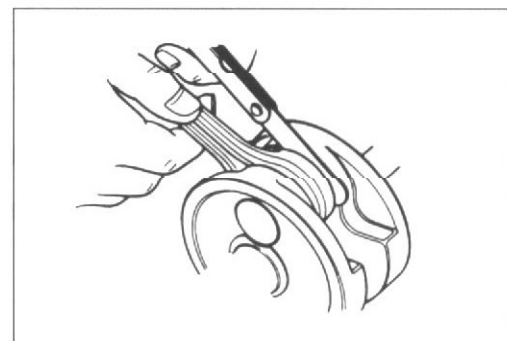
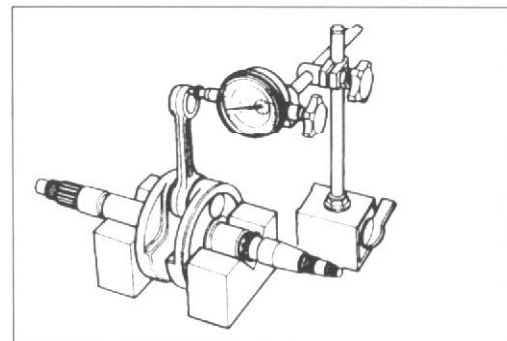
Wear on the big end of the conrod can be estimated by checking the movement of the small end of the rod. This method can also be used to check the extent of wear on the parts of the conrod's big end.

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

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

Push the big end of the conrod to one side and measure the side clearance using a thickness gauge. If the clearance exceeds the service limit, replace the crankshaft assembly with a new one or bring the deflection and the side clearance within the service limit by replacing the worn parts (conrod, big end bearing, crank pin, etc.) with new ones.

- TOOL** 09900-20803: Thickness gauge
DATA Big end side clearance
Service Limit: 1.00 mm (0.039 in)




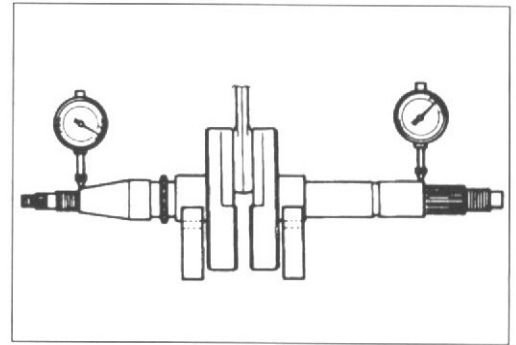
CRANKSHAFT

CRANKSHAFT RUNOUT

Support the crankshaft using V-blocks and measure the crankshaft runout using the dial gauge, as shown. If the runout exceeds the service limit, replace the crankshaft with a new one.

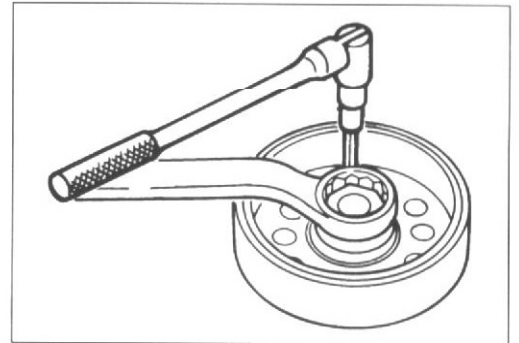
-  **09900-20606: Dial gauge (1/100 mm)**
- 09900-20701: Magnetic stand**
- 09910-21304: V-block set (100 mm)**

-  **Crankshaft runout**
- Service Limit: 0.08 mm (0.003 in)**



STARTER CLUTCH

- Hold the rotor with a 26 mm offset wrench and remove the hexagon bolts.

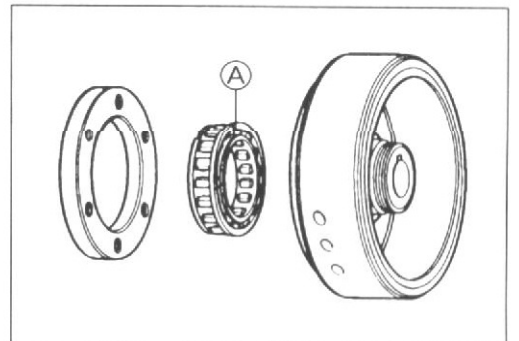


- Install the starter clutch in the proper direction as shown.

NOTE:

When installing the starter clutch onto the rotor, make sure that the notch  in the bearing faces to the rotor.

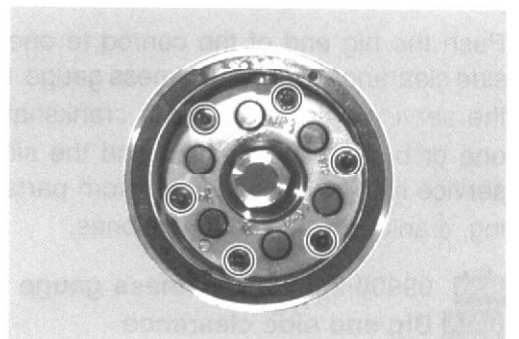
- Apply engine oil to the starter clutch.



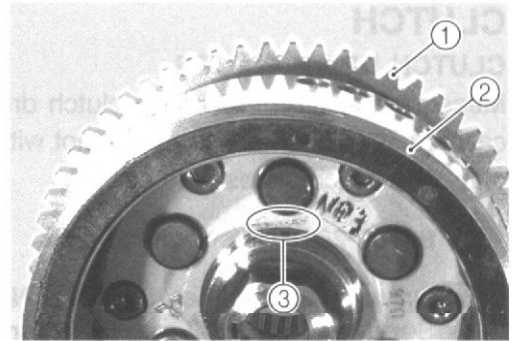
- Apply THREAD LOCK SUPER "1303" to the hexagon bolts, and then tighten them to the specified torque while holding the rotor and using a 26 mm offset wrench.

-  **99000-32030: THREAD LOCK SUPER "1303"**

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



- Install the starter gear ① to the starter clutch.
- Check that the rotor ② turns in the direction of the arrow ③ on the rotor while holding the starter gear, and that the rotor never turns in the opposite direction of the arrow.

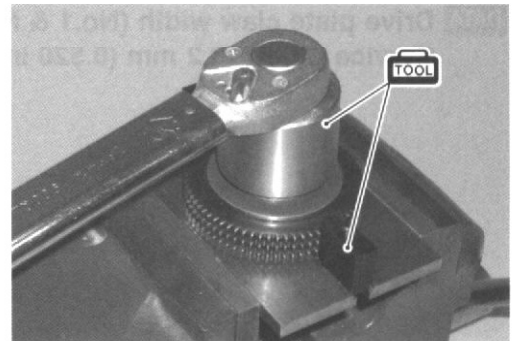


STARTER TORQUE LIMITER

⚠ CAUTION

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

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



- 🔧 **09930-73170: Starter torque limiter holder**
- 🔧 **09930-73180: Starter torque limiter socket**

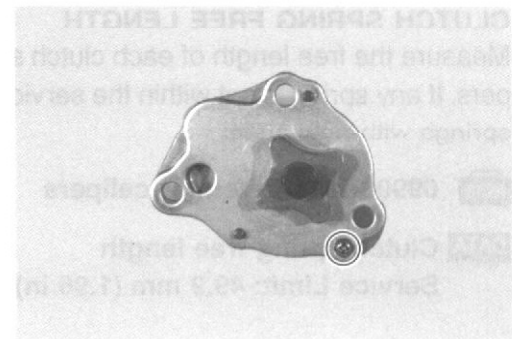
- 🔧 **Slip torque:**
30 – 55 N·m (3.0 – 5.5 kgf·m, 21.5 – 40.0 lb-ft)

OIL PUMP

⚠ CAUTION

The oil pump case securing screw is applied with SUZUKI THREAD LOCK SUPER “1303”. If an attempt is made to overhaul the oil pump assembly, the screw may be damaged. Only the oil pump unit is available as a replacement.

- 🔧 **99000-32030: THREAD LOCK SUPER “1303”**



CLUTCH

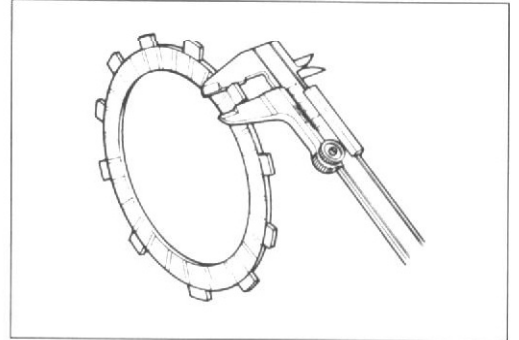
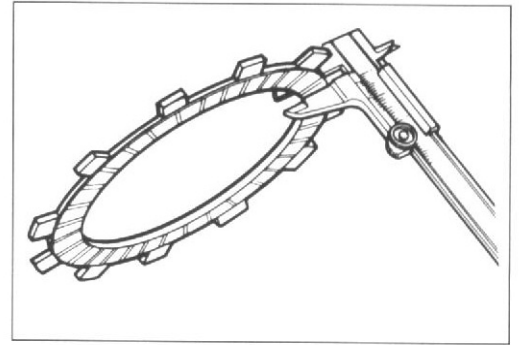
CLUTCH DRIVE PLATES

Measure the thickness of the clutch drive plates using vernier calipers. If a clutch drive plate is not within the service limit, replace the clutch plates as a set.

TOOL 09900-20101: Vernier calipers

DATA Drive plate thickness (No.1 & No.2)
Service Limit: 2.62 mm (0.103 in)

DATA Drive plate claw width (No.1 & No.2)
Service Limit: 13.2 mm (0.520 in)

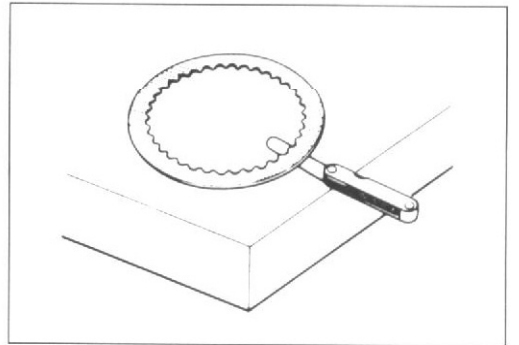


CLUTCH DRIVEN PLATES

Measure each clutch driven plate for distortion using the thickness gauge. If a clutch driven plate is not within the service limit, replace the clutch plates as a set.

TOOL 09900-20803: Thickness gauge

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

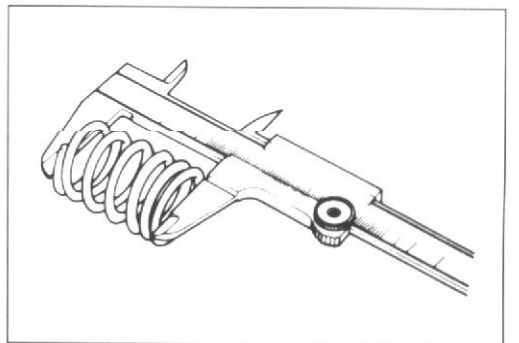


CLUTCH SPRING FREE LENGTH

Measure the free length of each clutch spring using vernier calipers. If any spring is not within the service limit, replace all of the springs with new ones.

TOOL 09900-20101: Vernier calipers

DATA Clutch spring free length
Service Limit: 49.9 mm (1.96 in)



GEARSHIFT FORK AND GEAR

GEARSHIFT-FORK-TO-GEARSHIFT-FORK GROOVE CLEARANCE

Clearance for each gearshift fork plays an important role in the smoothness and positiveness of the shifting process.

Measure the gearshift fork clearance in the groove of its respective gear using the thickness gauge.

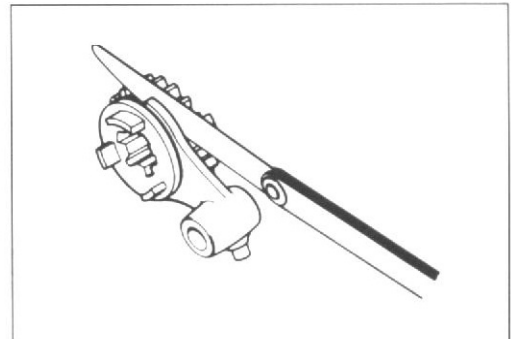
If the clearance exceeds specification, replace the fork, its respective gear, or both.



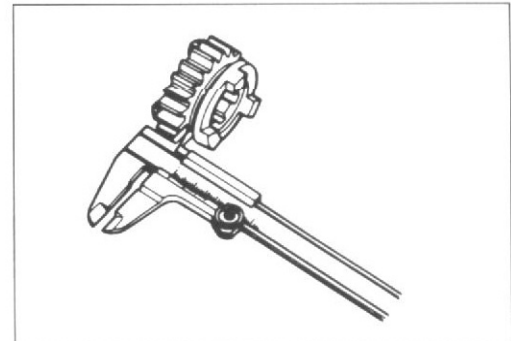
09900-20803: Thickness gauge
09900-20101: Vernier calipers



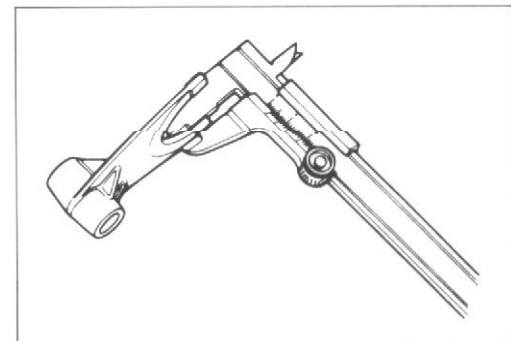
Gearshift-fork-to-gearshift-fork-groove clearance
Service Limit: 0.50 mm (0.020 in)



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



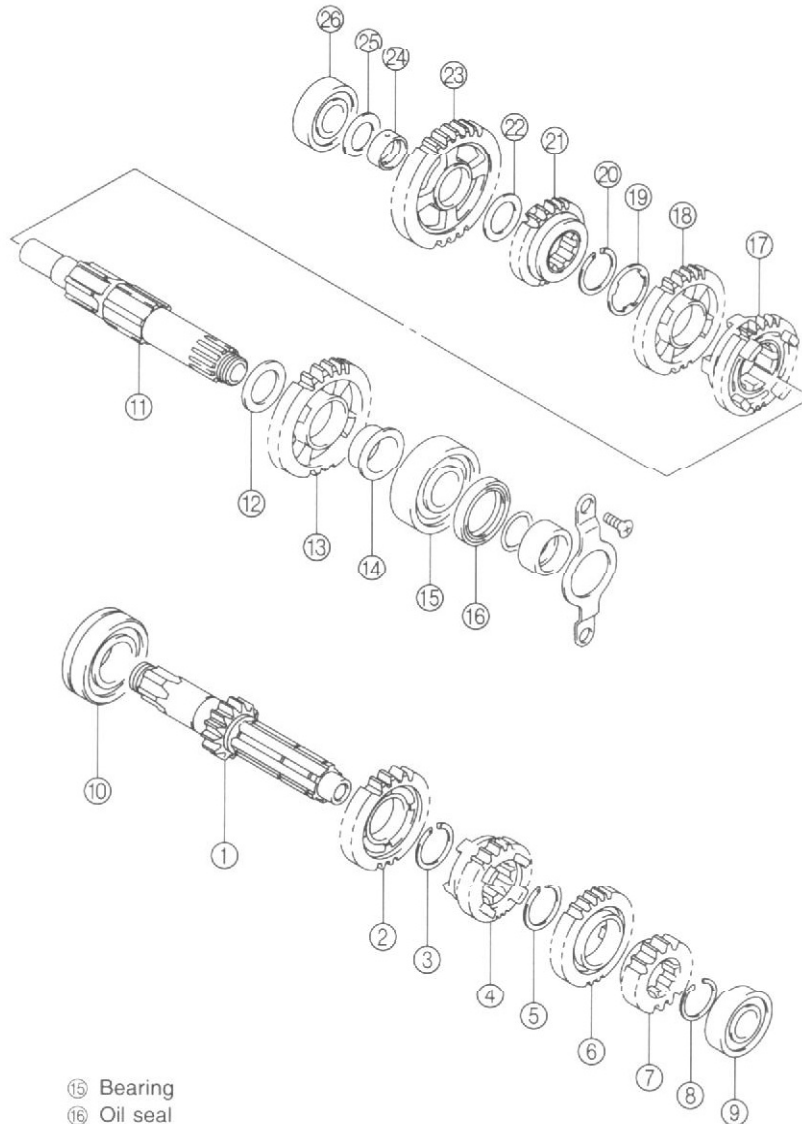
Shift fork thickness
Standard: 4.6 – 4.7 mm (0.181 – 0.185 in)



TRANSMISSION

DISASSEMBLY

Disassemble the transmission gears as shown.



- | | |
|------------------------|-------------------------|
| ① Countershaft | ⑮ Bearing |
| ② 5th (top) drive gear | ⑯ Oil seal |
| ③ Circlip | ⑰ 4th driven gear |
| ④ 3rd drive gear | ⑱ 3rd driven gear |
| ⑤ Circlip | ⑲ Washer |
| ⑥ 4th drive gear | ⑳ Circlip |
| ⑦ 2nd drive gear | ㉑ 5th (top) driven gear |
| ⑧ Circlip | ㉒ Washer |
| ⑨ Bearing | ㉓ 1st (low) driven gear |
| ⑩ Bearing | ㉔ Spacer |
| ⑪ Driveshaft | ㉕ Washer |
| ⑫ Washer | ㉖ Bearing |
| ⑬ 2nd driven gear | |
| ⑭ Spacer | |

REASSEMBLY

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

NOTE:

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

CAUTION

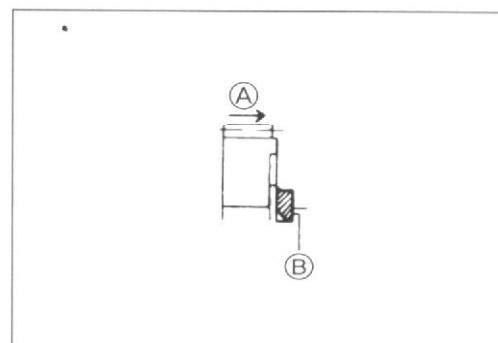
- * **Never reuse a circlip. After a circlip has been removed from a shaft, it should be discarded and a new circlip must be installed.**
- * **When installing a new circlip, do not expand the end gap larger than required to slip the circlip over the shaft.**
- * **After installing a new circlip, make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

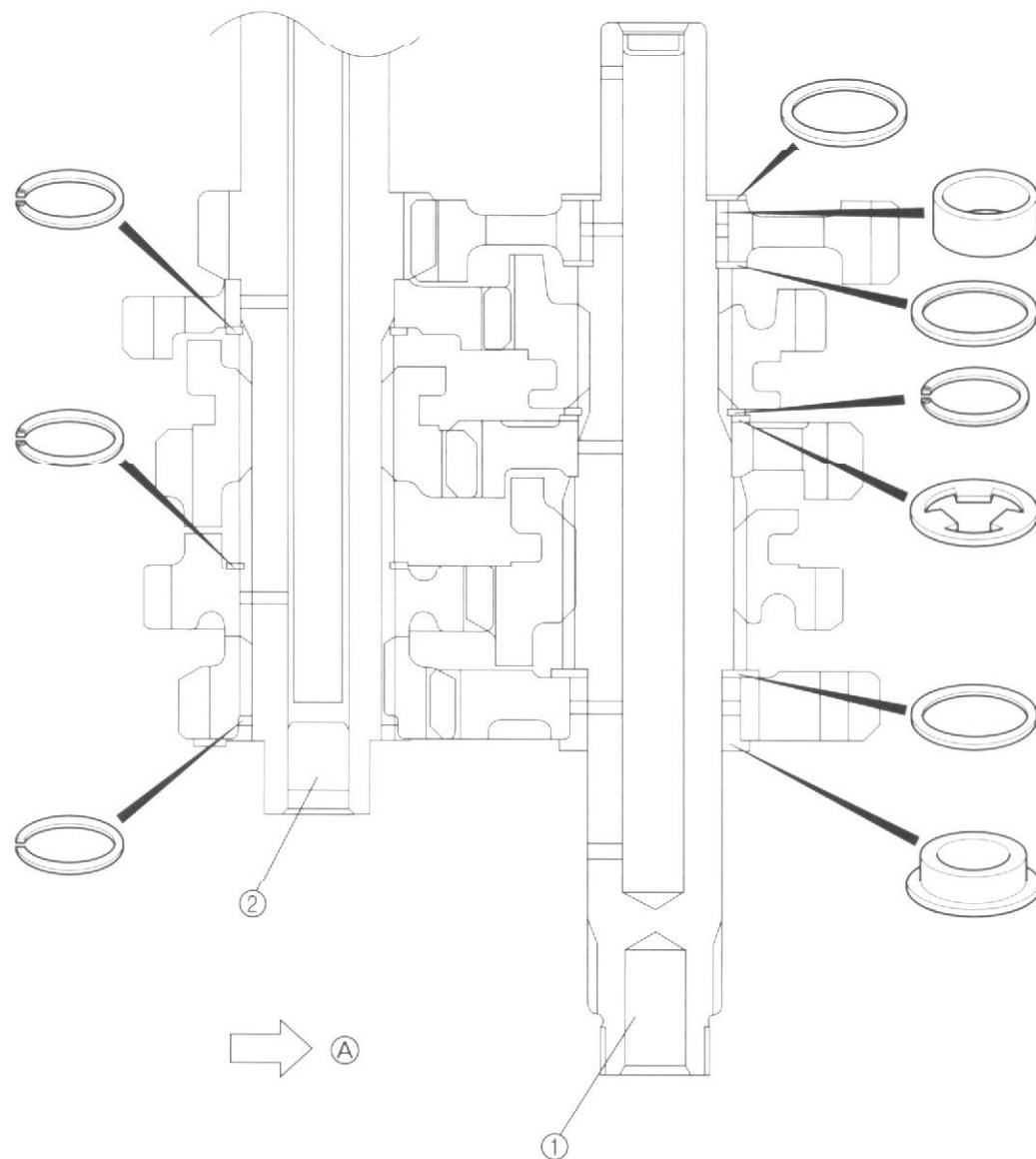
NOTE:

When reassembling the transmission, attention must be given to the locations and positions of the washers and circlips. The cross sectional view shows the correct position of the gears, washers, and circlips. (☞ 3-42)

- When installing a new circlip, pay attention to the direction of the circlip. Fit it to the side where the thrust is, as shown. The rounded side should be against the gear surface.

- Ⓐ Thrust
- Ⓑ Sharp edge

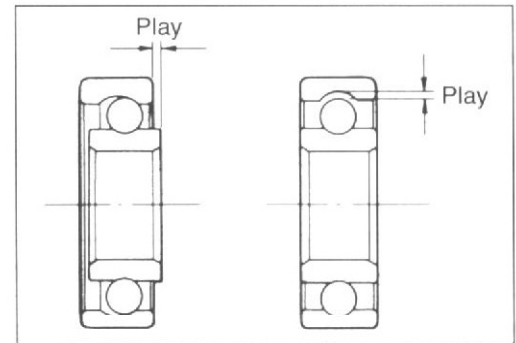




- ① Driveshaft
- ② Countershaft

BEARINGS

Wash the bearing with a cleaning solvent and lubricate it with motor oil before inspection. Rotate the inner race and check to see that it turns smoothly. If it does not turn quietly and smoothly, or if there are signs of any abnormalities, the bearing is defective and must be replaced with a new one as follows.



RIGHT COUNTERSHAFT BEARING

- Remove the bearing retainer.
- Remove the right countershaft bearing using the special tool.

TOOL 09921-20220: Bearing remover set

⚠ CAUTION

Replace the removed bearing with a new one.

- Install the right countershaft bearings using the special tool.

TOOL 09913-70210: Bearing installer set

- Apply a small quantity of THREAD LOCK "1342" or THREAD LOCK SUPER "1322" to the bearing retainer screws, and tighten them securely.

For USA

1342 99000-32050: THREAD LOCK "1342"

For the other countries

1322 99000-32110: THREAD LOCK SUPER "1322"

LEFT COUNTERSHAFT BEARING

- Remove the left countershaft bearing using the special tool.

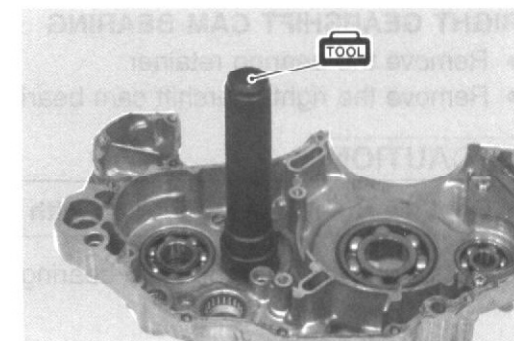
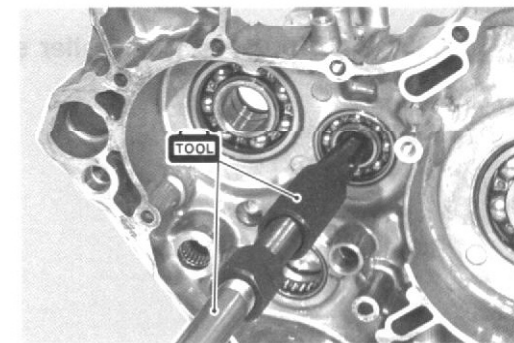
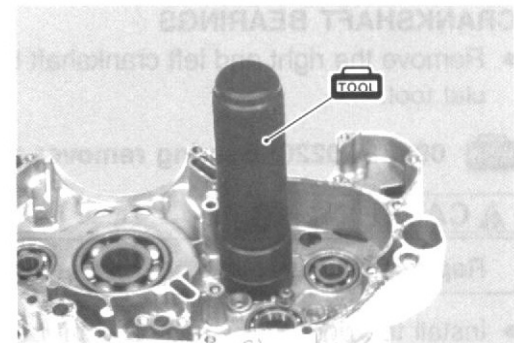
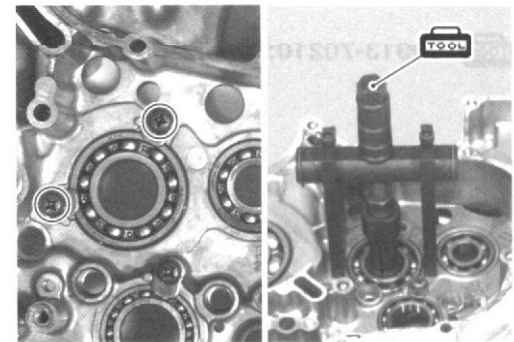
TOOL 09923-73210: Bearing remover
09930-30102: Sliding hammer

⚠ CAUTION

Replace the removed bearing with a new one.

- Install the left countershaft bearing using the special tool.

TOOL 09913-70210: Bearing installer set



DRIVESHAFT BEARINGS

- Remove the right and left driveshaft bearings using the special tool.

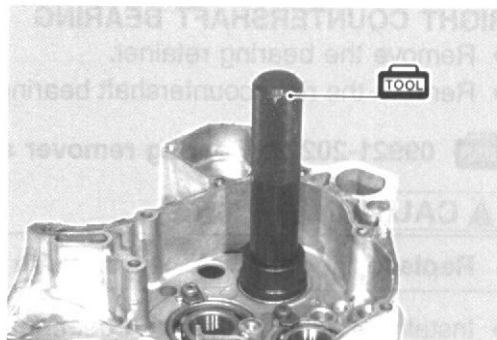
 **09921-20220: Bearing remover set**

CAUTION

Replace the removed bearings with new ones.

- Install the right and left driveshaft bearings using the special tool.

 **09913-70210: Bearing installer set**

**CRANKSHAFT BEARINGS**

- Remove the right and left crankshaft bearings using the special tool.

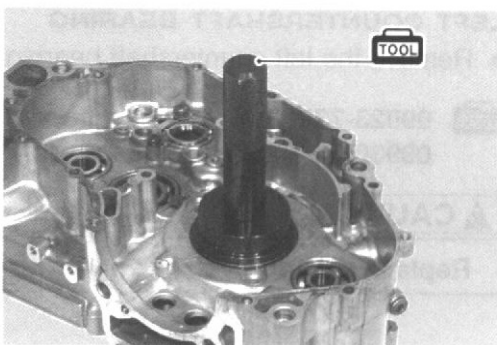
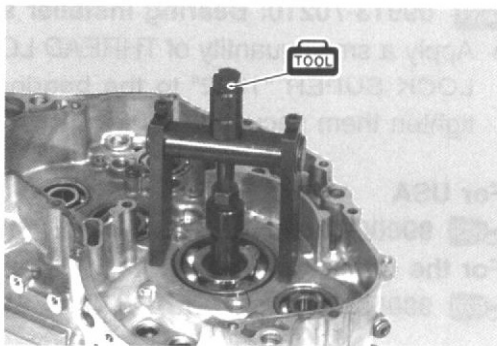
 **09921-20220: Bearing remover set**

CAUTION

Replace the removed bearings with new ones.

- Install the right and left crankshaft bearing using the special tool.

 **09913-70210: Bearing installer set**

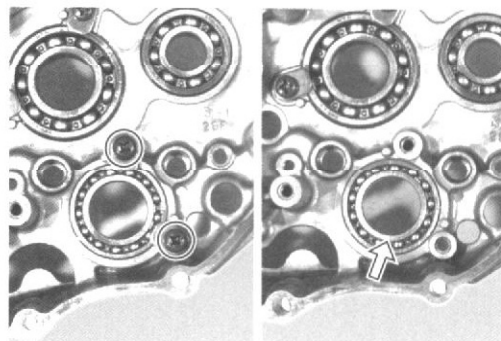
**RIGHT GEARSHIFT CAM BEARING**

- Remove the bearing retainer.
- Remove the right gearshift cam bearing.

CAUTION

Replace the removed bearing with a new one.

- Install the right gearshift cam bearing.



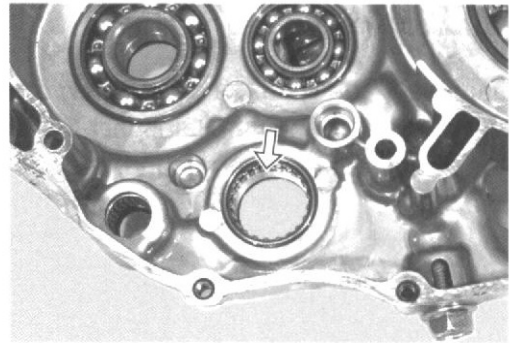
LEFT GEARSHIFT CAM BEARING

- Remove the left gear shift cam bearing.

⚠ CAUTION

Replace the removed bearing with a new one.

- Install the left gearshift cam bearing.

**RIGHT BALANCER SHAFT BEARING**

- Remove the right balancer shaft bearing using the special tool.

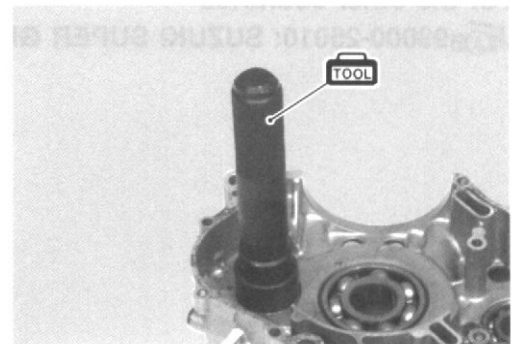
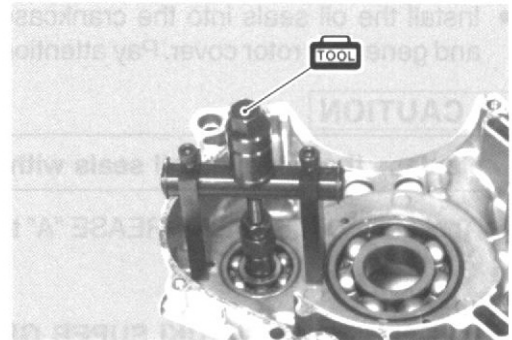
TOOL 09921-20220: Bearing remover set

⚠ CAUTION

Replace the removed bearing with a new one.

- Install the right balancer shaft bearing using the special tool.

TOOL 09913-70210: Bearing installer set

**LEFT BALANCER SHAFT BEARING**

- Remove the left balancer shaft bearing using the special tools.

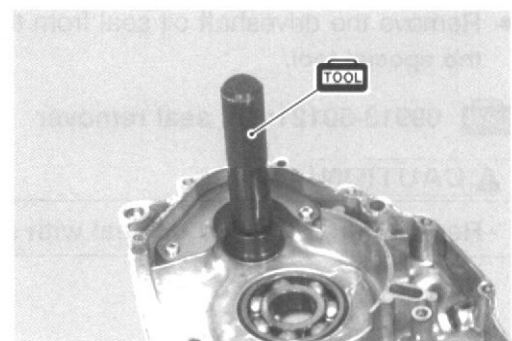
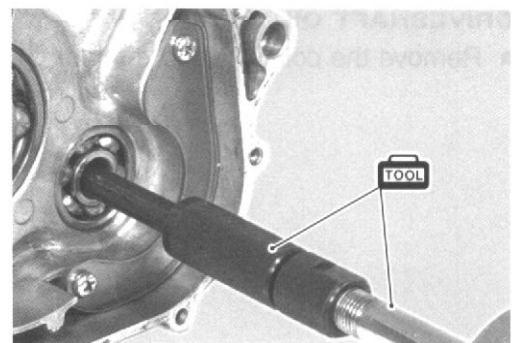
TOOL 09921-20210: Bearing remover
09930-30102: Sliding hammer

⚠ CAUTION

Replace the removed bearing with a new one.

- Install the left balancer shaft bearing using the special tool.

TOOL 09913-70210: Bearing installer set



OIL SEALS

Damage to the lip of the oil seal may result in leakage of the air/fuel mixture or engine oil. Inspect the oil seal for wear or damage. If any damages are found, replace the oil seal with a new one.

- Install the oil seals into the crankcase, clutch housing case, and generator rotor cover. Pay attention to the following points:

⚠ CAUTION

Replace the removed oil seals with new ones.

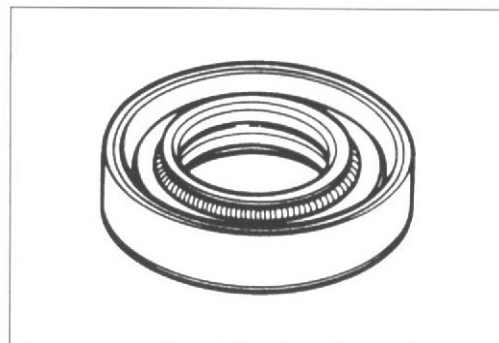
- Apply SUZUKI SUPER GREASE "A" to the lip of the oil seals.

For USA

 99000-25030: SUZUKI SUPER GREASE "A"

For the other countries

 99000-25010: SUZUKI SUPER GREASE "A"



DRIVESHAFT OIL SEAL

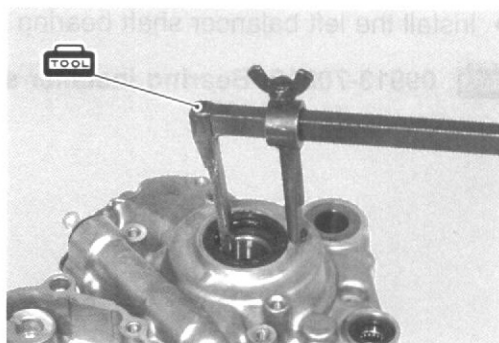
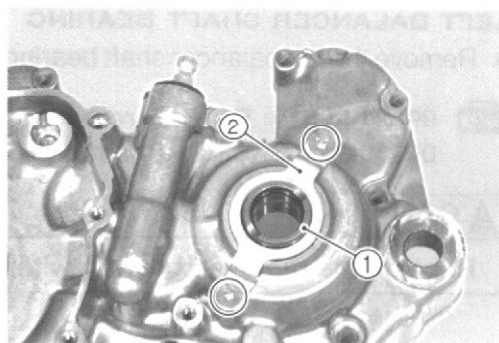
- Remove the collar ① and retainer ②.

- Remove the driveshaft oil seal from the left crankcase using the special tool.

 09913-50121: Oil seal remover

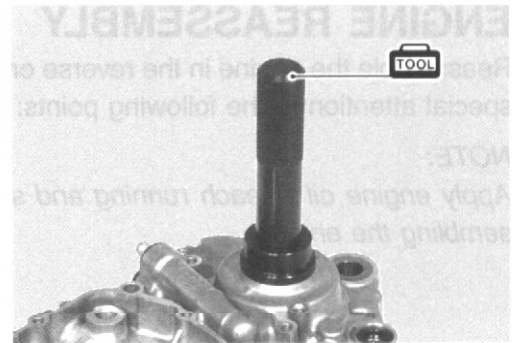
⚠ CAUTION

Replace the removed oil seal with a new one.



- Install the driveshaft oil seal into the left crankcase slowly, using the special tool.

 **09913-70210: Bearing installer set**



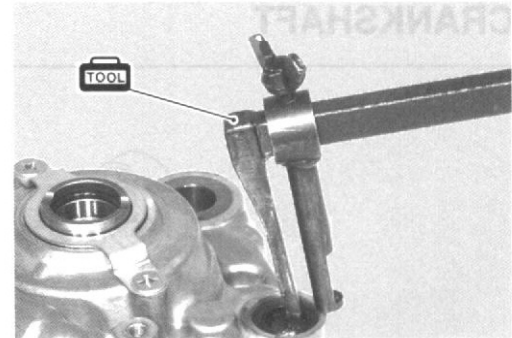
GEARSHIFT SHAFT OIL SEAL

- Remove the gearshift shaft oil seal from the left crankcase, slowly using the special tool.

 **09913-50121: Oil seal remover**

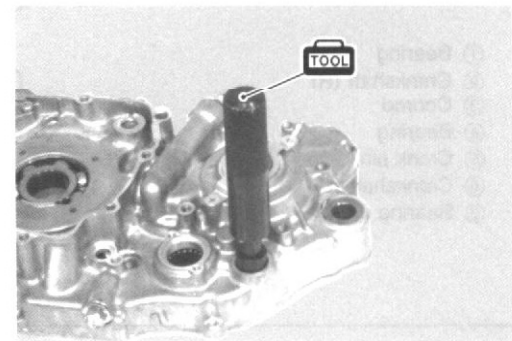
CAUTION

Replace the removed oil seal with a new one.



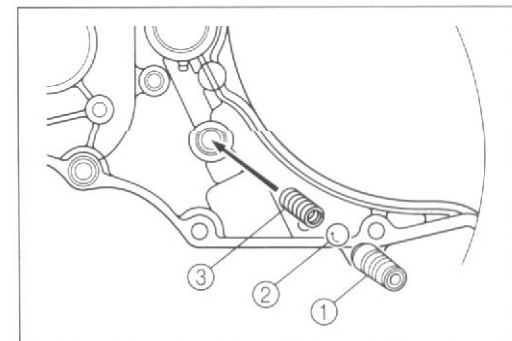
- Install the gearshift shaft oil seal into the left crankcase slowly, using the special tool.

 **09913-70210: Bearing installer set**



OIL CHECK VALVE

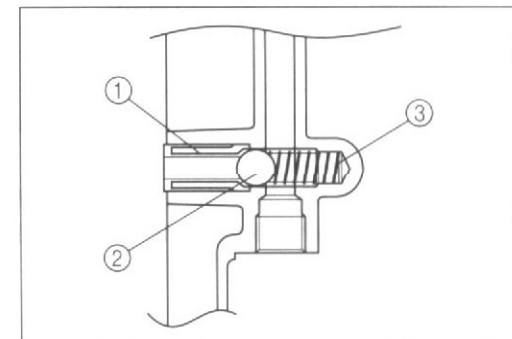
- Remove the bushing ①, oil check valve ball ② and spring ③ from the right crankcase cover.



- Install the spring ③, oil check valve ball ② and bushing ① to the right crankcase as shown.

CAUTION

The rubber part of bushing ① must face to the outside.



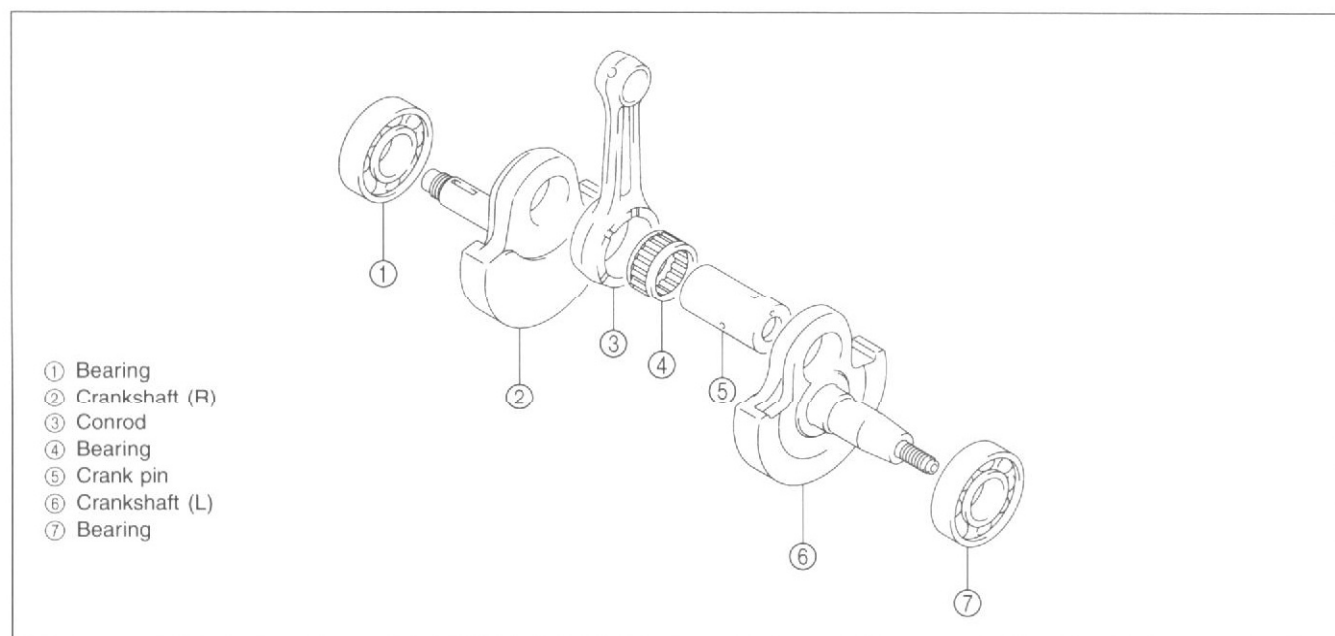
ENGINE REASSEMBLY

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

NOTE:

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

CRANKSHAFT



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

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

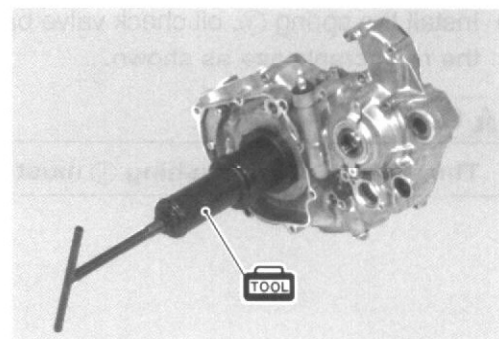
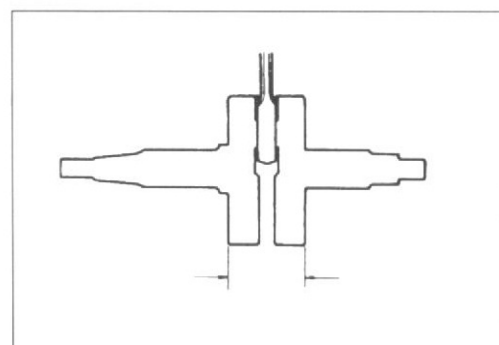
- When mounting the crankshaft in the crankcase, it is necessary to pull its left end into the crankcase by using the special tools.

TOOL 09910-32812: Crankshaft installer
 09940-52861: Attachment

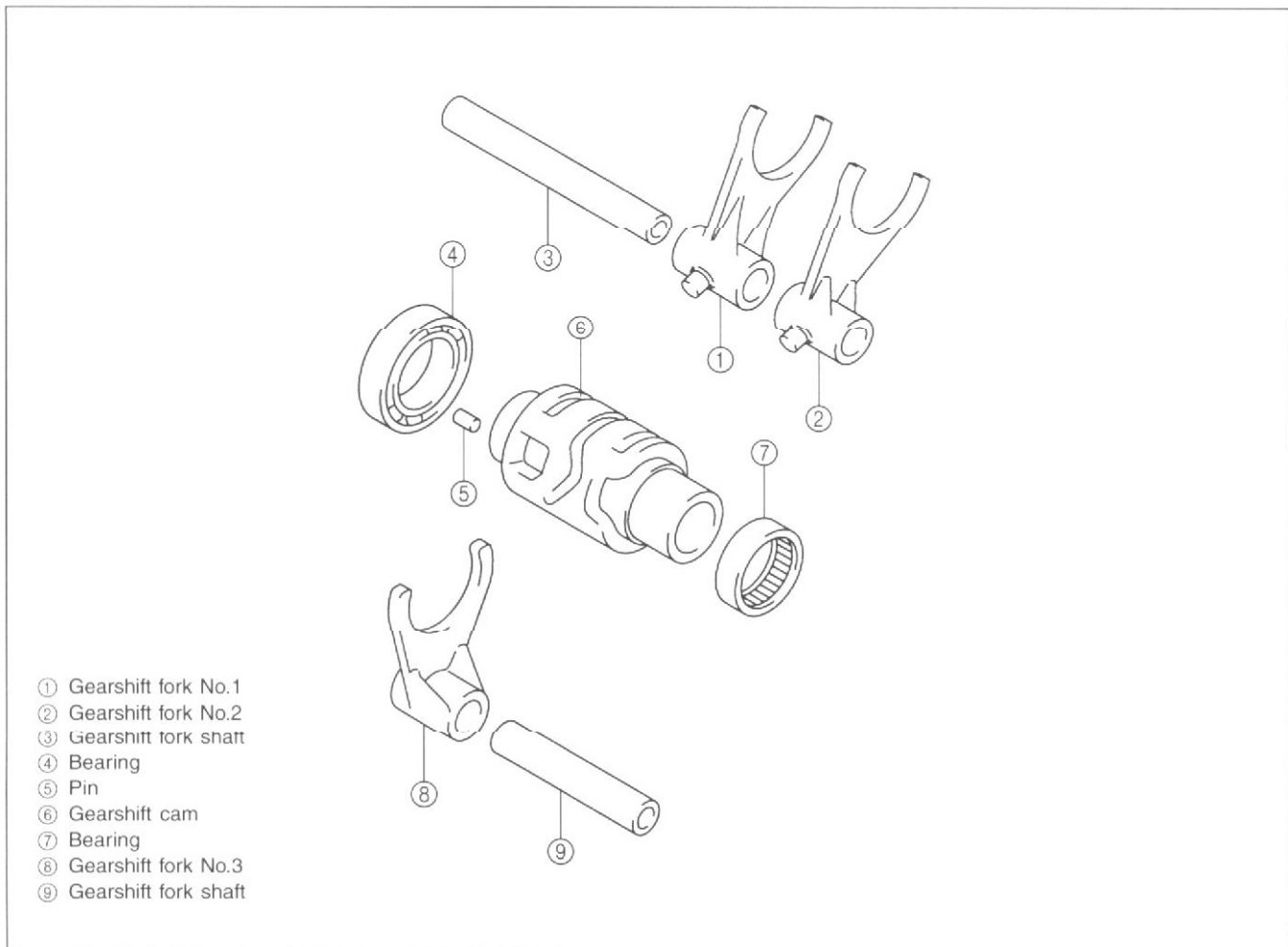
CAUTION

Never fit the crankshaft into the crankcase by striking it with a plastic hammer.

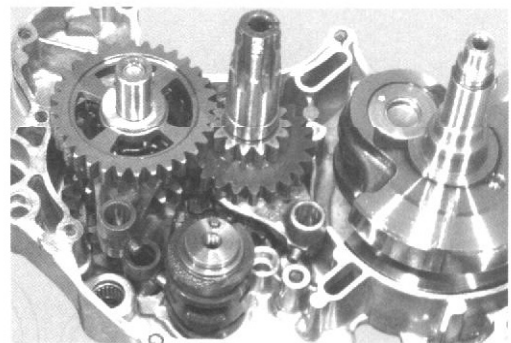
Always use the special tool, otherwise the accuracy of the crankshaft alignment will be affected.



GEARSHIFT CAM AND FORK



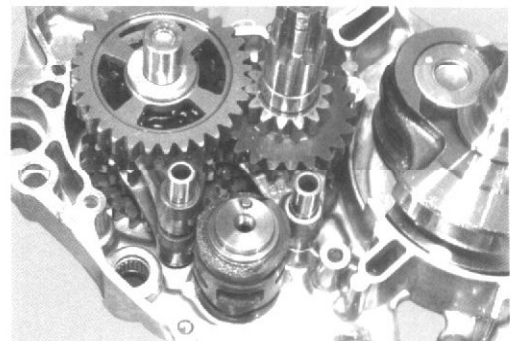
- Install the gearshift forks into the gearshifting groove in the correct position and direction.



- Install the gearshift fork shafts.

NOTE:

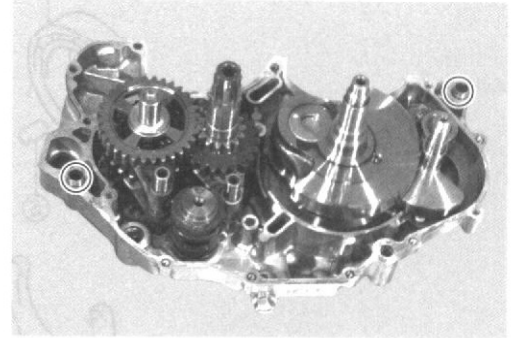
- * After the gearshift fork shaft and gearshift forks have been fitted, make sure that the gears engage normally.
- * Set the transmission gears to the neutral position.



CRANKCASE

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

- Thoroughly remove the sealant material and oil stains on the mating surface of the right and left crankcases.
- Before installing the sump filter, wash the sump filter with cleaning solvent, and then blow compressed air through it to dry it off.
- Install the dowel pins to the left crankcase.
- Apply engine oil to the conrod big end and to the transmission gears.



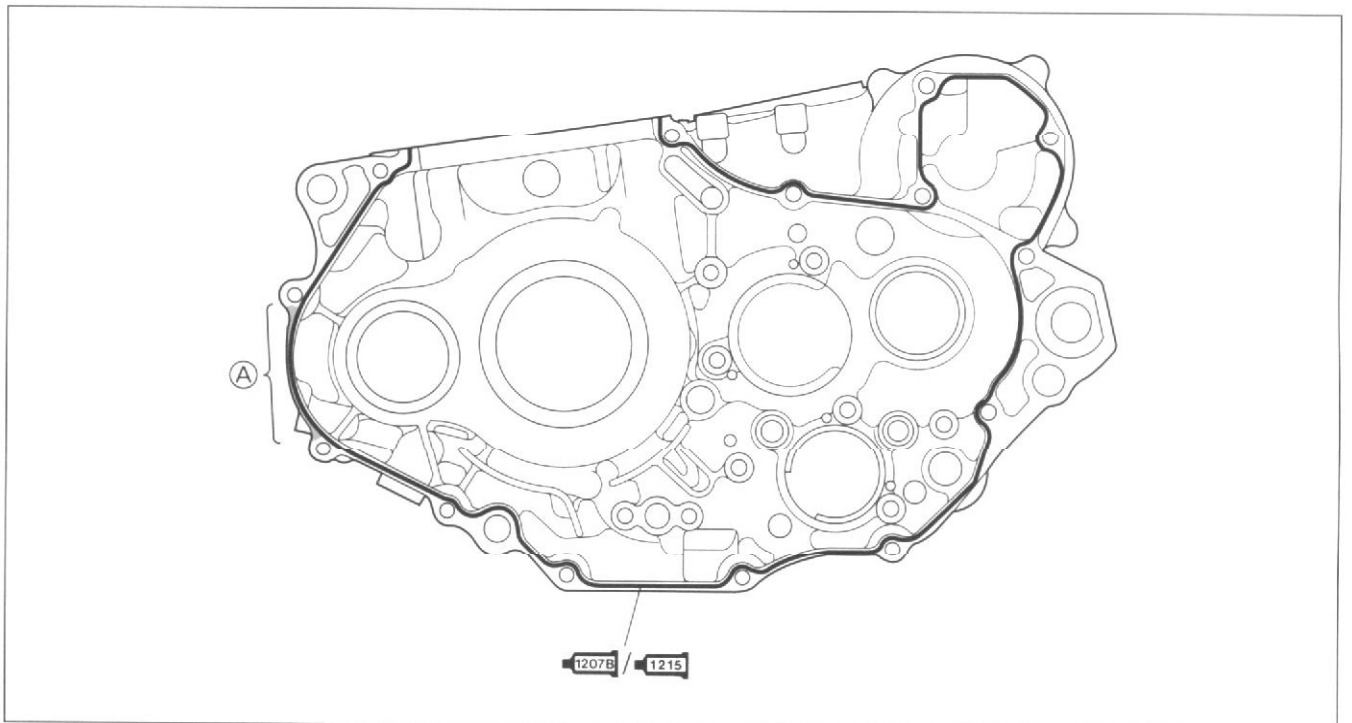
- Apply SUZUKI BOND “1207B” or “1215” to the mating surface of the right crankcase and section (A) of both crankcases as shown.

For USA

 99104-31140: SUZUKI BOND “1207B”

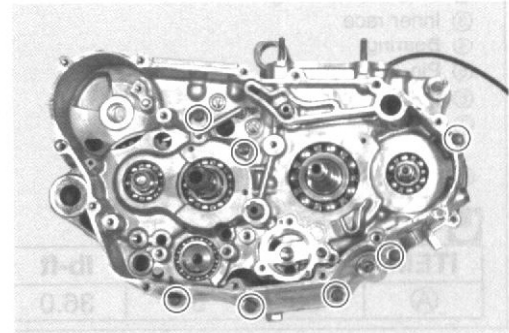
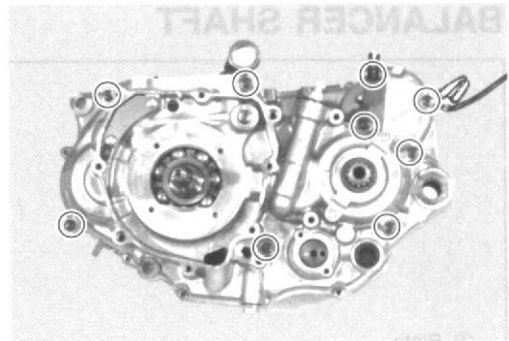
For the other countries

 99000-31110: SUZUKI BOND “1215”

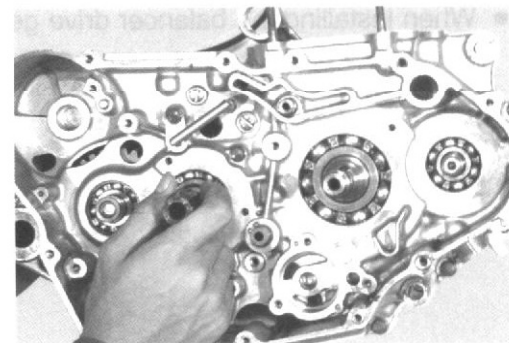


- Tighten the crankcase bolts to the specified torque.

🔧 Crankcase bolt: 11 N-m (1.1 kgf-m, 8.0 lb-ft)

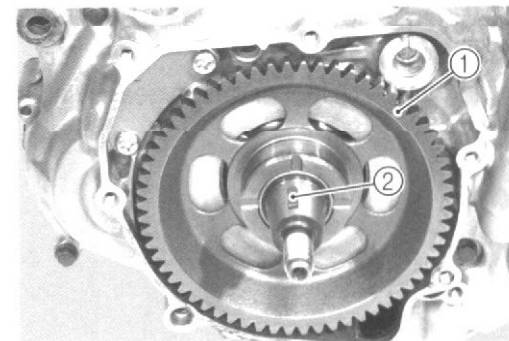


- After the crankcase bolts have been tightened, check if the crankshaft, countershaft, and driveshaft rotate smoothly. If a large resistance is felt to rotation, try to free the shafts by tapping them with a plastic mallet.



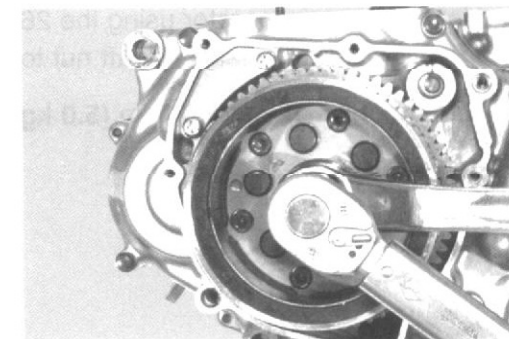
STARTER CLUTCH AND GENERATOR ROTOR

- Remove the grease from the tapered portion of the crankshaft and the generator rotor.
- Install the starter clutch gear ① and key ②.

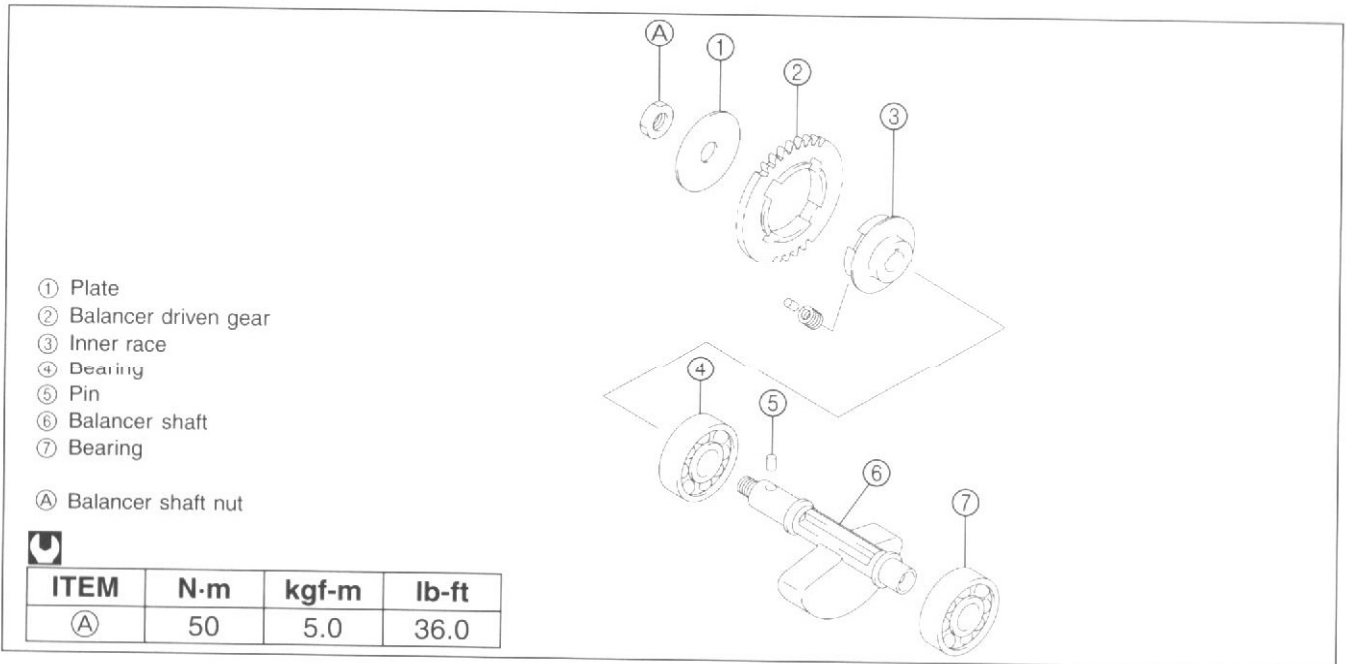


- Tighten the generator rotor nut to the specified torque using a 26 mm offset wrench.

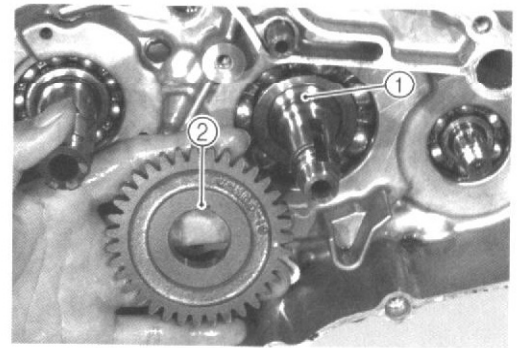
🔧 Generator rotor nut: 100 N-m (10.0 kgf-m, 72.5 lb-ft)



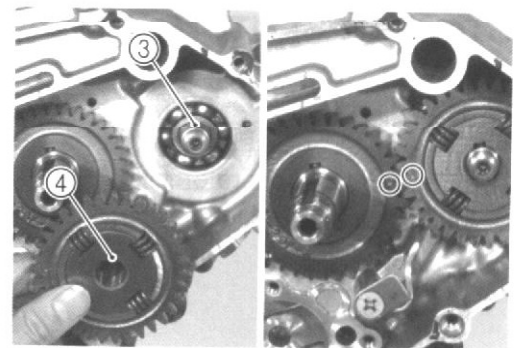
BALANCER SHAFT



- When installing the balancer drive gear, align the pin ① with the groove ②.

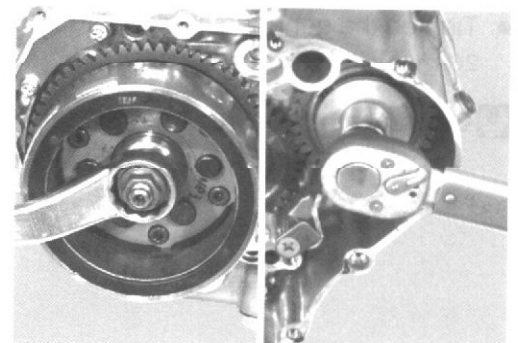


- When installing the balancer driven gear, align the pin ③ with the groove ④.
- Install the balancer driven gear by aligning the matching marks.



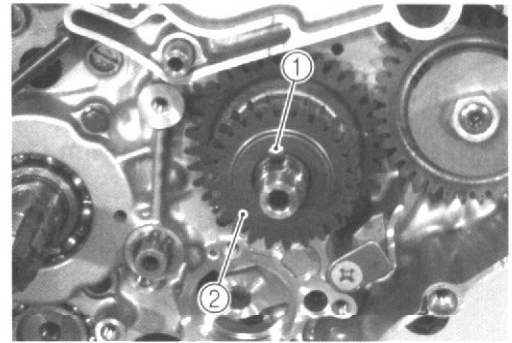
- Hold the generator rotor using the 26 mm offset wrench, and then tighten the balancer shaft nut to the specified torque.

🔧 Balancer shaft nut: 50 N·m (5.0 kgf·m, 36.0 lb·ft)



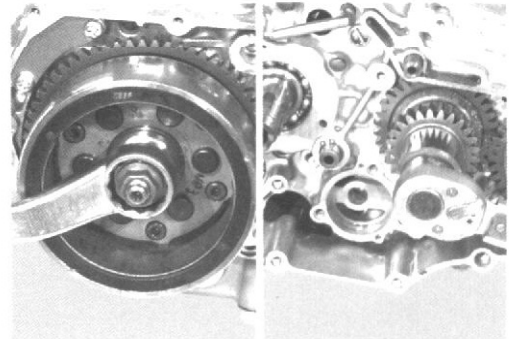
PRIMARY DRIVE GEAR

- Install the key ① and primary drive gear ②.




- Hold the generator rotor using the 26 mm offset wrench, and then tighten the primary drive gear nut to the specified torque.

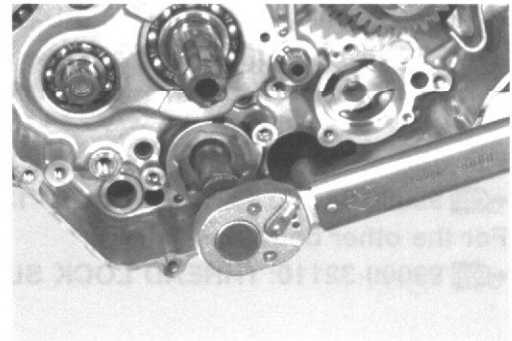
 **Primary drive gear nut: 110 N·m (11.0 kgf-m, 79.5 lb-ft)**



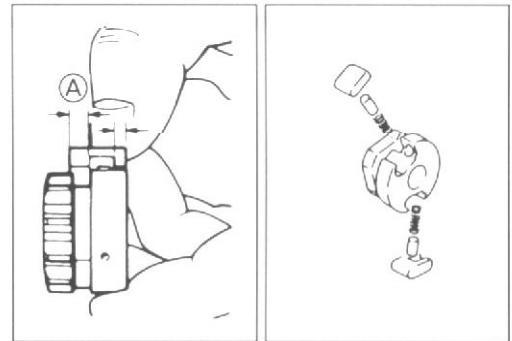
GEARSHIFT CAM DRIVEN GEAR

- Tighten the gearshift cam driven gear bolt to the specified torque.

 **Gearshift cam driven gear bolt:**
24 N·m (2.4 kgf-m, 17.5 lb-ft)



- Install each pawl lifter into the gearshift cam driven gear. The large shoulder ① must face to the outside.



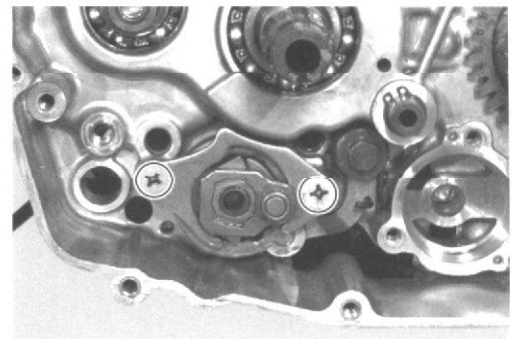
- Apply a small quantity of THREAD LOCK “1342” or THREAD LOCK SUPER “1322” to the pawl lifter screws, and then tighten them securely.

For USA

 **99000-32050: THREAD LOCK “1342”**

For the other countries

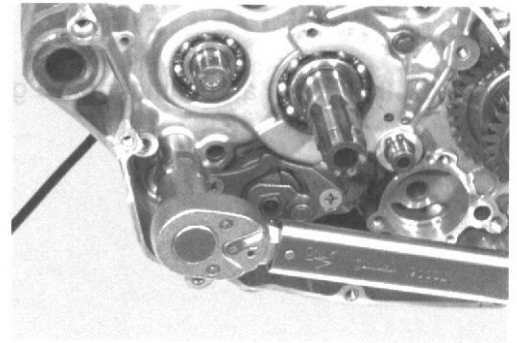
 **99000-32110: THREAD LOCK SUPER “1322”**



GEARSHIFT SHAFT

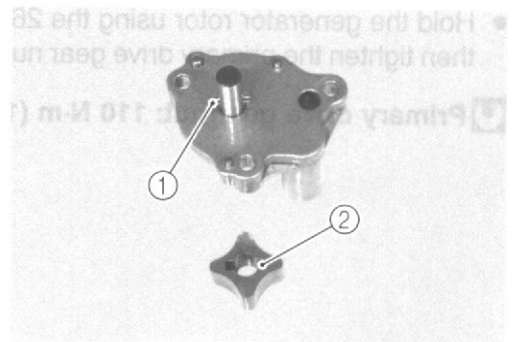
- Tighten the gearshift arm stopper to the specified torque.

 Gearshift arm stopper: 19 N·m (1.9 kgf·m, 13.5 lb·ft)



OIL PUMP

- Before mounting the oil pump, apply engine oil to the sliding surfaces of the oil pump case, outer rotor, inner rotor, and shaft.
- When installing the inner rotor, align the pin ① with the groove ②.



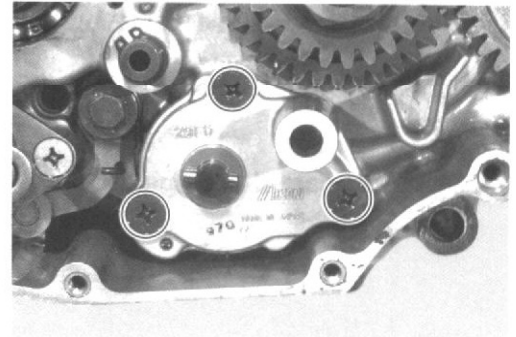
- Apply a small quantity of THREAD LOCK "1342" or THREAD LOCK SUPER "1322" to the threaded parts of the oil pump mounting screws, and then tighten them.

For USA

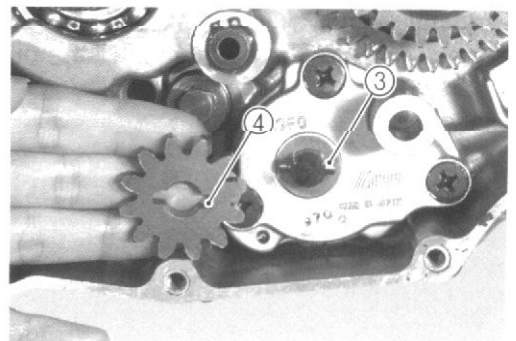
 99000-32050: THREAD LOCK "1342"

For the other countries

 99000-32110: THREAD LOCK SUPER "1322"



- When installing the oil pump driven gear, align the pin ③ with the groove ④.

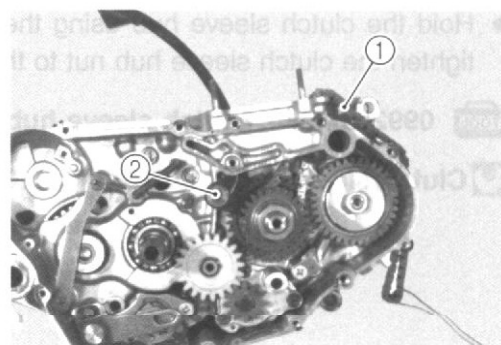


CAM CHAIN

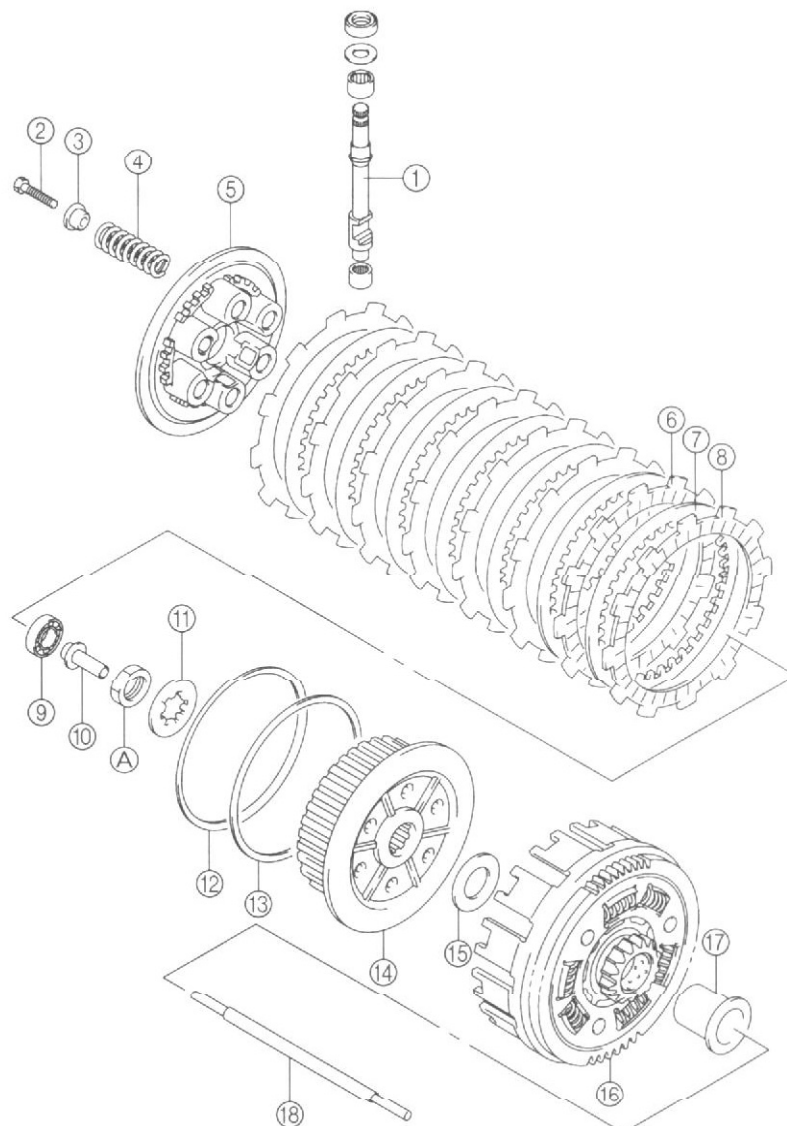
- Install the cam chain ① on to the sprocket.
- Tighten the cam chain tensioner mounting bolt ② to the specified torque.

Cam chain tensioner mounting bolt:

10 N·m (1.0 kgf-m, 7.0 lb-ft)



CLUTCH



- ① Clutch release camshaft
- ② Bolt
- ③ Spring retainer
- ④ Spring
- ⑤ Pressure plate
- ⑥ Drive plate (7 pcs)
- ⑦ Driven plate (7 pcs)
- ⑧ Drive plate (1 pc)
- ⑨ Bearing
- ⑩ Push piece
- ⑪ Washer
- ⑫ Spring washer
- ⑬ Spring washer seat
- ⑭ Clutch sleeve hub
- ⑮ Washer
- ⑯ Primary driven gear assembly
- ⑰ Spacer
- ⑱ Push rod

Ⓐ Clutch sleeve hub nut

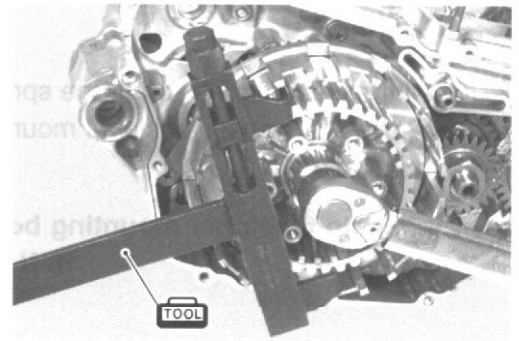


| ITEM | N·m | kgf-m | lb-ft |
|------|-----|-------|-------|
| Ⓐ | 70 | 7.0 | 50.5 |

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

 **09920-53740: Clutch sleeve hub holder**

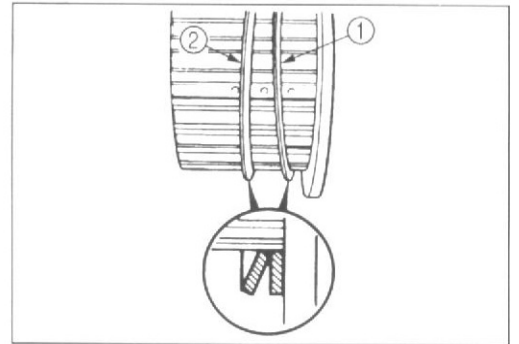
 **Clutch sleeve hub nut: 70 N·m (7.0 kgf·m, 50.5 lb-ft)**



- Bend the tongue of the washer securely.



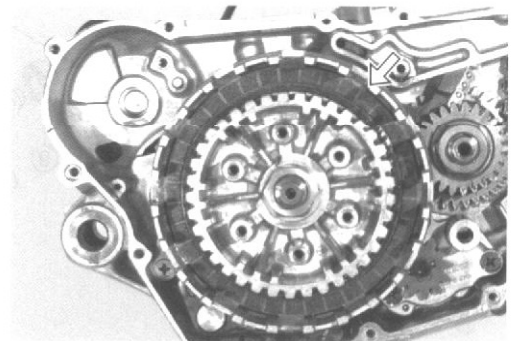
- Install the spring washer seat ① and spring washer ② onto the clutch sleeve hub correctly.



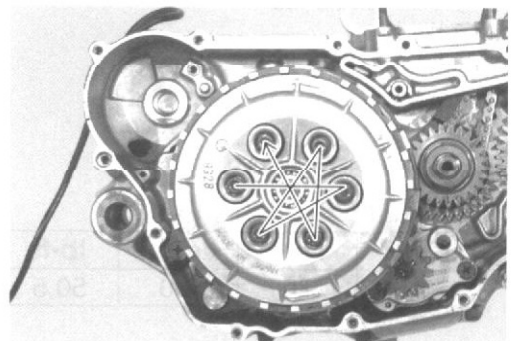
- Insert the clutch drive plates and driven plates one by one into the clutch sleeve hub in the prescribed order.

NOTE:

- * Be sure to install the drive plate with an inside diameter of 122.5 mm (4.82 in), first.
- * Two different types of drive plates are used: one with an inside diameter of 122.5 mm (4.82 in) and seven with an inside diameter of 116 mm (4.5 in). For further information refer to page 3-55.



- Tighten the clutch spring set bolts securely in diagonal stages.



RIGHT CRANKCASE COVER

- Install the dowel pins ① and new gasket ②.

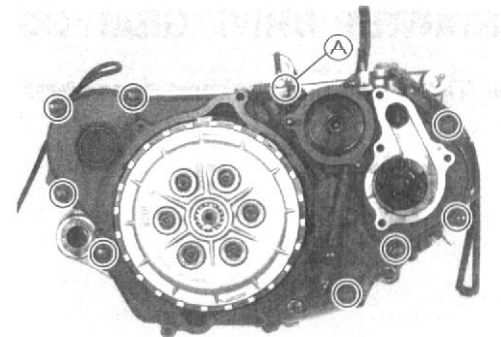
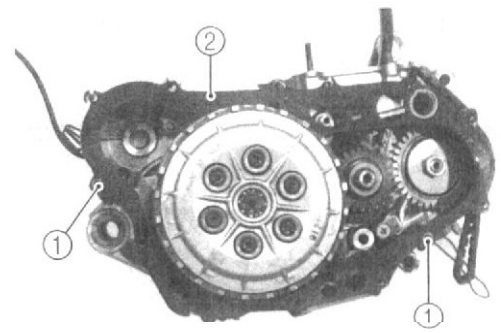
⚠ CAUTION

Use a new gasket to prevent oil leakage.

- Tighten the right crankcase cover bolts securely.

NOTE:

Install the new gasket onto the right crankcase cover bolt ① as shown.

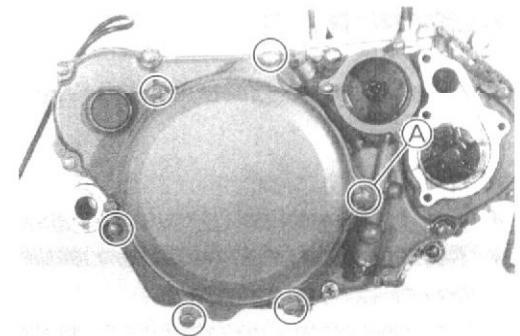


CLUTCH COVER

- Tighten the clutch cover bolts securely.

NOTE:

Install the new gasket onto the clutch cover bolt ① as shown.

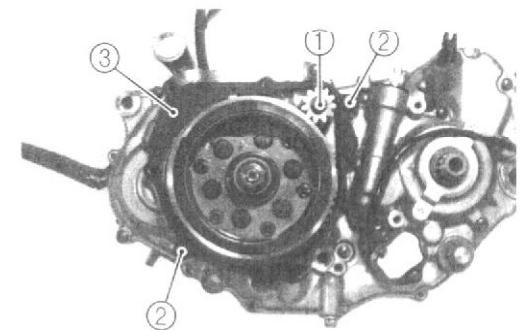


GENERATOR ROTOR COVER

- Install the starter driven gear ①, dowel pins ②, and new gasket ③.

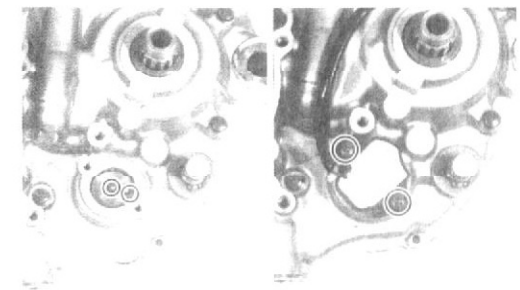
⚠ CAUTION

Use a new gasket to prevent oil leakage.

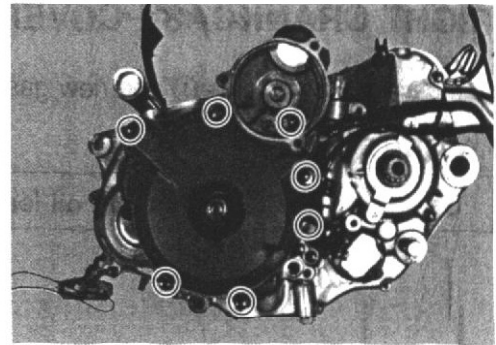


NEUTRAL SWITCH

- Install the springs and switch contacts.
- Install the neutral switch.

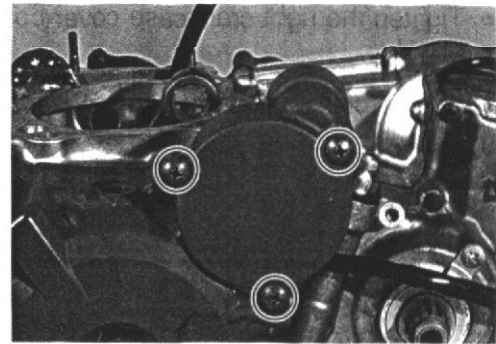


- Tighten the generator rotor cover bolts securely.



STARTER DRIVE GEAR COVER

- Tighten the starter drive gear cover screws securely.

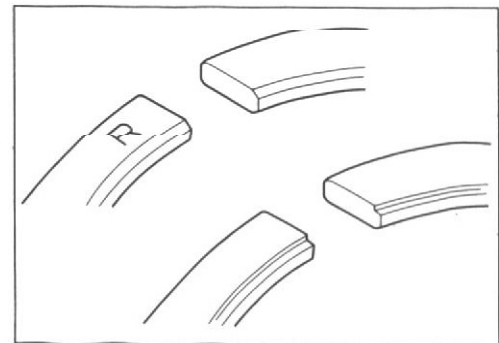
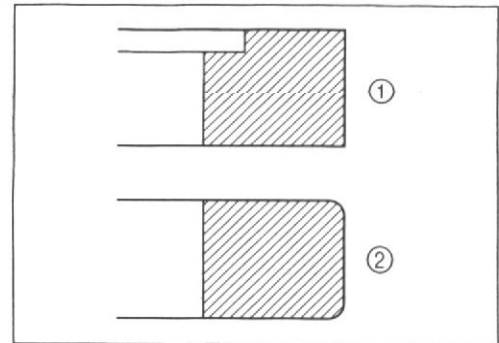


PISTON RING

- Install the oil ring first, the 2nd ring second, and the 1st ring last.

NOTE:

- * The 1st ① and 2nd ② piston rings differ in shape.
- * The 1st piston ring should be installed with the grooved portion of the ring facing up.
- * The 2nd piston ring should be installed with the mark facing up.

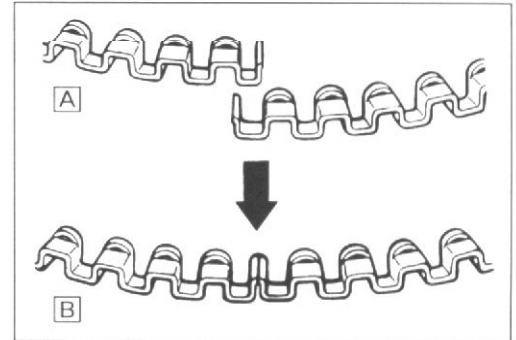
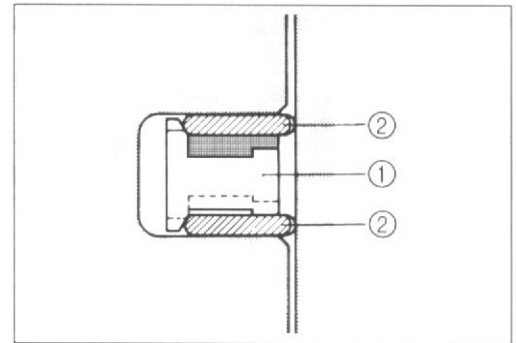


- First, install a spacer ① into the oil ring groove, and then install the two side rails ②. The spacer and side rails do not have a designated top and bottom. They can be installed in any position.

⚠ CAUTION

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

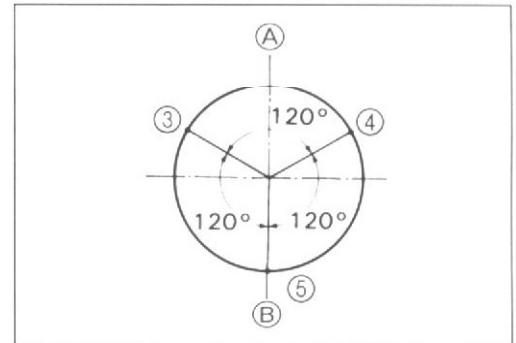
- Ⓐ INCORRECT
- Ⓑ CORRECT



- Position the piston ring gaps as shown. Before inserting the piston into its cylinder, check that the gaps are properly positioned.

- Ⓐ Exhaust side
- Ⓑ Intake side

- ③ 2nd ring and lower side rail
- ④ Upper side rail
- ⑤ 1st ring and spacer



PISTON AND CYLINDER

Install the piston and cylinder in the reverse order of removal.

NOTE:

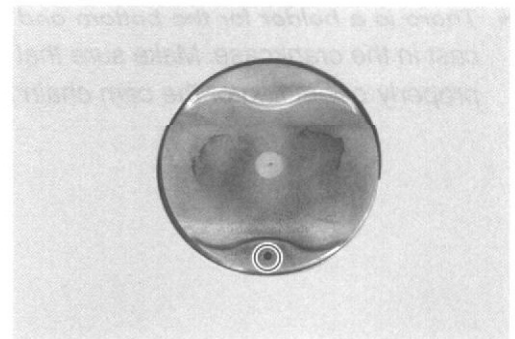
Install the piston with the punch mark on the piston head facing toward the exhaust side.

- Apply molybdenum oil solution onto the piston pin.
- Apply molybdenum oil solution to the small end of the conrod.
- Place a clean rag over the cylinder base to prevent the piston pin circlip from dropping into the crankcase, and then fit the piston pin circlip with long-nose pliers.

⚠ CAUTION

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

- Apply engine oil to the sliding surface of the piston and big end of the conrod.



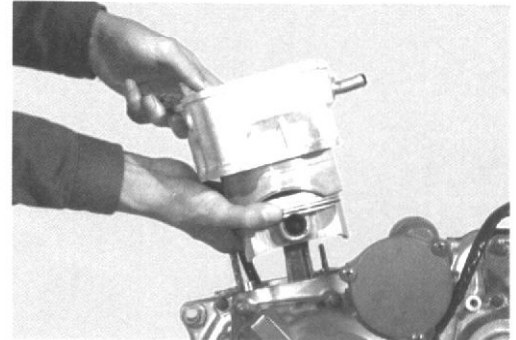
- Install the dowel pins ① and new gasket ② onto the crankcase.

⚠ CAUTION

Use a new gasket to prevent oil leakage.



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

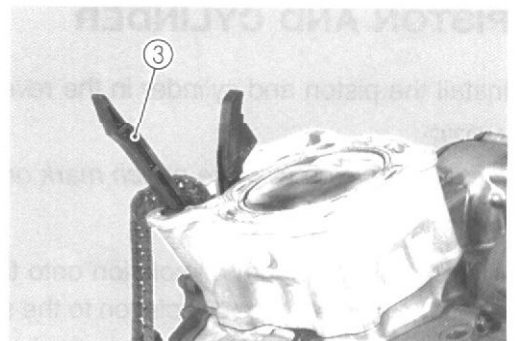


NOTE:

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



- * There is a holder for the bottom end of the cam chain guide cast in the crankcase. Make sure that the guide ③ is inserted properly or binding of the cam chain and guide may result.

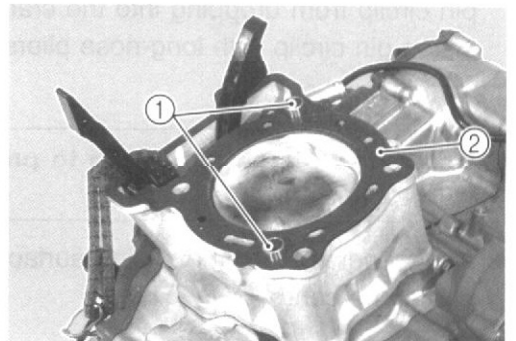


CYLINDER HEAD

- Install the dowel pins ① and new gasket ②.

⚠ CAUTION

Use a new cylinder head gasket to prevent gas leakage.



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

Cylinder head bolt

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

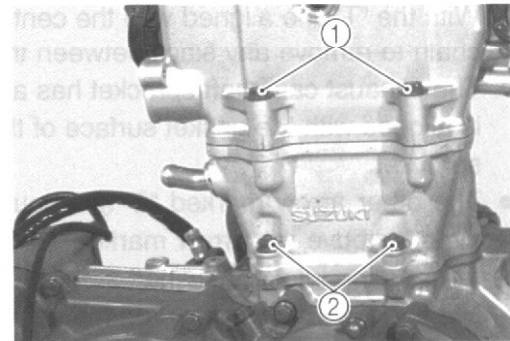
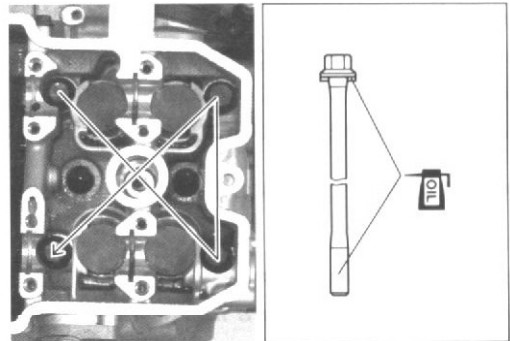
Final: 46 N·m (4.6 kgf-m, 33.5 lb-ft)

NOTE:

- * Apply engine oil to the threaded parts of the cylinder head bolts and its washers.
- * Be sure to install the washer with rounded side facing up.
- After tightening the cylinder head bolts to specification, tighten the cylinder head bolts ① and cylinder nuts ② to the specified torque.

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

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

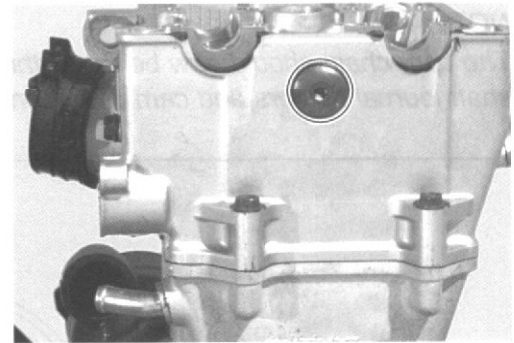


- Tighten the cylinder head side bolt to the specified torque.

 **Cylinder head side bolt:** 14 N·m (1.4 kgf-m, 10.0 lb-ft)

NOTE:

Be sure to install the gasket with the core bar facing toward the head of the bolt.

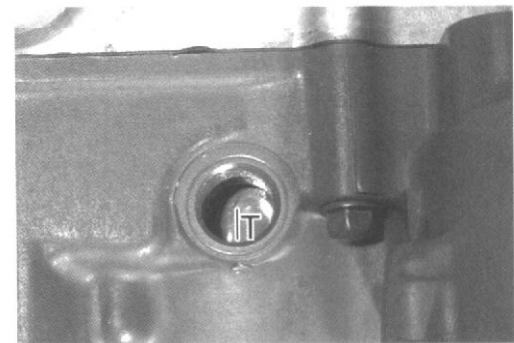


CAMSHAFT/AUTOMATIC DECOMPRESSION ASSEMBLY

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

CAUTION

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



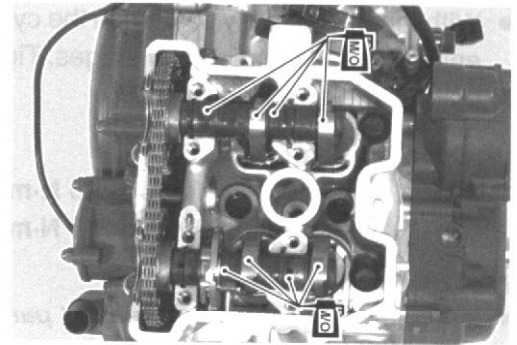
NOTE:

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

- Place each camshaft into the correct position.

NOTE:

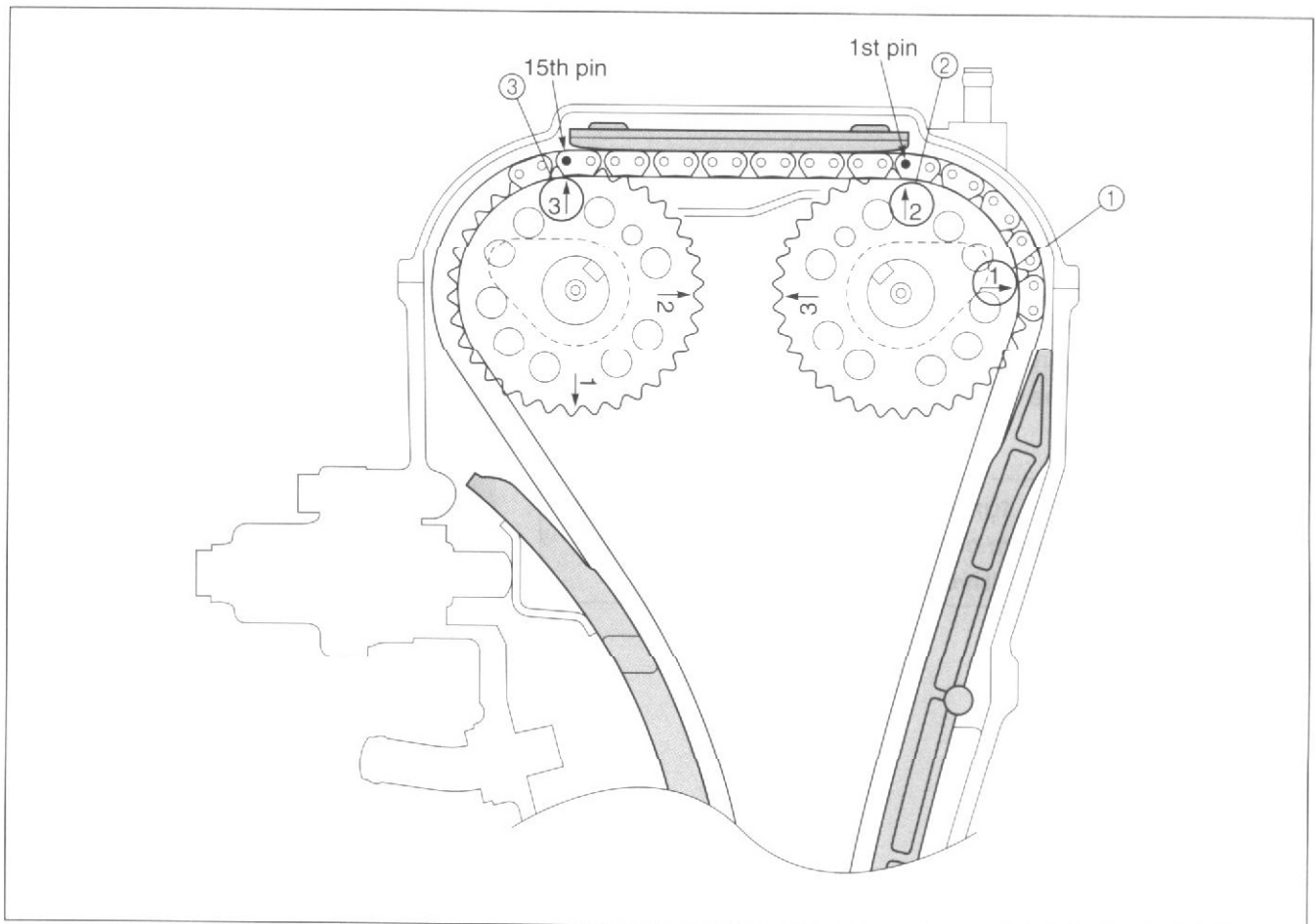
Camshafts which are marked "EX" are for the exhaust side and those marked "IN" are for the intake side.



- With the "T" line aligned with the center of the hole, hold the camshaft steady and lightly pull up the cam chain to remove any slack between the cam chain drive sprocket and exhaust camshaft sprocket.
- The exhaust camshaft sprocket has an arrow marked "1" ①. Turn the exhaust camshaft so that the arrow is aligned with the gasket surface of the cylinder head. Engage the cam chain with the exhaust camshaft sprocket.
- The other arrow marked "2" ② should now be pointing straight up. Starting from the roller pin that is directly above the arrow marked "2" ②, count out 15 roller pins (from the exhaust camshaft side going towards the intake camshaft side). Engage the 15th roller pin on the cam chain with the arrow marked "3" ③ on the intake sprocket. Refer to the following illustrations.

NOTE:

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



- Install the dowel pins.
- Place each camshaft journal holders and cam chain guide into the correct position.

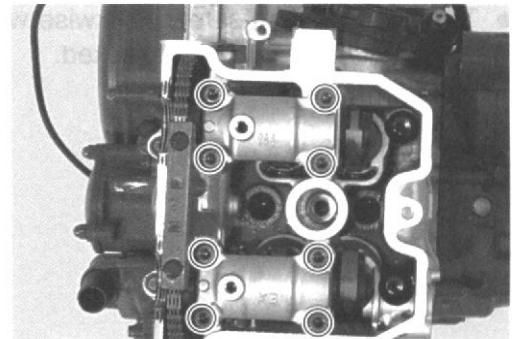
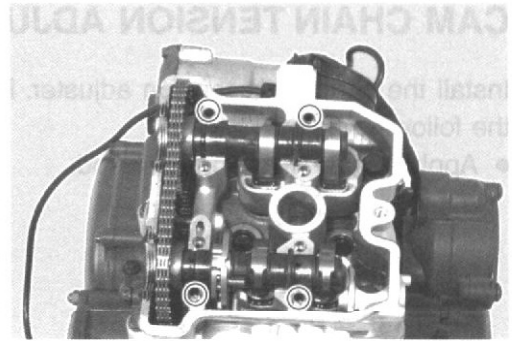
NOTE:

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

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

 **Camshaft journal holder bolt:**

10 N·m (1.0 kgf-m, 7.0 lb-ft)



CYLINDER HEAD COVER

- Thoroughly wipe off oil from the fitting surfaces of the cylinder head and cover.
- Apply SUZUKI BOND "1207B" to the end caps of the cylinder head cover gasket as shown.

For USA

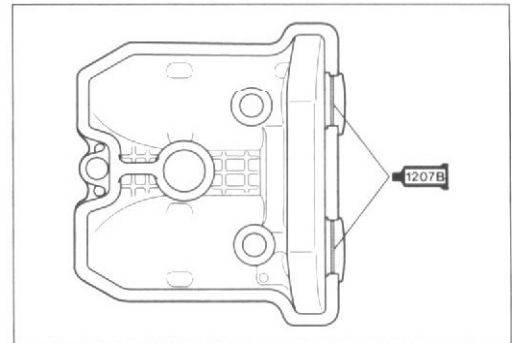
 **99104-31140: SUZUKI BOND "1207B"**

For the other countries

 **99000-31140: SUZUKI BOND "1207B"**

NOTE:

When tightening the cylinder head cover bolts, the piston position must be at TDC on the compression stroke.



- Apply engine oil to both sides of the washer ①.
- Lightly tighten the cylinder head cover bolts in diagonal stages, and then tighten them to the specified torque.

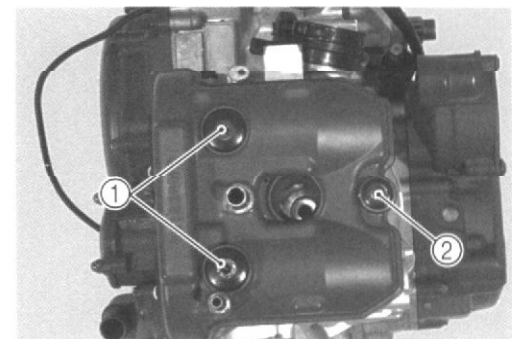
 **Cylinder head cover bolt**

Initial: 10 N·m (1.0 kgf-m, 7.0 lb-ft)

Final: 14 N·m (1.4 kgf-m, 10.0 lb-ft)

 **CAUTION**

Use a new washers ① and cushion ②.



CAM CHAIN TENSION ADJUSTER

Install the cam chain tension adjuster. Pay special attention to the following points:

- Apply engine oil to the push rod.
- Turn the adjusting screw clockwise with a flat-bladed screwdriver until the push rod is locked.

- Fit a new gasket to the chain tension adjuster body.

CAUTION

Use a new gasket to prevent oil leakage.

- Install the cam chain tension adjuster body to the cylinder, and then tighten the two Allen bolts to the specified torque.

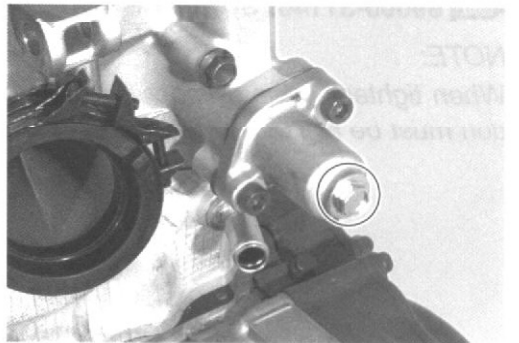
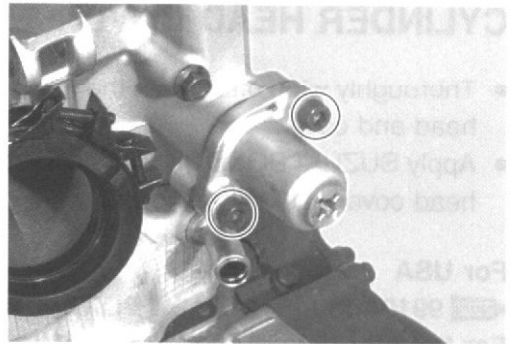
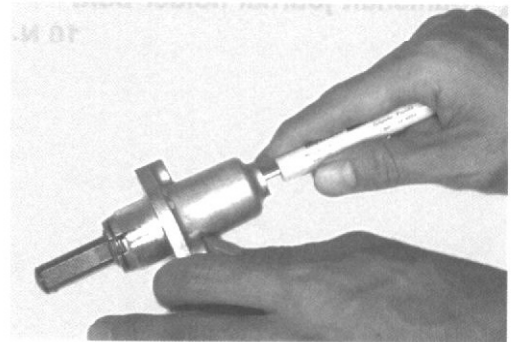
Cam chain tension adjuster bolt:

10 N·m (1.0 kgf·m, 7.0 lb-ft)

- Turn the adjusting screw counterclockwise with a flat-bladed screwdriver to unlock.
- Tighten the cam chain tensioner spring holder bolt to the specified torque.

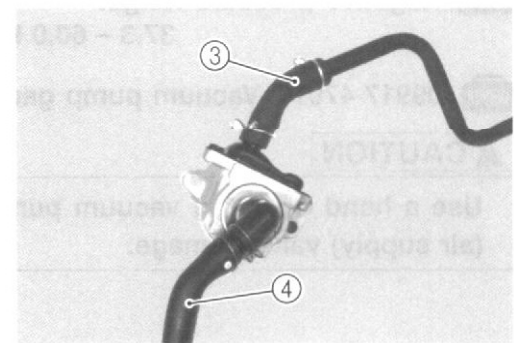
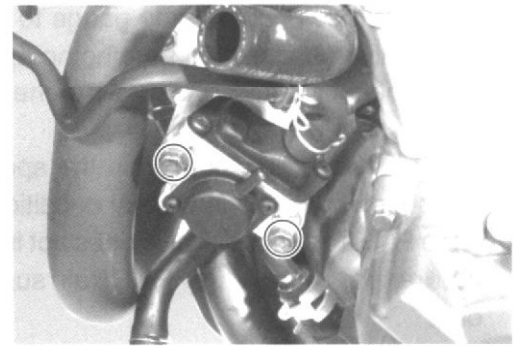
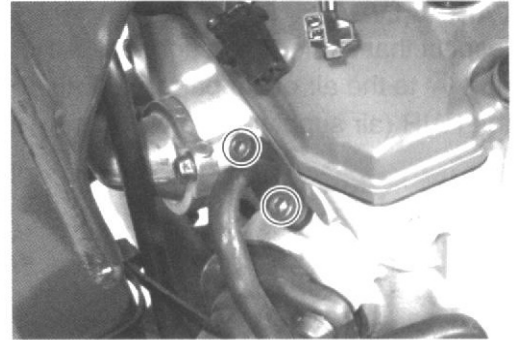
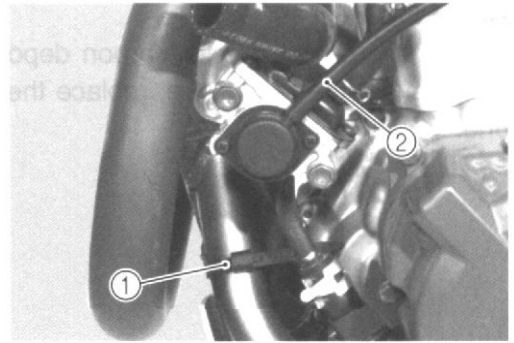
Cam chain tensioner spring holder bolt:

8 N·m (0.8 kgf·m, 6.0 lb-ft)



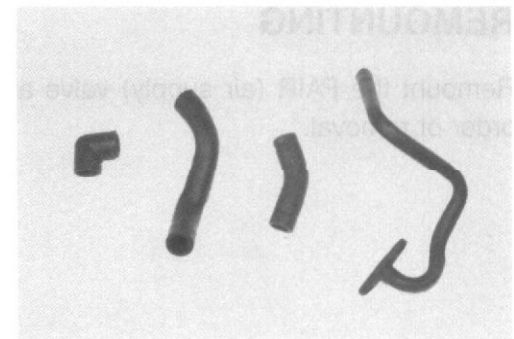
PAIR (AIR SUPPLY) SYSTEM (FOR E-02, 19, 54) REMOVAL

- Remove the left radiator. (☞ 5-6 and 5-7)
- Disconnect the clamp ① and vacuum hose ②.
- Remove the PAIR (air supply) pipe from the cylinder head.
- Remove the PAIR (air supply) valve assembly.
- Remove the PAIR (air supply) pipe ③ and air cleaner hose ④.



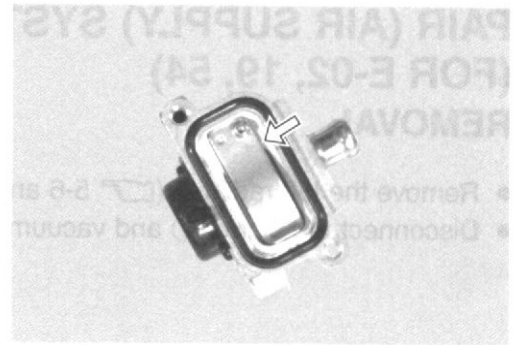
INSPECTION HOSE AND PIPE

Inspect each hose and pipe for wear or damage. If any damages are found, replace each hose and pipe with a new one.

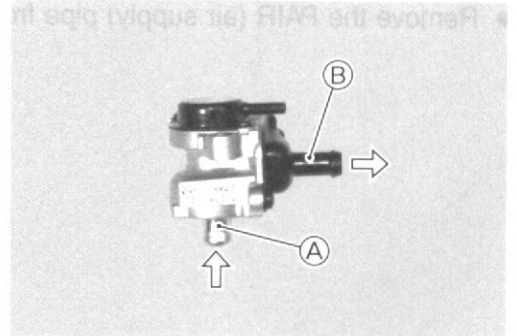


REED VALVE

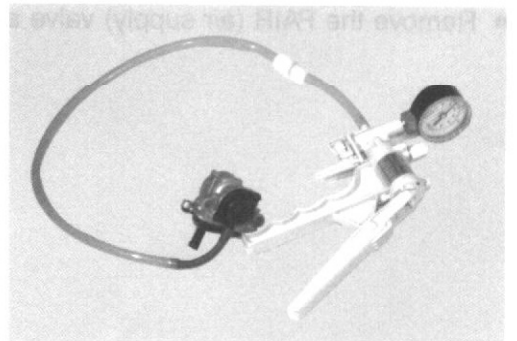
Inspect the reed valve for carbon deposits. If carbon deposits are found in the reed valve, replace the reed valve with a new one.

**PAIR VALVE**

Inspect that air flows through the PAIR (air supply) valve air inlet port (A) to the air outlet parts (B). If air does not flow out, replace the PAIR (air supply) valve with a new one.



- Connect the vacuum pump gauge to the vacuum port of the PAIR valve as shown in the photograph.
- Apply negative pressure slowly to the PAIR (air supply) valve and inspect the air flow.
- If air does not flow out within the specified range, the PAIR (air supply) valve is in normal condition.
- If the PAIR (air supply) valve does not function within the specified range, replace the PAIR (air supply) valve with a new one.



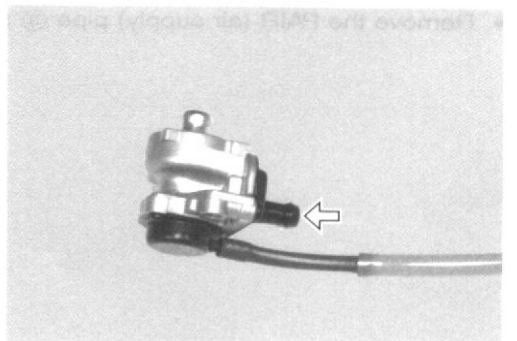
DATA Negative pressure range:

37.3 – 60.0 kPa (280 – 450 mmHg)

TOOL 09917-47010: Vacuum pump gauge

CAUTION

Use a hand operated vacuum pump to prevent PAIR (air supply) valve damage.

**REMOUNTING**

Remount the PAIR (air supply) valve assembly in the reverse order of removal.

FUEL AND LUBRICATION SYSTEM

CONTENTS

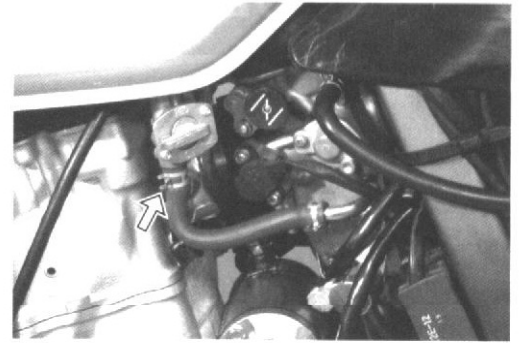
| | |
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FUEL TANK REMOVAL

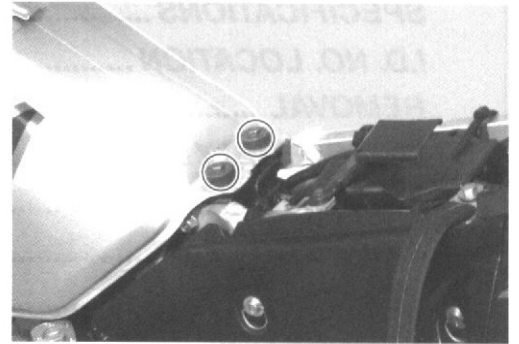
- Remove the seat and side covers. (☞ 6-2)
- Turn the fuel valve to the "OFF" position.
- Disconnect the fuel hose.

⚠ WARNING

Gasoline is highly flammable and explosive.
Keep heat, sparks, and flames away from gasoline.



- Remove the fuel tank.



RECOUNTING

Remount the fuel tank in the reverse order of removal.

FUEL VALVE REMOVAL AND INSPECTION

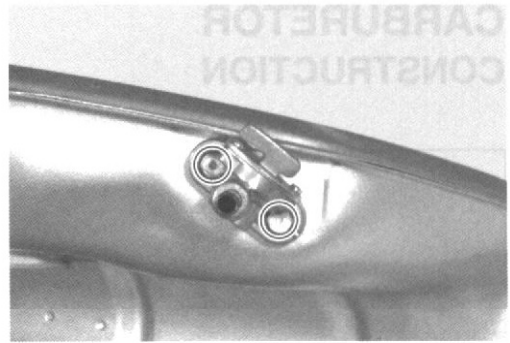
- Remove the fuel tank. (☞ 4-2)
- Drain the fuel completely.
- Remove the fuel valve.

⚠ WARNING

- * Gasoline is highly flammable and explosive. Keep heat, sparks, and flames away from gasoline.
- * Replace the removed O-ring with a new one to prevent fuel leakage.

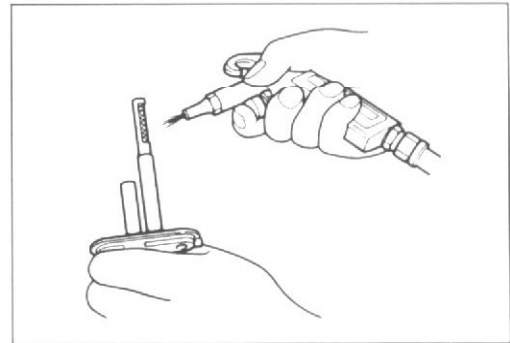
- Tighten the fuel valve mounting bolts to the specified torque.

 Fuel valve mounting bolt: 4.4 N·m (0.44 kgf-m, 3.2 lb-ft)



FUEL STRAINER

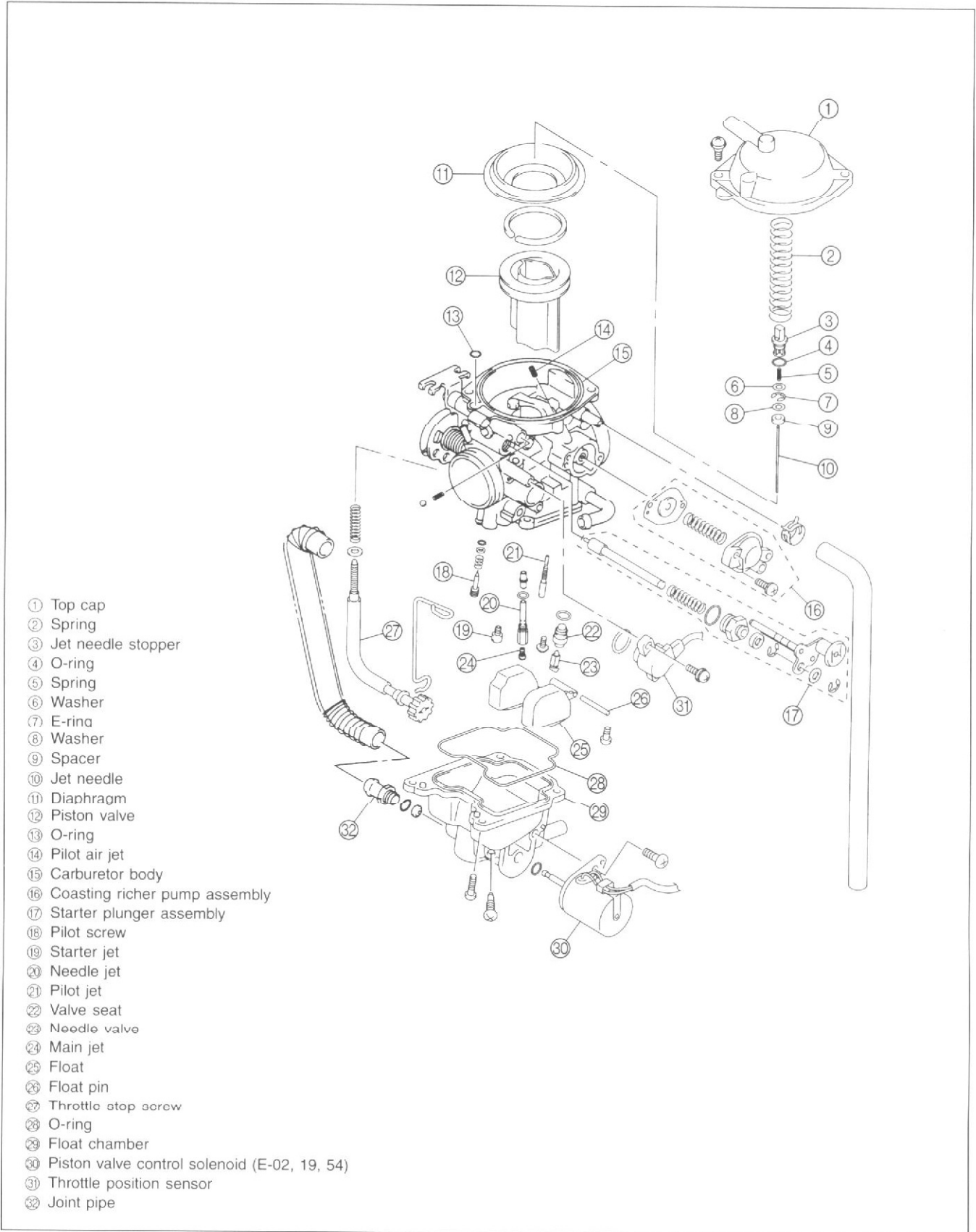
If the fuel strainer is dirty with sediment or rust, fuel will not flow smoothly and loss in engine power may result. Clean the fuel strainer with compressed air.



REMountING

Remount the fuel valve in the reverse order of removal.

CARBURETOR CONSTRUCTION



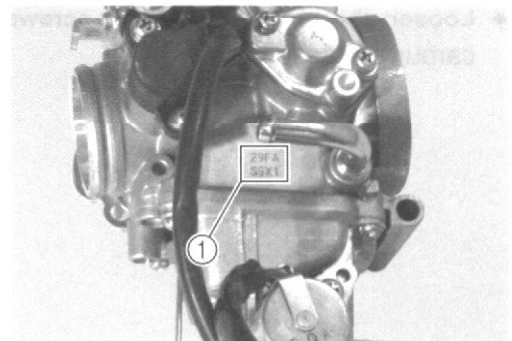
SPECIFICATIONS

| ITEM | SPECIFICATION | | |
|------------------------|--------------------------------|----------|------|
| | E-02, 19, 54 | E-03, 28 | E-33 |
| Carburetor type | MIKUNI BSR36 | ← | ← |
| Bore size | 36 mm (1.4 in) | ← | ← |
| I.D. No. | 29FA | 29FB | 29FC |
| Idle r/min | 1500 ± 100 r/min | ← | ← |
| Float height | 13.0 ± 1.0 mm (0.51 ± 0.04 in) | ← | ← |
| Main jet (M.J.) | #142.5 | #142.5 | ← |
| Jet needle (J.N.) | 5DH36 2nd | 5DH37 | ← |
| Needle jet (N.J.) | P-0M | P-0M | ← |
| Pilot jet (P.J.) | #22.5 | #22.5 | ← |
| Pilot air jet (P.A.J.) | #165 | #135 | ← |
| Pilot screw (P.S.) | 3 turns out | PRESET | ← |
| Throttle cable play | 2 – 4 mm (0.08 – 0.16 in) | ← | ← |

E-02: UK E-03: USA E-19: EU E-28: Canada E-33: California (USA) E-54: Israel

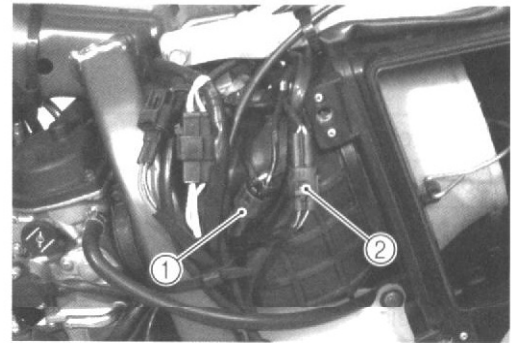
I.D. NO. LOCATION

Carburetor has an I.D. number ① printed on its body.

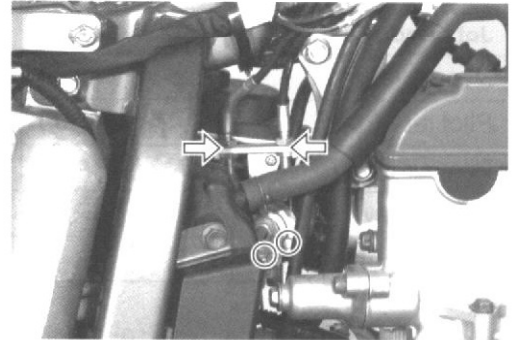


REMOVAL

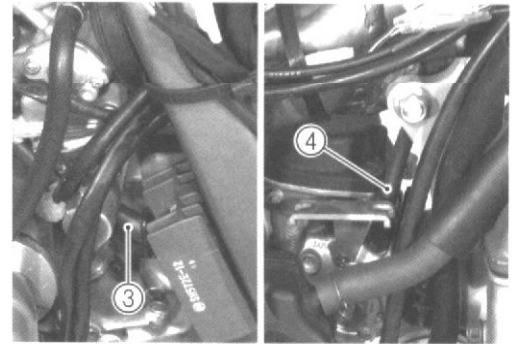
- Remove the fuel tank. (☞ 4-2)
- Remove the left frame cover. (☞ 6-2)
- Disconnect the throttle position sensor coupler ① and piston valve control solenoid coupler ② (Except for E-03, 28, 33).



- Disconnect the throttle cables.



- Disconnect the air vent hose ③ and vacuum hose ④.

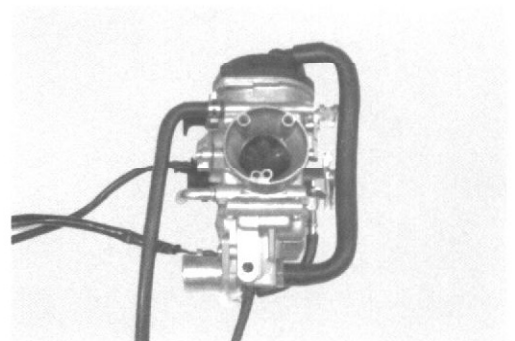


- Loosen the carburetor clamp screws, and then remove the carburetor assembly.

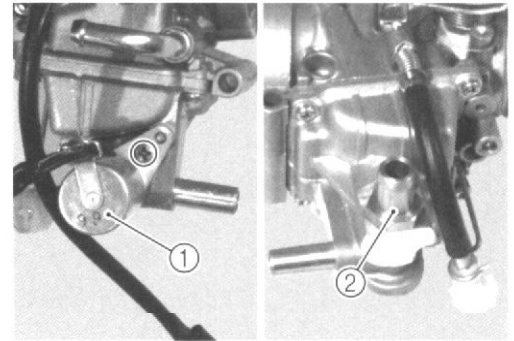


DISASSEMBLY

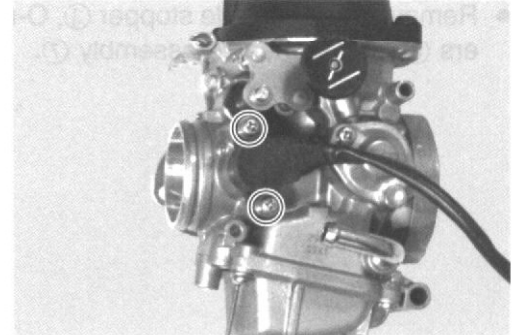
- Remove the carburetor hoses.



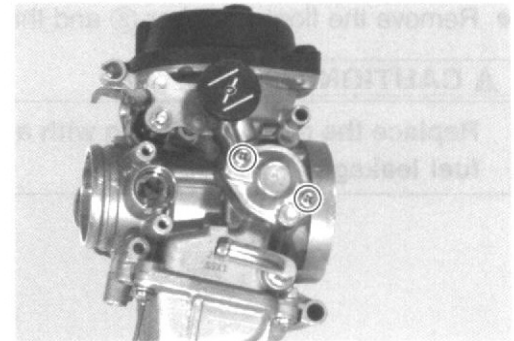
- Remove the piston valve control solenoid ① and joint pipe ② (Except for E-03, 28, 33).



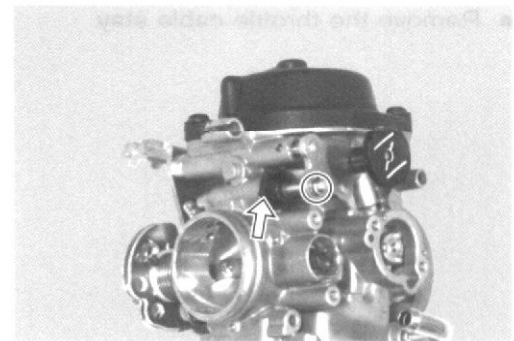
- Remove the throttle position sensor.



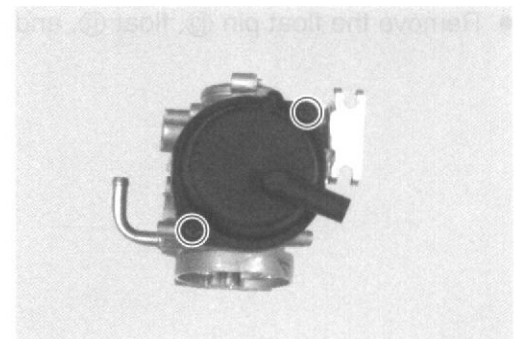
- Remove the coasting richer pump assembly.



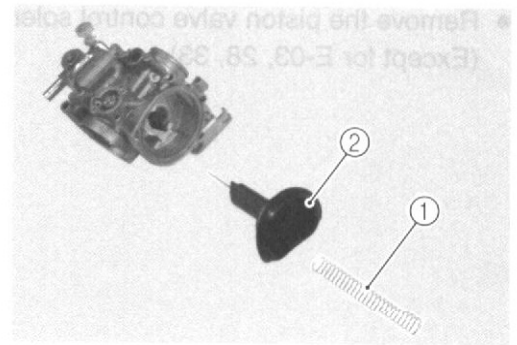
- Remove the starter plunger assembly



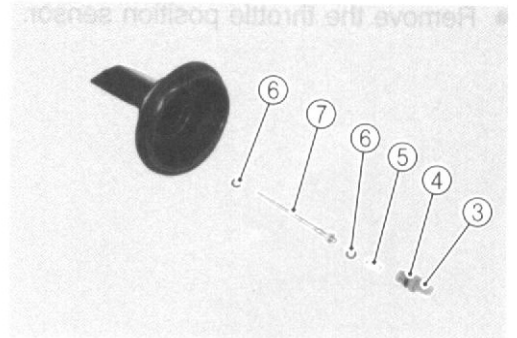
- Remove the top cap.



- Remove the spring ① and piston valve along with its diaphragm ②.



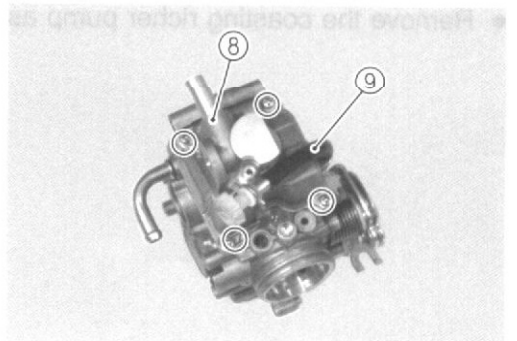
- Remove the jet needle stopper ③, O-ring ④, spring ⑤, washers ⑥, and jet needle assembly ⑦.



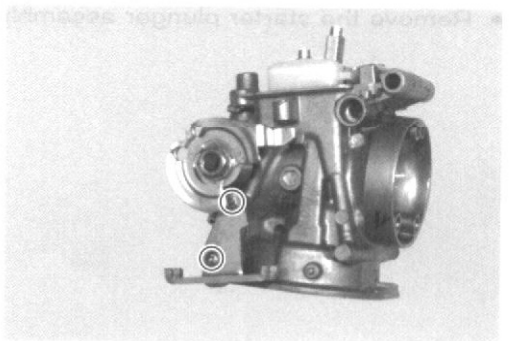
- Remove the float chamber ⑧ and throttle stop screw ⑨.

CAUTION

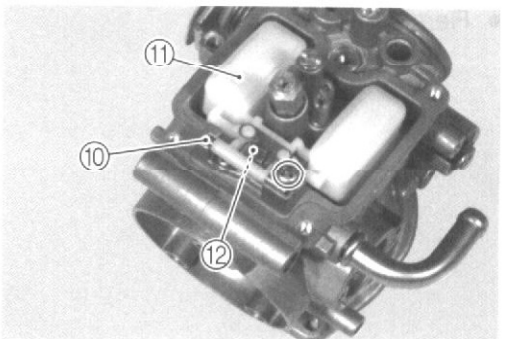
Replace the removed O-ring with a new one to prevent fuel leakage.



- Remove the throttle cable stay.



- Remove the float pin ⑩, float ⑪, and needle valve ⑫.



- Remove the following parts.

- | | |
|---------------|-----------------|
| ① Valve seat | ⑤ Needle jet |
| ② Main jet | ⑥ Starter jet |
| ③ Pilot jet | ⑦ Pilot air jet |
| ④ Pilot screw | |

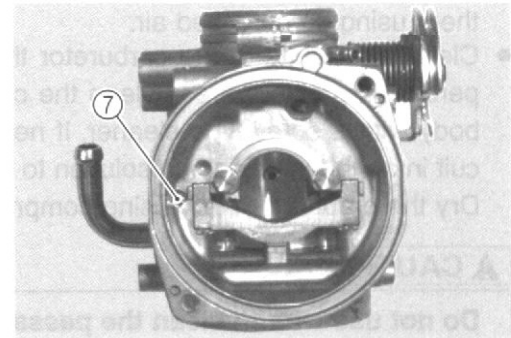
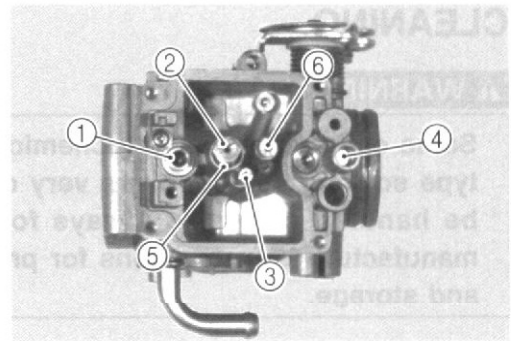
NOTE:

Before removing the pilot screw ④, its setting must be determined. Slowly turn the pilot screw clockwise and count the number of turns until it is lightly seated. Make a note of how many turns were made.

When reassembling the pilot screw, you will want to set the pilot screw to its original position.

CAUTION

Do not use wire to clean the passageways, valve seat, and jets. Use compressed air only.

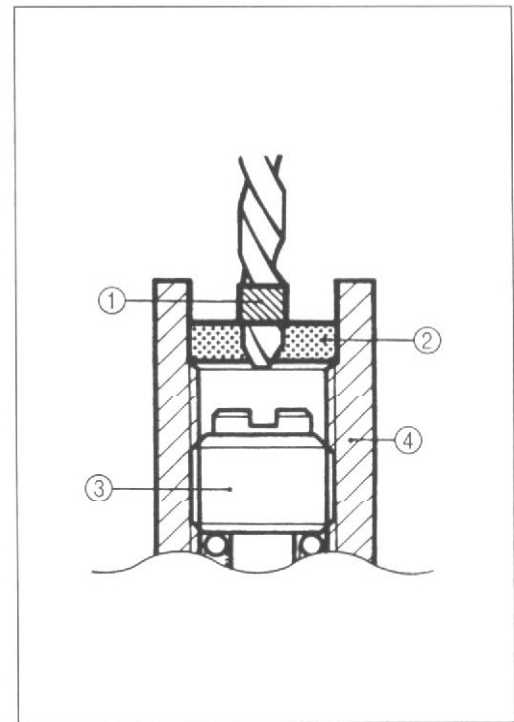


PILOT SCREW REMOVAL (FOR E-03, 28, 33)

Because harsh cleaning solvents can damage the O-ring seals in the pilot system, the pilot system components should be removed before cleaning.

- Use a 1/8" size drill bit with a drill-stop to remove the pilot screw plug. Set the drill-stop 6 mm from the end of the bit to prevent drilling into the pilot screw. Carefully drill through the plug.
- Thread a self-tapping sheet metal screw into the plug. Pull on the screw head with pliers to remove the plug. Carefully clean any metal shavings from the area.
- Slowly turn the pilot screw clockwise and count the number of turns until the screw is lightly seated. Make a note of how many turns were made so the screw can be reset correctly after cleaning.
- Remove the pilot screw along with the spring, washer, and O-ring.
- After cleaning, install the pilot screw to the original setting by turning the screw in until it lightly seats, and then backing it out the same number of turns counted during disassembly.
- Install a new plug by tapping it into place with a punch.

- | |
|-------------------|
| ① Drill-stop |
| ② Plug |
| ③ Pilot screw |
| ④ Carburetor body |



CLEANING

⚠ WARNING

Some carburetor cleaning chemicals, especially dip-type soaking solutions, are very corrosive and must be handled carefully. Always follow the chemical manufacturer's instructions for proper use, handling and storage.

- Clean all jets with a spray-type carburetor cleaner and dry them using compressed air.
- Clean all circuits of the carburetor thoroughly—not just the perceived problem area. Clean the circuits in the carburetor body with a spray-type cleaner. If necessary, soak each circuit in a dip-type cleaning solution to loosen dirt and varnish. Dry the carburetor body using compressed air.

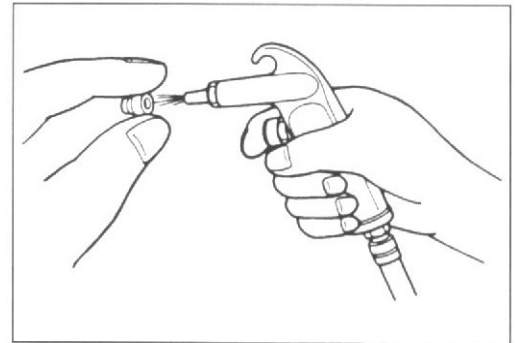
⚠ CAUTION

Do not use wire to clean the passageways, valve seat, and jets. If the components cannot be cleaned with a spray-type cleaner it may be necessary to soak them in a dip-type cleaning solution. Always follow the chemical manufacturer's instructions for proper use and cleaning of the carburetor components.

- After cleaning, reassemble the carburetor with new O-rings.

⚠ CAUTION

Replace the removed O-rings with new ones.



INSPECTION

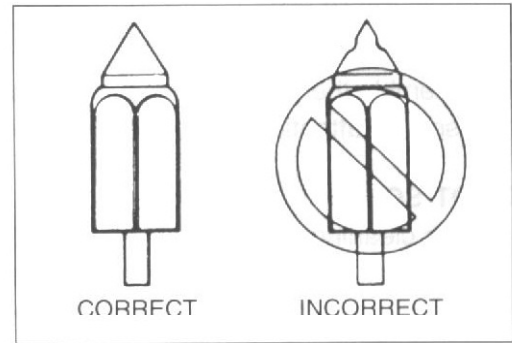
Check the following items for any damage or clogging. If any damages are found, replace the damaged parts with new ones.

- | | |
|---------------------------------|--------------------------|
| * Pilot jet | * Valve seat |
| * Main jet | * Jet needle |
| * Main air jet | * Piston valve |
| * Pilot air jet | * Starter (enricher) jet |
| * Needle jet air bleeding hole | * O-ring |
| * Float | * Throttle valve |
| * Needle valve | * Diaphragm |
| * Pilot outlet and bypass ports | |

NEEDLE VALVE INSPECTION

If foreign matter is caught between the valve seat and the needle valve, the gasoline will continue flowing and overflow. If the valve seat and needle valve are worn beyond the permissible limits, similar trouble will occur. Conversely, if the needle valve sticks, the gasoline will not flow into the float chamber.

Clean the float chamber and float parts with gasoline. If the needle valve is worn as shown, replace it and the valve seat a new one. Clean the fuel passage of the mixing chamber using compressed air.

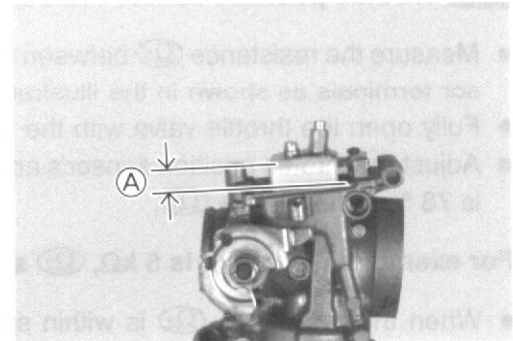


FLOAT HEIGHT ADJUSTMENT

To check the float height, turn the carburetor upside down. Measure the float height (A) while the float arm is just contacting the needle valve using vernier calipers. Bend the tongue as necessary to bring the float height (A) to the specified level.

TOOL 09900-20101: Vernier calipers

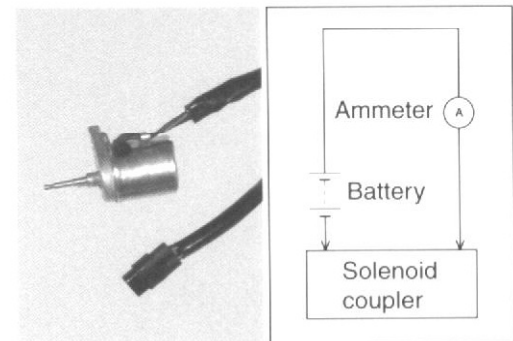
DATA Float height (A): 13.0 ± 1.0 mm (0.51 ± 0.04 in)



PISTON VALVE CONTROL SOLENOID INSPECTION (FOR E-02, 19, 54)

Test the piston valve control solenoid for load current using an ammeter.

To test the piston valve control solenoid, connect a 12 V battery to the solenoid coupler. If the needle valve of the piston valve control solenoid does not move, replace the piston valve control solenoid with a new one.



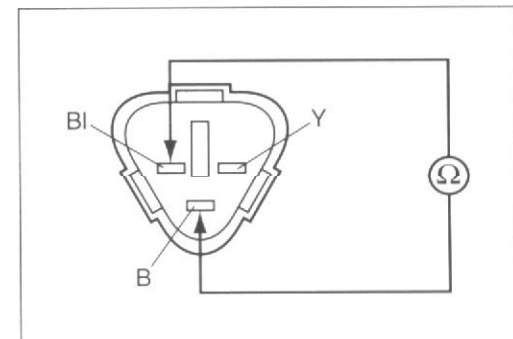
THROTTLE POSITION SENSOR INSPECTION

Measure the resistance between the terminals as shown in the illustration.

DATA Throttle position sensor resistance: 3.5 – 6.5 kΩ

NOTE:

When performing this test, it is not necessary to remove the throttle position sensor.



REASSEMBLY

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

PILOT SCREW

- After cleaning, install the pilot screw ① to the original setting by turning the screw in until it lightly seats, and then backing it out the same number of turns counted during disassembly.

- ① Pilot screw
- ② Carburetor body

⚠ CAUTION

Replace the removed O-ring with a new one.

THROTTLE POSITION SENSOR INSTALLATION

Install the throttle position sensor as described below.

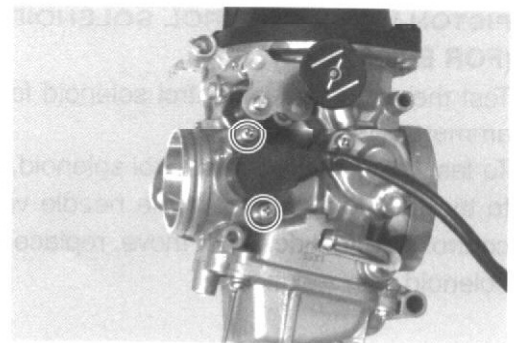
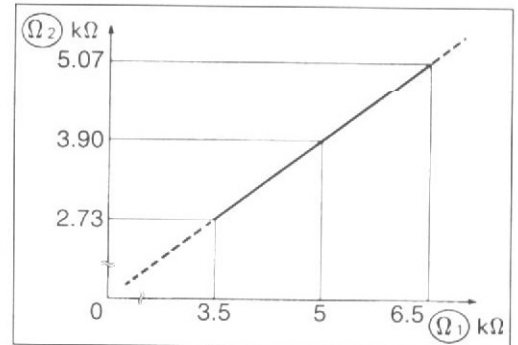
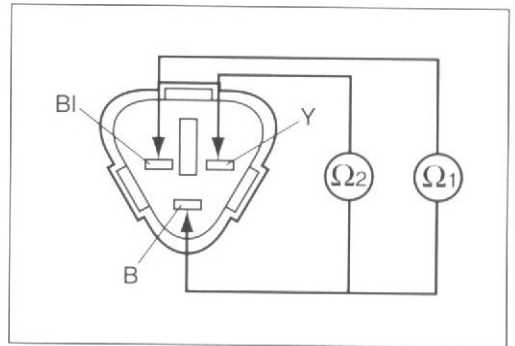
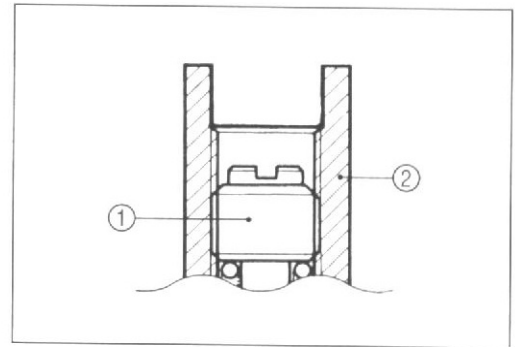
- Measure the resistance Ω_1 between the throttle position sensor terminals as shown in the illustration.

DATA Throttle position sensor resistance Ω_1 : 3.5 – 6.5 k Ω

- Measure the resistance Ω_2 between the throttle position sensor terminals as shown in the illustration.
- Fully open the throttle valve with the throttle lever.
- Adjust the throttle position sensor's angle until resistance Ω_2 is 78 % of resistance Ω_1 .

For example: When Ω_1 is 5 k Ω , Ω_2 should be 3.9 k Ω .

- When the resistance Ω_2 is within specification, tighten the throttle position sensor mounting screws.



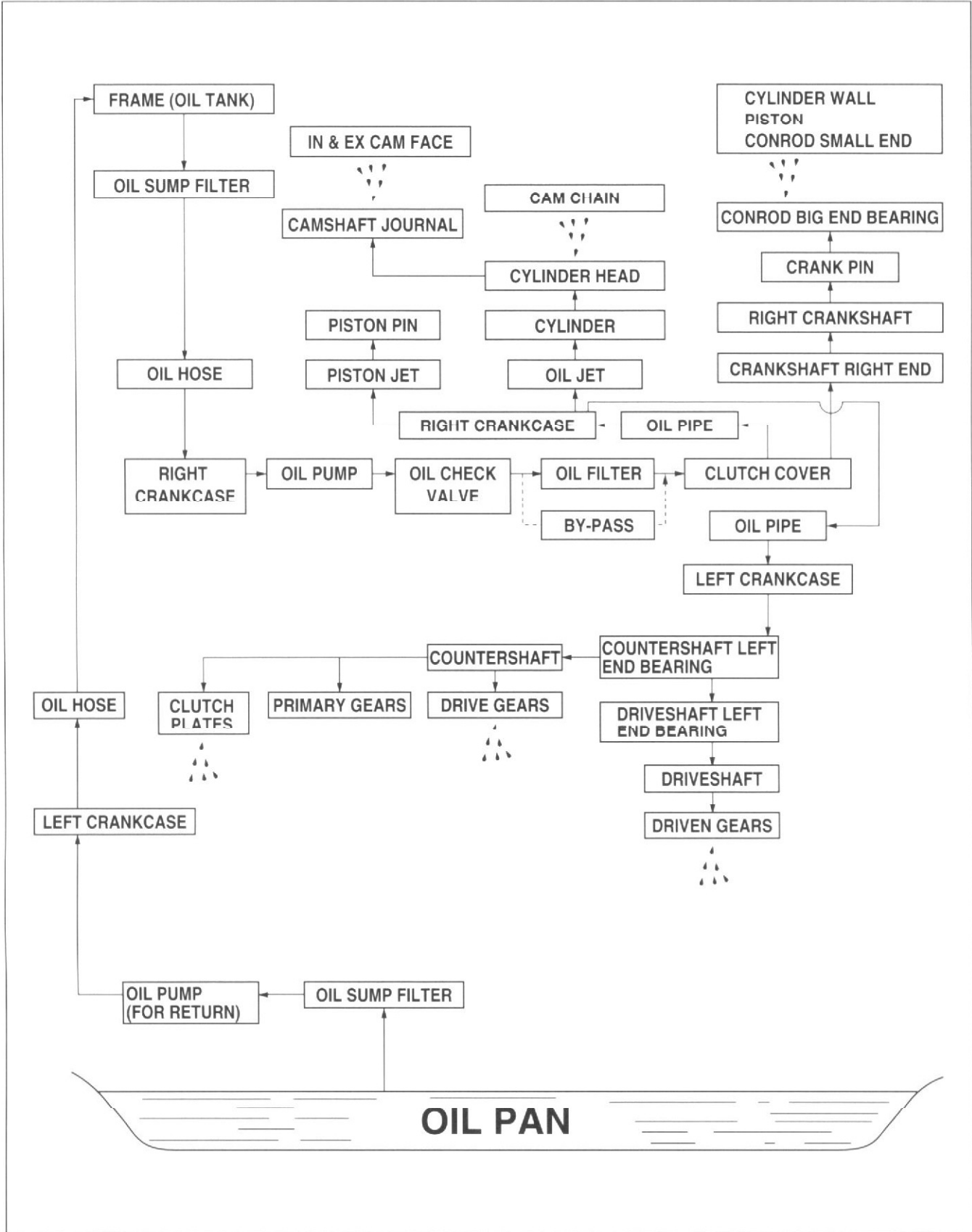
REMountING

Remount the carburetor assembly in the reverse order of removal. After the carburetor assembly has been remounted onto the engine perform the following adjustments:

- * **Throttle cable play** 2-13
- * **Engine idle speed** 2-14

LUBRICATION SYSTEM

ENGINE LUBRICATION SYSTEM CHART



COOLING SYSTEM

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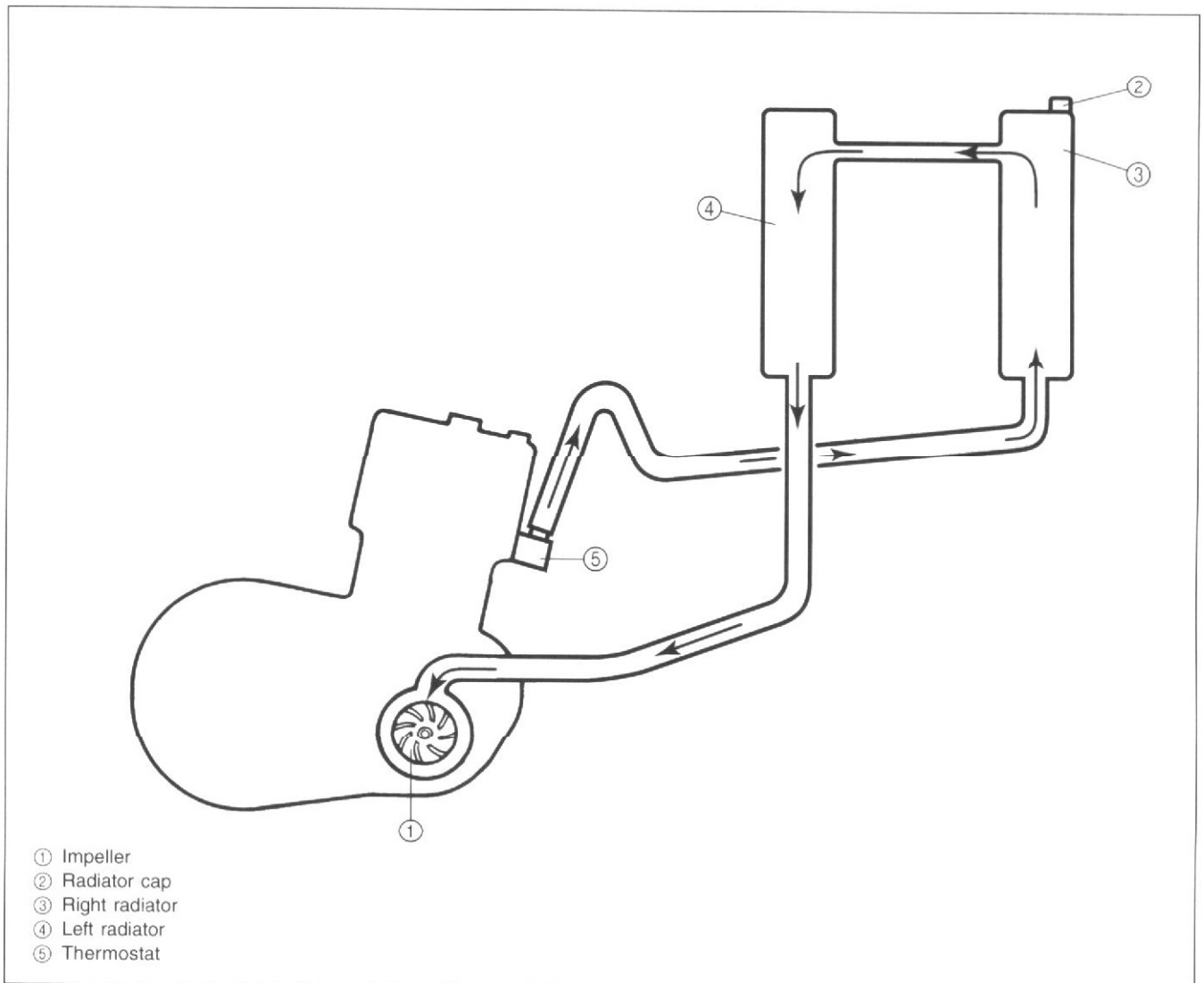
| | |
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COOLING SYSTEM DESCRIPTION

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

A wax-pellet type thermostat is used to regulate the flow of engine coolant through the radiator. As the coolant temperature rises to about 75°C (167°F) the thermostat valve unseats and a normal coolant flow is established. At about 90°C (194°F) the thermostat becomes completely open and, as a result, heat is released to the atmosphere through the radiator core.

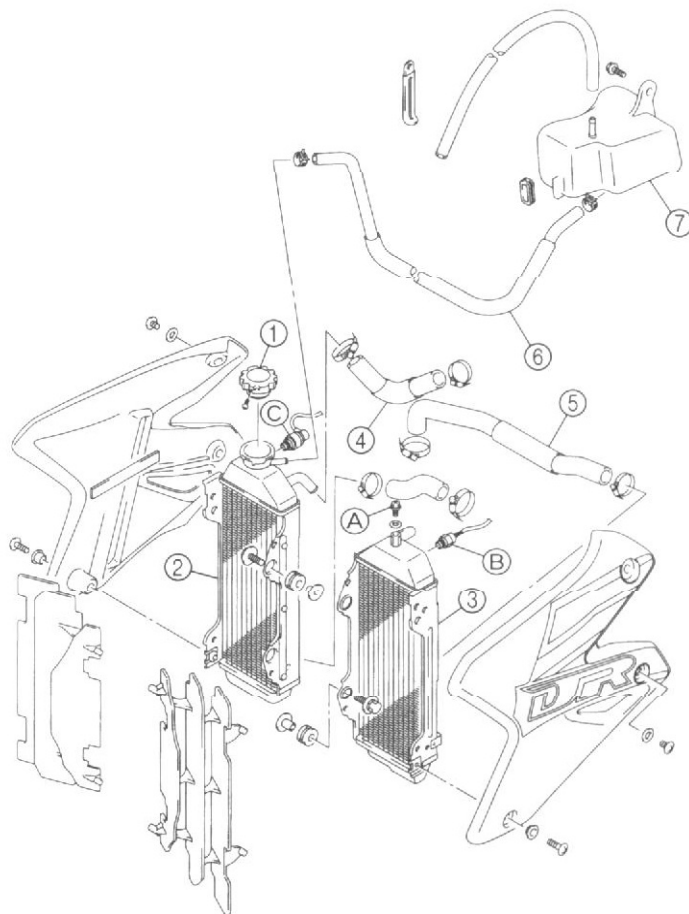
Referring to the following illustration, the thermostat is in the closed condition, so that engine coolant recirculates through the route comprising the water pump, engine, by-pass hole of the thermostat and radiator in the regulated condition.



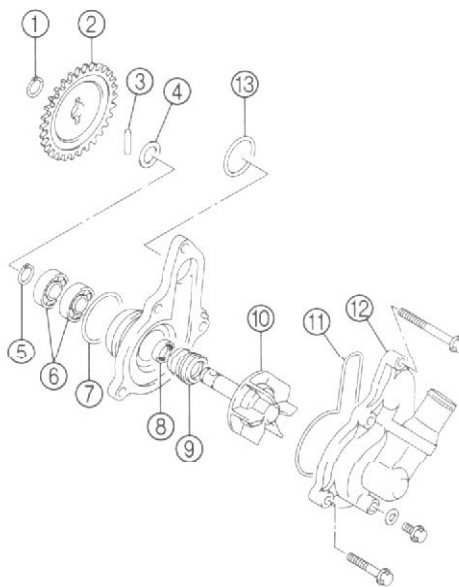
CONSTRUCTION

- ① Radiator cap
- ② Radiator (R)
- ③ Radiator (L)
- ④ Radiator inlet hose
- ⑤ Radiator outlet hose
- ⑥ Overflow hose
- ⑦ Overflow tank

- Ⓐ Air bleeder bolt
- Ⓑ Cooling fan thermostitch
- Ⓒ Engine coolant temperature thermostitch



| ITEM | N·m | kgf·m | lb·ft |
|------|-----|-------|-------|
| Ⓐ | 5.5 | 0.55 | 4.0 |
| Ⓑ | 13 | 1.3 | 9.5 |
| Ⓒ | 13 | 1.3 | 9.5 |



- ① Circlip
- ② Water pump driven gear
- ③ Pin
- ④ Washer
- ⑤ Circlip
- ⑥ Bearing
- ⑦ O-ring
- ⑧ Oil seal
- ⑨ Mechanical seal
- ⑩ Impeller
- ⑪ O-ring
- ⑫ Water pump cover
- ⑬ O-ring

ENGINE COOLANT

At the time of manufacture, the cooling system is filled with a 50:50 mixture of distilled water and ethylene glycol antifreeze. This mixture will provide optimum corrosion and heat protection, and will protect the cooling system from freezing at above -31°C (-24°F).

If the motorcycle is to be exposed to temperatures below -31°C (-24°F), the percentage of antifreeze should be increased to 55% or 60%, according to figure 2.

- The characteristics of different antifreeze vary; therefore, be sure to use the specified antifreeze.

DATA Engine coolant: Mix antifreeze designed for aluminum radiators with distilled water only.

Water/antifreeze mixture ratio: 50:50 – 40:60

CAUTION

- * Mix a high quality ethylene glycol based antifreeze with distilled water only. Do not mix an alcohol based antifreeze or different brands of antifreeze.
- * The percentage of antifreeze in the coolant should be between 50 to 60%. If the percentage of antifreeze is above or below this range the coolant's frost protection and rust-inhibiting capabilities will be reduced. Always keep the antifreeze content above 50% even if the atmospheric temperature does not go below the freezing point.

DATA Engine coolant capacity: 1 250 ml (1.3 US qt, 1.1 Imp qt)

| Antifreeze density | Freezing point |
|--------------------|---|
| 50% | -31°C (-24°F) |
| 55% | -40°C (-40°F) |
| 60% | -55°C (-67°F) |

WARNING

- * Do not open the radiator cap when the engine is hot, as you may be injured by escaping hot liquid or vapor.
- * The engine must be cool before servicing the cooling system.
- * Engine coolant may be harmful if swallowed or if it comes in contact with the skin or eyes. If engine coolant gets into the eyes or contacts the skin, flush the eyes or wash the skin thoroughly, with plenty of water. If engine coolant is swallowed, induce vomiting and call a physician immediately.

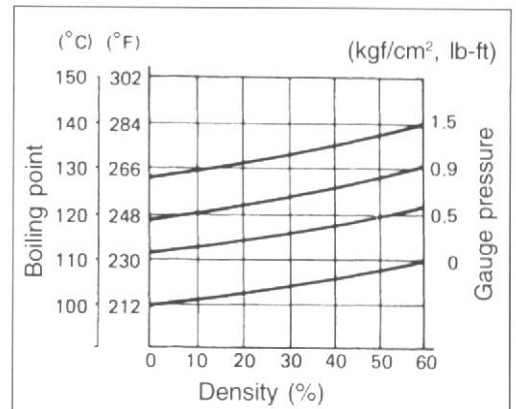


Fig. 1 Engine coolant density-boiling point

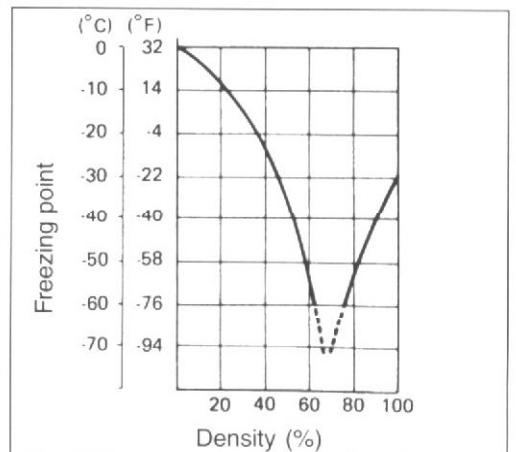


Fig. 2 Engine coolant density-freezing point

RADIATOR AND COOLING FAN INSPECTION

RADIATOR

Before removing the radiator and draining the engine coolant, check the following.

Check the cooling system for leaks with a radiator tester ①. Remove the radiator cap and connect the radiator tester to the filler. Pressurize the cooling system with 120 kPa (1.2 kgf/cm², 17 psi) of pressure, and then check if it holds the pressure for 10 seconds. If the cooling system does not hold the pressure for at least 10 seconds, check the entire cooling system for leaks. If a leak is found, replace the damaged part.

⚠ WARNING

- * Do not open the radiator cap when the engine is hot, as you may be injured by escaping hot liquid or vapor.
- * When removing the radiator cap tester, put a rag on the filler to prevent the engine coolant from spraying out.

⚠ CAUTION

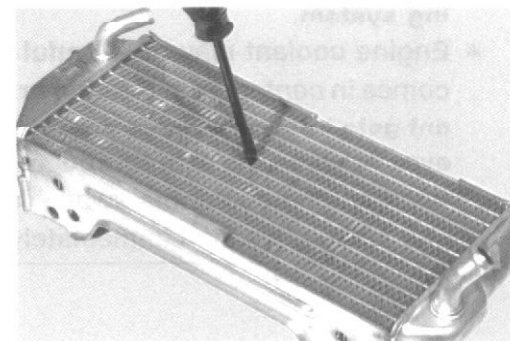
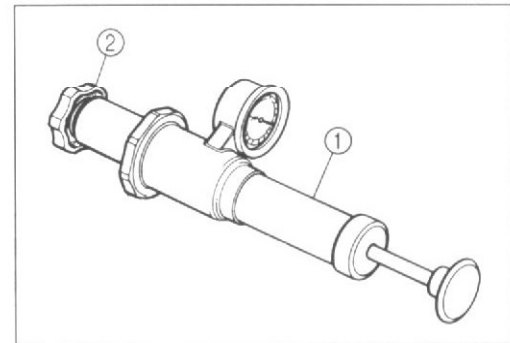
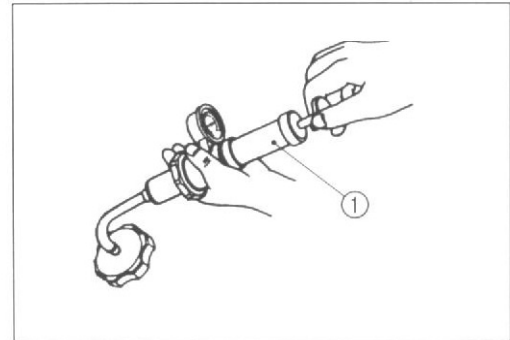
Do not exceed the radiator cap release pressure, or the radiator cap and subsequently the radiator, can be damaged.

Check the radiator cap ② using a radiator tester ①. Attach the radiator cap to the radiator tester as shown. Slowly apply pressure to the radiator cap; do not exceed 95 – 125 kPa (0.95 – 1.25 kgf/cm², 13.5 – 17.8 psi). If the radiator cap does not hold the pressure for at least 10 seconds, replace it with a new one.

DATA Radiator cap release pressure: 95 – 125 kPa
(0.95 – 1.25 kgf/cm², 13.5 – 17.8 psi)

Check the radiator for dirt and other foreign materials. If any are found, clean the radiator using compressed air. Also, repair any bent or dented fins using a small screwdriver.

Check all the water hoses for cracks, flat spots, or loose connections. Replace any damaged hoses and properly tighten any loose connections.



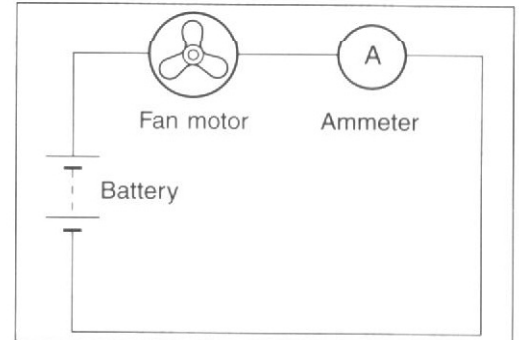
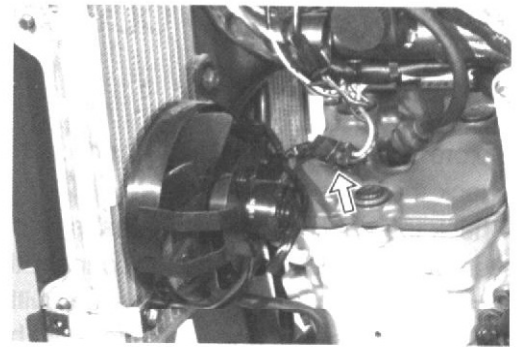
COOLING FAN

- Remove the fuel tank. (☞ 4-2)
- Disconnect the cooling fan motor coupler.

Test the cooling fan motor for load current using an ammeter connected as shown.

The voltmeter is for making sure that the battery applies 12 volts to the motor. With the motor with electric motor fan running at full speed, the ammeter should be indicating not more than 5 amperes.

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

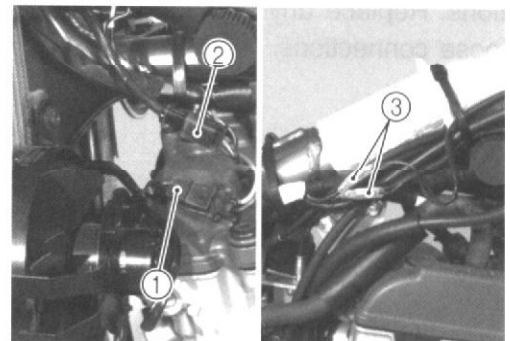
**REMOVAL**

- Remove the fuel tank. (☞ 4-2)
- Drain the engine coolant. (☞ 2-15)

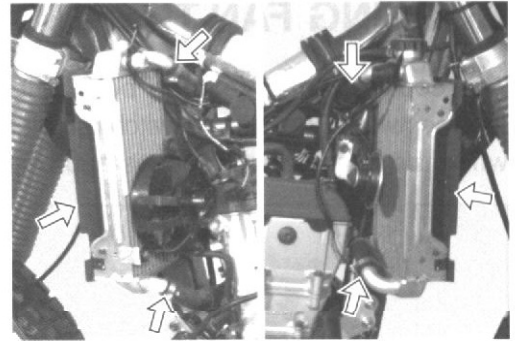
⚠ WARNING

- * Do not open the radiator cap when the engine is hot, as you may be injured by escaping hot liquid or vapor.
- * The engine must be cool before servicing the cooling system.
- * Engine coolant may be harmful if swallowed or if it comes in contact with the skin or eyes. If engine coolant gets into the eyes or contacts the skin, flush the eyes or wash the skin thoroughly, with plenty of water. If engine coolant is swallowed, induce vomiting and call a physician immediately.

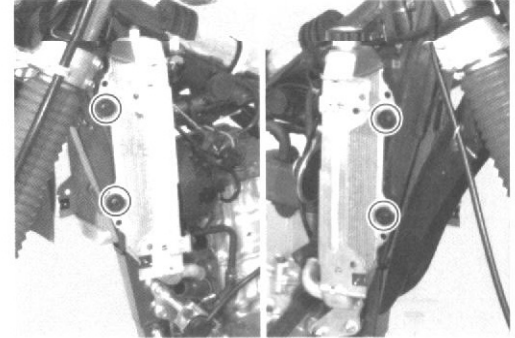
- Disconnect the cooling fan motor coupler ①, cooling fan thermostatic coupler ②, and engine coolant temperature thermostatic lead wires ③.



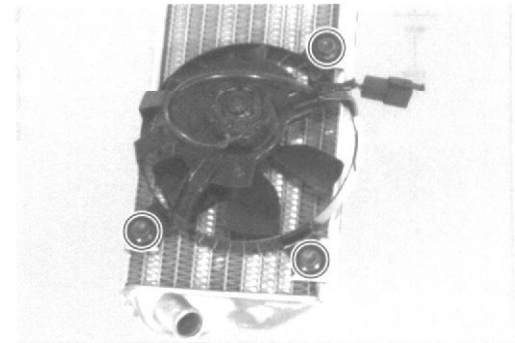
- Disconnect the radiator hoses and radiator covers.



- Remove the radiators.



- Remove the cooling fan.

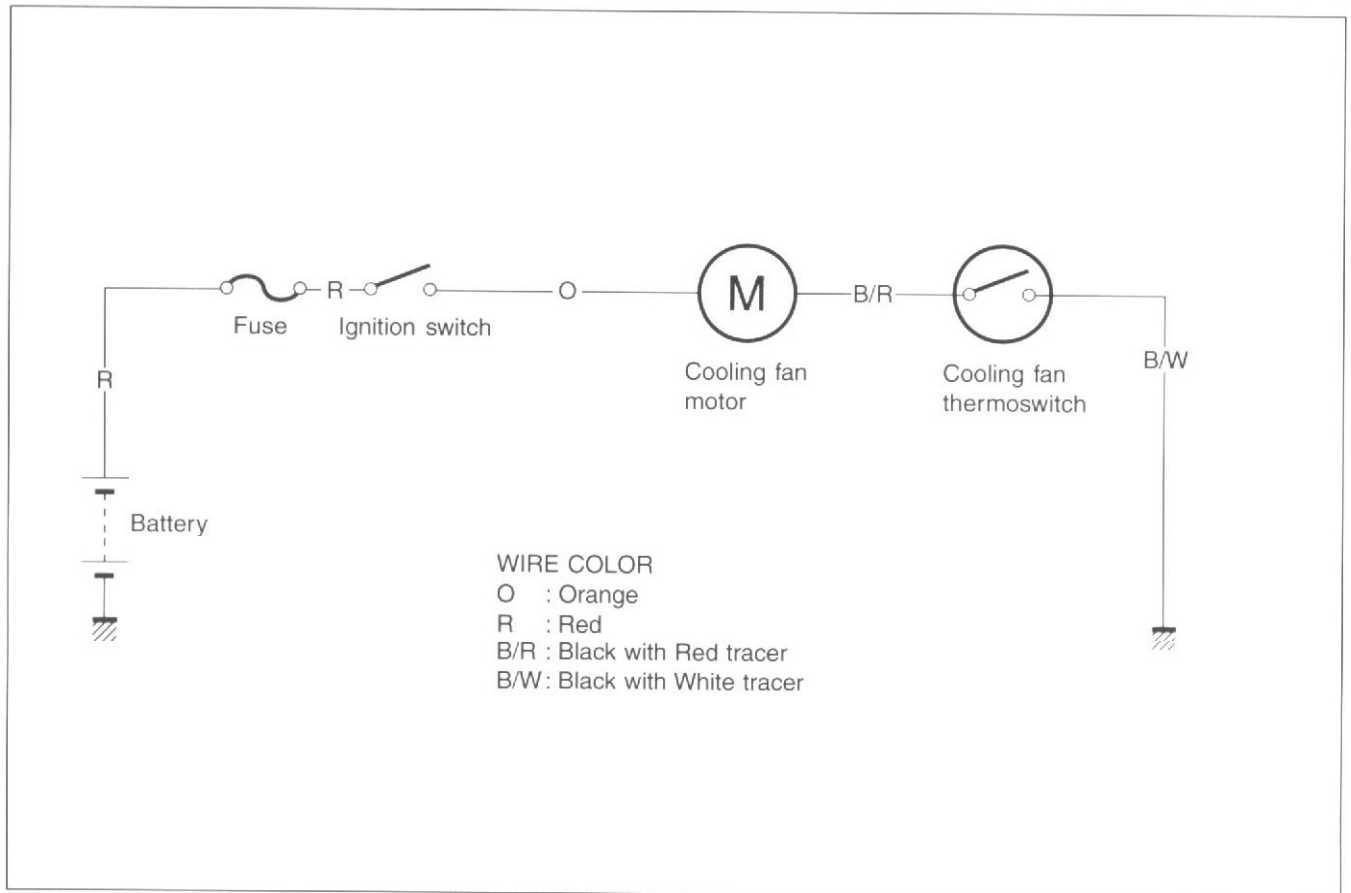


REMOUNTING

Remount the radiator in the reverse order of removal. After remounting the radiator, be sure to add engine coolant. (↩ 2-15)

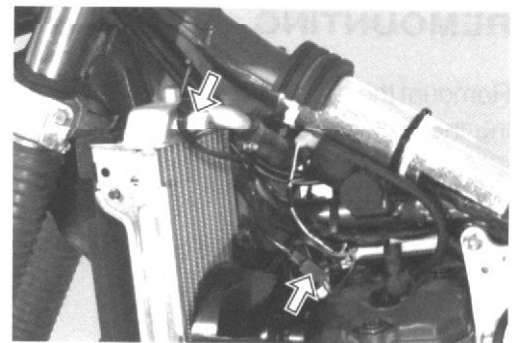
COOLING FAN THERMOSWITCH

The cooling fan is secured behind the radiator by three bolts and is automatically controlled by the thermoswitch. The thermoswitch remains open when the temperature of the engine coolant is low, but closes when the temperature reaches approximately 96°C (205°F) setting the cooling fan in motion.



REMOVAL

- Remove the fuel tank. (☞ 4-2)
- Disconnect the cooling fan thermoswitch coupler and remove the cooling fan thermoswitch.



INSPECTION

Check the operating temperature of the cooling fan thermostatic switch.

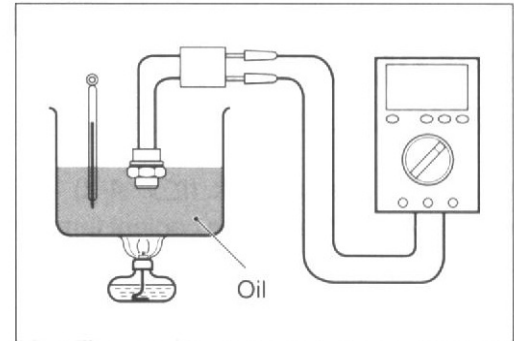
- Connect the multi circuit tester to the cooling fan thermostatic switch.
- Place the cooling fan thermostatic switch into a container of oil.
- Heat the oil and check the temperature on the thermometer when the cooling fan thermostatic switch is operated.

TOOL 09900-25008: Multi circuit tester set

DATA Cooling fan thermostatic switch specification:

OFF → ON: Approximately 96°C (205°F)

ON → OFF: Approximately 91°C (196°F)



INSTALLATION

Install the cooling fan thermostatic switch in the reverse order of removal. Pay attention to the following points:

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

For USA

AH 99000-25030: SUZUKI SUPER GREASE "A"

For the other countries

AH 99000-25010: SUZUKI SUPER GREASE "A"

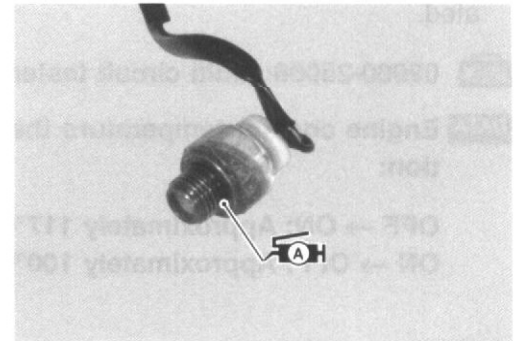
- Tighten the cooling fan thermostatic switch to the specified torque.

T Cooling fan thermostatic switch: 13 N·m (1.3 kgf·m, 9.5 lb-ft)

CAUTION

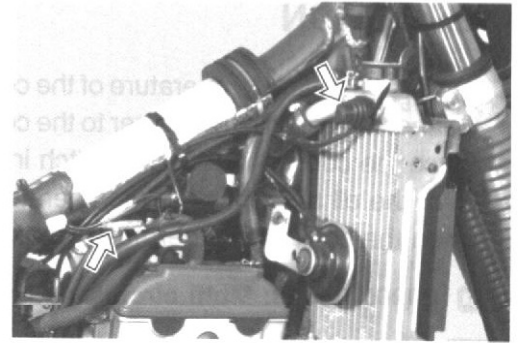
- * Take special care when handling the cooling fan thermostatic switch. Do not subject it to strong blows or allow it to be dropped.
- * Replace the removed O-ring with a new one.

- After installing the cooling fan thermostatic switch, be sure to add engine coolant. (☞ 2-15)



ENGINE COOLANT TEMPERATURE THERMOSWITCH REMOVAL

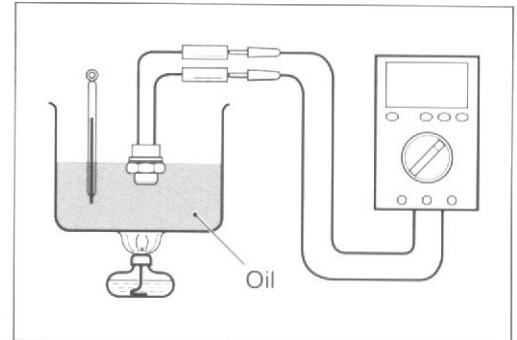
- Remove the fuel tank. (☞ 4-2)
- Disconnect the engine coolant temperature thermoswitch lead wires and remove the engine coolant temperature thermoswitch.



INSPECTION

Check the operating temperature of the engine coolant temperature thermoswitch.

- Connect the multi circuit tester to the engine coolant temperature thermoswitch.
- Place the engine coolant temperature thermoswitch into a container of oil.
- Heat the oil and check the temperature on the thermometer when the engine coolant temperature thermoswitch is operated.



TOOL 09900-25008: Multi circuit tester set

DATA Engine coolant temperature thermoswitch specification:

OFF → ON: Approximately 117°C (243°F)

ON → OFF: Approximately 100°C (212°F)

INSTALLATION

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

- Apply SUZUKI SUPER GREASE “A” to the O-ring.

For USA

AH 99000-25030: SUZUKI SUPER GREASE “A”

For the other countries

AH 99000-25010: SUZUKI SUPER GREASE “A”

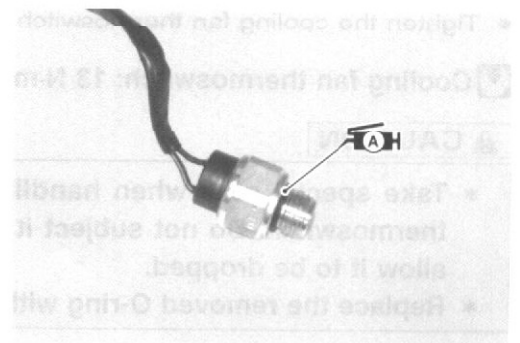
- Tighten the engine coolant temperature thermoswitch to the specified torque.

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

CAUTION

Take special care when handling the engine coolant temperature thermoswitch. Do not subject it to strong blows or allow it to be dropped.

- After installing the engine coolant temperature thermoswitch, be sure to add engine coolant. (☞ 2-15)



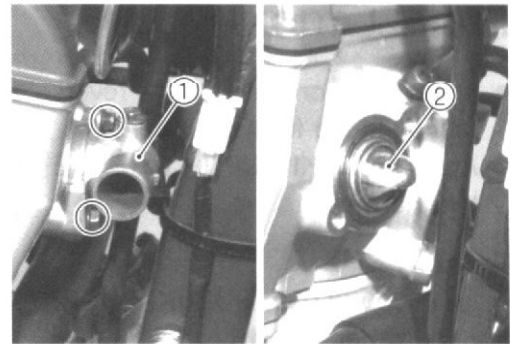
THERMOSTAT REMOVAL

- Drain the engine coolant. (☞ 2-15)
- Remove the right radiator. (☞ 5-6 and 5-7)

⚠ WARNING

- * Do not open the radiator cap when the engine is hot, as you may be injured by escaping hot liquid or vapor.
- * The engine must be cool before servicing the cooling system.
- * Engine coolant may be harmful if swallowed or if it comes in contact with the skin or eyes. If engine coolant gets into the eyes or contacts the skin, flush the eyes or wash the skin thoroughly, with plenty of water. If engine coolant is swallowed, induce vomiting and call a physician immediately.

- Disconnect the thermostat case ① and remove the thermostat ②.

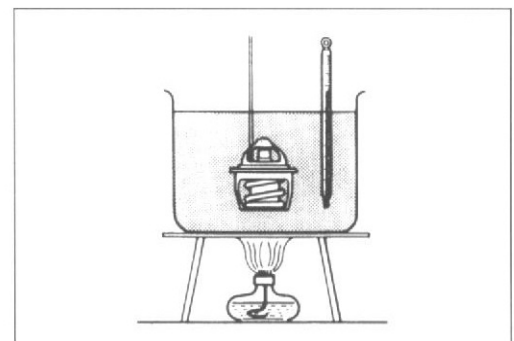
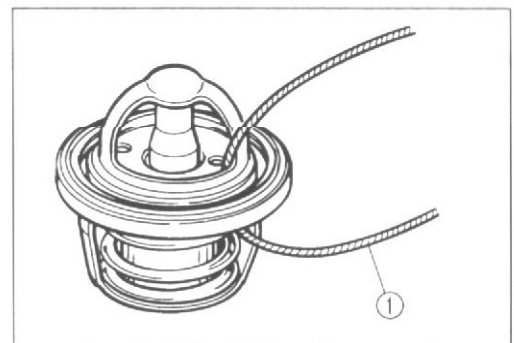


INSPECTION

Inspect the thermostat for cracks or damage. If any damages are found, replace the thermostat with a new one.

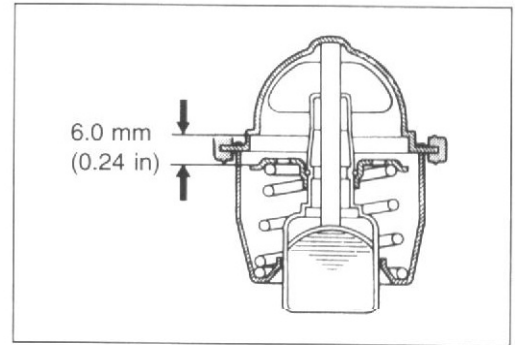
Check the opening temperature of the thermostat valve.

- Pass a string ① between the flange as shown.
- Immerse the thermostat into a container of water and keep it suspended as shown.



- Slowly heat the container and check the temperature on the thermometer when the thermostat valve begins to open.

DATA Thermostat valve opening temperature:
Approximately 75°C (167°F)



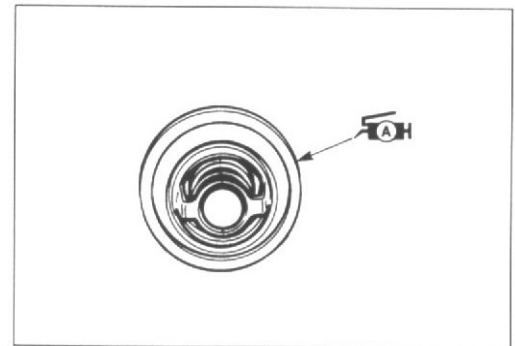
- Continue heating the container until the water temperature is above 90°C (194°F).
- When the water temperature reaches 90°C (194°F), the thermostat valve should have lifted at least 6.0 mm (0.24 in).

DATA Thermostat valve lift: **over 6.0 mm at 90°C**
(over 0.24 in at 194°F)

- If the thermostat is faulty in either of these two checks, replace it.

INSTALLATION

- Install the thermostat in the reverse order of removal. Pay attention to the following points.
- Apply SUZUKI SUPER GREASE "A" to the rubber seal on the thermostat.



For USA

 99000-25030: SUZUKI SUPER GREASE "A"

For the other countries

 99000-25010: SUZUKI SUPER GREASE "A"

- After installing the thermostat, be sure to add engine coolant.
 2-15)

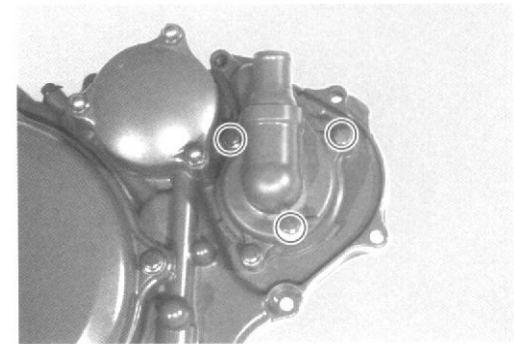
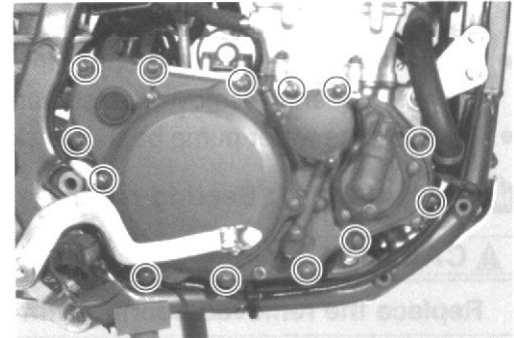
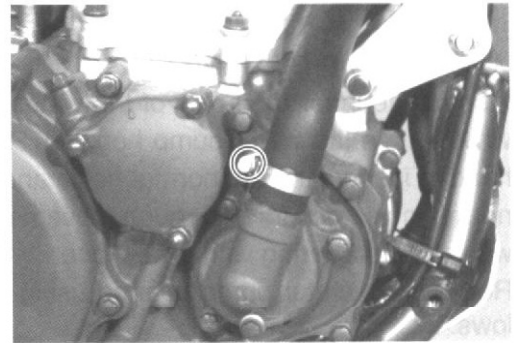
WATER PUMP REMOVAL AND DISASSEMBLY

- Drain the engine coolant. (☞ 2-15)
- Drain the engine oil. (☞ 2-11)

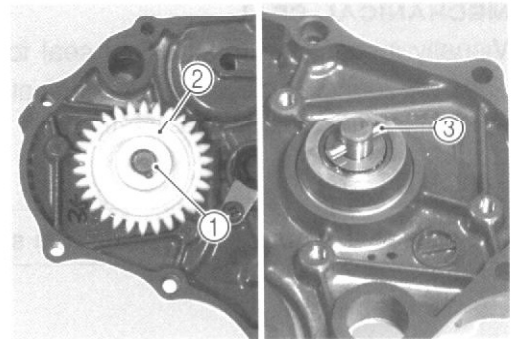
⚠ WARNING

- * Do not open the radiator cap when the engine is hot, as you may be injured by escaping hot liquid or vapor.
- * The engine must be cool before servicing the cooling system.
- * Engine coolant may be harmful if swallowed or if it comes in contact with the skin or eyes. If engine coolant gets into the eyes or contacts the skin, flush the eyes or wash the skin thoroughly, with plenty of water. If engine coolant is swallowed, induce vomiting and call a physician immediately.

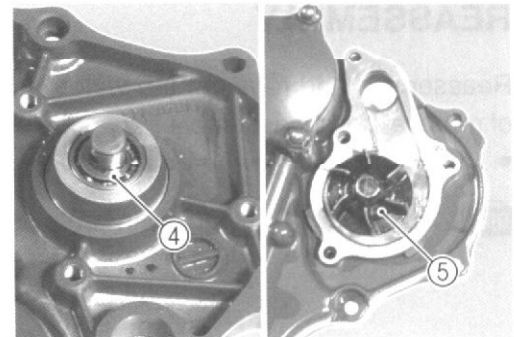
- Disconnect the radiator hose.
- Remove the right crankcase cover.
- Remove the water pump cover.



- Remove the circlip ①, water pump driven gear ② and pin ③.



- Remove the E-ring ④ and impeller ⑤.



INSPECTION

WATER PUMP BEARING

Inspect the inner race play of the water pump bearing by hand while it is in the water pump housing. Rotate the inner race by hand to inspect it for abnormal noise and smooth rotation. If abnormal noise occurs or if rough movement is noted, replace the water pump bearing with a new one.

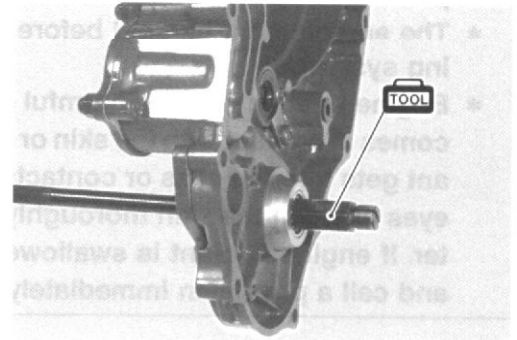
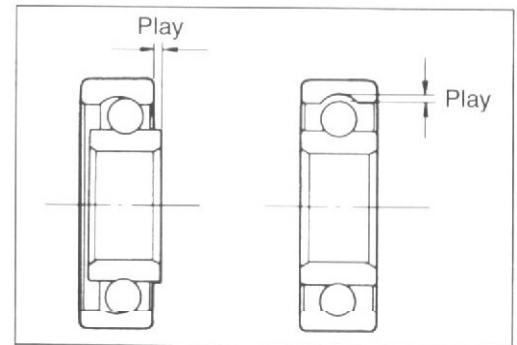
Remove the water pump bearing using the special tool, as follows:

- Insert the bearing remover attachment into the water pump bearing.
- Install the wedge from the opposite side and lock it into the slit of the bearing remover attachment.
- Drive out the water pump bearing by knocking the wedge bar.

 **09941-50111: Bearing remover**

CAUTION

Replace the removed bearing with a new one.



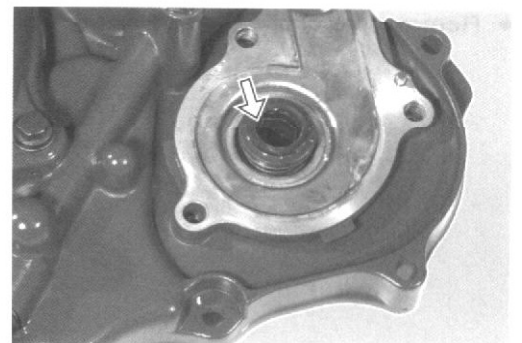
MECHANICAL SEAL

Visually inspect the mechanical seal for damage. If any damages are found, replace the mechanical seal with a new one.

- Remove the mechanical seal.

CAUTION

Replace the removed mechanical seal with a new one.

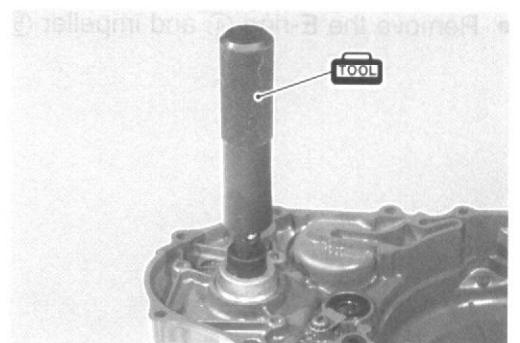


REASSEMBLY

Reassemble and remount the water pump in the reverse order of removal and disassembly. Pay attention to the following points:

- Install the water pump bearings using the special tool.

 **09913-70210: Bearing installer set**



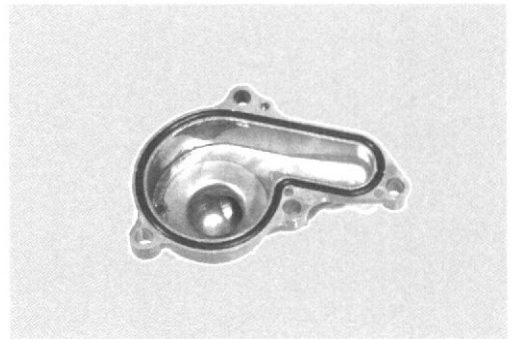
- Apply SUZUKI SUPER GREASE "A" to the new O-ring.

For USA

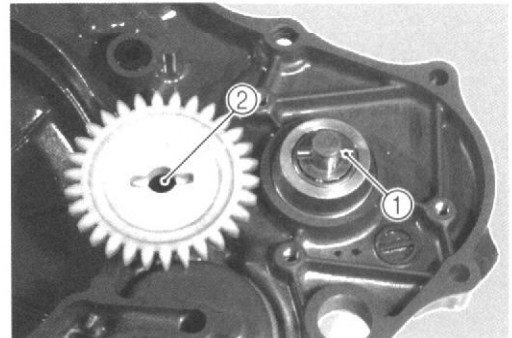
 H99000-25030: SUZUKI SUPER GREASE "A"

For the other countries

 H99000-25010: SUZUKI SUPER GREASE "A"



- When installing the water pump driven gear align the pin ① with the groove ②.
- After installing the water pump, be sure to add engine coolant. (☞ 2-15)



CHASSIS

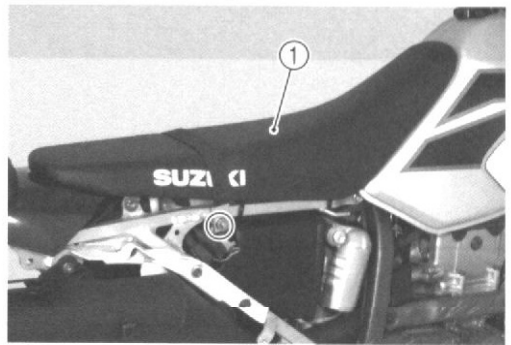
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EXTERIOR PARTS REMOVAL

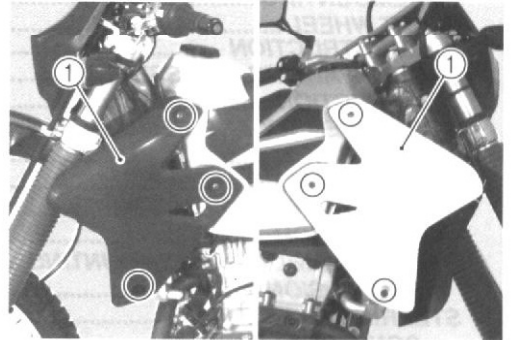
SEAT

- Remove the right frame cover. (☞ 6-2)
- Remove the seat ①.



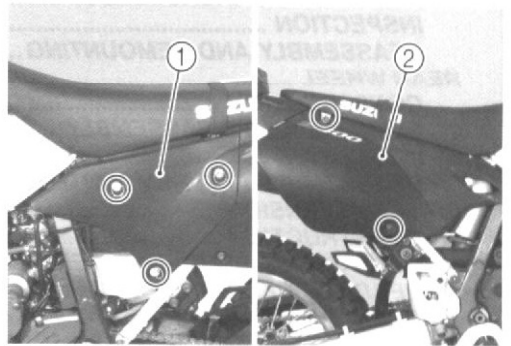
SIDE COVERS

- Remove the left and right side covers ①.



FRAME COVERS

- Remove the left frame cover ① and right frame cover ②.



BATTERY COVER

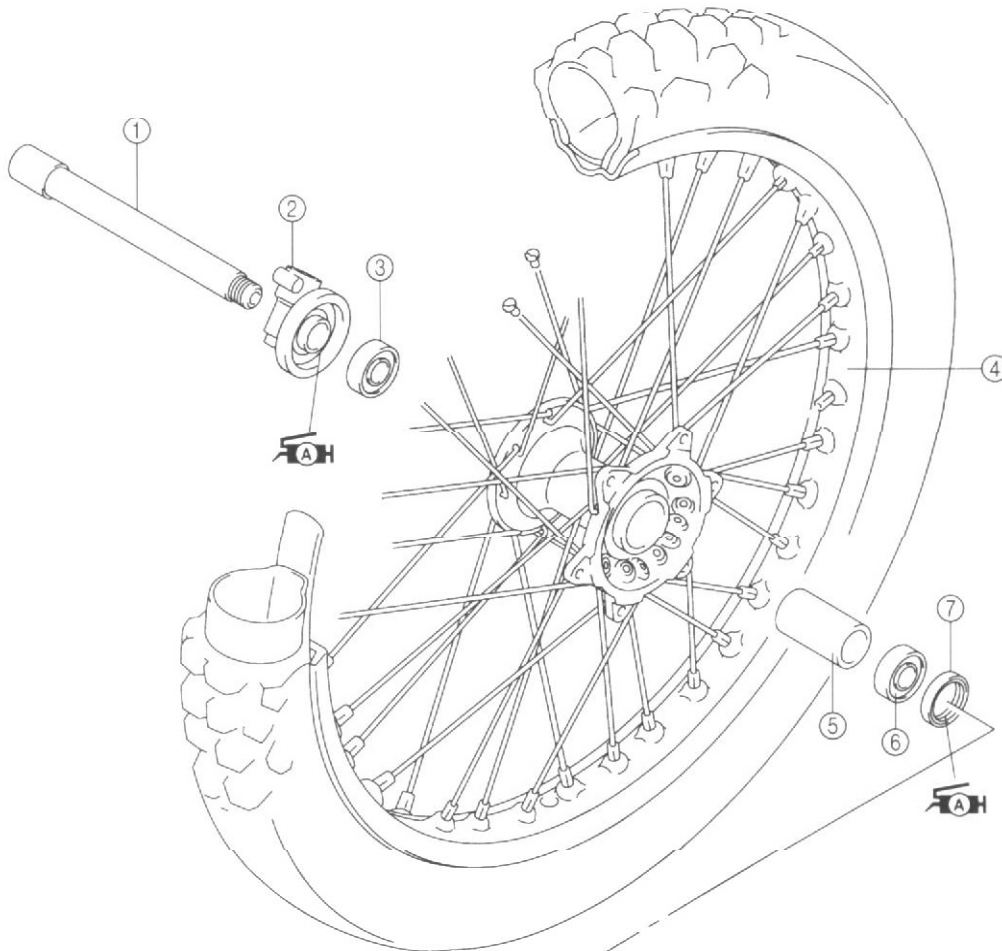
- Remove the battery cover ①.



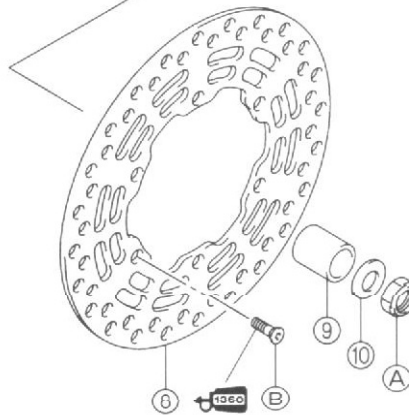
REMountING

Remount the seat, side covers, frame covers, and battery cover in the reverse order of removal.

FRONT WHEEL CONSTRUCTION



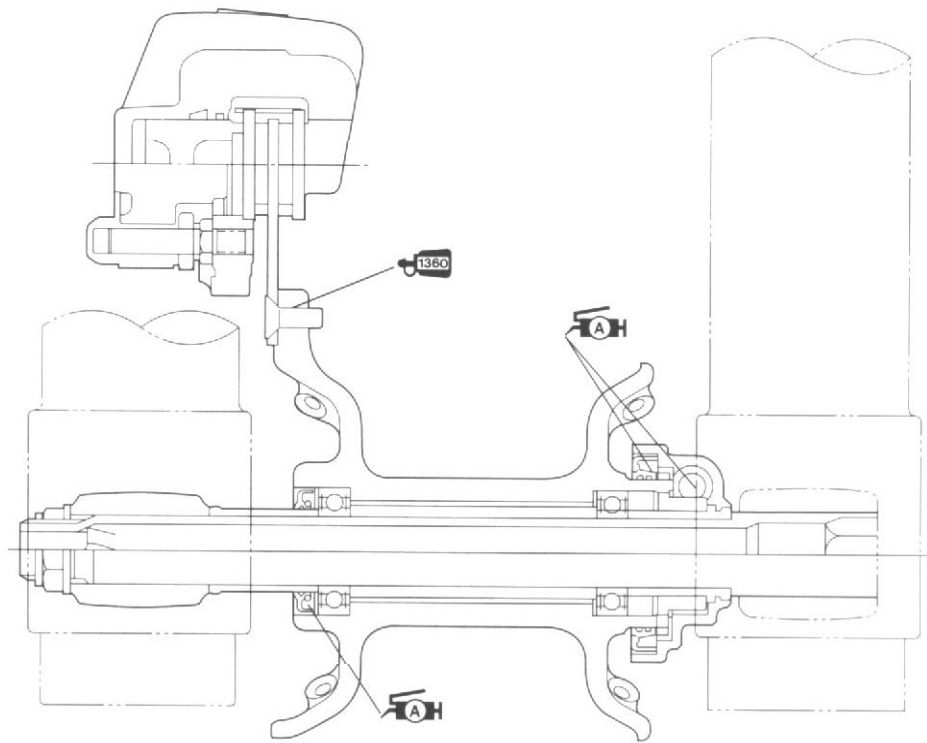
- ① Front axle
- ② Speedometer gearbox
- ③ Bearing (R)
- ④ Front wheel
- ⑤ Spacer
- ⑥ Bearing (L)
- ⑦ Dust seal
- ⑧ Brake disc
- ⑨ Spacer
- ⑩ Washer
- (A) Front axle nut
- (B) Brake disc mounting bolt



| ITEM | N·m | kgf·m | lb·ft |
|------|-----|-------|-------|
| (A) | 42 | 4.2 | 30.5 |
| (B) | 10 | 1.0 | 7.0 |

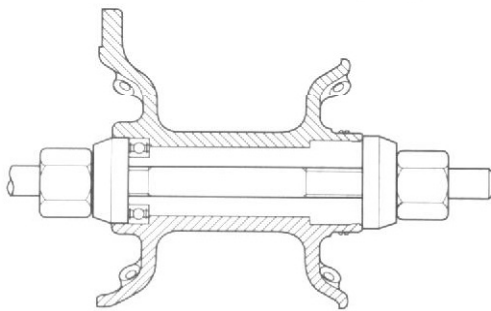
Left ←

→ Right



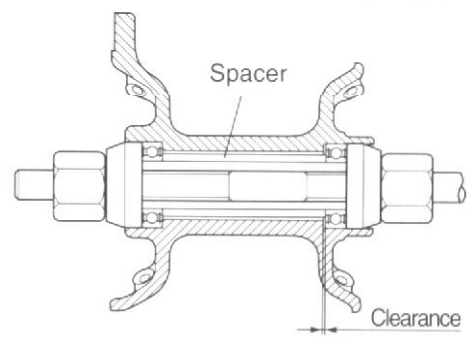
Left ←

→ Right



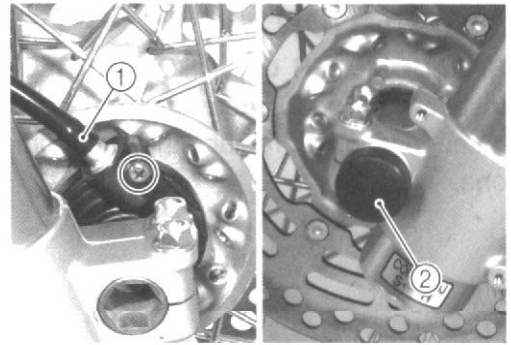
Left ←

→ Right

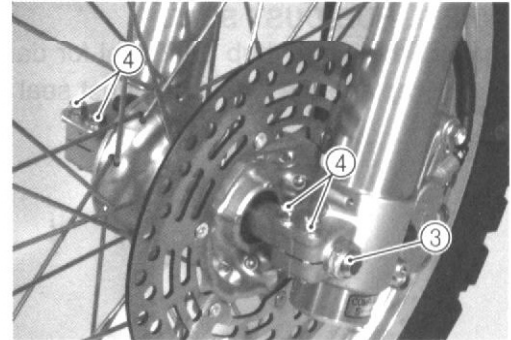


REMOVAL AND DISASSEMBLY

- Disconnect the speedometer cable ① and remove the axle nut cap ②. (Except for E-03, 28, 33)



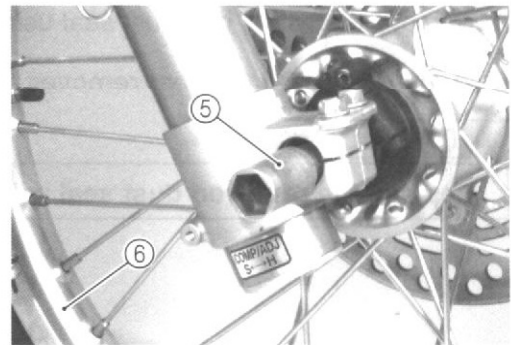
- Remove the front axle nut ③ and loosen the front axle pinch bolts ④.



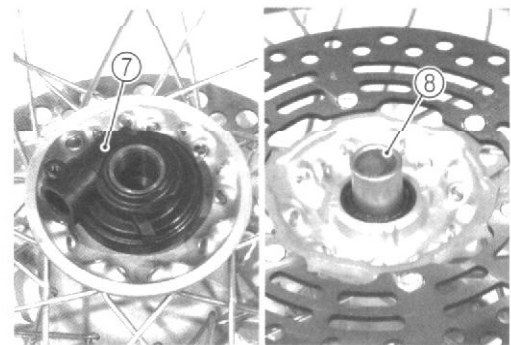
- Support the motorcycle with a jack or wooden block and remove the front axle ⑤ and front wheel ⑥.

⚠ CAUTION

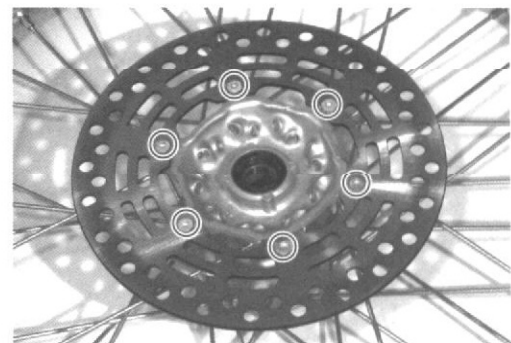
Do not operate the brake lever during or after front wheel removal.



- Remove the speedometer gearbox ⑦ and spacer ⑧.



- Remove the brake disc.



INSPECTION

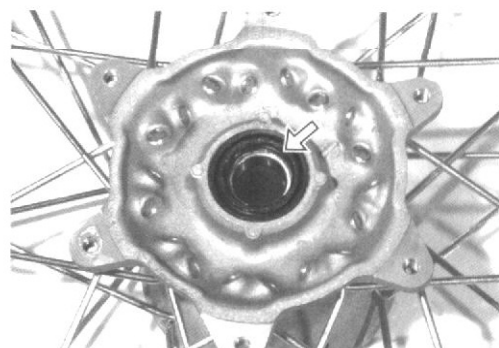
SPEEDOMETER GEARBOX DUST SEAL

Inspect the speedometer gearbox dust seal for damage. If any damage is found, replace the speedometer gearbox with a new one.



WHEEL HUB DUST SEAL

Inspect the wheel hub dust seal for damage. If any damage is found, replace the wheel hub dust seal with a new one.

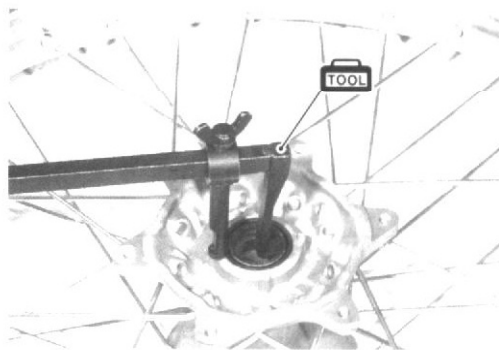


- Remove the wheel hub dust seal using the special tool.

 09913-50121: Oil seal remover

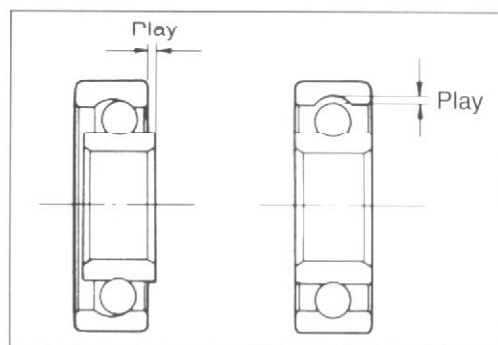
 **CAUTION**

Replace the removed dust seal with a new one.



WHEEL BEARINGS

Inspect the play of the wheel bearings by hand while they are in the wheel. Rotate the inner race by hand to inspect for abnormal noise and smooth rotation. If any abnormal noise occurs, or rough movement is noted, replace the wheel bearings with new ones.



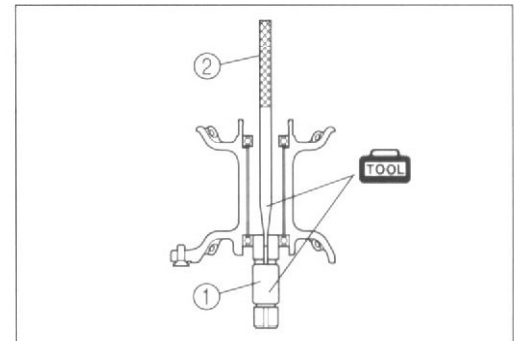
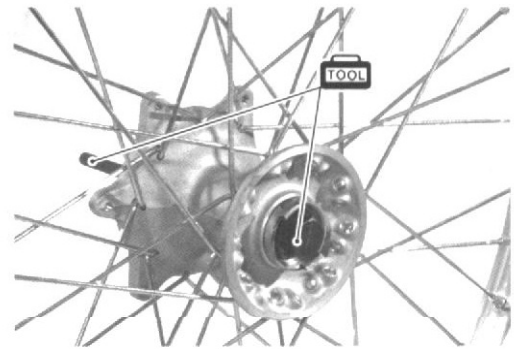
Remove the wheel bearings as follows:

- Remove the wheel hub dust seal. (☞ 6-6)
- Insert the bearing remover attachment ① into the wheel bearing.
- Insert the wedge bar ② from the opposite side and lock it into the slit of the bearing remover attachment.
- Drive out the wheel bearing by striking the wedge bar.

TOOL 09941-50111: Bearing remover

CAUTION

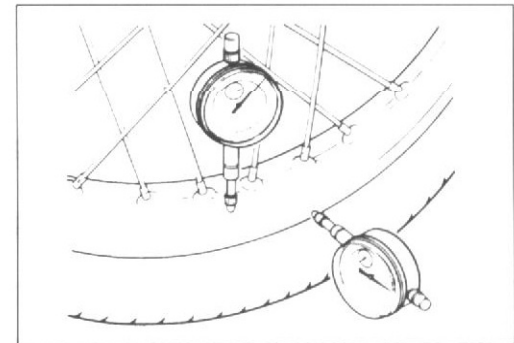
Replace the removed bearings with new ones.



FRONT WHEEL

Make sure that the wheel runout (axial and radial) does not exceed the service limit when checked as shown. An excessive amount of runout is usually due to worn or loose wheel bearings and can be corrected by replacing the bearings. If bearing replacement fails to reduce the runout, replace the wheel with a new one.

DATA Wheel rim runout (axial and radial)
Service Limit: 2.0 mm (0.08 in)

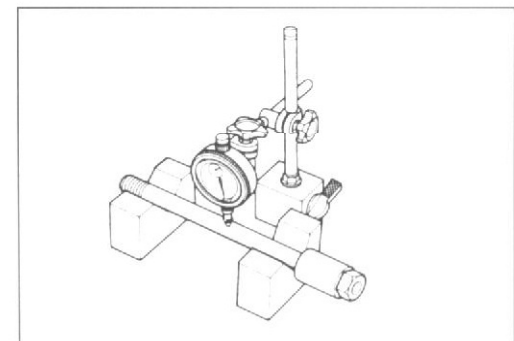


FRONT AXLE

Measure the front axle runout using the dial gauge. If the runout exceeds the service limit, replace the front axle with a new one.

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

DATA Wheel axle runout
Service Limit: 0.25 mm (0.010 in)



- TIRE** ☞ 2-21 and 2-22
- SPOKE NIPPLES** ☞ 2-22

REASSEMBLY AND REMOUNTING

Reassemble and remount the front wheel in the reverse order of removal and disassembly. Pay special attention to the following points:

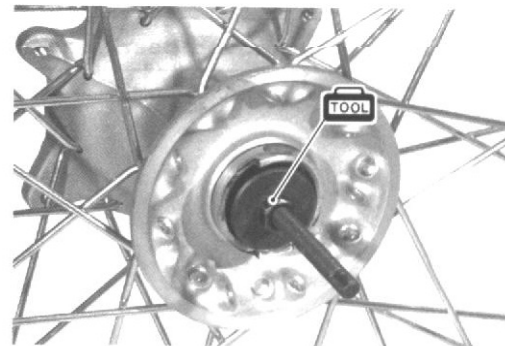
WHEEL BEARINGS

- Install the wheel bearings using the special tool.

 09924-84521: Bearing installer set

CAUTION

First, install the left wheel bearing, and then install the right wheel bearing. ( 6-4)



WHEEL HUB DUST SEAL

- Apply SUZUKI SUPER GREASE "A" to the lip of dust seal.

For USA

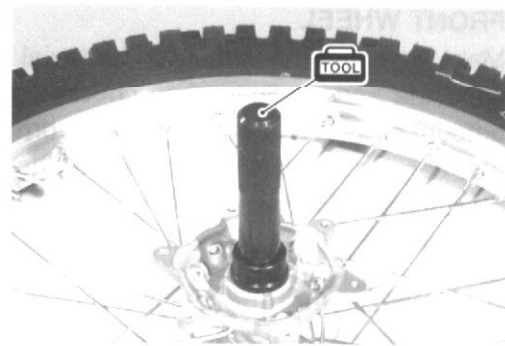
 99000-25030: SUZUKI SUPER GREASE "A"

For the other countries

 99000-25010: SUZUKI SUPER GREASE "A"

- Install the wheel hub dust seal using the special tool.

 09913-70210: Bearing installer set

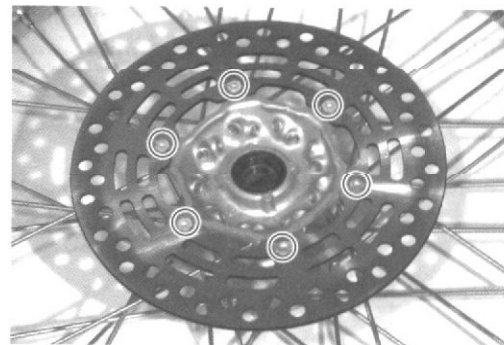


BRAKE DISC

- Make sure that the brake disc is clean and free of any grease. Apply THREAD LOCK SUPER "1360" to the brake disc mounting bolts, and then tighten them to the specified torque.

 99000-32130: THREAD LOCK SUPER "1360"

 Brake disc mounting bolt: 10 N·m (1.0 kgf·m, 7.0 lb-ft)



SPEEDOMETER GEARBOX

- Apply SUZUKI SUPER GREASE “A” to the speedometer gearbox dust seal.

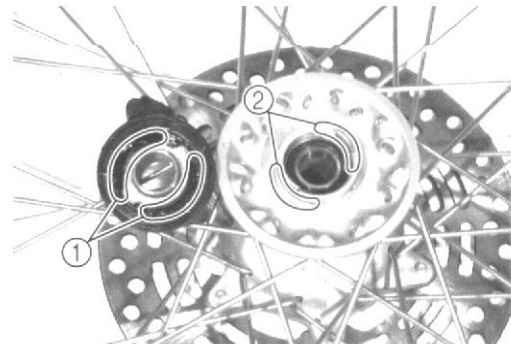
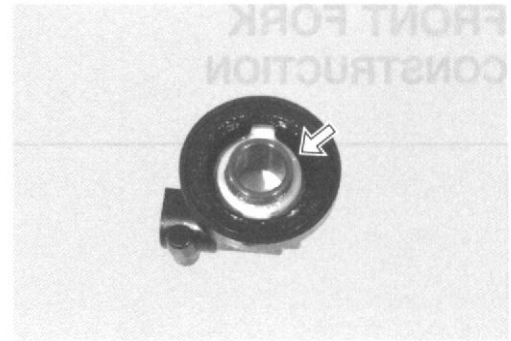
For USA

 99000-25030: SUZUKI SUPER GREASE “A”

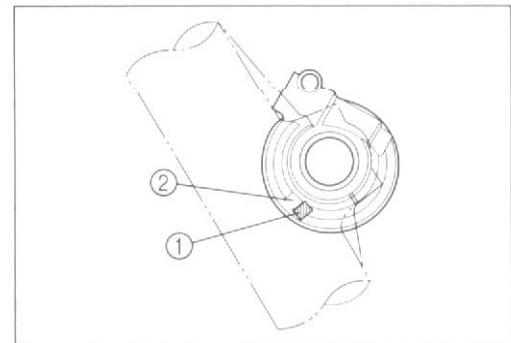
For the other countries

 99000-25010: SUZUKI SUPER GREASE “A”

- Align the grooves ① on the speedometer gearbox with the lugs ② on the wheel hub.

**FRONT WHEEL**

- Make sure that the front fork stopper ① and the speedometer gearbox stopper ② are installed as shown.



- Tighten the front axle nut to 20 N·m (2.0 kgf-m, 14.5 lb-ft) by holding the front axle using the special tools.

 **09940-34520: T handle**
09940-34581: Attachment F

- Tighten the front axle pinch bolts ③ to the specified torque.

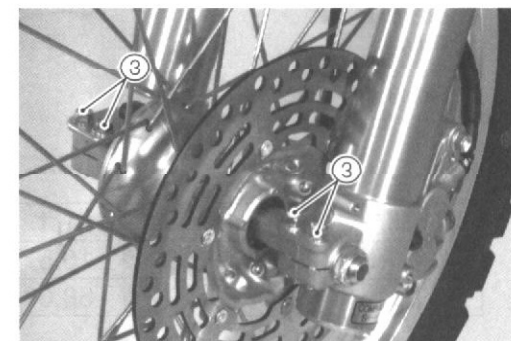
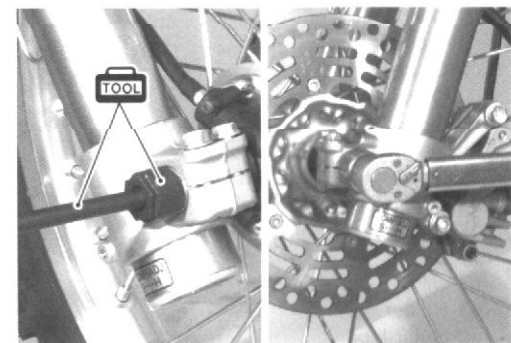
 **Front axle pinch bolt: 18 N·m (1.8 kgf-m, 13.0 lb-ft)**

- Tighten the front axle nut to the specified torque, after tightening the axle pinch bolts.

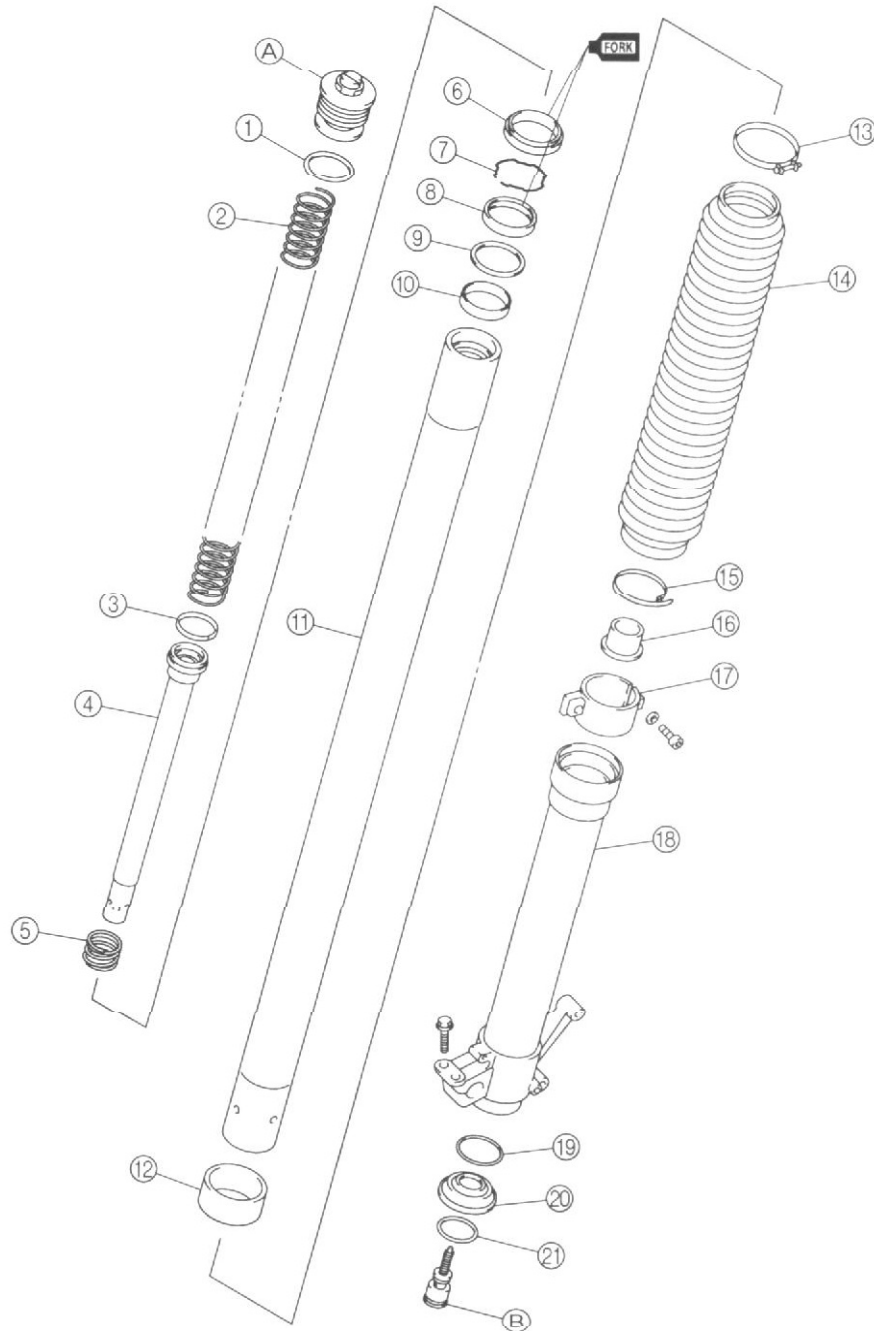
 **Front axle nut: 42 N·m (4.2 kgf-m, 30.5 lb-ft)**

NOTE:

After remounting the front wheel, pump the brake lever a few times to check for proper brake operation.



FRONT FORK CONSTRUCTION



- ① O-ring
- ② Fork spring
- ③ Damper rod ring
- ④ Damper rod
- ⑤ Rebound spring
- ⑥ Dust seal
- ⑦ Stopper ring
- ⑧ Oil seal
- ⑨ Oil seal retainer
- ⑩ Inner tube antifriction metal
- ⑪ Inner tube
- ⑫ Outer tube antifriction metal
- ⑬ Clamp
- ⑭ Boot
- ⑮ Clamp
- ⑯ Oil lock piece
- ⑰ Holder
- ⑱ Outer tube
- ⑲ O-ring
- ⑳ End plate
- ㉑ O-ring

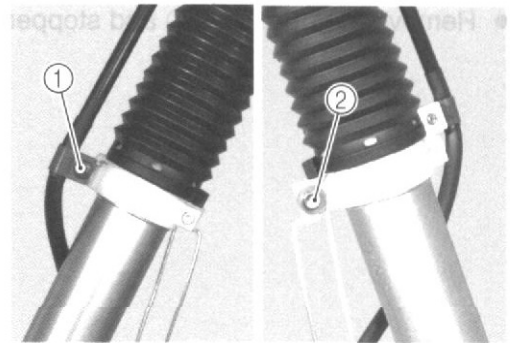
- Ⓐ Front fork cap bolt
- Ⓑ Front fork damper rod bolt



| ITEM | N·m | kgf·m | lb·ft |
|------|-----|-------|-------|
| Ⓐ | 23 | 2.3 | 16.5 |
| Ⓑ | 80 | 8.0 | 58.0 |

REMOVAL AND DISASSEMBLY

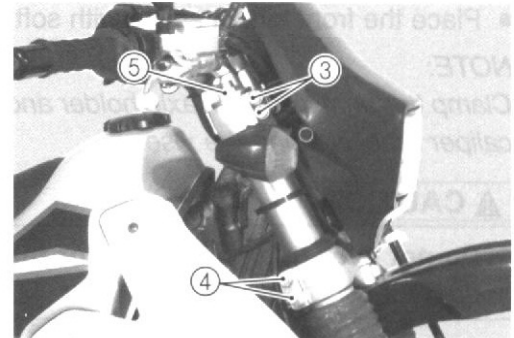
- Remove the front wheel. (☞ 6-5)
- Remove the front brake caliper. (☞ 6-43)
- Remove the brake hose clamp ① and speedometer cable guide ②.



- Remove the front fork after loosening the front fork upper clamp bolts ③ and lower clamp bolts ④.

NOTE:

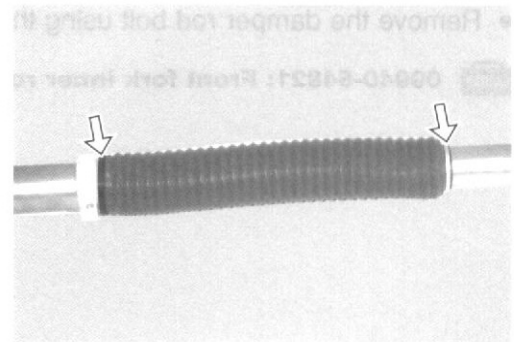
Slightly loosen the front fork cap bolt ⑤ to facilitate later disassembly.



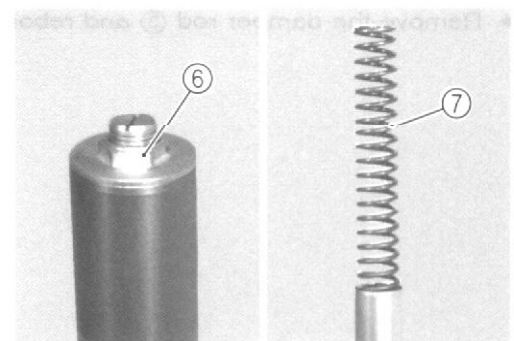
- Remove the boot.

CAUTION

Replace the removed lower boot clamp with a new one.



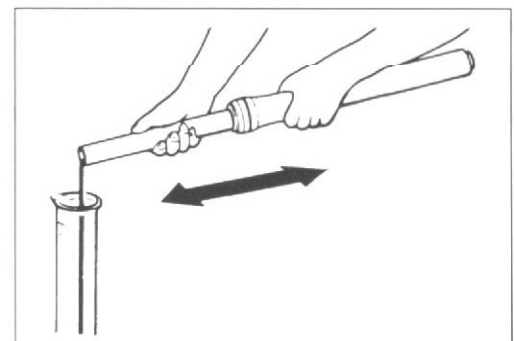
- Remove the cap bolt ⑥ and fork spring ⑦.



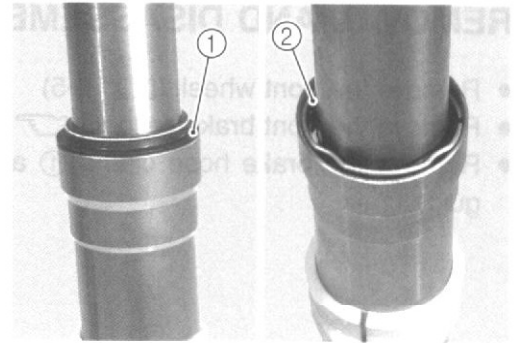
- Invert the fork and stroke it several times to drain out the fork oil.

NOTE:

Hold the fork inverted for a few minutes to drain the oil.



- Remove the dust seal ① and stopper ring ②.



- Place the front fork in a vise with soft jaws.

NOTE:

Clamp the right front fork axle holder and the left front fork brake caliper bracket using the vise.

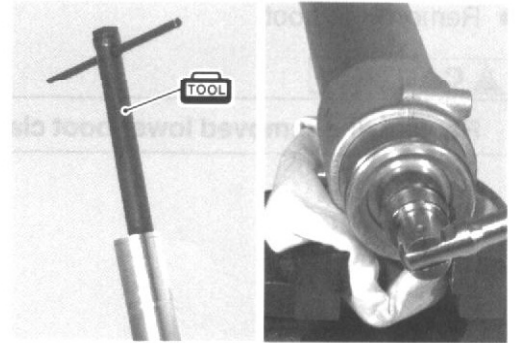
CAUTION

Do not over tighten the vise or the outer tube will be damaged.

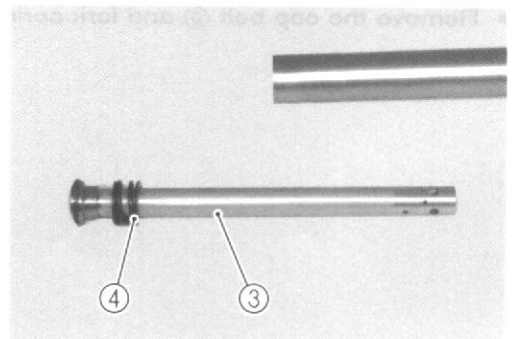


- Remove the damper rod bolt using the special tool.

TOOL 09940-54821: Front fork inner rod holder



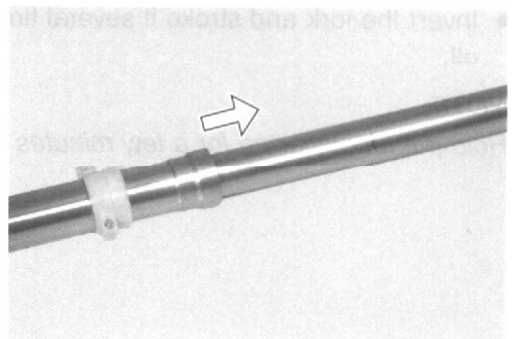
- Remove the damper rod ③ and rebound spring ④.



- Slowly pull out the inner tube.

NOTE:

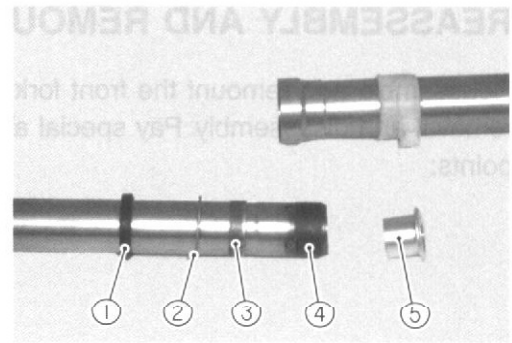
Be careful not to damage the inner tube.



- Remove the oil seal ①, oil seal retainer ②, outer tube antifriction metal ③, inner tube antifriction metal ④, and oil lock piece ⑤.

⚠ CAUTION

The outer and inner tube's antifriction metals must be replaced along with the oil seal and dust seal when assembling the front fork.

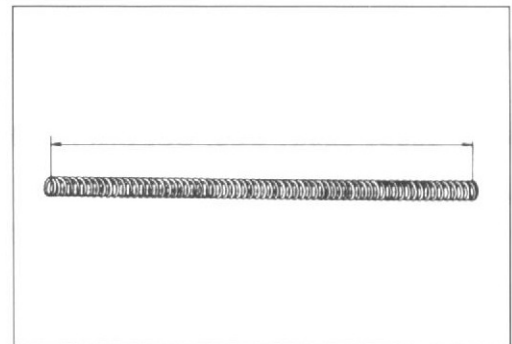


INSPECTION

FORK SPRING

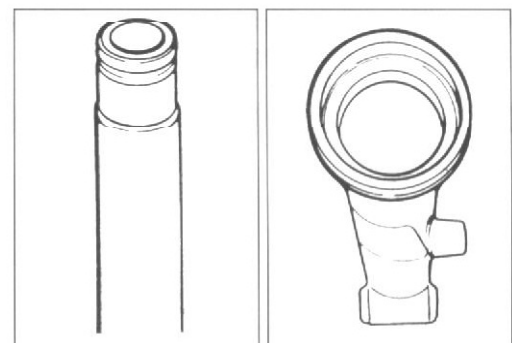
Measure the fork spring free length. If the fork spring free length is shorter than the service limit, replace the fork spring with a new one.

DATA Front fork spring free length
Service Limit: 561 mm (22.1 in)



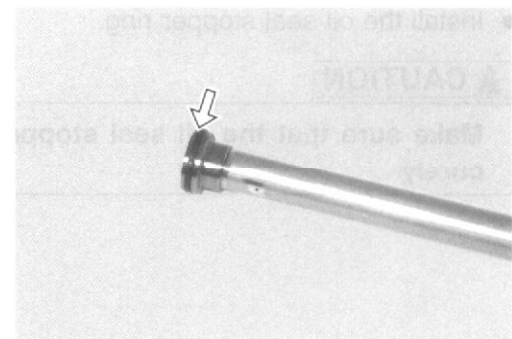
INNER AND OUTER TUBE

Inspect the inner tube sliding surface and outer tube sliding surface for any scuffing or damage. If any damages are found, replace the inner tube and outer tube with new ones.



DAMPER ROD RING

Inspect the damper rod ring for wear or damage. If any damages are found, replace the fork cylinder ring with a new one.



REASSEMBLY AND REMOUNTING

Reassemble and remount the front fork in the reverse order of removal and disassembly. Pay special attention to the following points:

ANTIFRICTION METALS, OIL SEAL, AND DUST SEAL

- Hold the inner tube vertically, clean the metal groove, and install the inner tube antifriction metal by hand.

⚠ CAUTION

- * Do not damage the Teflon coated surface of the inner tube antifriction metal when mounting the inner tube.
- * Apply fork oil to the inner and outer tube antifriction metals.

- Apply front fork oil to the lip of oil seal lightly before installing it.

99000-99001-SS5: SUZUKI FORK OIL SS-05

- Install the oil lock piece ①, outer tube antifriction metal ②, oil seal retainer ③, and oil seal ④ onto the inner tube.

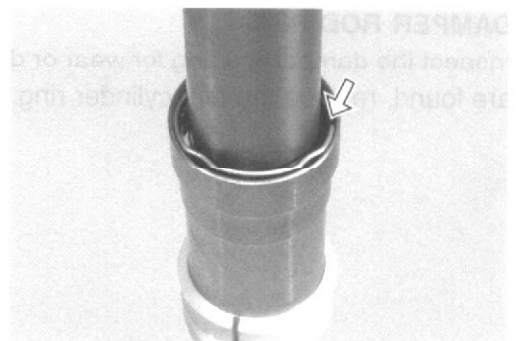
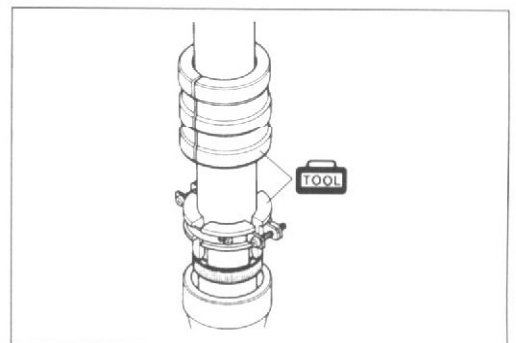
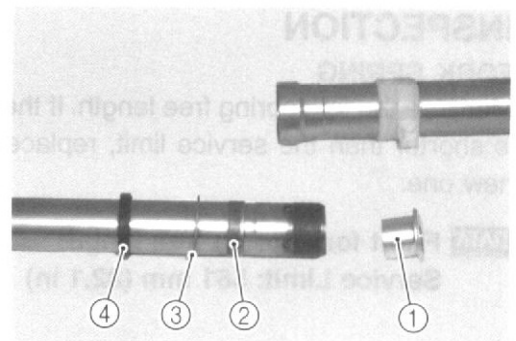
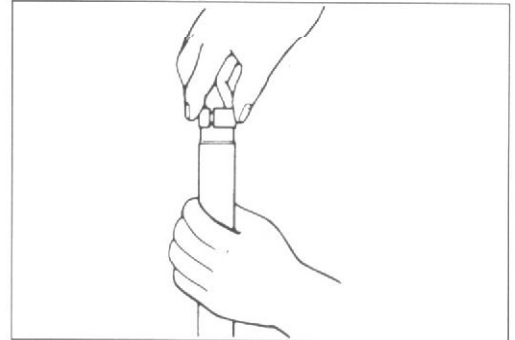
- Insert the inner tube into the outer tube and install the oil seal using the special tool.

09940-52861: Front fork oil seal installer set

- Install the oil seal stopper ring.

⚠ CAUTION

Make sure that the oil seal stopper ring is fitted securely.



DAMPER ROD BOLT

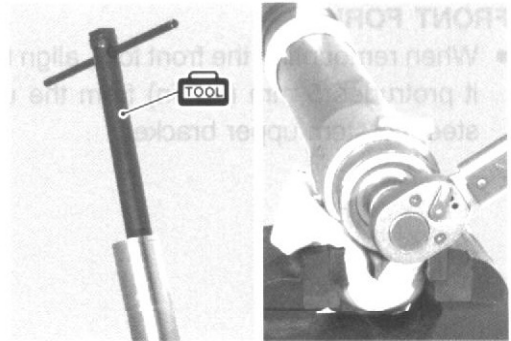
- Tighten the front fork damper rod bolt to the specified torque using the special tool.

TOOL 09940-54821: Front fork inner rod holder

FRONT FORK Frant fork damper rod bolt: 80 N·m (8.0 kgf·m, 58.0 lb-ft)

CAUTION

Use a new O-ring to prevent oil leakage.

**FORK OIL**

- Place the front fork vertically without the spring.
- Pour the specified fork oil into the inner tube.

FORK 99000-99001-SS5: SUZUKI FORK OIL SS-05

DATA Standard fork oil capacity (each leg):
709 ml (24.0 US oz, 25.0 Imp oz)

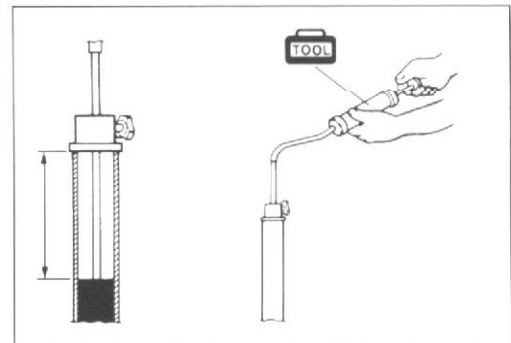
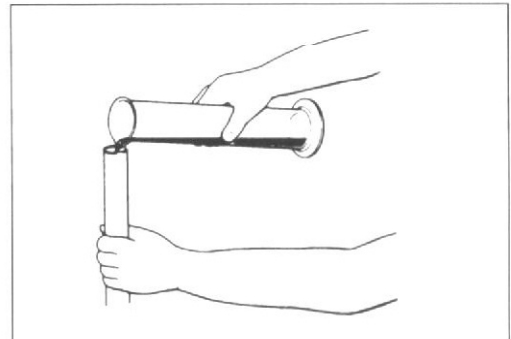
- Move the inner tube slowly several times.
- Hold the front fork in a vertical position and adjust the fork oil level using the special tool.

TOOL 09943-74111: Fork oil level gauge

DATA Fork oil level
Standard: 165 mm (6.5 in)

NOTE:

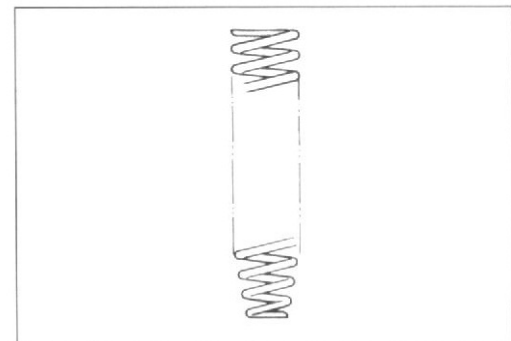
Before adjusting the oil level, remove the fork spring and compress the inner tube fully.

**FORK SPRING**

- Install the fork spring.

NOTE:

The end of the fork spring with the smaller inside diameter should be at the bottom of the front fork.

**CAP BOLT**

- Install the cap bolt.

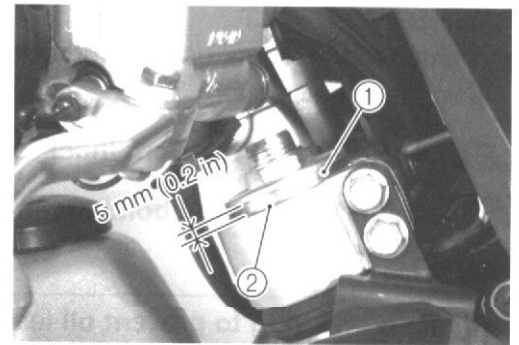
NOTE:

Before installing the cap bolt turn the spring adjuster to the softest position.



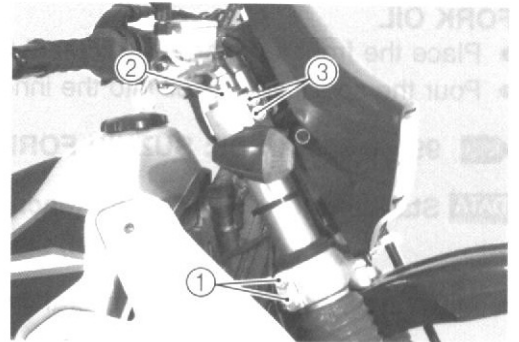
FRONT FORK

- When remounting the front fork, align the inner tube ① so that it protrudes 5 mm (0.2 in) from the upper surface ② of the steering stem upper bracket.



- Tighten the front fork lower clamp bolts ①, front fork cap bolt ②, and front fork upper clamp bolts ③ to the specified torque.

- 🔧 **Front fork lower clamp bolt: 32 N·m (3.2 kgf-m, 23.0 lb-ft)**
Front fork upper clamp bolt: 30 N·m (3.0 kgf-m, 21.5 lb-ft)
Front fork cap bolt: 23 N·m (2.3 kgf-m, 16.5 lb-ft)



FRONT WHEEL 🛞 6-9

NOTE:

Before tightening the front axle nut and front axle pinch bolts, move the front fork up and down four or five times.



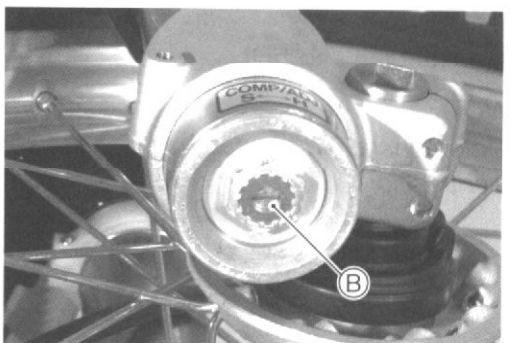
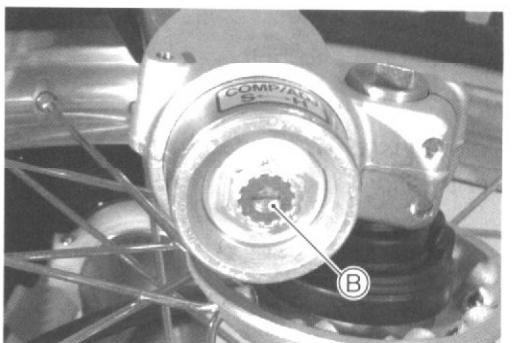
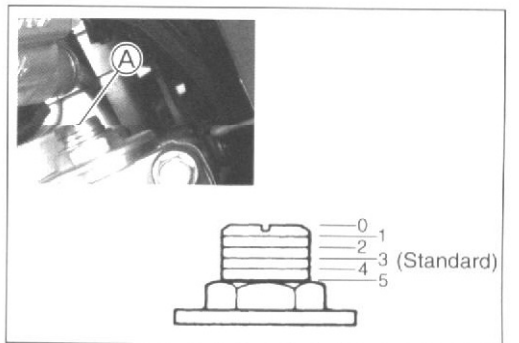
SUSPENSION SETTING

After installing the front fork, adjust the fork spring and compression damping force as follows.

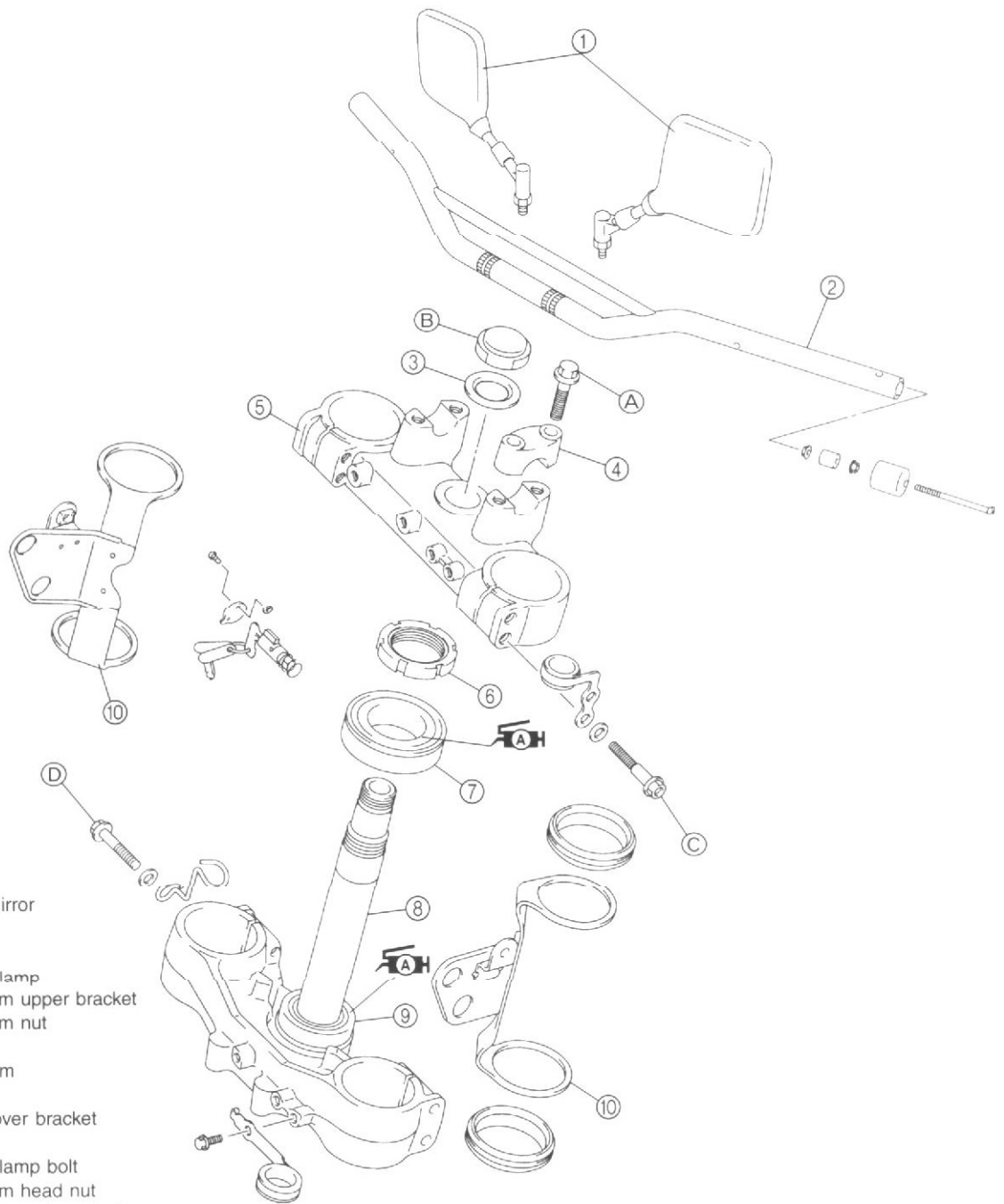
Fully turn the compression damping force adjuster clockwise to the hard setting position, and then turn it out to the standard setting position.

DATA Standard setting position

- Front fork spring pre-load adjuster ①: 3rd groove from top
- Compression damping force adjuster ②: 7 clicks out



STEERING CONSTRUCTION



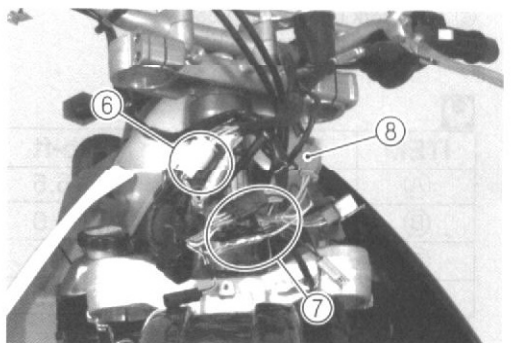
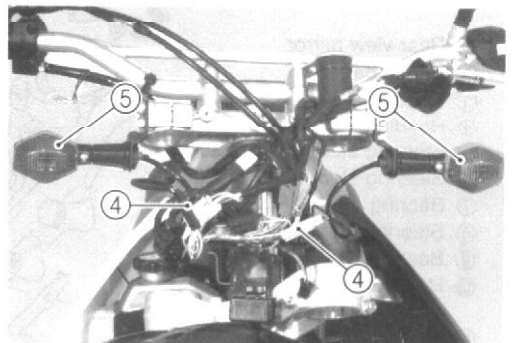
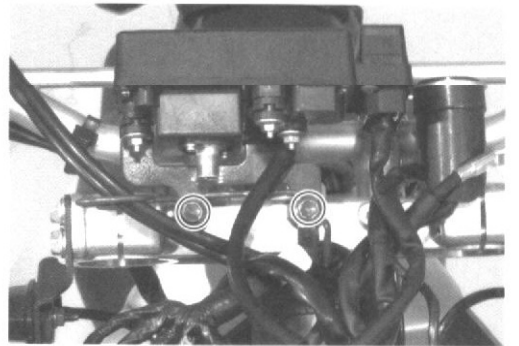
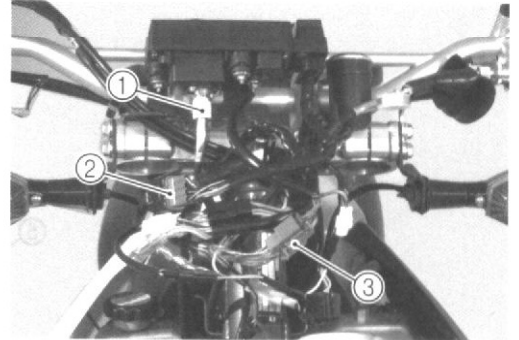
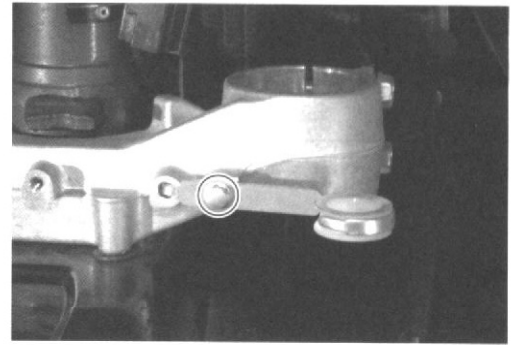
- ① Rear view mirror
 - ② Handlebar
 - ③ Washer
 - ④ Handlebar clamp
 - ⑤ Steering stem upper bracket
 - ⑥ Steering stem nut
 - ⑦ Bearing
 - ⑧ Steering stem
 - ⑨ Bearing
 - ⑩ Headlight cover bracket
- A Handlebar clamp bolt
 - B Steering stem head nut
 - C Front fork upper clamp bolt
 - D Front fork lower clamp bolt



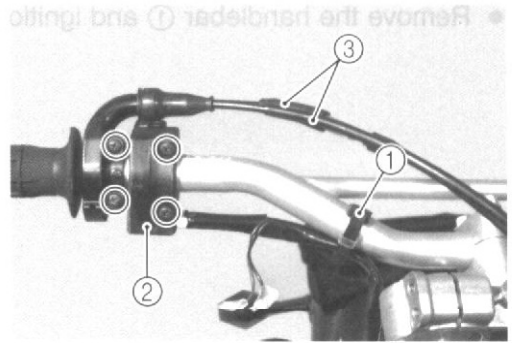
| ITEM | N-m | kgf-m | lb-ft |
|------|-----|-------|-------|
| (A) | 23 | 2.3 | 16.5 |
| (B) | 90 | 9.0 | 65.0 |
| (C) | 30 | 3.0 | 21.5 |
| (D) | 32 | 3.2 | 23.0 |

REMOVAL AND DISASSEMBLY

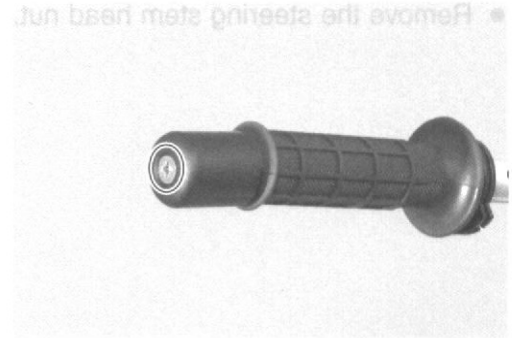
- Remove the front fork. (☞ 6-11)
 - Remove the master cylinder assembly. (☞ 6-47)
 - Remove the headlight assembly. (☞ 7-29)
 - Remove the front brake hose guide bolt.
-
- Disconnect the speedometer cable ①, indicator lights coupler ②, and speedometer coupler ③.
-
- Remove the speedometer assembly.
-
- Disconnect the left and right turn signal light couplers ④ and remove the left and right turn signal light ⑤.
-
- Disconnect the left handlebar switch lead wire and coupler ⑥, right handlebar switch lead wire and coupler ⑦, and ignition switch coupler ⑧.



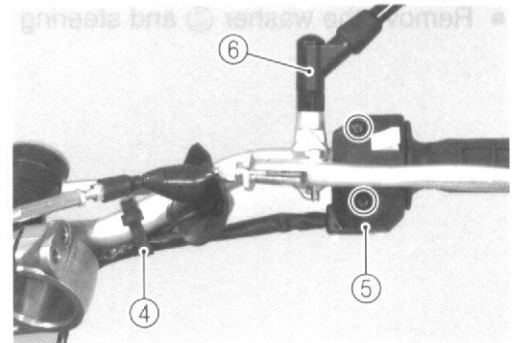
- Remove the clamp ①, right handlebar switch ②, and throttle cables ③.



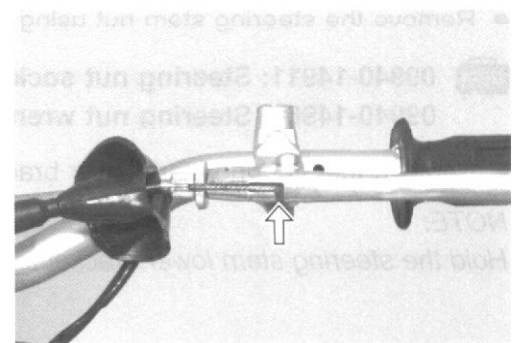
- Remove the throttle grip.



- Remove the clamp ④, left handlebar switch ⑤ and left rear view mirror ⑥.



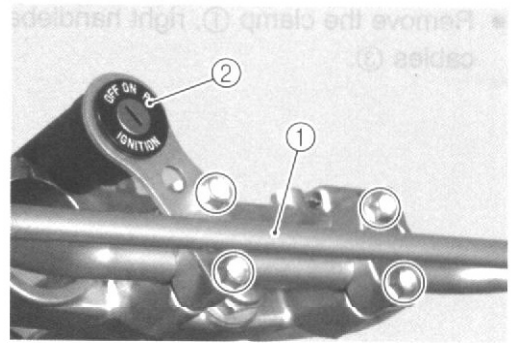
- Disconnect the clutch cable.



- Remove the front fender.



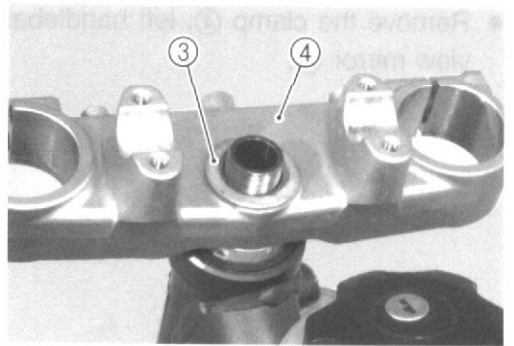
- Remove the handlebar ① and ignition switch ②.



- Remove the steering stem head nut.



- Remove the washer ③ and steering stem upper bracket ④.



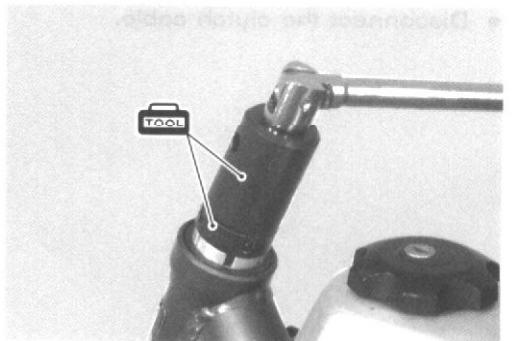
- Remove the steering stem nut using the special tools.

-  **09940-14911: Steering nut socket wrench**
 - 09940-14960: Steering nut wrench socket**

- Remove the steering stem lower bracket.

NOTE:

Hold the steering stem lower bracket to prevent it from falling.



- Remove the steering stem upper bearing.



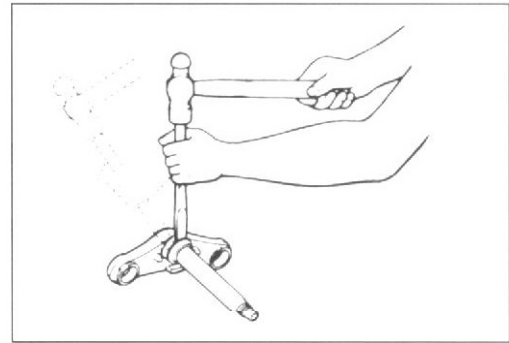
INSPECTION

Inspect the removed parts for the following abnormalities. If any damages are found, replace the respective part with a new one.

- * Steering race wear and brinelling.
- * Bearing wear or damage.
- * Abnormal bearing noise.
- * Distortion of steering stem or handlebar.
- Remove the steering stem lower bearing using a chisel.

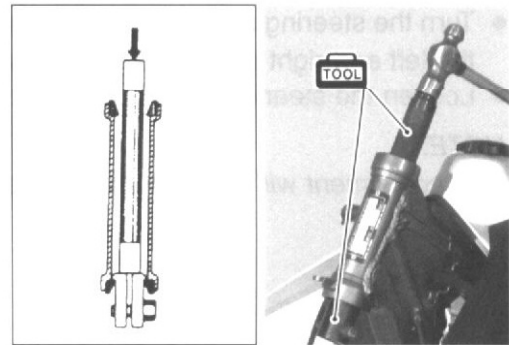
CAUTION

Replace the removed bearing with a new one.



- Drive out the steering stem upper and lower bearing races using the special tools.

- TOOL** 09941-54911: Bearing outer race remover
- 09941-74910: Bearing installer



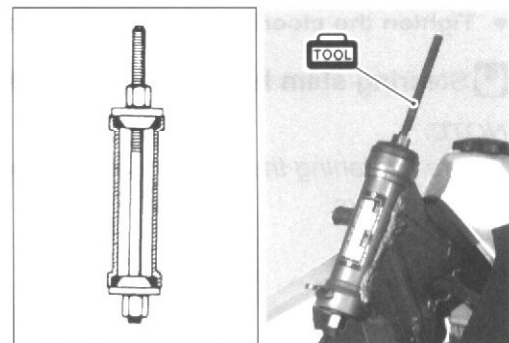
REASSEMBLY AND REMOUNTING

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

BEARING RACES

- Press in the upper and lower bearing races using the special tools.

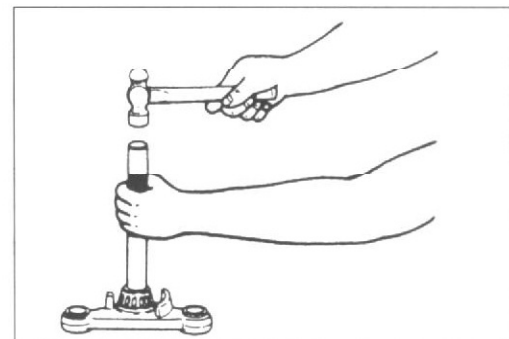
- TOOL** 09924-84510: Bearing installer set
- 09941-34513: Steering race installer



BEARINGS

- Press in the steering stem lower bearing using the special tool.

- TOOL** 09925-18010: Steering bearing installer



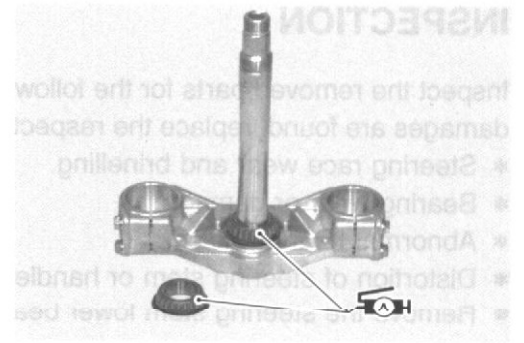
- Apply SUZUKI SUPER GREASE “A” to the steering stem upper and lower bearings.

For USA

 99000-25030: SUZUKI SUPER GREASE “A”


For the other countries

 99000-25010: SUZUKI SUPER GREASE “A”

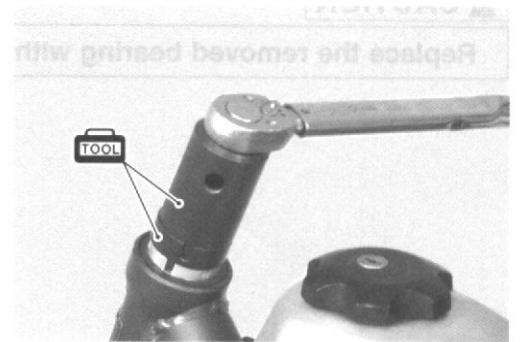


STEERING STEM

- Tighten the steering stem nut to the specified torque using the special tools.

 09940-14911: Steering nut socket wrench
09940-14960: Steering nut wrench socket

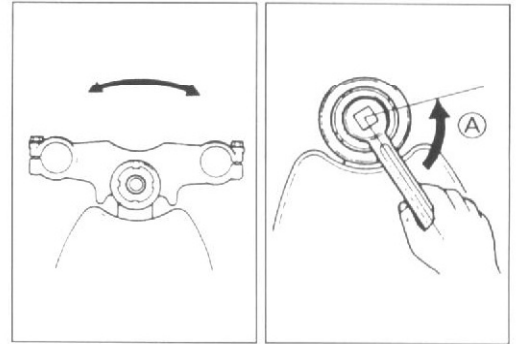
 **Steering stem nut: 45 N·m (4.5 kgf·m, 32.5 lb-ft)**



- Turn the steering stem lower bracket about five or six times to the left and right so that the bearings seat properly.
- Loosen the steering stem nut 1/4-1/2 of a turn (A).

NOTE:

This adjustment will vary from motorcycle to motorcycle.



- Tighten the steering stem head nut to the specified torque.

 **Steering stem head nut: 90 N·m (9.0 kgf·m, 65.0 lb-ft)**

NOTE:

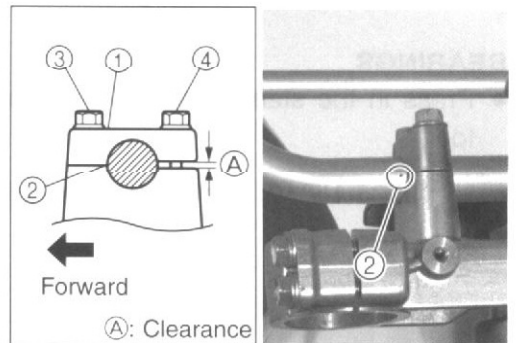
Before tightening the steering stem head nut, temporarily install the front forks.



HANDLEBAR

When setting the handlebar clamp to the handlebar holder of the steering upper bracket, face the punched mark ① on its clamp forward.

- Set the handlebar to match its punched mark ② to the mating face of the handlebar clamp.
- First, tighten the handlebar clamp bolts ③ to the half of specified torque, and then tighten the handlebar clamp bolts ③ and ④ to the specified torque.



 **Handlebar clamp bolt: 23 N·m (2.3 kgf·m, 16.5 lb-ft)**

CLUTCH CABLE AND THROTTLE CABLES

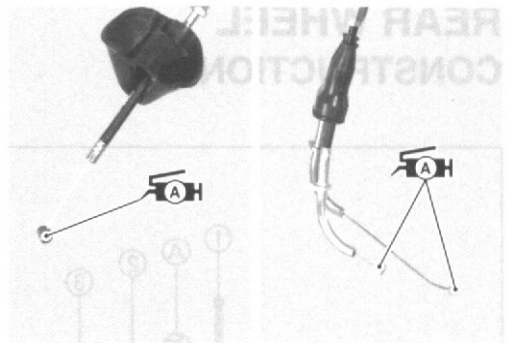
- Apply SUZUKI SUPER GREASE “A” to the end of clutch cable and throttle cables.

For USA

 99000-25030: SUZUKI SUPER GREASE “A”

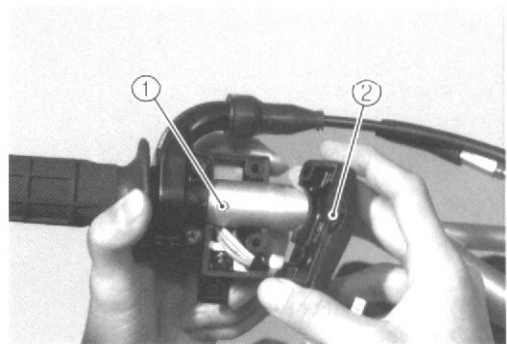
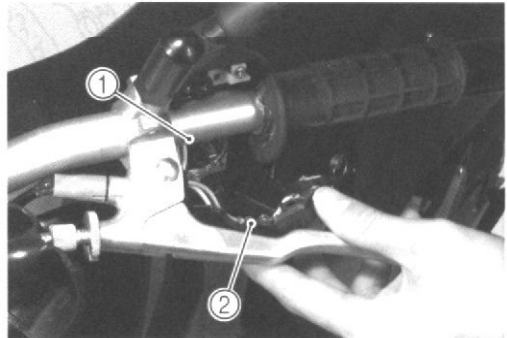
For the other countries


 99000-25010: SUZUKI SUPER GREASE “A”




HANDLEBAR SWITCHES

- Align the grooves ① on the handlebar with the lugs ② on the handlebar switches.



FRONT WHEEL  6-9

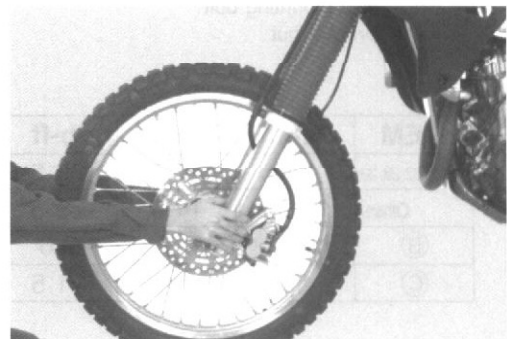
WIRE HARNESS, CABLE,
AND HOSE ROUTING  8-12 to 8-20

NOTE:

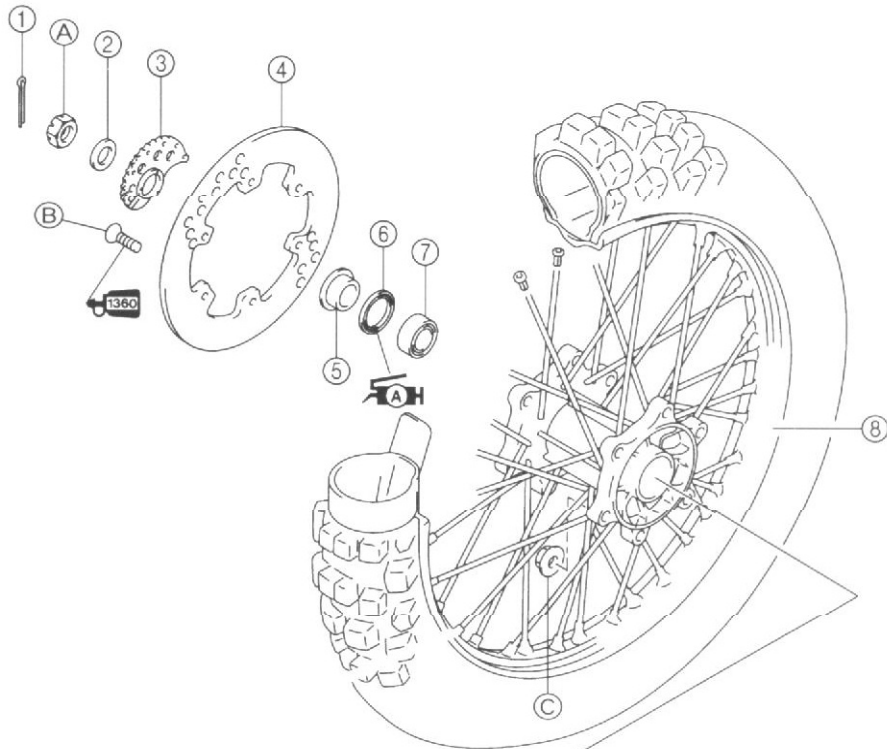
Hold the front fork legs, move them back and forth and make sure that the steering is not loose.

CAUTION

After performing the adjustment and installing the handlebars, “rock” the front wheel assembly forward and backward to ensure that there is no play and that the procedure was accomplished correctly. Finally, check to make sure that the steering stem moves freely from left to right with its own weight. If play or stiffness is noticeable, readjust the steering stem nut.

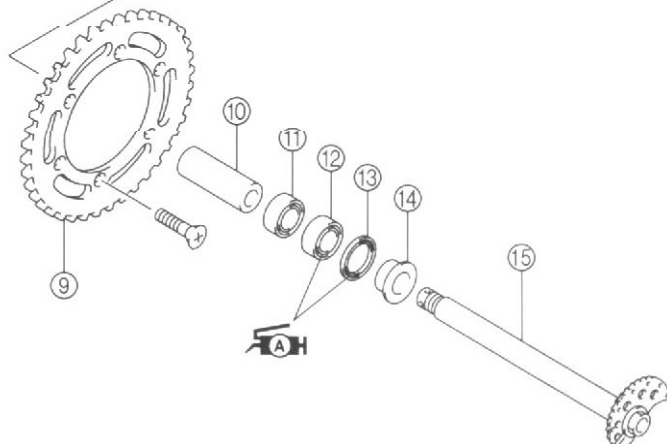


REAR WHEEL CONSTRUCTION

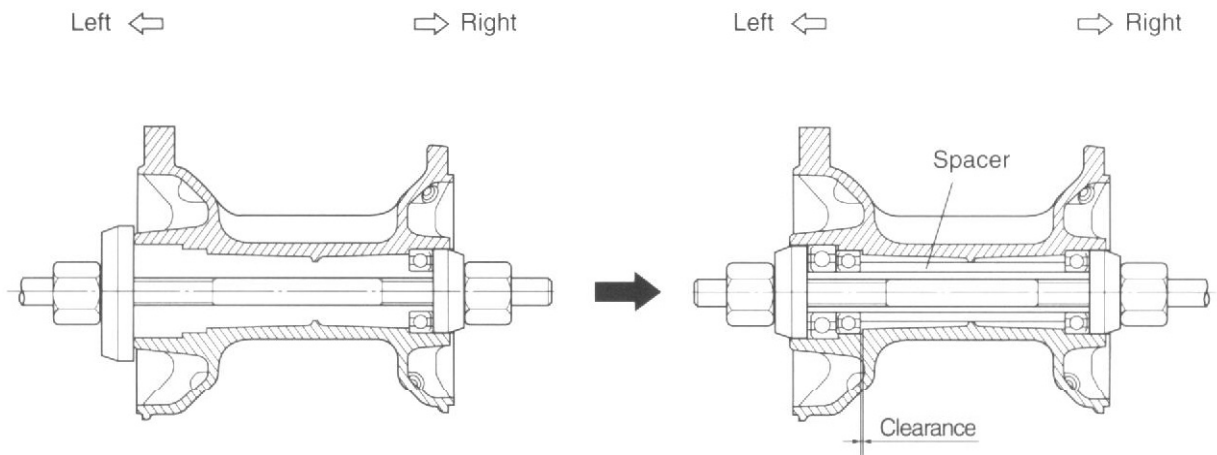
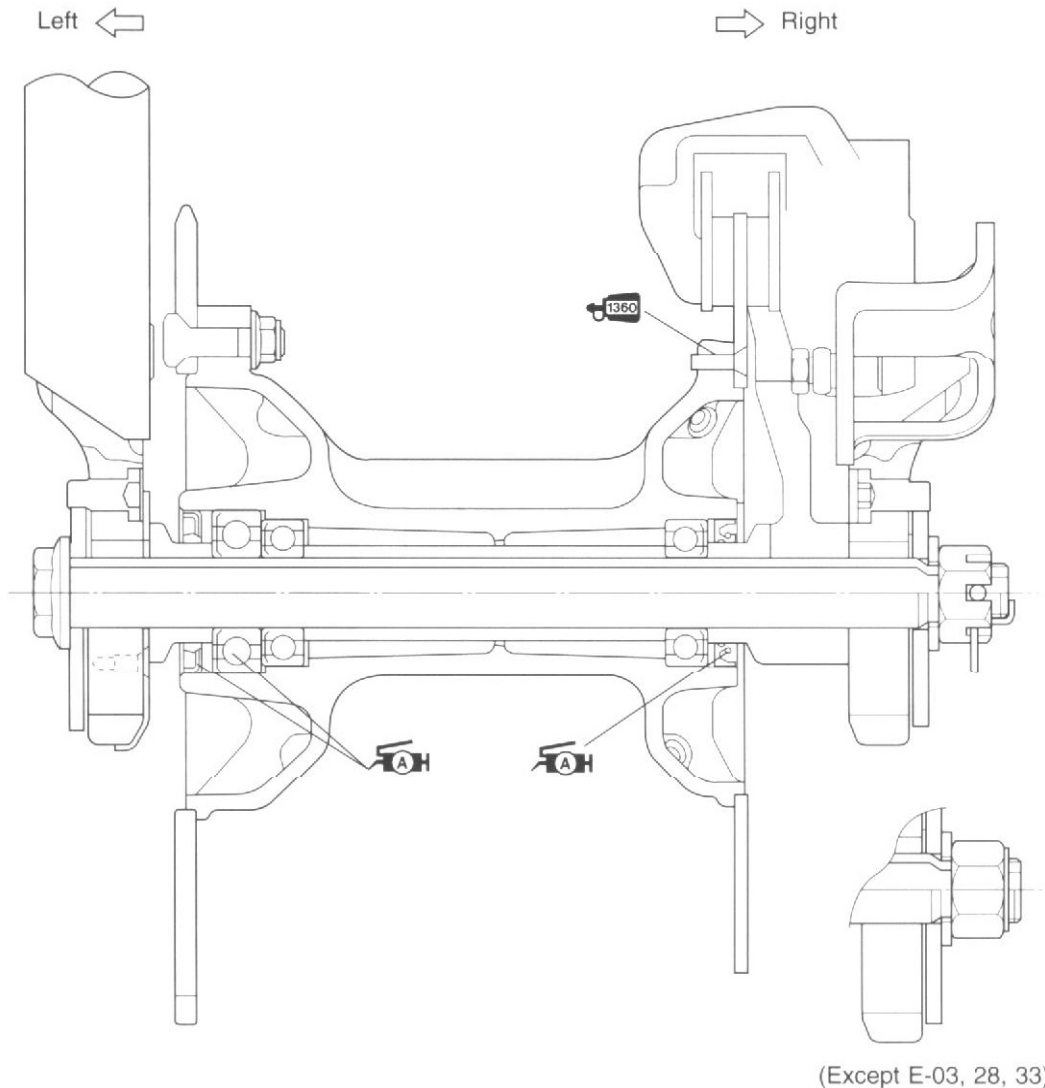


- ① Cotter pin (For E-03, 28, 33)
- ② Washer
- ③ Chain adjuster
- ④ Brake disc
- ⑤ Spacer
- ⑥ Dust seal
- ⑦ Bearing
- ⑧ Rear wheel
- ⑨ Rear sprocket
- ⑩ Spacer
- ⑪ Bearing
- ⑫ Bearing
- ⑬ Dust seal
- ⑭ Spacer
- ⑮ Rear axle

- (A) Rear axle nut
- (B) Brake disc mounting bolt
- (C) Rear sprocket nut



| ITEM | N·m | kgf·m | lb·ft |
|------------------|-----|-------|-------|
| (A) E-03, 28, 33 | 100 | 10.0 | 72.5 |
| Others | 110 | 11.0 | 75.5 |
| (B) | 10 | 1.0 | 7.0 |
| (C) | 30 | 3.0 | 21.5 |



REMOVAL AND DISASSEMBLY

- Remove the cotter pin. (For E-03, 28, 33)
- Remove the rear axle nut.

⚠ CAUTION

Replace the removed cotter pin with a new one.

- Support the motorcycle with a jack or wooden block and remove the rear axle ① and rear wheel.

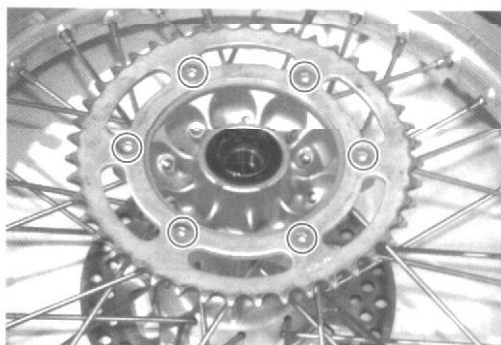
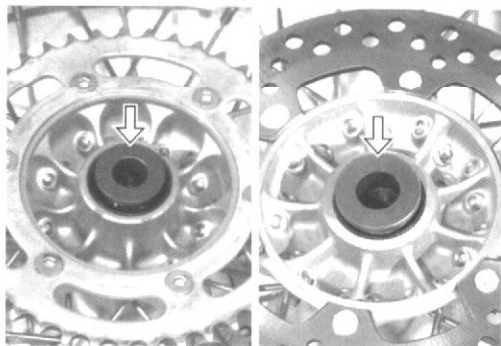
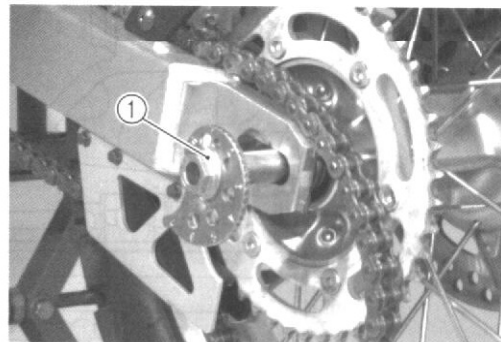
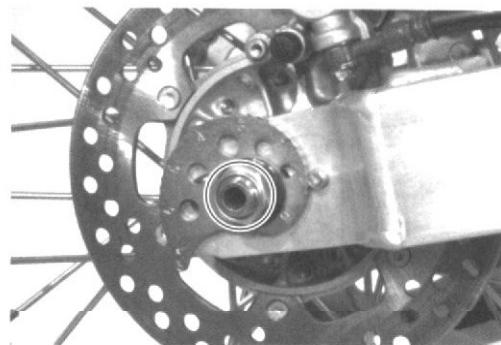
⚠ CAUTION

Do not operate the brake pedal during or after rear wheel removal.

- Remove the spacers.

- Remove the rear sprocket.

- Remove the brake disc.



INSPECTION

REAR SPROCKET

Inspect the rear sprocket for wear and damage. If any damages are found, replace the sprocket and drive chain as a set.

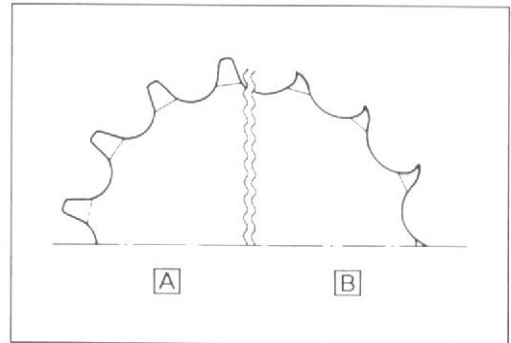
- [A] Normal wear
- [B] Excessive wear

WHEEL HUB DUST SEALS 6-6

WHEEL BEARINGS 6-6 and 6-7

REAR WHEEL 6-7

REAR AXLE 6-7



REASSEMBLY AND REMOUNTING

Reassemble and remount the front wheel in the reverse order of removal and disassembly. Pay special attention to the following points:

WHEEL BEARINGS

- Apply SUZUKI SUPER GREASE "A" to the left wheel bearing.

For USA

99000-25030: SUZUKI SUPER GREASE "A"

For the other countries

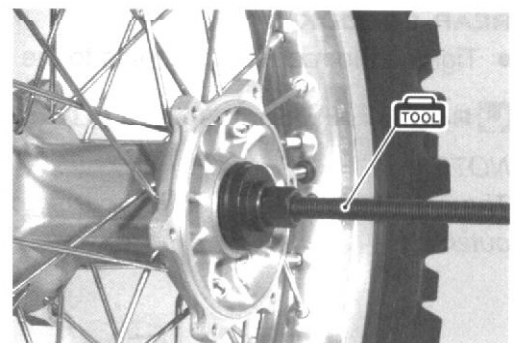
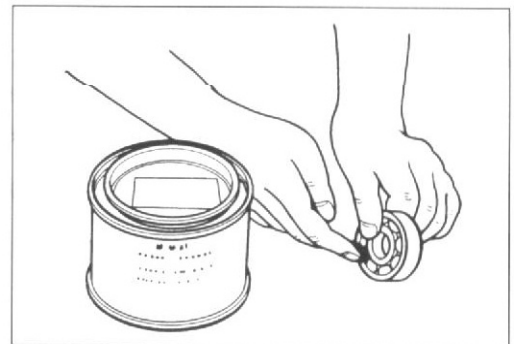
99000-25010: SUZUKI SUPER GREASE "A"

- Install the wheel bearings using the special tool.

09941-34513: Bearing installer set

CAUTION

First, install the right wheel bearing, and then install the left wheel bearings. The sealed cover on the wheel bearing must face out. (6-25)



WHEEL HUB DUST SEALS

- Apply SUZUKI SUPER GREASE “A” to the wheel hub dust seals.

For USA

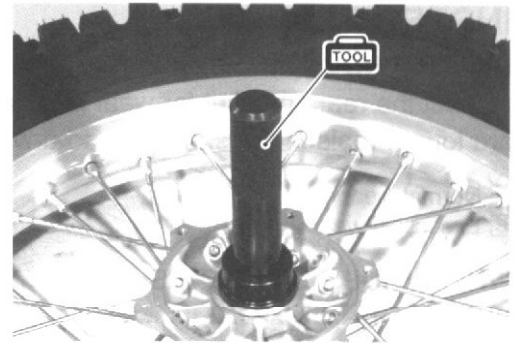
 99000-25030: SUZUKI SUPER GREASE “A”

For the other countries

 99000-25010: SUZUKI SUPER GREASE “A”

- Install the wheel hub dust seals using the special tool.

 09913-70210: Bearing installer set

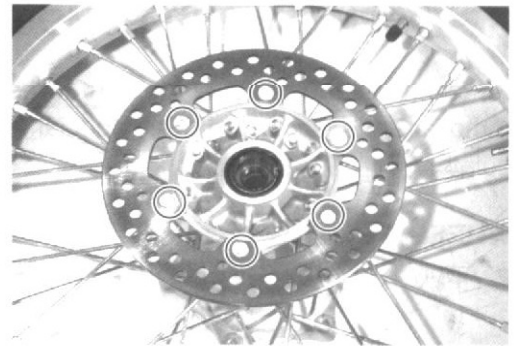


BRAKE DISC

- Make sure that the brake disc is clean and free of any grease. Apply THREAD LOCK SUPER “1360” to the brake disc mounting bolts, and then tighten them to the specified torque.

 99000-32130: THREAD LOCK SUPER “1360”

 Brake disc mounting bolt: 10 N-m (1.0 kgf-m, 7.0 lb-ft)



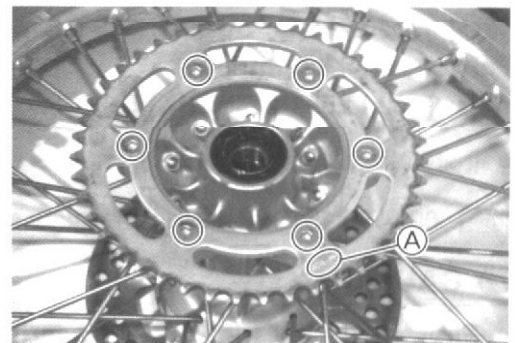
REAR SPROCKET

- Tighten the rear sprocket nuts to the specified torque.

 Rear sprocket nut: 30 N-m (3.0 kgf-m, 21.5 lb-ft)

NOTE:

The stamped mark (A) on the rear sprocket should face to the outside.

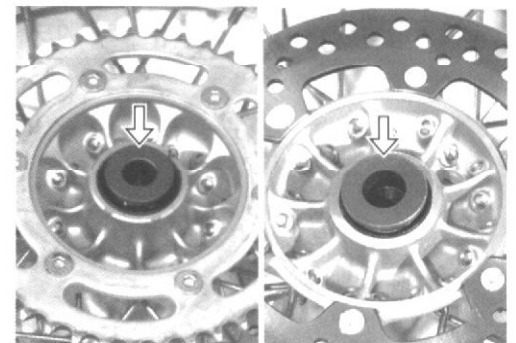


SPACERS

- Install the spacers.

 **CAUTION**

After installing the right and left spacers, make sure that the dust seals lips are properly positioned.



REAR WHEEL

- Adjust the drive chain slack after installing the rear wheel axle. (☞ 2-16 and 2-17)
- Tighten the rear axle nut to the specified torque.

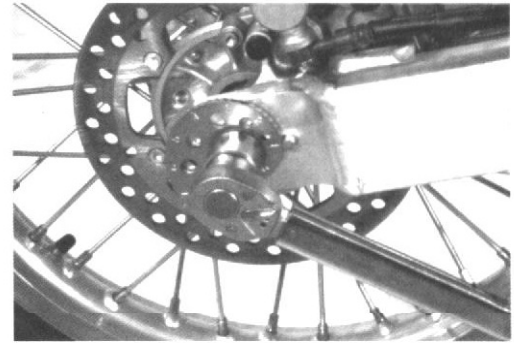
🔧 Rear axle nut:

100 N·m (10.0 kgf-m, 72.5 lb-ft).. For E-03, 28, 33

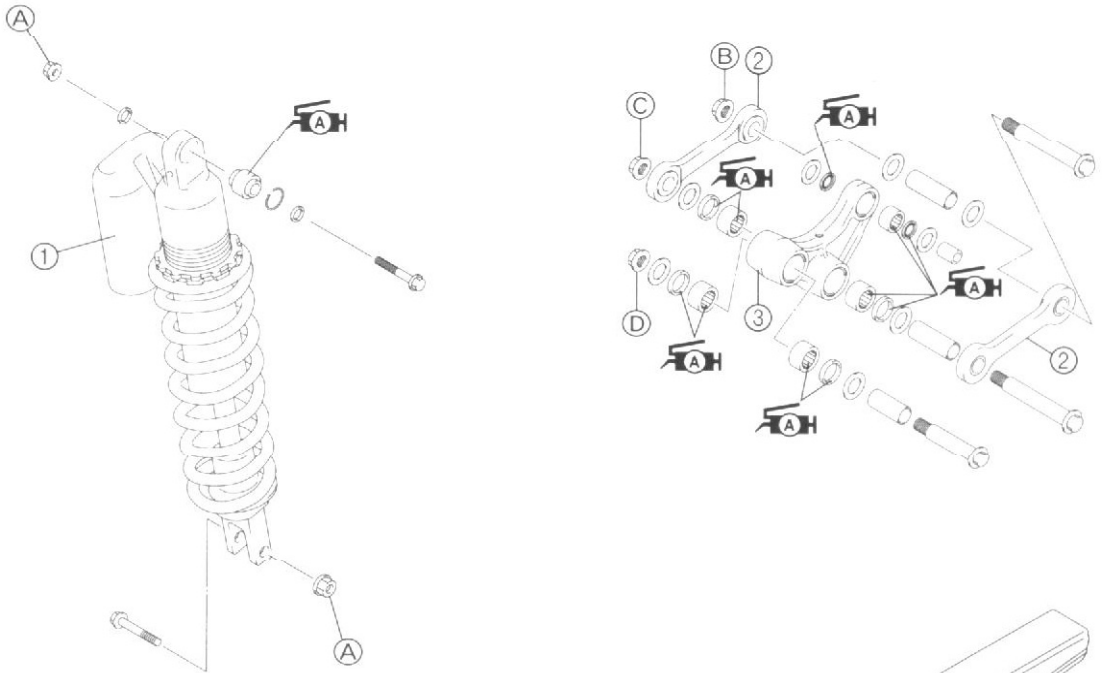
110 N·m (11.0 kgf-m, 79.5 lb-ft).. For the other countries

NOTE:

- * *After installing the rear axle nut, insert a new cotter pin into the rear axle. (For E-03, 28, 33)*
- * *After remounting the rear wheel, pump the brake pedal a few times to check for proper brake operation.*



REAR SUSPENSION CONSTRUCTION

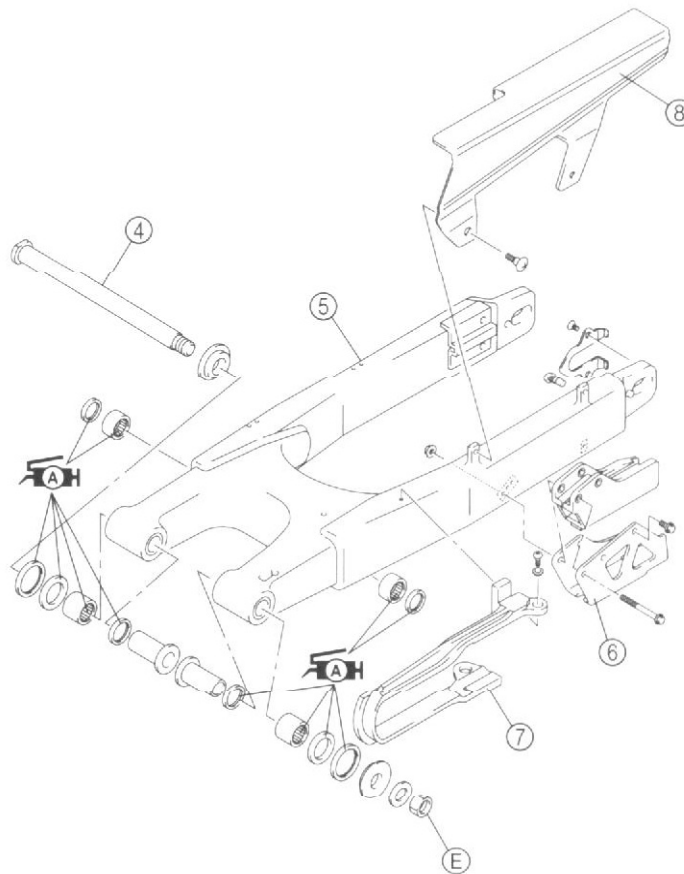


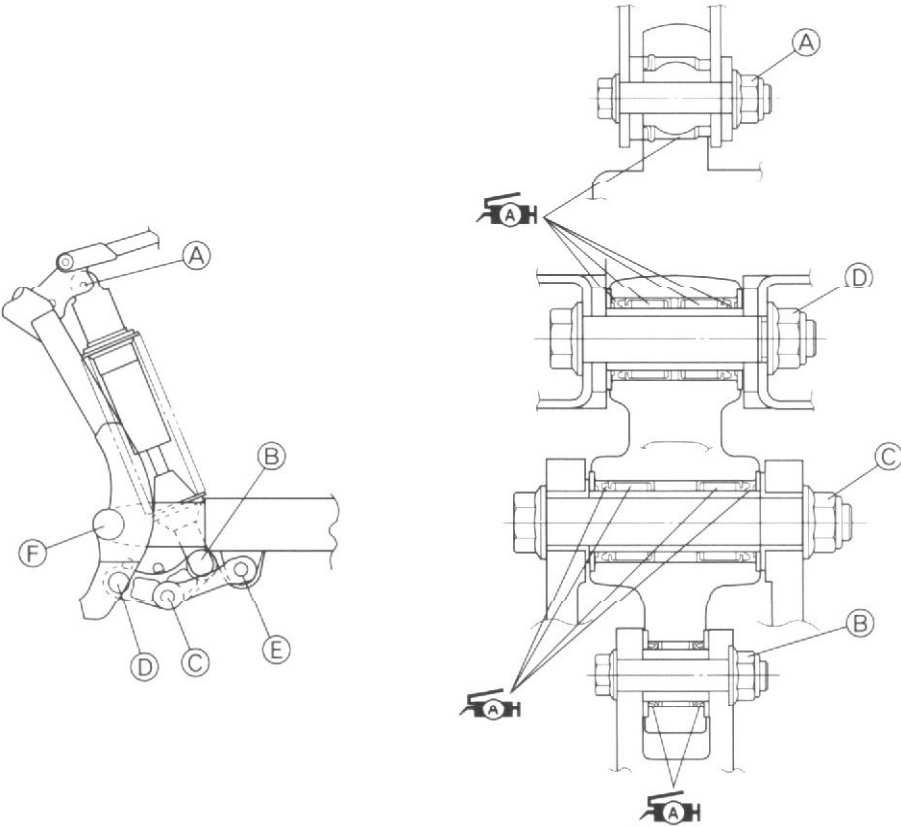
- ① Rear shock absorber
- ② Cushion lever rod
- ③ Cushion lever
- ④ Swingarm pivot shaft
- ⑤ Swingarm
- ⑥ Chain guide
- ⑦ Chain buffer
- ⑧ Chain case

- (A) Rear shock absorber nut
- (B) Cushion rod mounting nut
- (C) Cushion lever mounting nut
- (D) Cushion lever mounting nut
- (E) Swingarm pivot nut

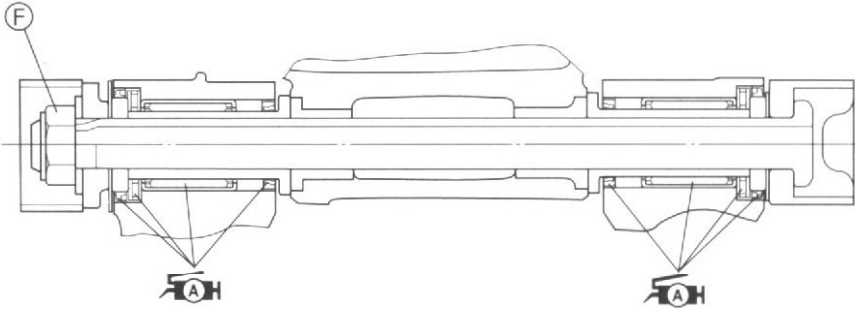
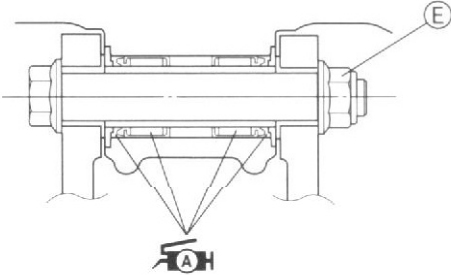


| ITEM | N·m | kgf·m | lb·ft |
|-----------|-----|-------|-------|
| (A) | 55 | 5.5 | 40.0 |
| (B, C, D) | 100 | 10.0 | 72.5 |
| (E) | 77 | 7.7 | 55.5 |



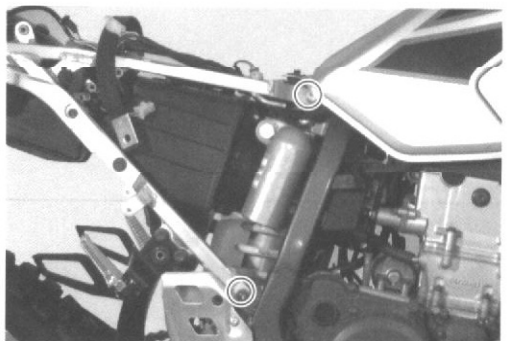
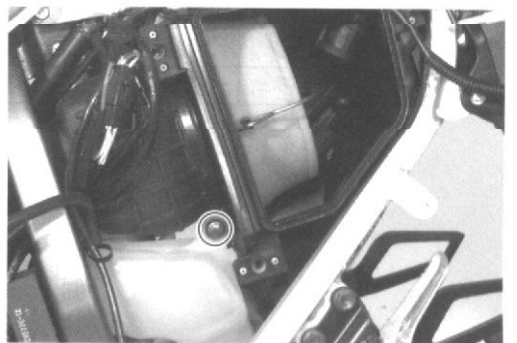
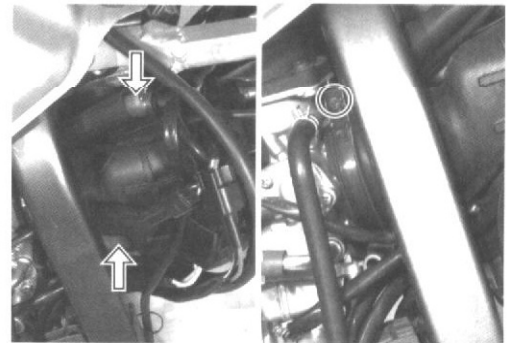
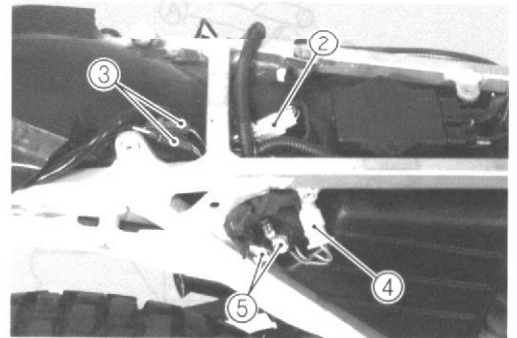
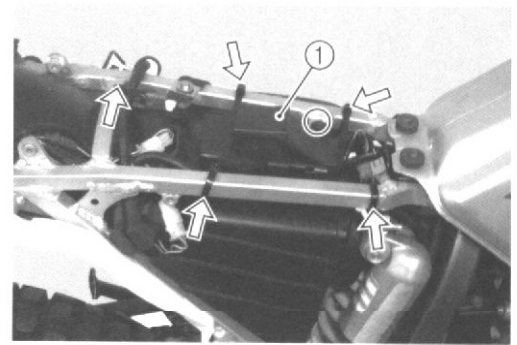


| ITEM | N·m | kgf·m | lb·ft |
|------|-----|-------|-------|
| (A) | 55 | 5.5 | 40.0 |
| (B) | 55 | 5.5 | 40.0 |
| (C) | 100 | 10.0 | 72.5 |
| (D) | 100 | 10.0 | 72.5 |
| (E) | 100 | 10.0 | 72.5 |
| (F) | 77 | 7.7 | 55.5 |

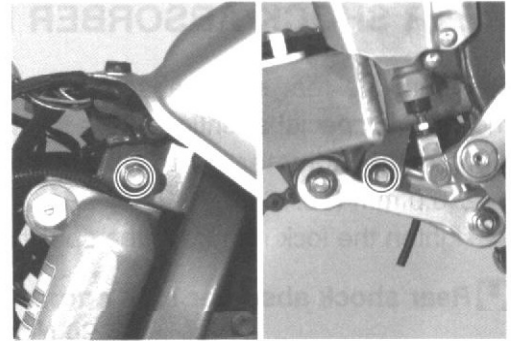


REAR SHOCK ABSORBER REMOVAL

- Remove the muffler. (☞ 3-5)
 - Remove the battery. (☞ 7-34)
 - Remove the clamps and CDI unit cover ①.
-
- Disconnect the brake light/taillight coupler ②, left and right turn signal light couplers ③, starter relay coupler ④, and starter relay lead wires ⑤.
-
- Disconnect the air cleaner breather hoses and loosen the carburetor clamp.
-
- Remove the overflow tank mounting bolt
-
- Remove the seat rail with air cleaner case assembly.



- Support the motorcycle with a jack or wooden block and remove the rear shock absorber.



REAR SHOCK ABSORBER INSPECTION

Inspect the rear shock absorber for damage and oil leakage. If any damages are found, replace the rear shock absorber with a new one.

⚠ CAUTION

Do not attempt to disassemble the rear shock absorber. It is unserviceable.



REAR SHOCK ABSORBER DISPOSAL

⚠ WARNING

- * The rear shock absorber unit contains high-pressure nitrogen gas.
- * Mishandling can cause explosion.
- * Keep away from fire and heat. High gas pressure caused by heat can cause an explosion.
- * Release gas pressure before disposing.



GAS PRESSURE RELEASE

- Remove the valve cap.
- Press the valve with a screwdriver to bleed out the nitrogen gas.

⚠ WARNING

- * Releasing high pressure gas from the rear shock absorber unit can be hazardous. Never perform any servicing until the nitrogen gas pressure has been released from the rear shock absorber unit.
- * When releasing the gas pressure, place a rag over the gas valve and use the tip of a screwdriver to press the valve. Do not use your finger to depress the gas valve, and be sure to direct the valve away from your face and body.
- * Be sure to always wear eye protection when performing this procedure.



REAR SHOCK ABSORBER REMOUNTING

Remount the rear shock absorber in the reverse order of removal. Pay special attention to the following points:

- Turn the adjuster ① to obtain the spring length ④ of 258.0 mm (10.16 in).
- Tighten the lock ring ② to the specified torque.

🔧 Rear shock absorber lock ring:
90 N·m (9.0 kgf-m, 65.0 lb-ft)

SPRING SETTING TABLE

| Spring preset length | | |
|------------------------|------------------------|-----------------------|
| Standard | Soft | Hard |
| 258.0 mm (10.16 in) | 259.5 mm (10.22 in) | 247.5 mm (9.74 in) |

⚠ CAUTION

Do not set the spring less than 247.5 mm (9.74 in).

- Tighten the rear shock absorber upper and lower mounting nut to the specified torque.

🔧 Rear shock absorber upper and lower mounting nut:
55 N·m (5.5 kgf-m, 40.0 lb-ft)

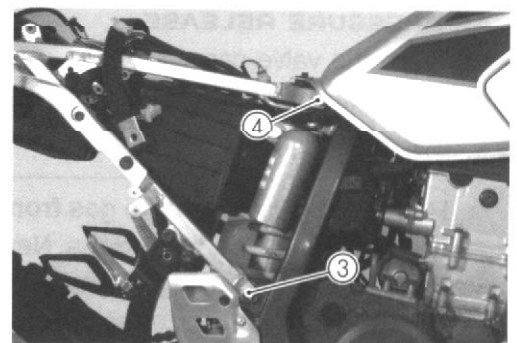
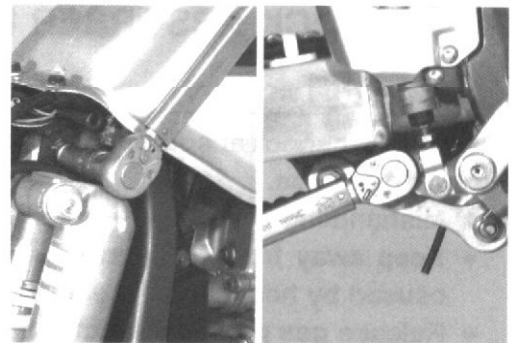
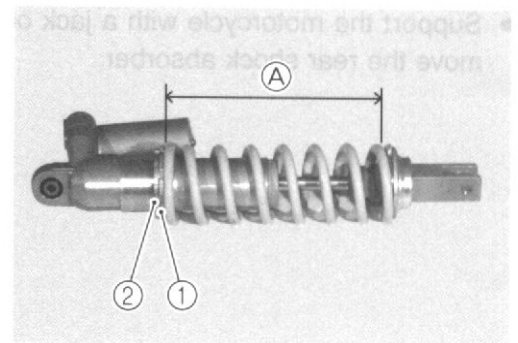
- Apply THREAD LOCK SUPER “1303” to the seat rail lower mounting bolts ③.

🔧 99000-32030: THREAD LOCK SUPER “1303”

- Tighten the seat rail lower mounting bolts ③ and upper mounting nut ④ to the specified torque.

🔧 Seat rail lower mounting bolt:
35 N·m (3.5 kgf-m, 25.5 lb-ft)

🔧 Seat rail upper mounting nut:
35 N·m (3.5 kgf-m, 25.5 lb-ft)



REAR SHOCK ABSORBER DAMPING FORCE ADJUSTMENT

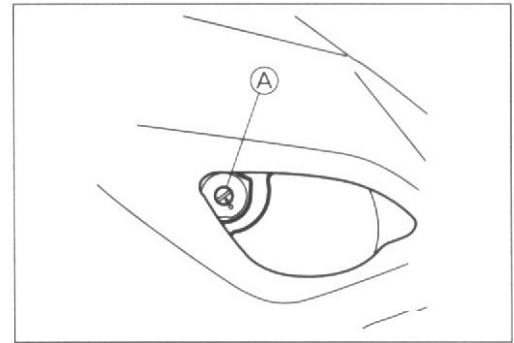
After installing the rear suspension, adjust the compression damping force as follows.

Fully turn the damping adjuster clockwise to the hard setting position, and then turn it out to the standard setting position.

DATA Standard setting position:

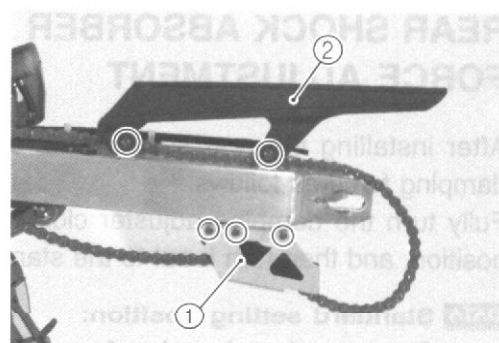
Compression damping force adjuster (A):

11 clicks out

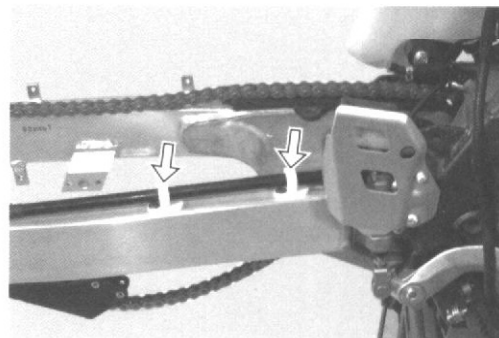


REAR SWINGARM AND CUSHION LEVER REMOVAL

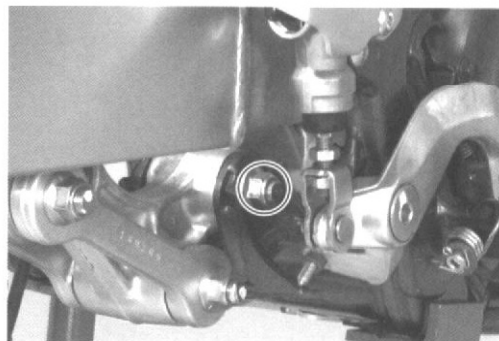
- Remove the rear wheel. (☞ 6-26)
- Remove the rear shock absorber. (☞ 6-32 and 6-33)
- Remove the rear brake caliper. (☞ 6-53)
- Remove the drive chain guide ① and chain case ②.



- Disconnect the brake hose from the brake hose guide.



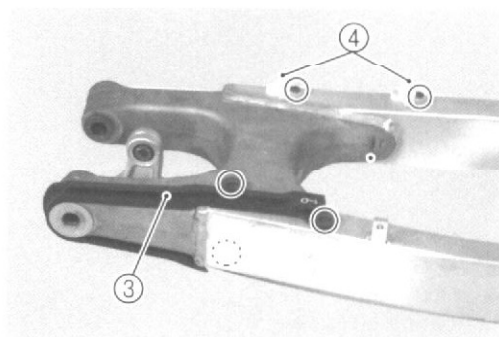
- Remove the cushion lever mounting bolt and nut.



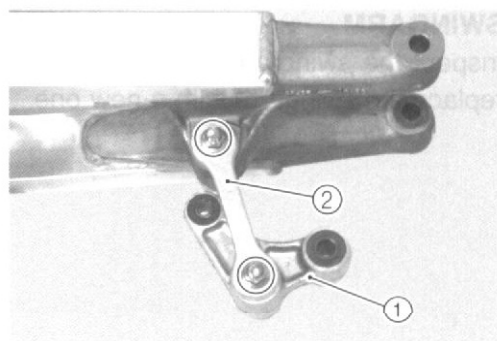
- Remove the swingarm pivot shaft nut and pivot shaft.
- Remove the rear suspension assembly.



- Remove the chain buffer ③ and brake hose guides ④.



- Remove the cushion lever ① and cushion lever rods ②.



INSPECTION AND DISASSEMBLY

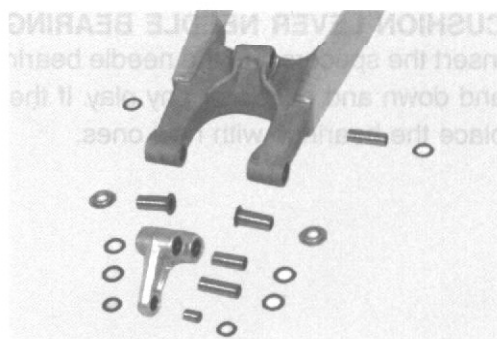
SPACERS

- Remove the dust seals, washers and spacers from the swingarm and cushion lever.

Inspect the spacers for any flaws or other damage. If any damages are found, replace the spacers with new ones.

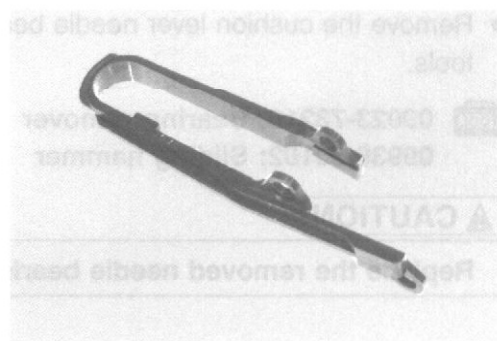
CAUTION

Replace the removed dust seals with new ones.



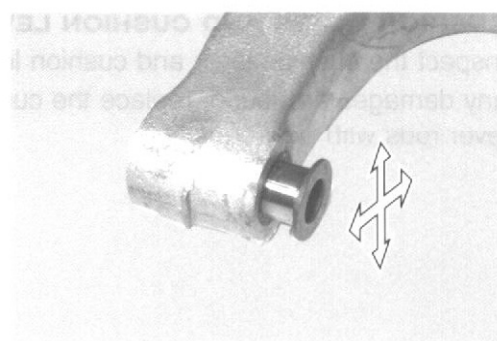
CHAIN BUFFER

Inspect the chain buffer for wear and damage. If any damages are found, replace the chain buffer with a new one.



SWINGARM NEEDLE BEARINGS

Insert the spacers into the needle bearings, move the spacer up and down and check for any play. If there is excessive play, replace the bearings with new ones.

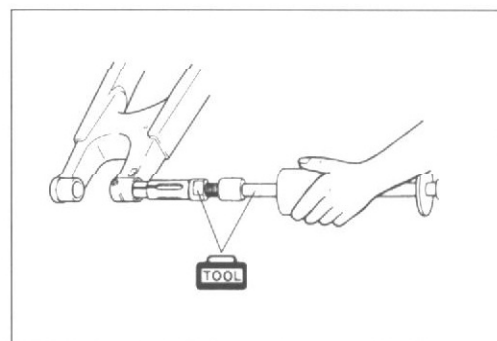


- Remove the swingarm needle bearings using the special tools.

TOOL 09923-74510: Bearing remover
09930-30102: Sliding hammer

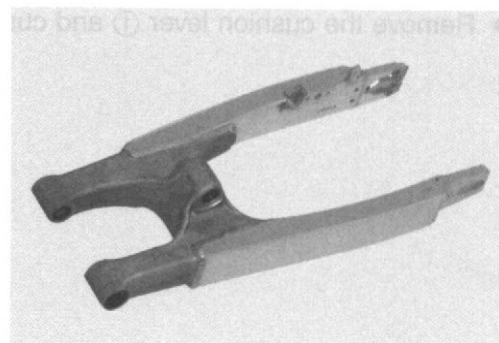
CAUTION

Replace the removed needle bearings with new ones.



SWINGARM

Inspect the swingarm for damage. If any damages are found, replace the swingarm with a new one.

**CUSHION LEVER NEEDLE BEARINGS**

Insert the spacers into the needle bearings, move the spacer up and down and check for any play. If there is excessive play, replace the bearings with new ones.

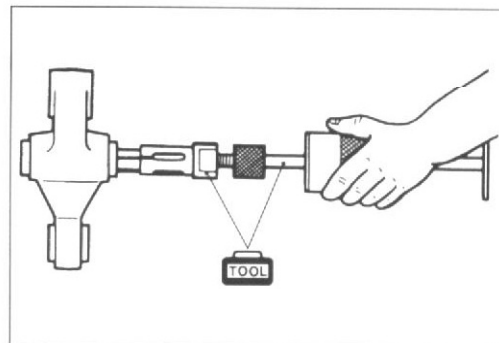


- Remove the cushion lever needle bearings using the special tools.

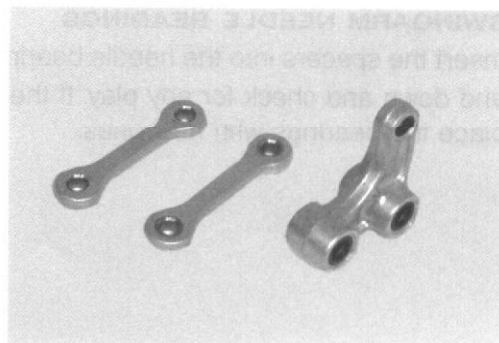
TOOL 09923-73210: Bearing remover
09930-30102: Sliding hammer

CAUTION

Replace the removed needle bearings with new ones.

**CUSHION LEVER AND CUSHION LEVER RODS**

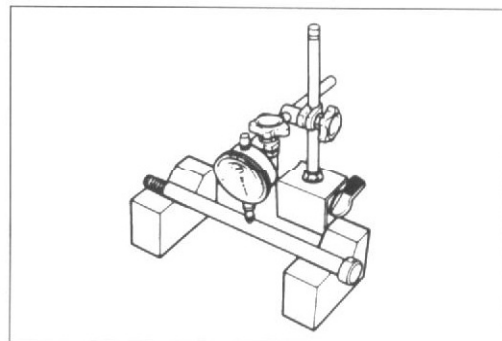
Inspect the cushion lever and cushion lever rods for damage. If any damages are found, replace the cushion lever and cushion lever rods with new ones.

**PIVOT SHAFT**

Measure the pivot shaft runout using the dial gauge. If the runout exceeds the service limit, replace the pivot shaft.

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

DATA Swingarm pivot shaft runout
Service Limit: 0.3 mm (0.01 in)



REASSEMBLY AND REMOUNTING

Reassemble and remount the rear suspension in the reverse order of removal and disassembly. Pay special attention to the following points:

SWINGARM NEEDLE BEARINGS

- Apply SUZUKI SUPER GREASE "A" to the spacers, dust seals and needle bearings.

For USA

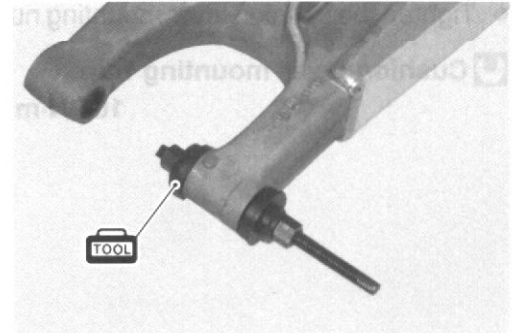
 99000-25030: SUZUKI SUPER GREASE "A"

For the other countries

 99000-25010: SUZUKI SUPER GREASE "A"

- Press the needle bearings into the swingarm pivot using the special tool.

 09941-34513: Steering outer race installer



CUSHION LEVER NEEDLE BEARINGS

- Apply SUZUKI SUPER GREASE "A" to the spacers and needle bearings.

For USA

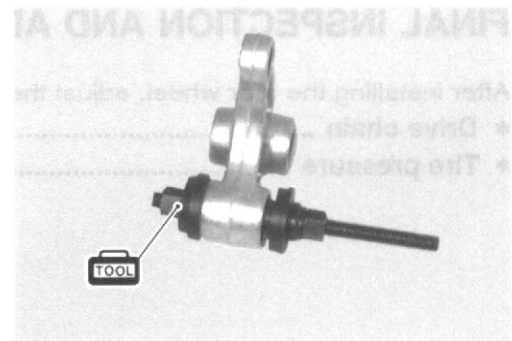
 99000-25030: SUZUKI SUPER GREASE "A"

For the other countries

 99000-25010: SUZUKI SUPER GREASE "A"

- Press the needle bearings into the cushion lever using the special tool.

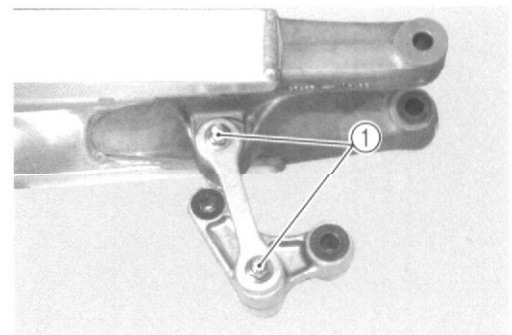
 09941-34513: Steering outer race installer



REAR SUSPENSION

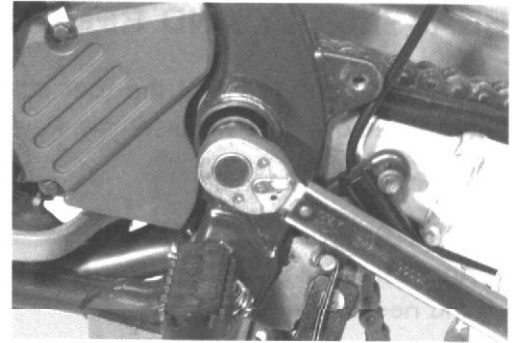
- Tighten the cushion lever rod mounting nuts ① to the specified torque.

 **Cushion lever rod mounting nut:**
100 N·m (10.0 kgf·m, 72.5 lb-ft)



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

 **Pivot shaft nut: 77 N·m (7.7 kgf-m, 55.5 lb-ft)**




- Tighten the cushion lever mounting nut to the specified torque.

 **Cushion lever mounting nut:**
100 N·m (10.0 kgf-m, 72.5 lb-ft)



FINAL INSPECTION AND ADJUSTMENT

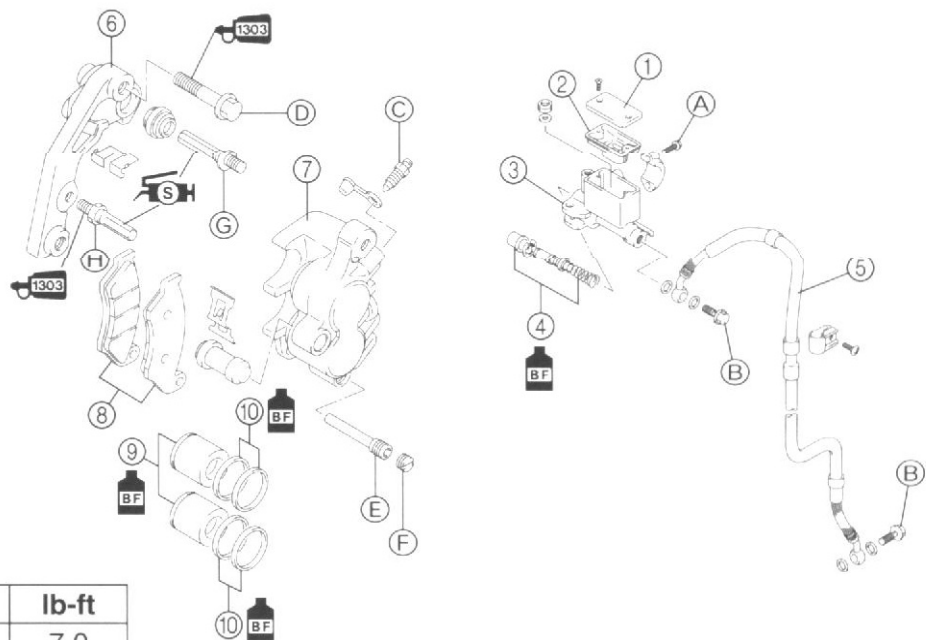
After installing the rear wheel, adjust the following before riding.

- * **Drive chain**  2-16 to 2-17
- * **Tire pressure**  2-22

FRONT BRAKE CONSTRUCTION

- ① Cap
- ② Diaphragm
- ③ Master cylinder
- ④ Piston set
- ⑤ Brake hose
- ⑥ Caliper holder
- ⑦ Caliper
- ⑧ Pad set
- ⑨ Piston
- ⑩ Piston and dust seal

- (A) Master cylinder mounting bolt
- (B) Brake hose union bolt
- (C) Air bleeder valve
- (D) Brake caliper mounting bolt
- (E) Brake pad mounting pin
- (F) Plug
- (G) Caliper axle
- (H) Caliper axle



| ITEM | N-m | kgf-m | lb-ft |
|------|-----|-------|-------|
| (A) | 10 | 1.0 | 7.0 |
| (B) | 23 | 2.3 | 16.5 |
| (C) | 7.5 | 0.75 | 5.5 |
| (D) | 26 | 2.6 | 19.0 |
| (E) | 18 | 1.8 | 13.0 |
| (F) | 2.5 | 0.25 | 1.8 |
| (G) | 23 | 2.3 | 16.5 |
| (H) | 13 | 1.3 | 9.5 |

⚠ WARNING

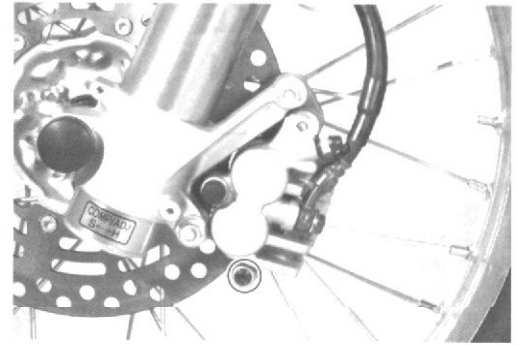
- * The brake system is filled with an glycol-based brake fluid, which is classified DOT 4. Do not use or mix other types of brake fluid, such as silicone-based and petroleum-based brake fluids when refilling the brake system, otherwise serious damage to the brake system will result.
- * Do not use any brake fluid taken from old, used, or unsealed containers.
- * Do not reuse brake fluid left over from the last servicing or which has been stored for a long period of time.
- * When storing brake fluid, be sure to seal the container completely and keep it out of the reach of children.
- * When replenishing brake fluid, be sure not to get any dust or other foreign materials in the fluid.
- * When washing brake components, always use new brake fluid. Do not use cleaning solvent.
- * A contaminated brake disc or brake pad reduces braking performance. Discard contaminated pads and clean the brake disc with high-quality brake cleaner or a neutral detergent.

⚠ CAUTION

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

BRAKE PAD REPLACEMENT

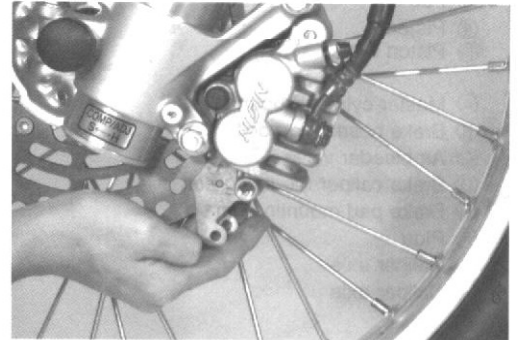
- Remove the brake pad mounting pin.



- Remove the brake pads.

⚠ CAUTION

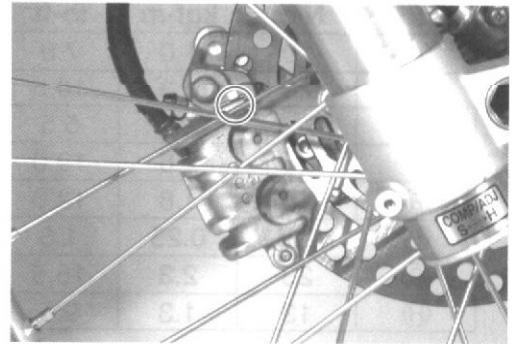
- * Do not operate the brake lever during or after brake pad removal.
- * Replace the brake pads as a set, otherwise braking performance will be adversely affected.



- Install the new brake pads.

⚠ WARNING

Make sure that the brake pad is properly engaged with the guide plate as shown in the photograph.

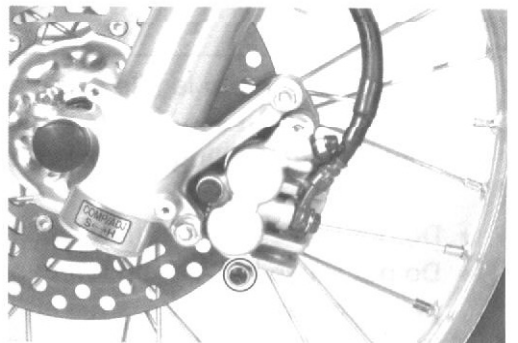


- Tighten the brake pad mounting pin to the specified torque.

🔩 Brake pad mounting pin: 18 N·m (1.8 kgf·m, 13.0 lb·ft)

NOTE:

After replacing the brake pads, pump the brake lever a few times to check for proper brake operation and then check the brake fluid level.



BRAKE FLUID REPLACEMENT

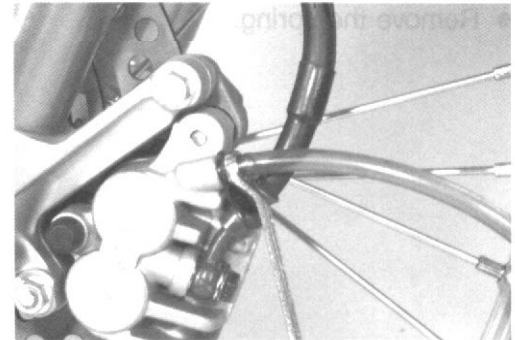
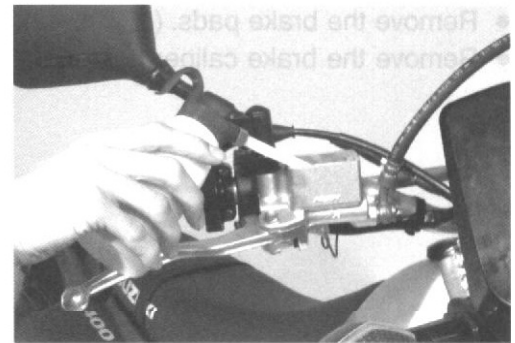
- Place the motorcycle on a level surface and keep the handlebar straight.
- Remove the master cylinder reservoir cap and diaphragm.
- Remove as much old brake fluid as possible.
- Fill the reservoir with new brake fluid.

Specification and classification: DOT 4

- Connect a clear hose to the air bleeder valve and insert the other end of the hose into a receptacle.
- Loosen the air bleeder valve and pump the brake lever until the old brake fluid is completely out of the brake system.
- Close the air bleeder valve and disconnect the clear hose. Fill the reservoir with new brake fluid to the upper end of the inspection window.

CAUTION

Bleed air from the brake system.
( 2-19 and 2-20)

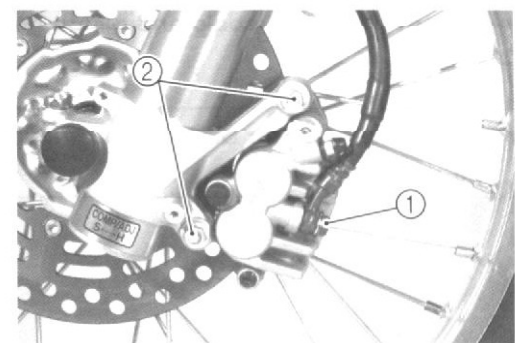


BRAKE CALIPER REMOVAL AND DISASSEMBLY

- Disconnect the brake hose from the brake caliper by removing the brake hose union bolt ① and allow the brake fluid to drain into a suitable receptacle.
- Remove the brake caliper by removing the brake caliper mounting bolts ②.

WARNING

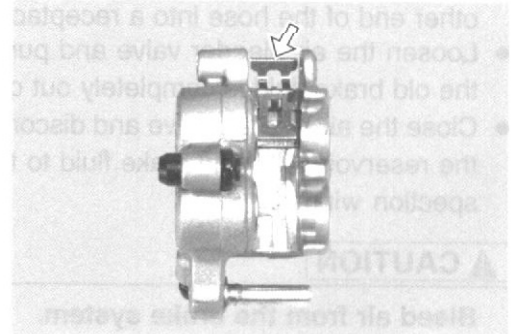
- * Do not reuse the brake fluid left over from the last servicing or which has been stored for a long period of time, otherwise serious damage to the brake system will result.
- * Brake fluid, if it leaks, will interfere with safe running and discolor painted surfaces. Check the brake hose and hose joints for cracks and oil leakage.



- Remove the brake pads. (☞ 6-42)
- Remove the brake caliper holder.



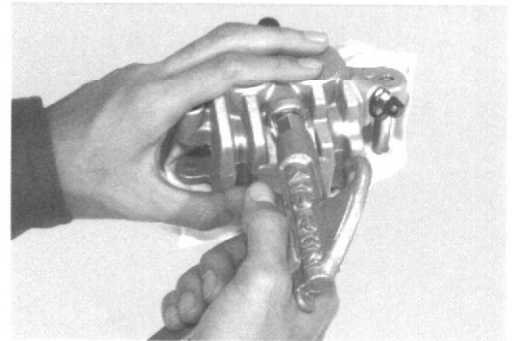
- Remove the spring.



- Place a rag over the brake caliper pistons to prevent them from popping out, and then force out the pistons using compressed air.

▲ CAUTION

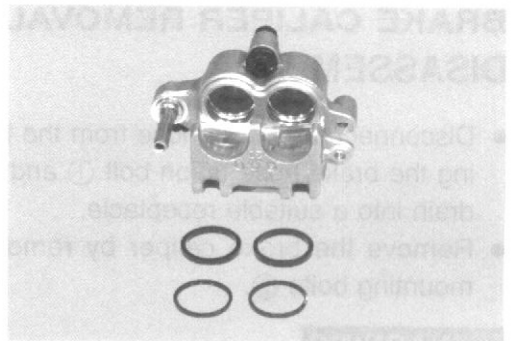
Do not use extremely high pressure to remove the brake caliper pistons, otherwise damage to the pistons will result.



- Remove the dust seals and piston seals.

▲ CAUTION

Do not reuse the dust seals and piston seals to prevent fluid leakage.



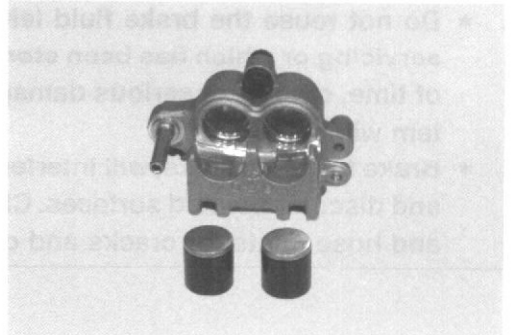
BRAKE CALIPER INSPECTION

BRAKE CALIPER

Inspect each brake caliper cylinder wall for nicks, scratches or other damage. If any damages are found, replace the brake caliper with a new one.

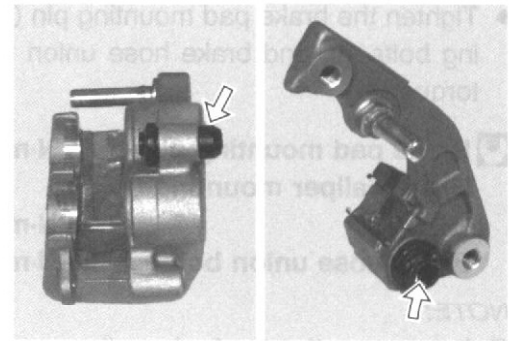
BRAKE CALIPER PISTONS

Inspect the brake caliper pistons for any scratches or other damage. If any damages are found, replace the piston with a new one.



RUBBER PARTS

Replace the removed rubber parts with new ones.



BRAKE CALIPER REASSEMBLY AND REMOUNTING

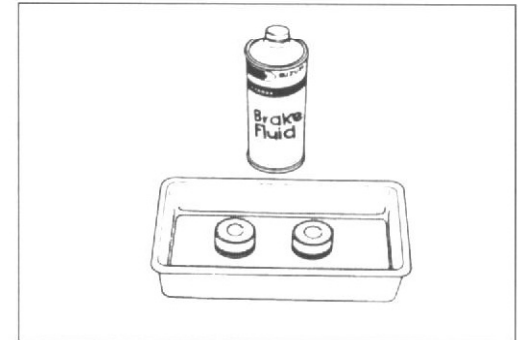
Reassemble and remount the brake caliper in the reverse order of removal and disassembly. Pay special attention to the following points:

- Wash the caliper bores and pistons with the specified brake fluid. Thoroughly wash the dust seal grooves and piston seal grooves.

 **Specification and classification: DOT 4**

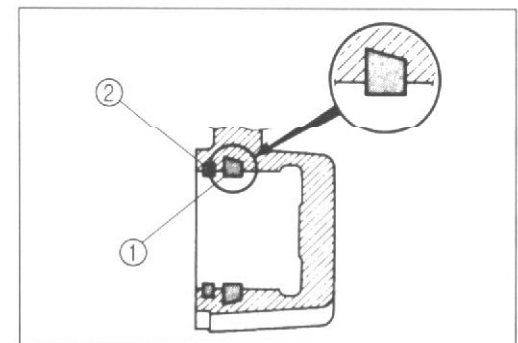
CAUTION

- * Wash the brake caliper components with new brake fluid before reassembly.
- * Do not wipe the brake fluid off after washing the components.
- * When washing the components, use the specified brake fluid. Never use different types of fluid or cleaning solvents such as gasoline, kerosine, etc.
- * Replace the removed piston seals and dust seals with new ones.
- * Apply brake fluid to all of the seals, brake caliper bores and pistons before reassembly.



PISTON SEALS

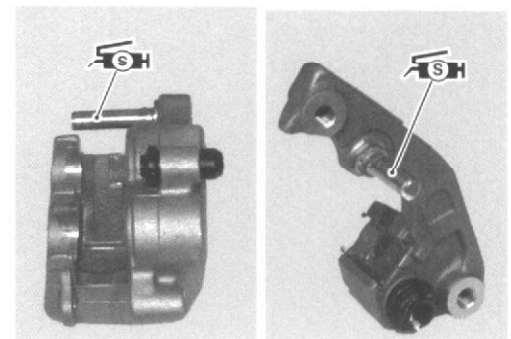
- Install the piston seals ① and dust seals ② as shown.



BRAKE CALIPER HOLDER

- Apply SUZUKI SILICON GREASE to the brake caliper holder.

 **99000-25100: SUZUKI SILICONE GREASE**



- Tighten the brake pad mounting pin ①, brake caliper mounting bolts ②, and brake hose union bolt ③ to the specified torque.

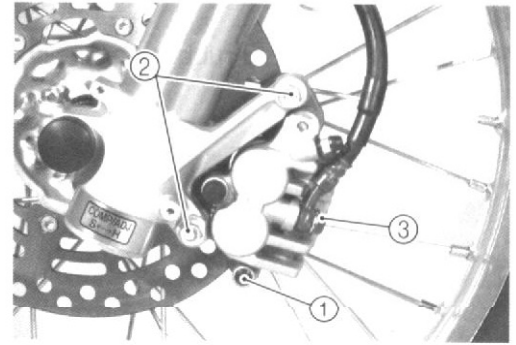
| | |
|--|---------------------------------------|
|  Brake pad mounting pin: | 18 N·m (1.8 kgf-m, 13.0 lb-ft) |
| Brake caliper mounting bolt: | 26 N·m (2.6 kgf-m, 19.0 lb-ft) |
| Brake hose union bolt: | 23 N·m (2.3 kgf-m, 16.5 lb-ft) |

NOTE:

Before remounting the brake caliper, push the brake caliper pistons all the way into the caliper.

CAUTION

Bleed air from the system after reassembling the brake caliper. (👉 2-19 and 2-20)

**BRAKE DISC INSPECTION**


Check the brake disc for cracks or damage and measure the thickness using the micrometer. If any damages are found or if the thickness is less than the service limit, replace the brake disc with a new one.

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

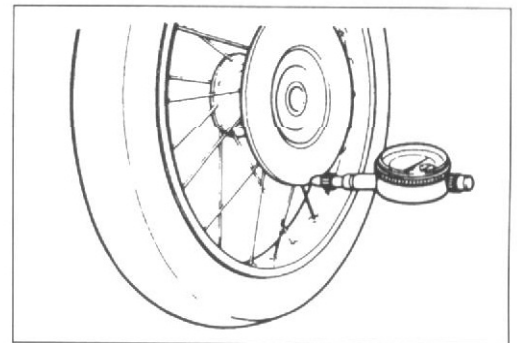
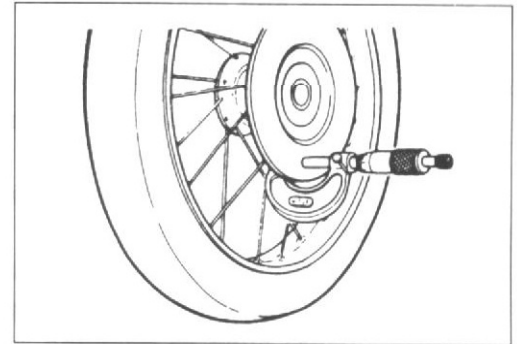
 **Brake disc thickness**
Service Limit: 2.5 mm (0.098 in)

Measure the runout using the dial gauge. If the runout exceeds the service limit, replace the brake disc with a new one.

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

 **Brake disc runout**
Service Limit: 0.3 mm (0.012 in)

- If either measurement exceeds the service limit, replace the brake disc with a new one. (👉 6-5)



MASTER CYLINDER REMOVAL AND DISASSEMBLY

- Place a rag underneath the brake hose union bolt on the master cylinder to catch any spilt brake fluid. Remove the brake hose union bolt and disconnect the brake hose.

⚠ CAUTION

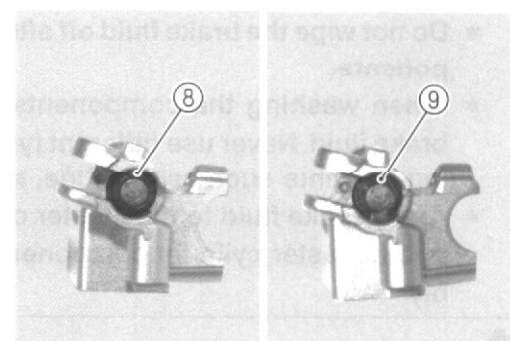
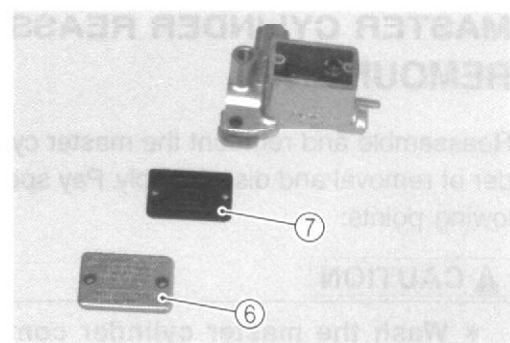
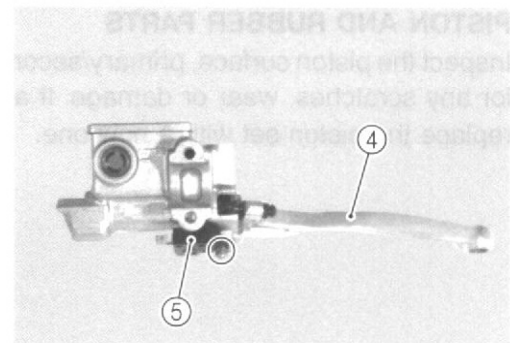
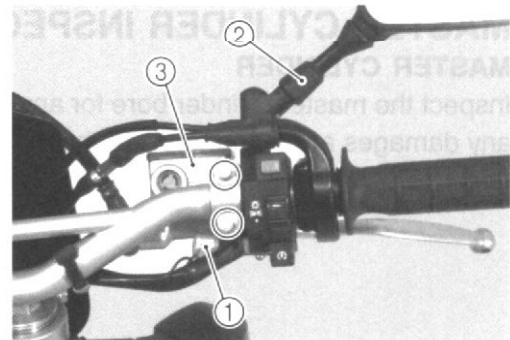
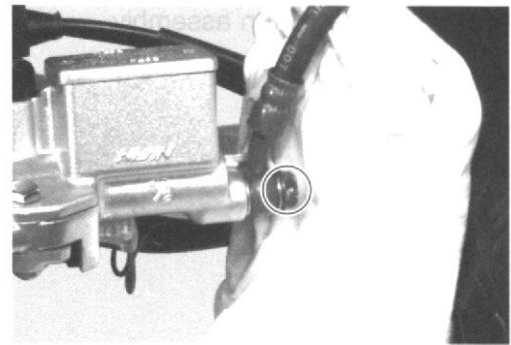
Immediately wipe off any brake fluid contacting any part of the motorcycle. The brake fluid reacts chemically with paint, plastics, rubber materials, etc., and will damage them severely.

- Disconnect the front brake light switch lead wires ①.
- Remove the right rear view mirror ② and master cylinder assembly ③.

- Remove the brake lever ④ and front brake light switch ⑤.

- Remove the reservoir cap ⑥ and diaphragm ⑦.
- Drain the brake fluid.

- Pull the dust boot ⑧ out and remove the circlip ⑨.



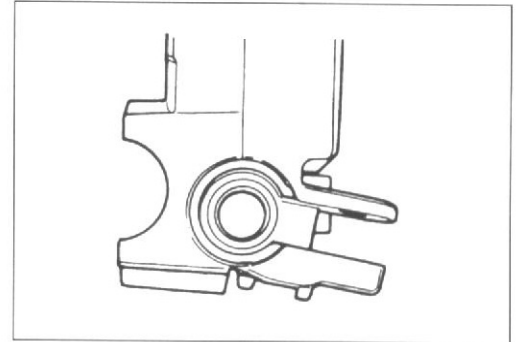
- Remove the piston assembly.



MASTER CYLINDER INSPECTION

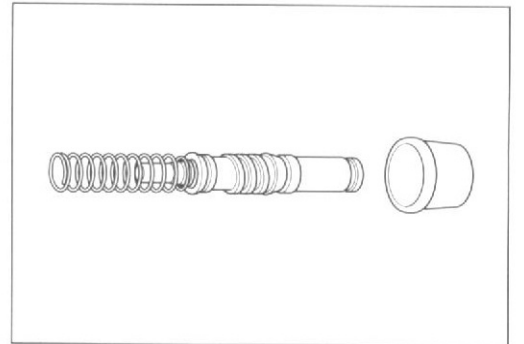
MASTER CYLINDER

Inspect the master cylinder bore for any scratches or damage. If any damages are found, replace the master cylinder with a new one.



PISTON AND RUBBER PARTS

Inspect the piston surface, primary/secondary cup, and dust boot for any scratches, wear or damage. If any damages are found, replace the piston set with a new one.

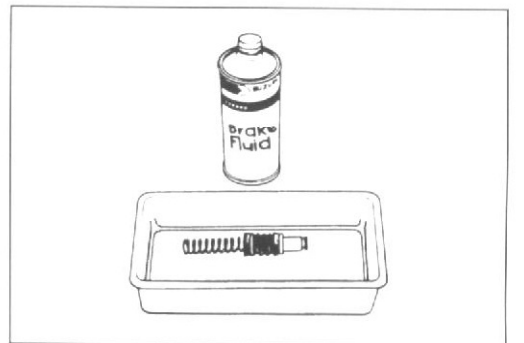


MASTER CYLINDER REASSEMBLY AND REMOUNTING

Reassemble and remount the master cylinder in the reverse order of removal and disassembly. Pay special attention to the following points:

⚠ CAUTION

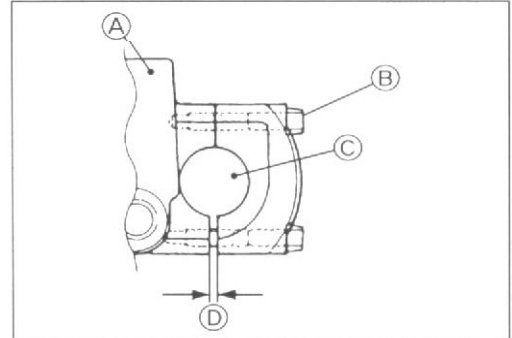
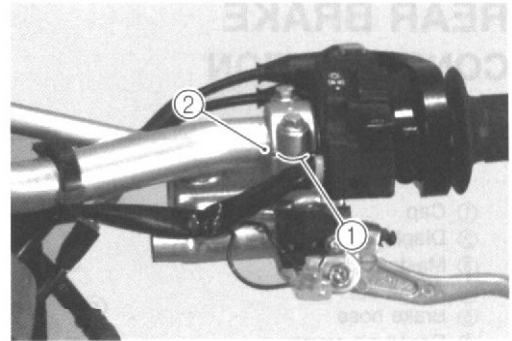
- * Wash the master cylinder components with new brake fluid before reassembly.
- * Do not wipe the brake fluid off after washing the components.
- * When washing the components, use the specified brake fluid. Never use different types of fluid or cleaning solvents such as gasoline, kerosine, etc.
- * Apply brake fluid to the master cylinder bore and all of the master cylinder components before reassembly.



- When remounting the master cylinder on the handlebar, align the master cylinder holder's mating surface ① with the punch mark ② on the handlebar, and then tighten the upper clamp bolt first.

Master cylinder clamp bolt: 10 N·m (1.0 kgf-m, 7.0 lb-ft)

- Ⓐ Master cylinder
- Ⓑ Master cylinder upper clamp bolt
- Ⓒ Handlebar
- Ⓓ Clearance



- Tighten the brake hose union bolt to the specified torque.

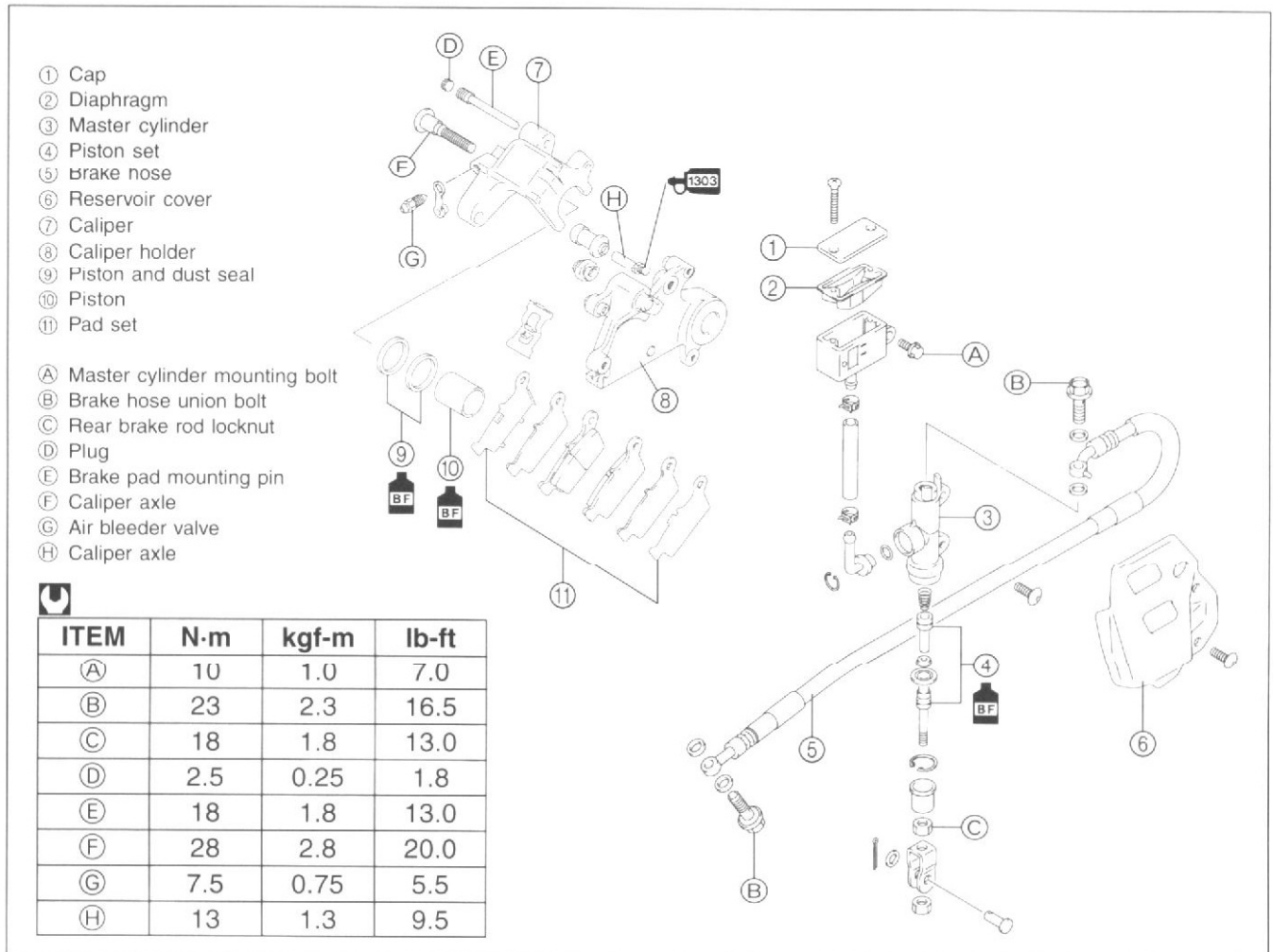
Brake hose union bolt: 23 N·m (2.3 kgf-m, 16.5 lb-ft)

CAUTION

Bleed air from the brake system after reassembling the master cylinder. (🔧 2-19 and 2-20)



REAR BRAKE CONSTRUCTION



⚠ WARNING

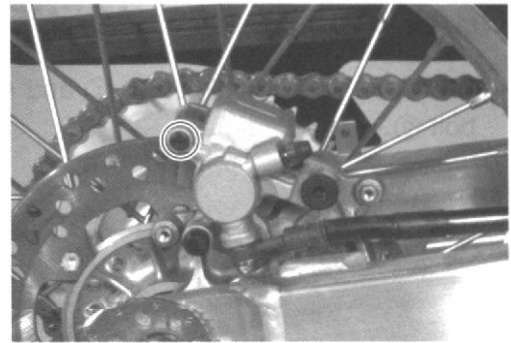
- * The brake system is filled with an glycol-based brake fluid, which is classified DOT 4. Do not use or mix other types of brake fluid, such as silicone-based and petroleum-based brake fluids when refilling the brake system, otherwise serious damage to the brake system will result.
- * Do not use any brake fluid taken from old, used, or unsealed containers.
- * Do not reuse brake fluid left over from the last servicing or which has been stored for a long period of time.
- * When storing brake fluid, make sure to seal the container completely and keep it out of the reach of children.
- * When replenishing brake fluid, make sure not to get any dust or other foreign materials in the fluid.
- * When washing brake components, always use new brake fluid. Do not use cleaning solvent.
- * A contaminated brake disc or brake pad reduces braking performance. Discard contaminated pads and clean the brake disc with high-quality brake cleaner or a neutral detergent.

⚠ CAUTION

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

BRAKE PAD REPLACEMENT

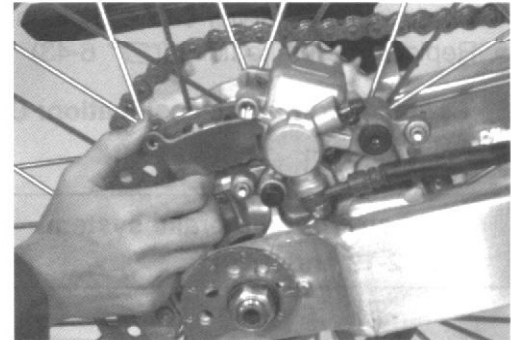
- Remove the brake pad mounting pin.



- Remove the brake pads.

⚠ CAUTION

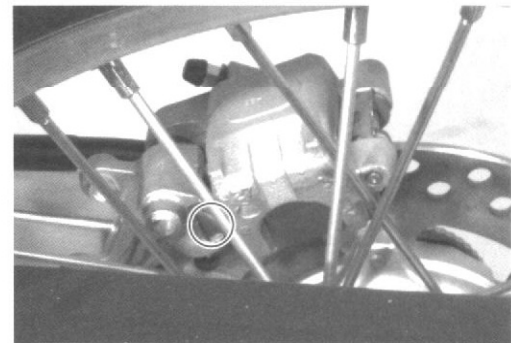
- * Do not operate the brake pedal during or after brake pad removal.
- * Replace the brake pads as a set, otherwise braking performance will be adversely affected.



- Install the new brake pads.

⚠ WARNING

Make sure that the brake pad is properly engaged with the guide plate as shown in the photograph.

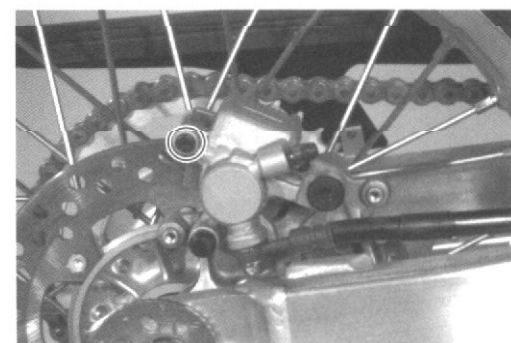


- Tighten the brake pad mounting pin to the specified torque.

🔩 Brake pad mounting pin: 18 N·m (1.8 kgf·m, 13.0 lb-ft)

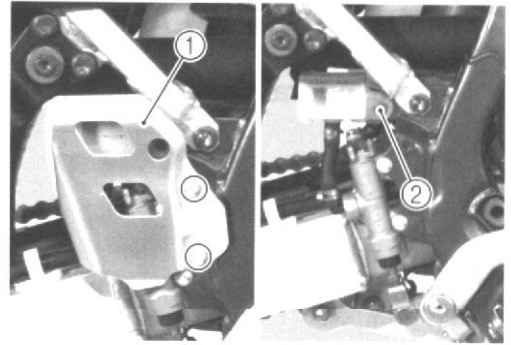
NOTE:

After replacing the brake pads, pump the brake pedal a few times to check for proper brake operation and then check the brake fluid level.



BRAKE FLUID REPLACEMENT

- Remove the reservoir cover ① and reservoir tank mounting bolt ②.

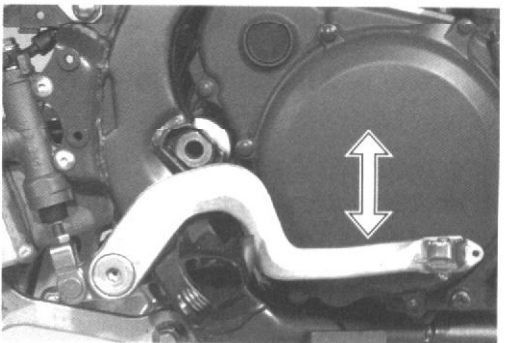
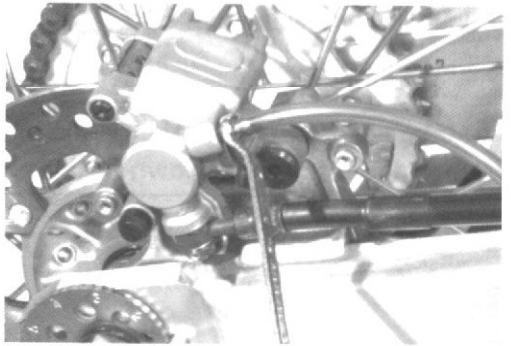
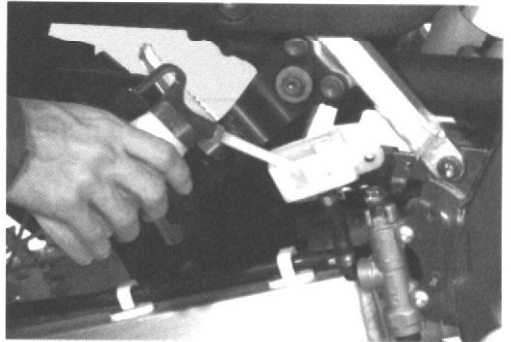


- Remove the reservoir cap and diaphragm.
- Replace the brake fluid. (☞ 6-43)

 **Specification and classification: DOT 4**

 **CAUTION**

Bleed air from the brake system.
(☞ 2-19 and 2-20)



BRAKE CALIPER REMOVAL AND DISASSEMBLY

- Remove the rear wheel. (☞ 6-26)
- Disconnect the brake hose from the brake caliper by removing the brake hose union bolt and allow the brake fluid to drain into a suitable receptacle.
- Remove the brake caliper.

⚠ WARNING

- * Do not reuse the brake fluid left over from the last servicing or which has been stored for a long period of time, otherwise serious damage to the brake system will result.
- * Brake fluid, if it leaks, will interfere with safe running and discolor painted surfaces. Check the brake hose and hose joints for cracks and oil leakage.

- Remove the brake pads. (☞ 6-51)
- Remove the brake caliper holder.
- Remove the spring.

- Place a rag over the brake caliper piston to prevent them from popping out and then force out the piston using compressed air.

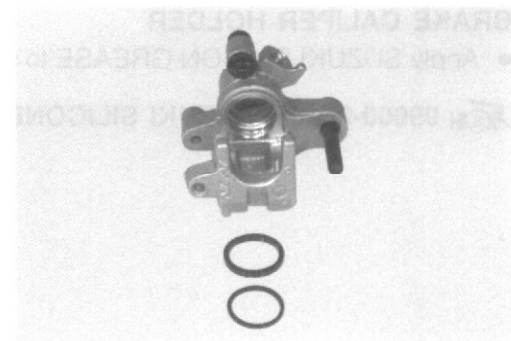
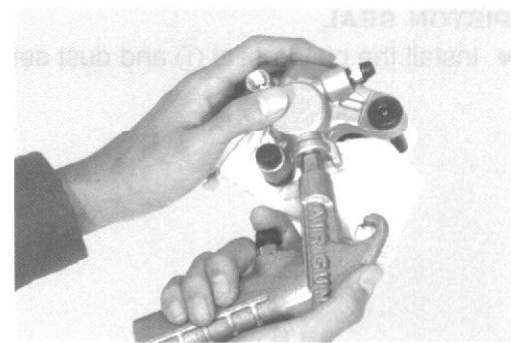
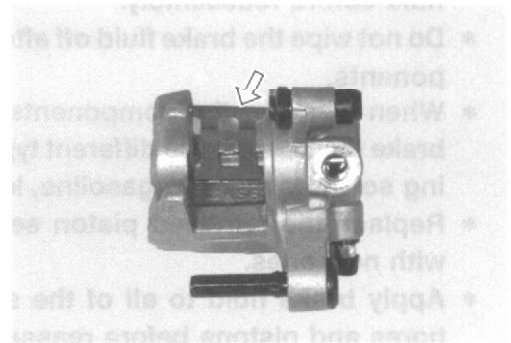
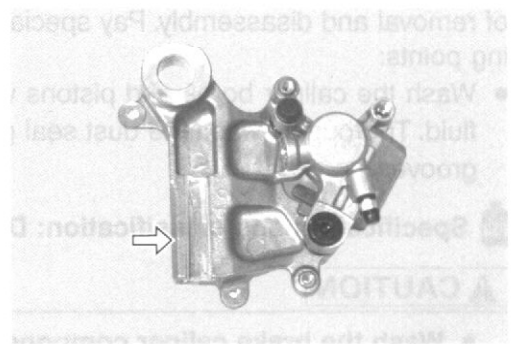
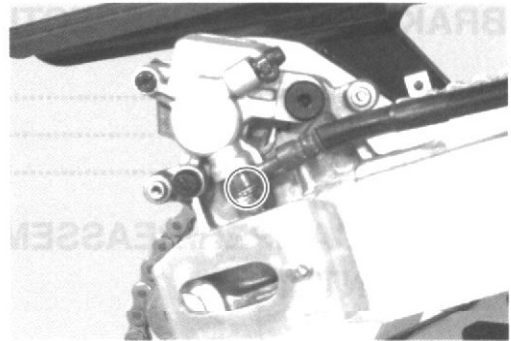
⚠ CAUTION

Do not use extremely high pressure to remove the brake caliper piston, otherwise damage to the piston will result.

- Remove the dust seals and piston seals.

⚠ CAUTION

Do not reuse the dust seals and piston seals to prevent fluid leakage.




BRAKE CALIPER INSPECTION

| | | |
|----------------------------|---|------|
| BRAKE CALIPER |  | 6-44 |
| BRAKE CALIPER PISTON |  | 6-44 |
| RUBBER PARTS |  | 6-45 |

BRAKE CALIPER REASSEMBLY AND REMOUNTING

Reassemble and remount the brake caliper in the reverse order of removal and disassembly. Pay special attention to the following points:

- Wash the caliper bores and pistons with the specified brake fluid. Thoroughly wash the dust seal grooves and piston seal grooves.

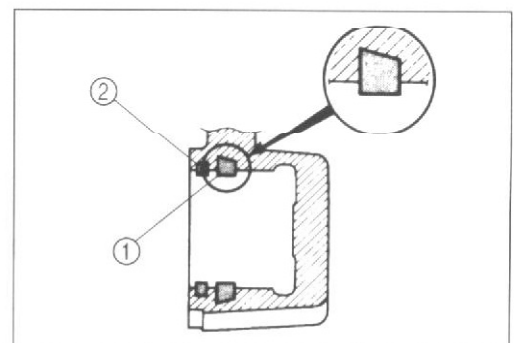
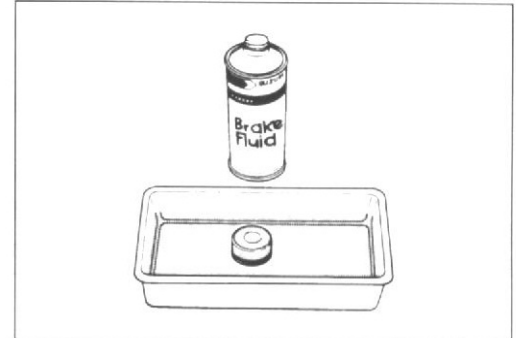
 **Specification and classification: DOT 4**

CAUTION

- * Wash the brake caliper components with new brake fluid before reassembly.
- * Do not wipe the brake fluid off after washing the components.
- * When washing the components, use the specified brake fluid. Never use different types of fluid or cleaning solvents such as gasoline, kerosine, etc.
- * Replace the removed piston seals and dust seals with new ones.
- * Apply brake fluid to all of the seals, brake caliper bores and pistons before reassembly.

PISTON SEAL

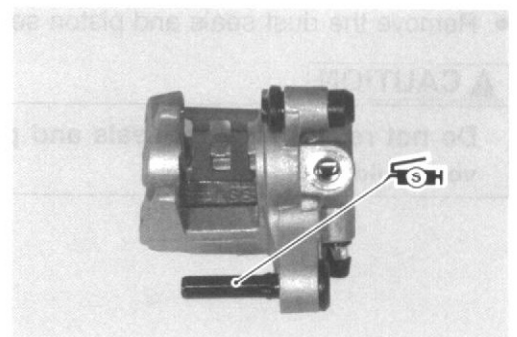
- Install the piston seal ① and dust seal ② as shown.



BRAKE CALIPER HOLDER

- Apply SUZUKI SILICON GREASE to the brake caliper holder.

 99000-25100: SUZUKI SILICONE GREASE



- Tighten the brake hose union bolt to the specified torque.

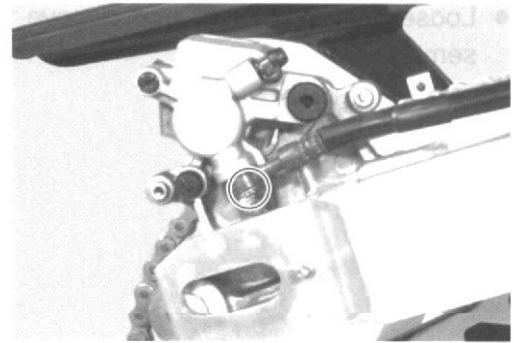
U Brake hose union bolt: 23 N·m (2.3 kgf-m, 16.5 lb-ft)

NOTE:

Before remounting the rear wheel, push the brake caliper pistons all the way into the caliper.

⚠ CAUTION

Bleed air from the system after remounting the rear wheel. (☞ 2-19 and 2-20)



BRAKE DISC INSPECTION

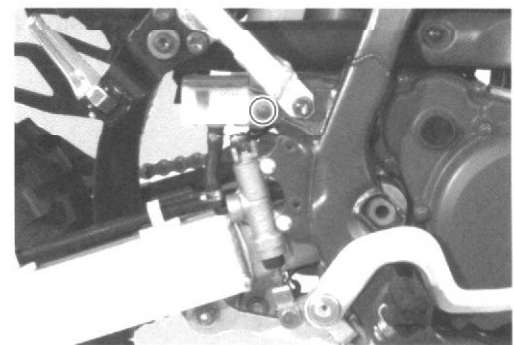
BRAKE DISC ☞ 6-46

MASTER CYLINDER REMOVAL AND DISASSEMBLY

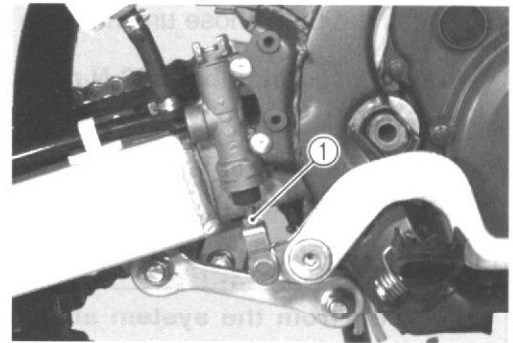
- Remove the reservoir cover. (☞ 6-52)
 - Remove the reservoir mounting bolt.
-
- Place a rag underneath the brake hose union bolt on the master cylinder to catch any spilt brake fluid. Remove the brake hose union bolt and disconnect the brake hose.

⚠ CAUTION

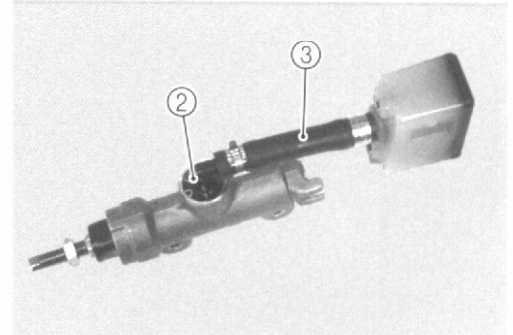
Immediately wipe off any brake fluid contacting any part of the motorcycle. The brake fluid reacts chemically with paint, plastics, rubber materials, etc., and will damage them severely.



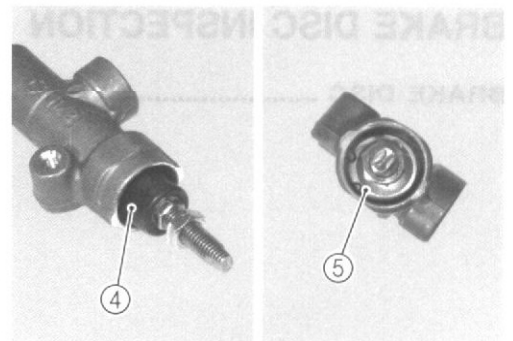
- Loosen the locknut ① and remove the master cylinder assembly.



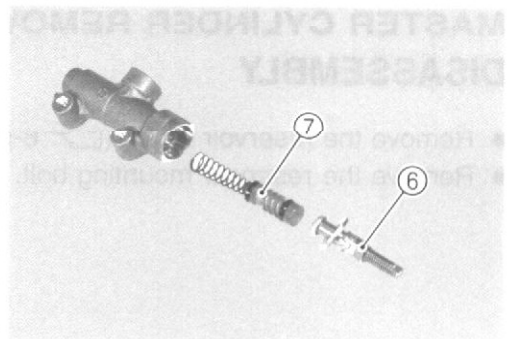
- Remove the circlip ② and reservoir assembly ③.



- Pull the dust boot ④ out and remove the circlip ⑤.



- Remove the push rod ⑥ and piston assembly ⑦.



MASTER CYLINDER INSPECTION

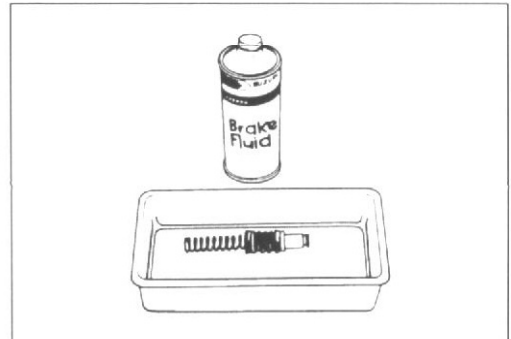
| | | |
|-------------------------------|---|------|
| MASTER CYLINDER |  | 6-48 |
| PISTON AND RUBBER PARTS |  | 6-48 |

MASTER CYLINDER REASSEMBLY AND REMOUNTING

Reassemble and remount the master cylinder in the reverse order of removal and disassembly. Pay special attention to the following points:

⚠ CAUTION

- * Wash the master cylinder components with new brake fluid before reassembly.
- * Do not wipe the brake fluid off after washing the components.
- * When washing the components, use the specified brake fluid. Never use different types of fluid or cleaning solvents such as gasoline, kerosine, etc.
- * Apply brake fluid to the master cylinder bore and all of the master cylinder components before reassembly.



BF Specification and classification: DOT 4

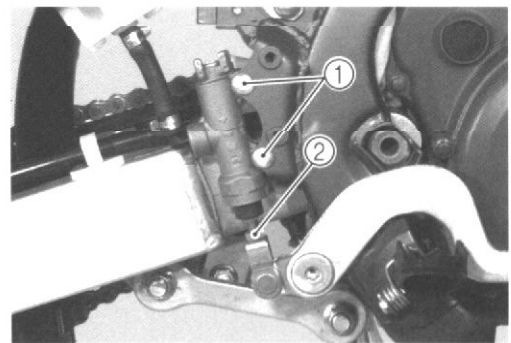
- Tighten the master cylinder mounting bolts ①, brake rod locknut ②, and brake hose union bolt to the specified torque.

🔧 Master cylinder mounting bolt:

| | |
|------------------------|--------------------------------|
| | 10 N·m (1.0 kgf-m, 7.0 lb-ft) |
| Brake rod locknut: | 18 N·m (1.8 kgf-m, 13.0 lb-ft) |
| Brake hose union bolt: | 23 N·m (2.3 kgf-m, 16.5 lb-ft) |

⚠ CAUTION

Bleed air from the brake system after reassembling the master cylinder. (👉 2-19 and 2-20)

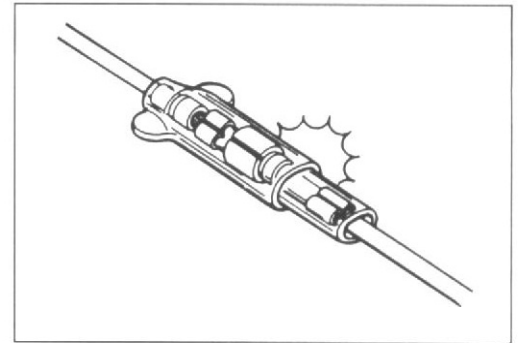


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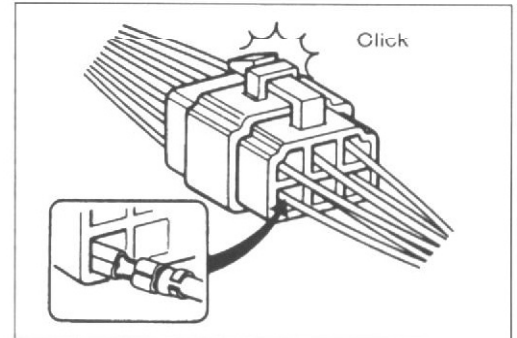
CAUTIONS IN SERVICING CONNECTORS

- When disconnecting a connector, be sure to hold the terminals; do not pull the lead wires.
- When connecting a connector, push it in so it is firmly attached.
- Inspect the connector for corrosion, contamination and any breakage in the cover.



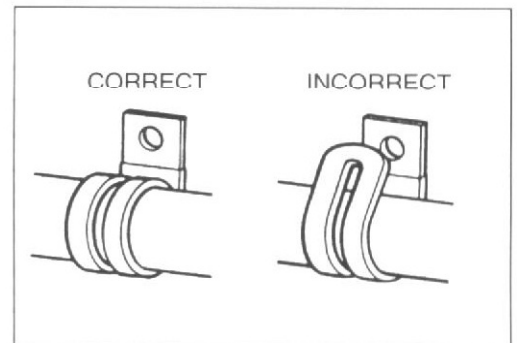
COUPLERS

- With a lock-type coupler, be sure to release the lock before disconnecting it. When connecting a coupler, push it in until the lock clicks shut.
- When disconnecting a coupler, be sure to hold the coupler; do not pull the lead wires.
- Inspect each terminal on the coupler for looseness or bends.
- Inspect each terminal for corrosion and contamination.



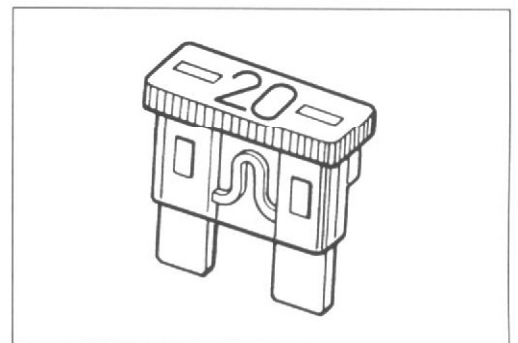
CLAMPS

- Refer to the "WIRE HARNESS, CABLE, AND HOSE ROUTING" section for proper clamping procedures. (☞ 8-12 to 8-18)
- Bend the clamp properly, as shown in the illustration.
- When clamping the wire harness, do not allow it to hang down.
- Do not use wire or any substitutes for the band-type clamp.



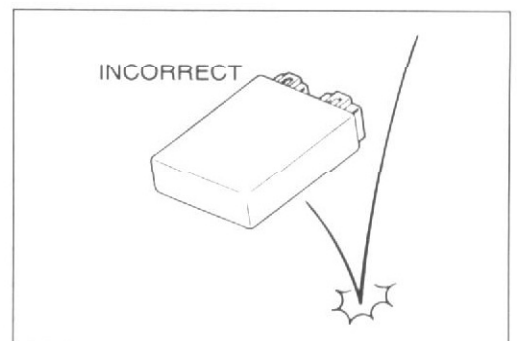
FUSE

- When a fuse blows, always investigate the cause, correct the problem, and then replace the fuse.
- Do not use a fuse of a different capacity.
- Do not use any substitutes for the fuse (e.g., wire).



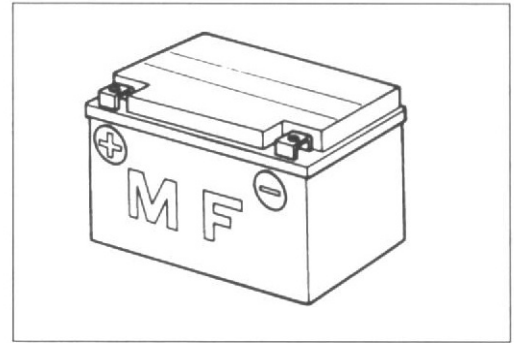
SEMICONDUCTOR EQUIPPED PARTS

- Do not drop any part that contains a semiconductor (e.g., CDI unit, regulator/rectifier).
- When inspecting the part, follow the inspection instructions carefully. Neglecting proper procedures may cause this part to be damaged.



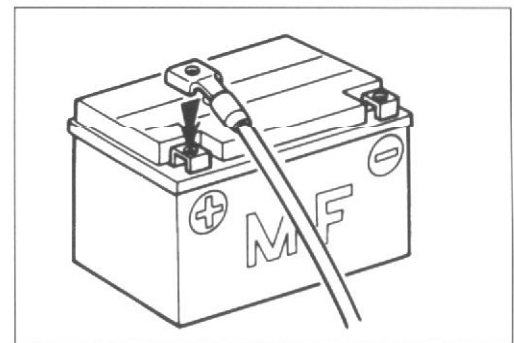
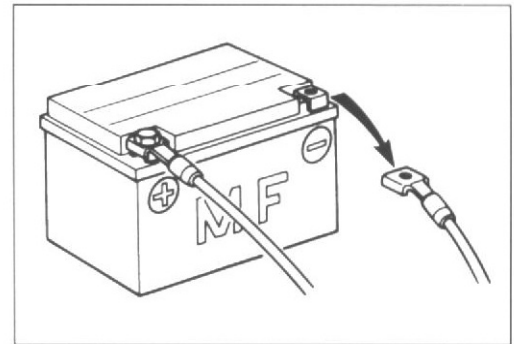
BATTERY

- The battery has been pre-filled with electrolyte so there is no need to add fluid at any time.
- The MF battery used in this motorcycle does not require maintenance (e.g., electrolyte level inspection, distilled water replenishment).
- During normal charging, no hydrogen gas is produced. However, if the battery is overcharged, hydrogen gas may be produced. Therefore, make sure that there are no fire or spark sources (e.g., short circuit) nearby when charging the battery.
- Be sure to recharge the battery in a well-ventilated and open area.
- Note that the charging system for the MF battery is different from that of a conventional battery. Do not replace the MF battery with a conventional battery.



CONNECTING THE BATTERY

- When disconnecting terminals from the battery for disassembly or servicing, be sure to disconnect the \ominus battery lead wire, first.
- When connecting the battery lead wires, be sure to connect the \oplus battery lead wire, first.
- If the terminal is corroded, remove the battery, pour warm water over it and clean it with a wire brush.
- After connecting the battery, apply a light coat of grease to the battery terminals.
- Install the cover over the \oplus battery terminal.



WIRING PROCEDURE

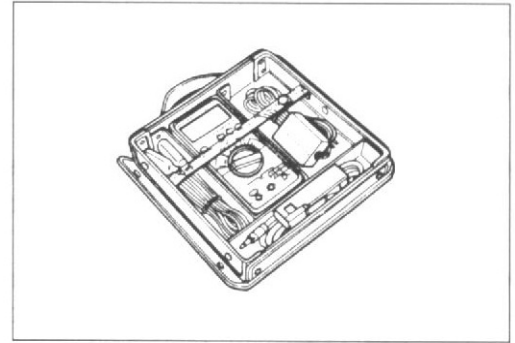
- Properly route the wire harness according to the "WIRE HARNESS, CABLE, AND HOSE ROUTING" section. (🔧 8-12 to 8-20)

USING THE MULTI CIRCUIT TESTER

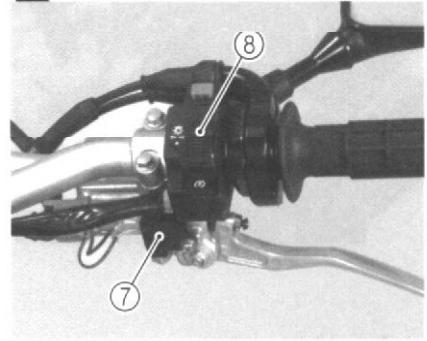
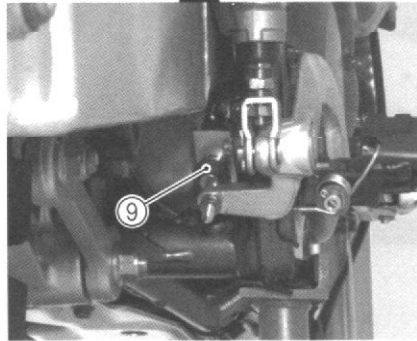
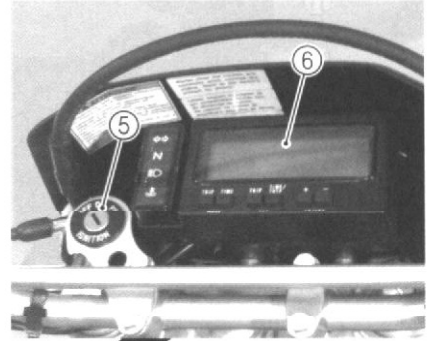
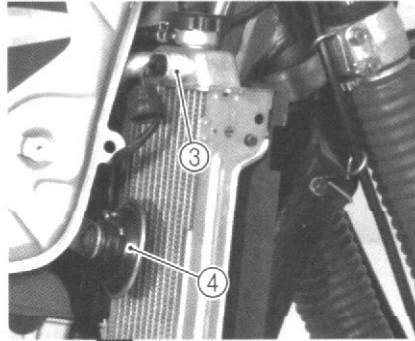
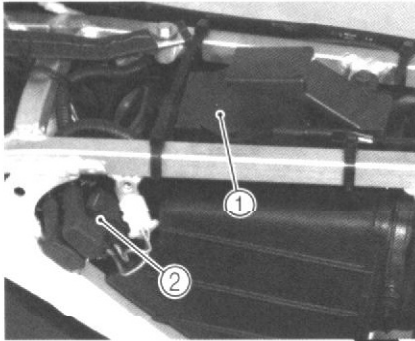
- Properly use the multi circuit tester \oplus and \ominus probes. Improper use can cause damage to the motorcycle and tester.
- If the voltage and current values are not known, begin measuring in the highest range.
- When measuring the resistance, make sure that no voltage is applied. If voltage is applied, the tester will be damaged.
- After using the tester, be sure to turn the switch to the "OFF" position.

⚠ CAUTION

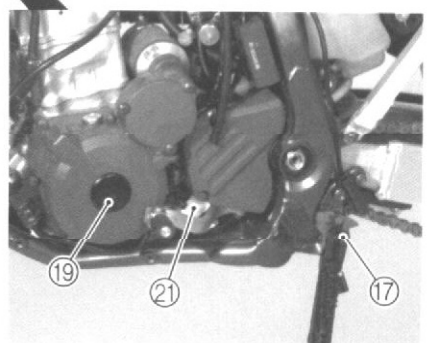
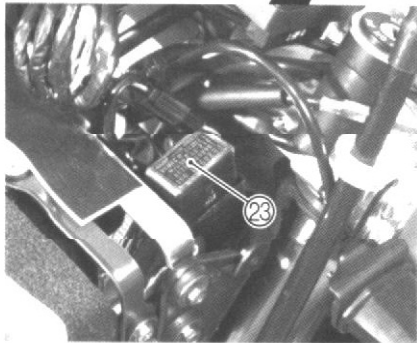
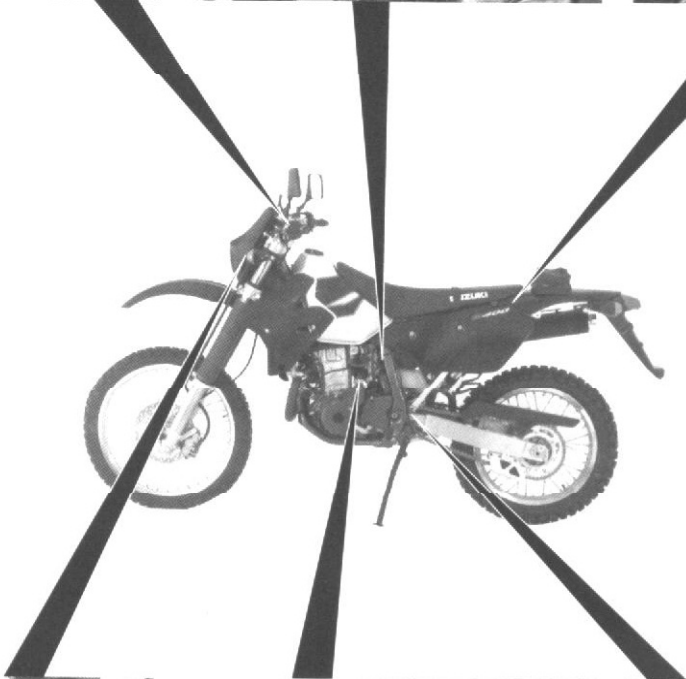
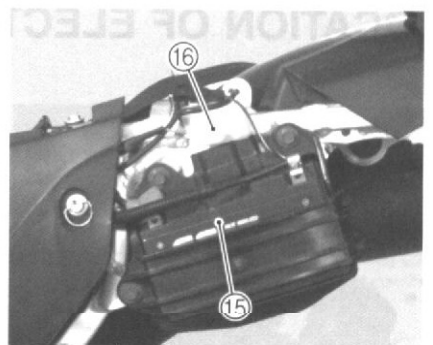
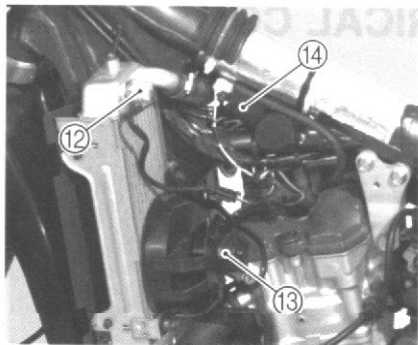
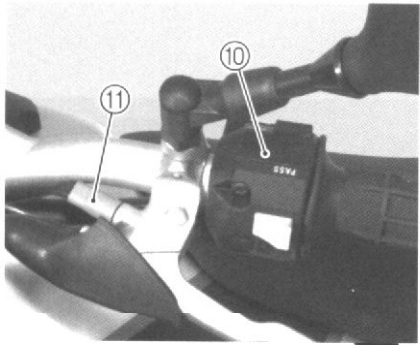
Before using the multi circuit tester, be sure to read its instruction manual.



LOCATION OF ELECTRICAL COMPONENTS



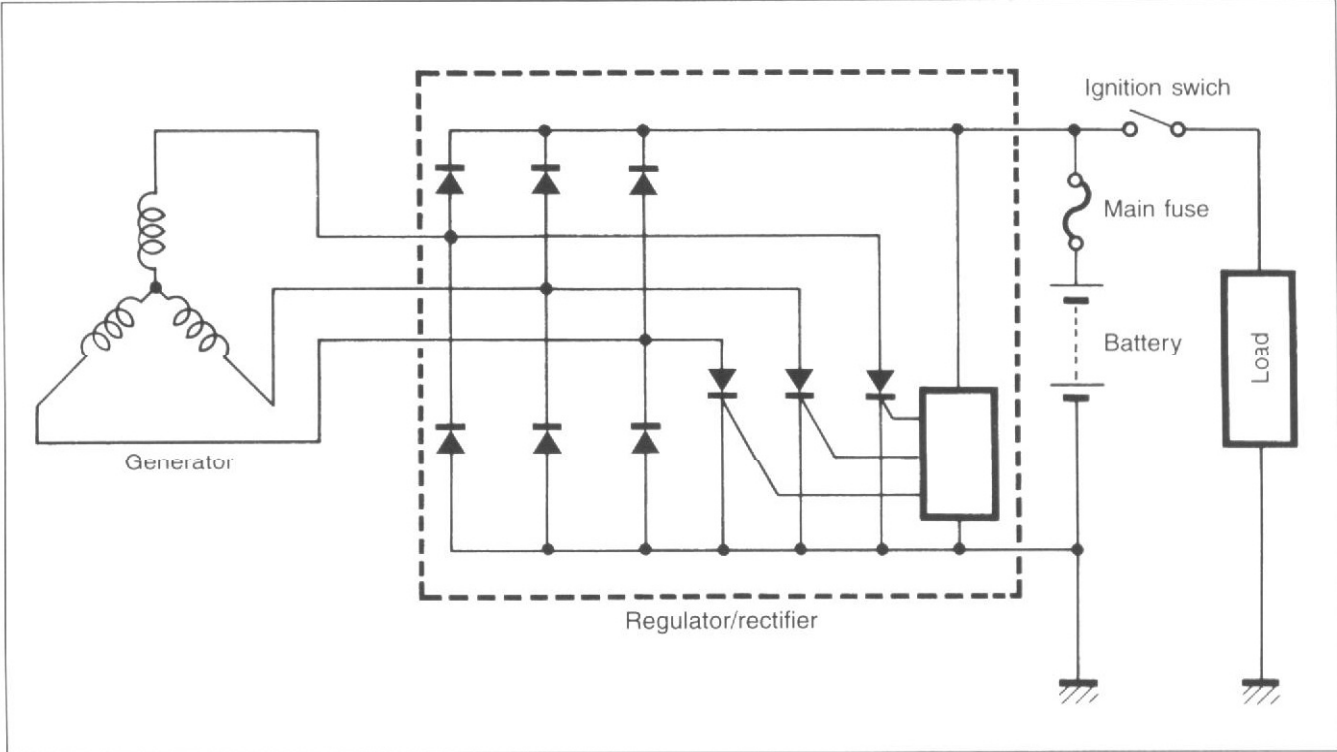
- ① CDI unit
- ② Starter relay
- ③ Engine coolant temperature thermoswitch
- ④ Horn
- ⑤ Ignition switch
- ⑥ Speedometer
- ⑦ Front brake light switch
- ⑧ Right handlebar switch
- ⑨ Rear brake light switch



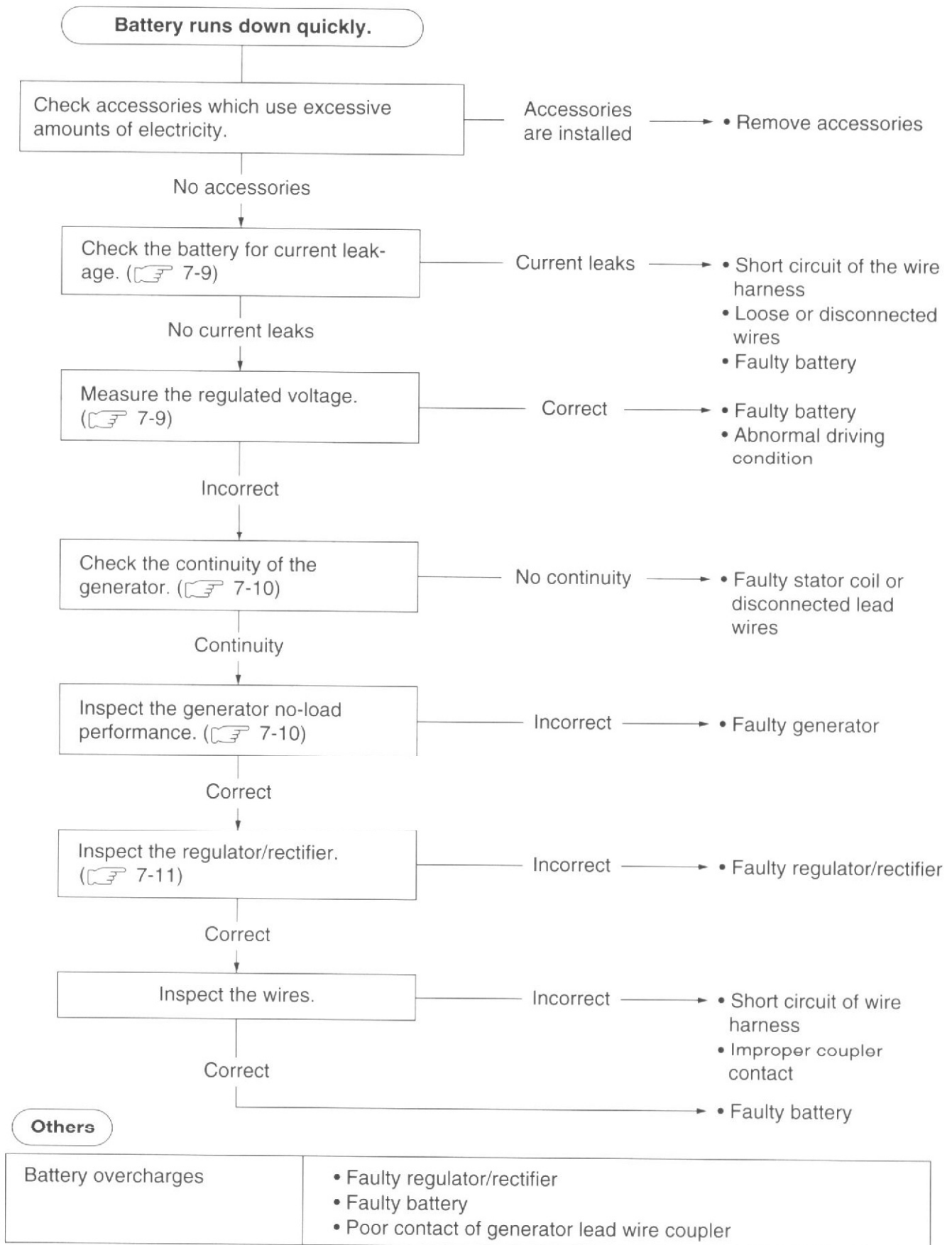
- ⑩ Left handlebar switch
- ⑪ Clutch lever position switch
- ⑫ Cooling fan thermoswitch
- ⑬ Cooling fan motor
- ⑭ Ignition coil
- ⑮ Battery
- ⑯ Fuse box
- ⑰ Side stand switch
- ⑱ Regulator/rectifier
- ⑲ Generator
- ⑳ Starter motor
- ㉑ Neutral switch
- ㉒ Throttle position sensor
- ㉓ Turn signal/side stand relay
- ㉔ Piston valve control solenoid

CHARGING SYSTEM DESCRIPTION

The charging system consists of a generator, regulator/rectifier, and battery. The AC current, which is generated by the generator, is converted by the regulator/rectifier into DC current. The regulator/rectifier is one unit with two functions. The regulator prevents overcharging of the battery by grounding the excessive AC current. The rectifier changes the AC current, which is produced by the generator, to the DC current. All of these components work together to maintain a correct and constant voltage and to prevent the battery from overcharging.



TROUBLESHOOTING



INSPECTION

BATTERY CURRENT LEAKAGE

- Turn the ignition switch to the "OFF" position.
- Remove the battery cover. (☞ 6-2)
- Disconnect the - battery lead wire.

Measure the current between the - battery terminal and the - battery lead wire using the multi circuit tester. If the reading exceeds the specified value, leakage is evident.

TOOL 09900-25008: Multi circuit tester set

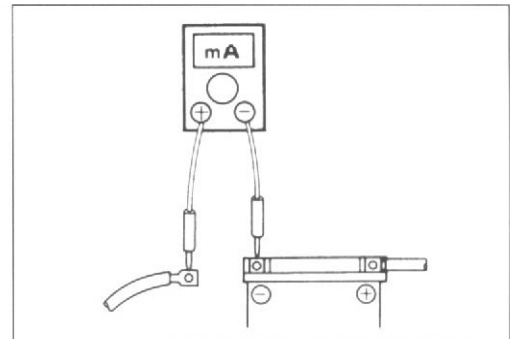
TESTER Tester knob indication: Current (— , 20mA)

DATA Battery current (leak): Under 1mA

CAUTION

- * Because the current leak might be large, turn the multi circuit tester to the high range first to avoid damage to the tester.
- * Do not turn the ignition switch to the "ON" position when measuring the current.

When checking to find the excessive current leakage, remove the couplers and connectors, one by one, checking each part.



REGULATED VOLTAGE

- Remove the battery cover. (☞ 6-2)
- Start the engine and run the engine at 5 000 r/min.

Measure the DC voltage between the + and - battery terminals using the multi circuit tester. If the voltage is not within the specified value, inspect the generator and regulator/rectifier. (☞ 7-10 and 7-11)

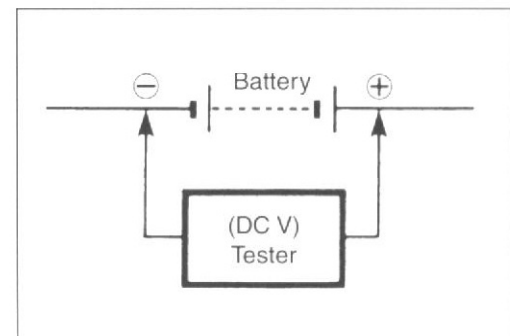
NOTE:

When performing this measurement, make sure that the battery is fully charged.

TOOL 09900-25008: Multi circuit tester set

TESTER Tester knob indication: Voltage (—)

DATA Charging output (regulated voltage)
Standard: 13.5 – 15.0 V at 5 000 r/min



STATOR COIL RESISTANCE

- Remove the left frame cover. (☞ 6-2)
- Disconnect the stator coil lead wire coupler.

Measure the resistance between the three lead wires using the multi circuit tester. If the resistance is not within the specified value, replace the stator coil with a new one. Also, check that the generator core is insulated.

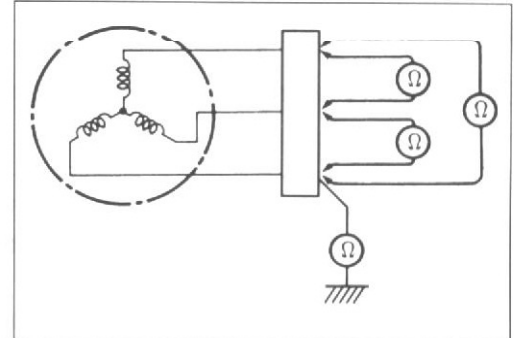
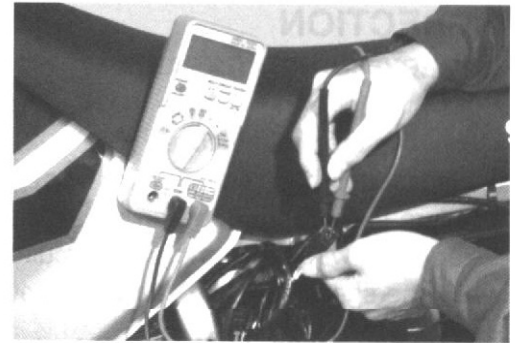
TOOL 09900-25008: Multi circuit tester set

Tester knob indication: Resistance (Ω)

DATA Stator coil resistance

Standard: 0.50 – 1.25 Ω (Yellow – Yellow)

∞ Ω (Yellow – Ground)



AC GENERATOR NO-LOAD PERFORMANCE

- Remove the left frame cover. (☞ 6-2)
- Disconnect the stator coil lead wire coupler.
- Start the engine and run it at 5 000 r/min.

Measure the AC voltage between the lead wires of the generator using the multi circuit tester. If the voltage is under the specified value, replace the AC generator with a new one.

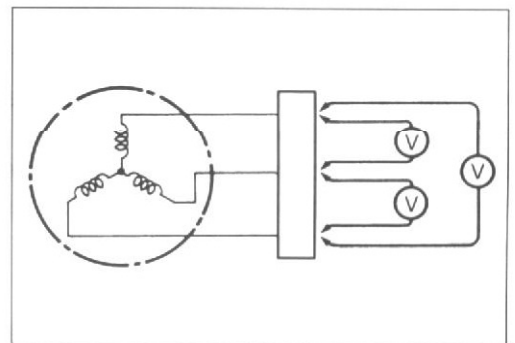
TOOL 09900-25008: Multi circuit tester set

Tester knob indication: Voltage (~)

DATA AC generator no-load performance

Standard:

More than 75 V (AC) at 5 000 r/min



REGULATOR/RECTIFIER

- Remove the left frame cover. (☞ 6-2)
- Disconnect the regulator/rectifier couplers.

Measure the voltage between the terminals using the multi circuit tester, as indicated in the table below. If the voltage is not within the specified value, replace the regulator/rectifier with a new one.

 **09900-25008: Multi circuit tester set**

 **Tester knob indication: Diode test (←)**



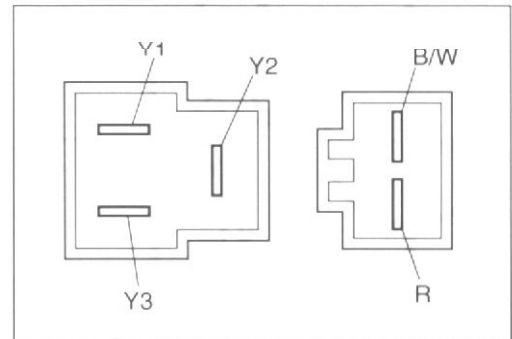
Unit: V

| | | ⊕ Tester probe | | | | |
|----------------|----------------|----------------|-----------|----------------|----------------|----------------|
| ⊖ Tester probe | | R | B/W | Y ₁ | Y ₂ | Y ₃ |
| | R | | 0.5 – 1.2 | 0.4 – 0.7 | 0.4 – 0.7 | 0.4 – 0.7 |
| | B/W | 1.4 – 1.5 | | 1.4 – 1.5 | 1.4 – 1.5 | 1.4 – 1.5 |
| | Y ₁ | 1.4 – 1.5 | 0.4 – 0.7 | | 1.4 – 1.5 | 1.4 – 1.5 |
| | Y ₂ | 1.4 – 1.5 | 0.4 – 0.7 | 1.4 – 1.5 | | 1.4 – 1.5 |
| | Y ₃ | 1.4 – 1.5 | 0.4 – 0.7 | 1.4 – 1.5 | 1.4 – 1.5 | |

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

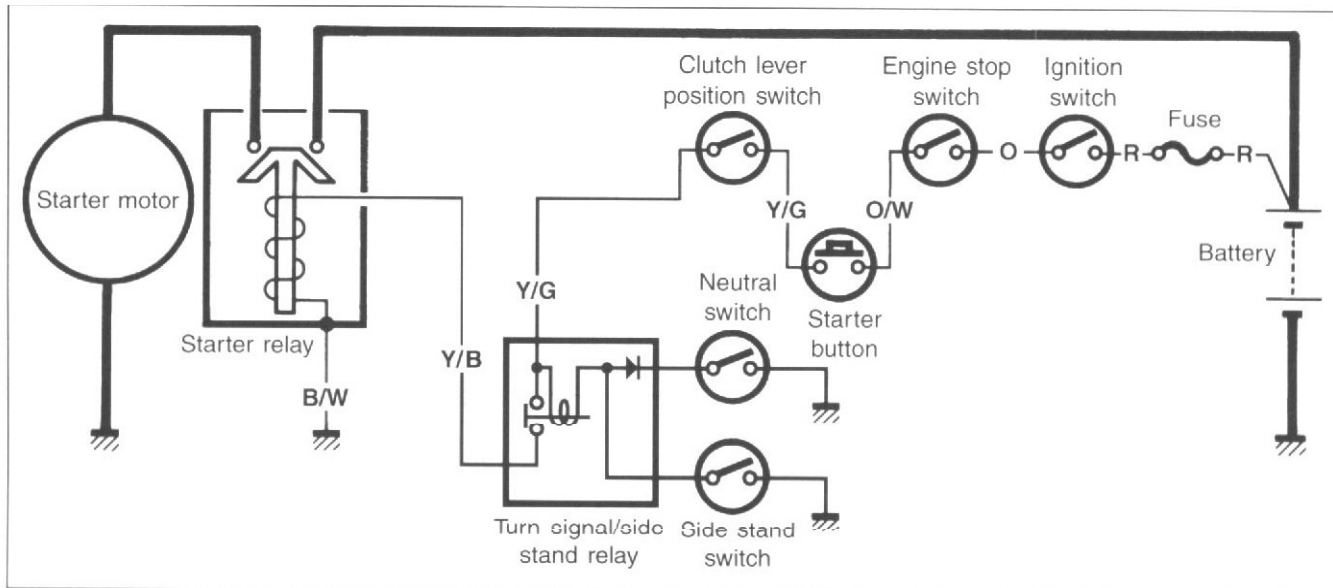
NOTE:

If the tester reads under 1.4 V, disconnect the tester probes from the wire leads, and then replace the multi circuit tester's battery.

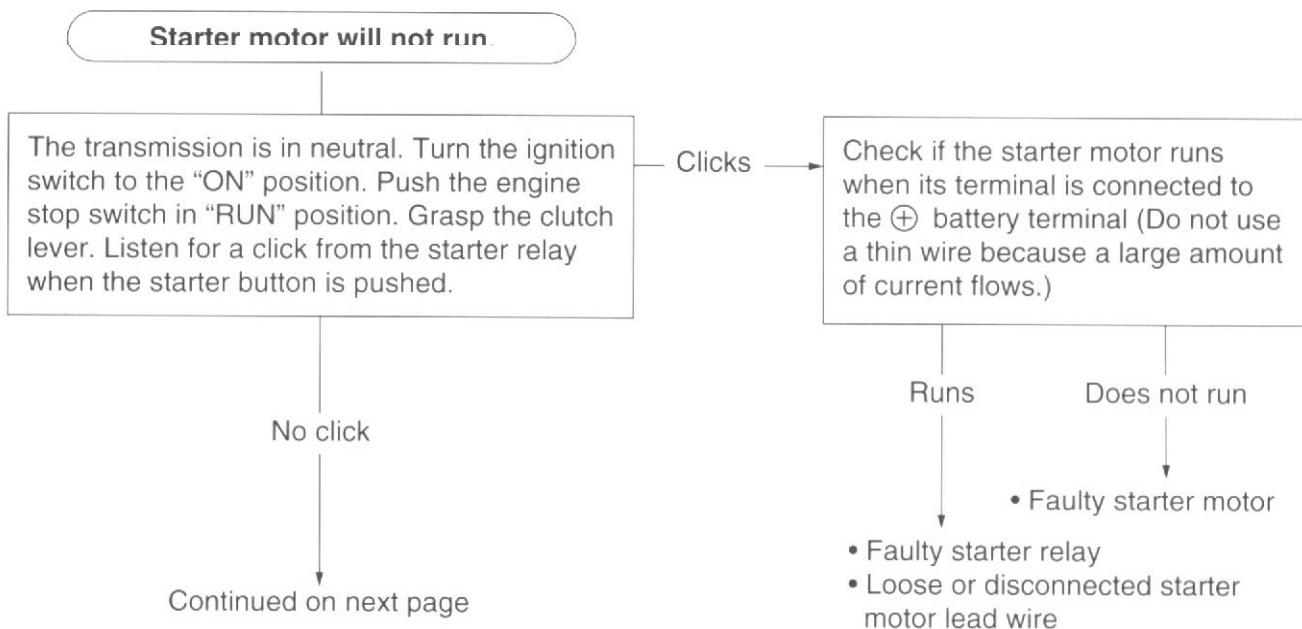


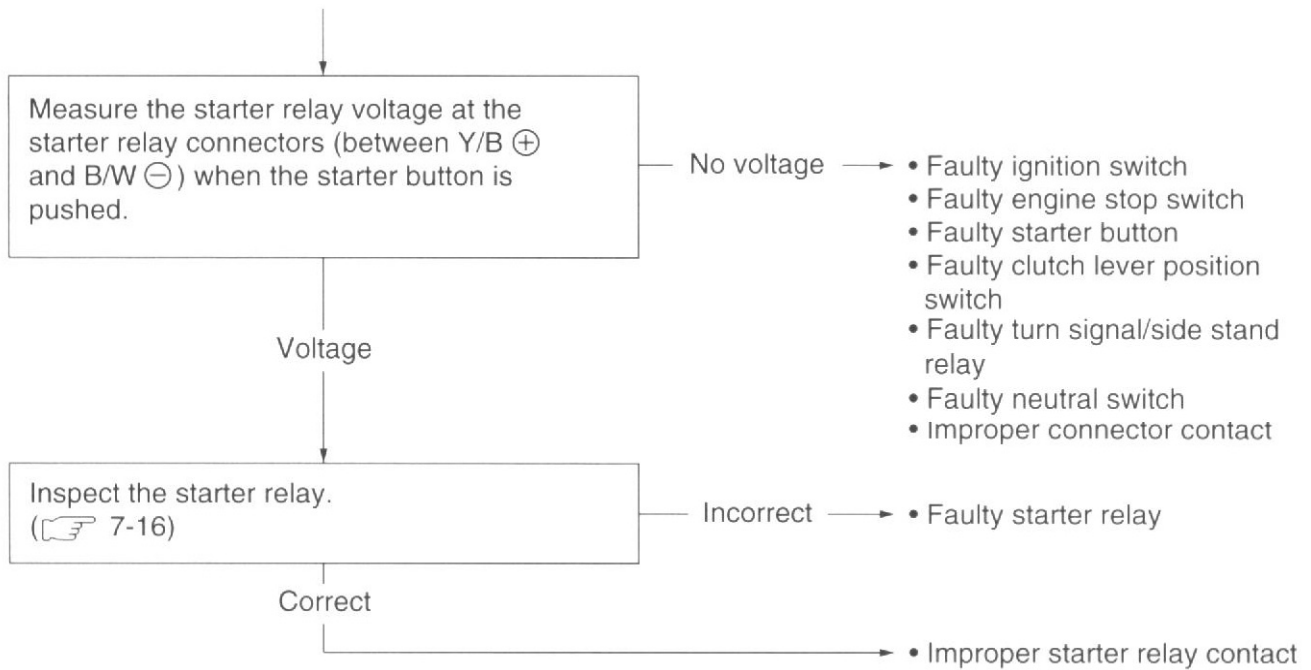
STARTER SYSTEM DESCRIPTION

The starter system consists of the following components: the starter motor, starter relay, side stand switch, neutral switch, turn signal/side stand relay, clutch lever position switch, starter button, engine stop switch, ignition switch, and battery. Pressing the starter button energizes the starter relay, causing the contact points to close, thus, completing the circuit from the starter motor to the battery. The starter motor draws about 80 amperes to start the engine.

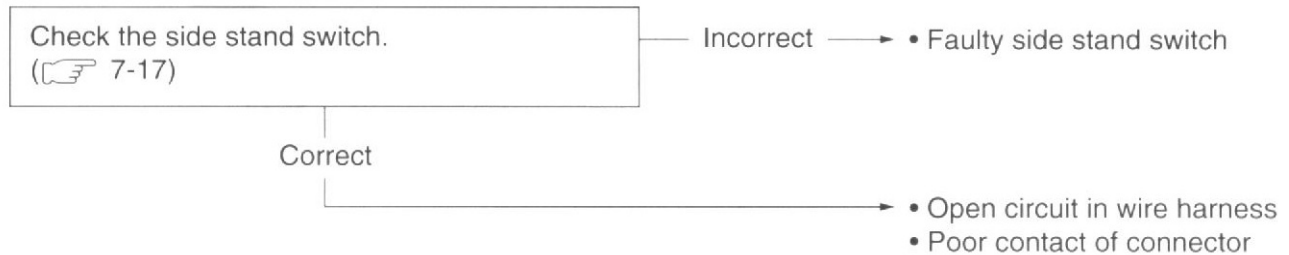


TROUBLESHOOTING





The starter motor runs when the transmission is in neutral, but does not run when the transmission is in any position other than neutral, with the side stand up.



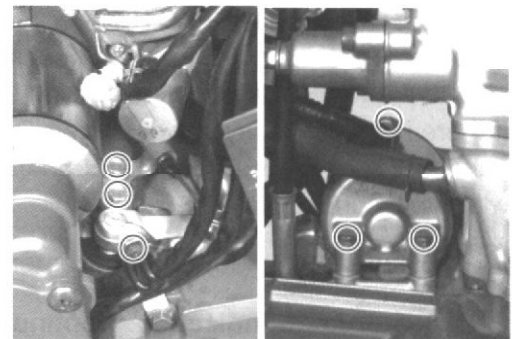
Others

Engine does not turn though the starter motor runs.

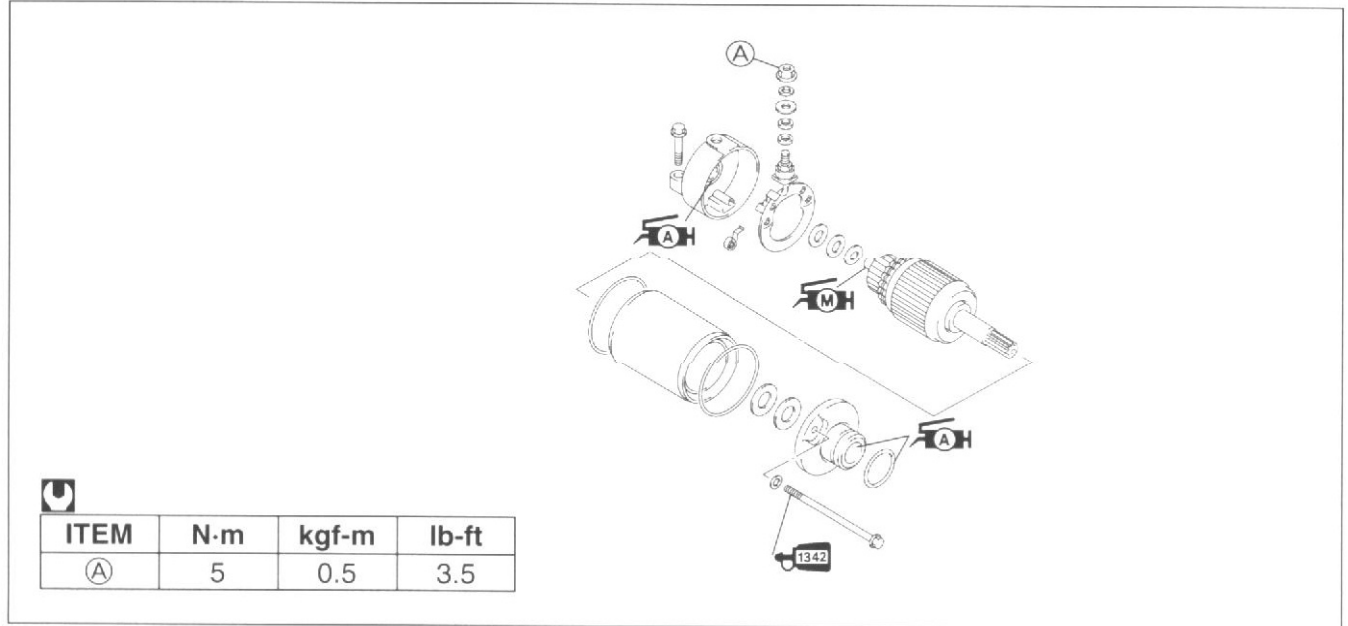
- Faulty starter clutch

STARTER MOTOR REMOVAL AND DISASSEMBLY

- Remove the exhaust pipe/muffler. (👉 3-5)
- Remove the clutch cable guide mounting bolt.
- Disconnect the starter motor lead wire.
- Remove the starter motor.



- Disassemble the starter motor, as shown.

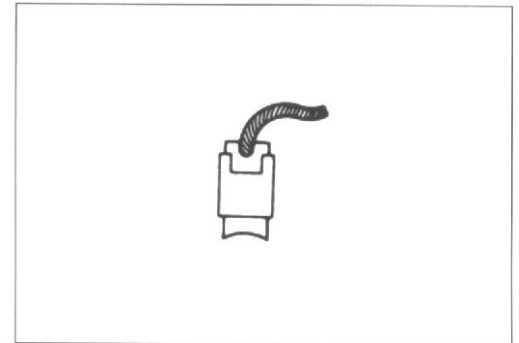


STARTER MOTOR INSPECTION

CARBON BRUSHES

Inspect the carbon brushes for abnormal wear, cracks, or smoothness in the brush holder.

If any damages are found, replace the brush assembly with a new one.



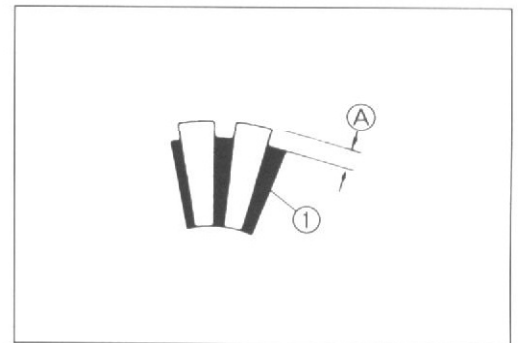
COMMUTATOR

Inspect the commutator for discoloration, abnormal wear or undercut Ⓐ.

If abnormal wear is found, replace the armature with a new one.

If the commutator surface is discolored, polish it with #400 sandpaper and wipe it using a clean, dry cloth.

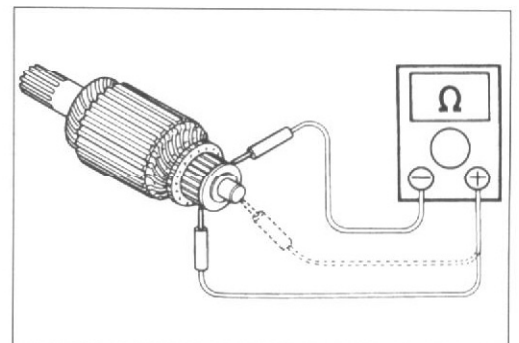
If there is no undercut, scrape out the insulator ① with a saw blade.



ARMATURE COIL INSPECTION

Check for continuity between each segment and between each segment and the armature shaft using the multi circuit tester.

If there is no continuity between the segments or there is continuity between the segments and shaft, replace the armature with a new one.



TOOL 09900-25008: Multi circuit tester set

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

OIL SEAL

Check the seal lip for damage or leakage. If any damages are found, replace the housing end (inside) of the starter motor with a new one.

**STARTER MOTOR REASSEMBLY AND REMOUNTING**

Reassemble and remount the starter motor in the reverse order of removal and disassembly. Pay special attention to the following points:

⚠ CAUTION

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

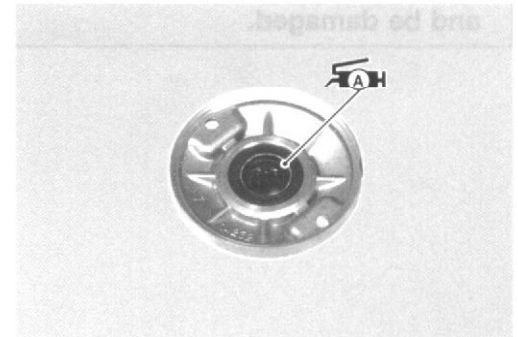
- Apply SUZUKI SUPER GREASE "A" to the lip of the oil seal.

For USA

 99000-25030: SUZUKI SUPER GREASE "A"

For the other countries

 99000-25010: SUZUKI SUPER GREASE "A"



- Apply a small quantity of SUZUKI MOLY PASTE to the armature shaft.

 99000-25140: SUZUKI MOLY PASTE

- Align the match marks on the starter motor case with the match mark on the housing end.
- Apply a small quantity of THREAD LOCK "1342" to the starter motor housing bolts.

 99000-32050: THREAD LOCK "1342"

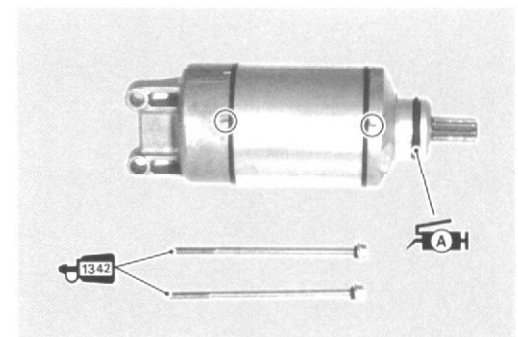
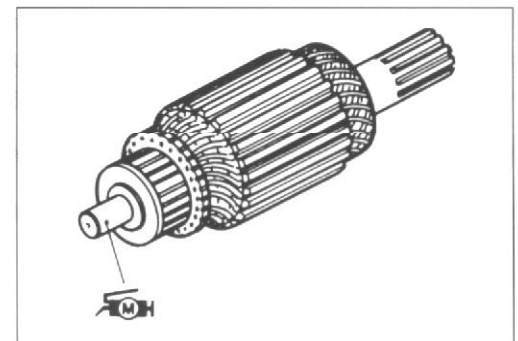
- Apply SUZUKI SUPER GREASE "A" to the O-ring.

For USA

 99000-25030: SUZUKI SUPER GREASE "A"

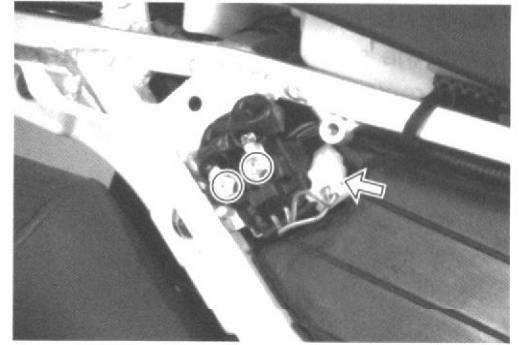
For the other countries

 99000-25010: SUZUKI SUPER GREASE "A"



STARTER RELAY INSPECTION

- Remove the right frame cover. (☞ 6-2)
- Disconnect the starter motor lead wire, battery lead wire, and starter relay coupler at the starter relay.
- Remove the starter relay.



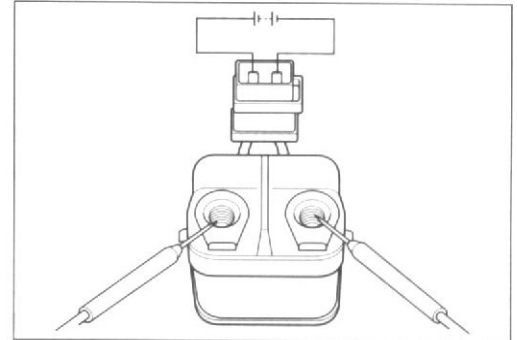
Apply 12 V to the terminals and check for continuity between the positive and negative terminals using the multi circuit tester. If the starter relay clicks and continuity is found, the relay is ok.

TOOL 09900-25008: Multi circuit tester set

Tester knob indication: Continuity test (•)))

CAUTION

Do not apply battery voltage to the starter relay for more than five seconds, since the relay coil may overheat and be damaged.

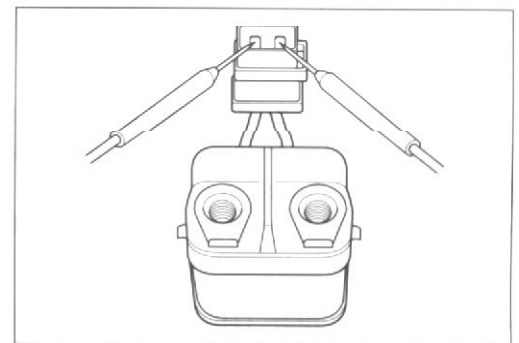


Measure the relay coil resistance between the terminals using the multi circuit tester. If the resistance is not within the specified value, replace the starter relay with a new one.

TOOL 09900-25008: Multi circuit tester set

Tester knob indication: Resistance (Ω)

DATA Starter relay resistance
Standard: 3 – 5 Ω



SIDE STAND/IGNITION INTERLOCK SYSTEM PARTS INSPECTION

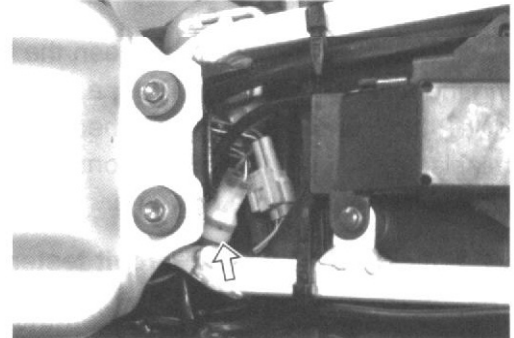
Check the interlock system for proper operation. If the interlock system does not operate properly, check each component for damage or abnormalities. If any abnormality is found, replace the component with a new one.

NEUTRAL INDICATOR LIGHT SWITCH

The neutral indicator light switch coupler is located under the seat.

- Remove the seat. (🔧 6-2)
- Disconnect the neutral indicator light switch coupler and measure the continuity between the Blue and Black/White lead wires with the transmission in neutral.

| | Blue | Black/White |
|----------------------|------|-------------|
| ON (in neutral) | ○ | ○ |
| OFF (not in neutral) | ○ | ○ |



SIDE STAND SWITCH

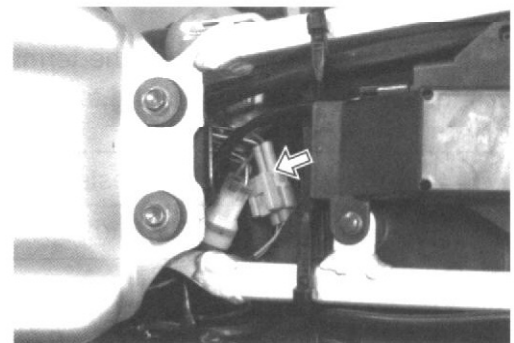
The side stand switch coupler is located under the seat.

- Remove the seat. (🔧 6-2)
- Disconnect the side stand switch coupler and measure the voltage between the Green and Black/White lead wires with the side stand up.

TOOL 09900-25008: Multi circuit tester set

Tester knob indication: Diode test (↔)

| | Green (⊕ probe) | Black/White (⊖ probe) |
|-----------------------|--------------------|--------------------------|
| ON (side stand up) | 0.4 – 0.6 V | |
| OFF (side stand down) | 1.4 – 1.5 V | |



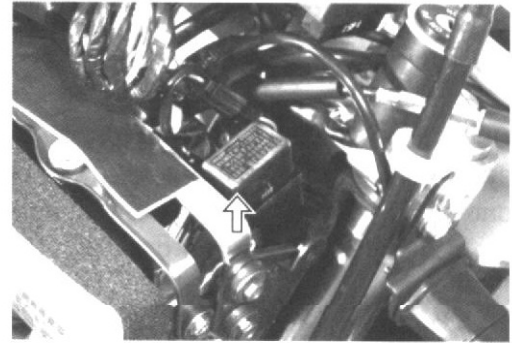
NOTE:

If the multi circuit tester reads under 1.4 V, replace its battery when the tester probes are not connected.

TURN SIGNAL/SIDE STAND RELAY AND DIODE

The turn signal/side stand relay, which is located behind the headlight bracket, is composed of the turn signal relay/side stand relay and diode.

- Remove the headlight assembly. (☞ 7-29)
- Remove the turn signal/side stand relay.

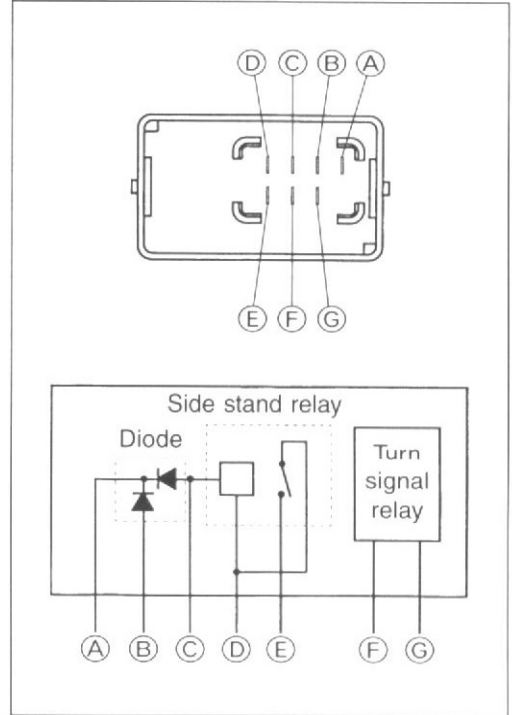


Side stand relay

First, check the insulation between the (D) and (E) terminals using the multi circuit tester. Then, apply 12 V to terminals (D) and (C) (+ to (D) and - to (C)) and check the continuity between terminals (D) and (E). If there is no continuity, replace the turn signal/side stand relay with a new one.

TOOL 09900-25008: Multi circuit tester set

Tester knob indication: Continuity test (•))



Diode Inspection

Measure the voltage between the terminals using the multi circuit tester. Refer to the following table.

Unit: V

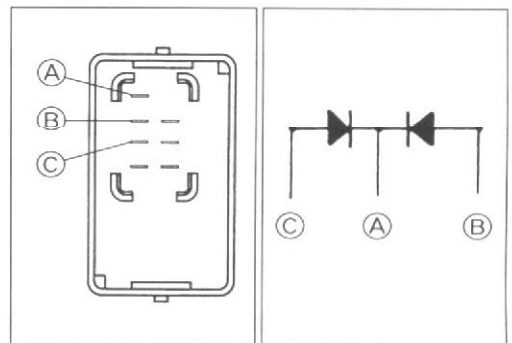
| Tester probe | ⊕ Tester probe | |
|--------------|----------------|-----------|
| | (C), (B) | (A) |
| (C), (B) | | 1.4 - 1.5 |
| (A) | 0.4 - 0.6 | |

TOOL 09900-25008: Multi circuit tester set

Tester knob indication: Diode test (←)

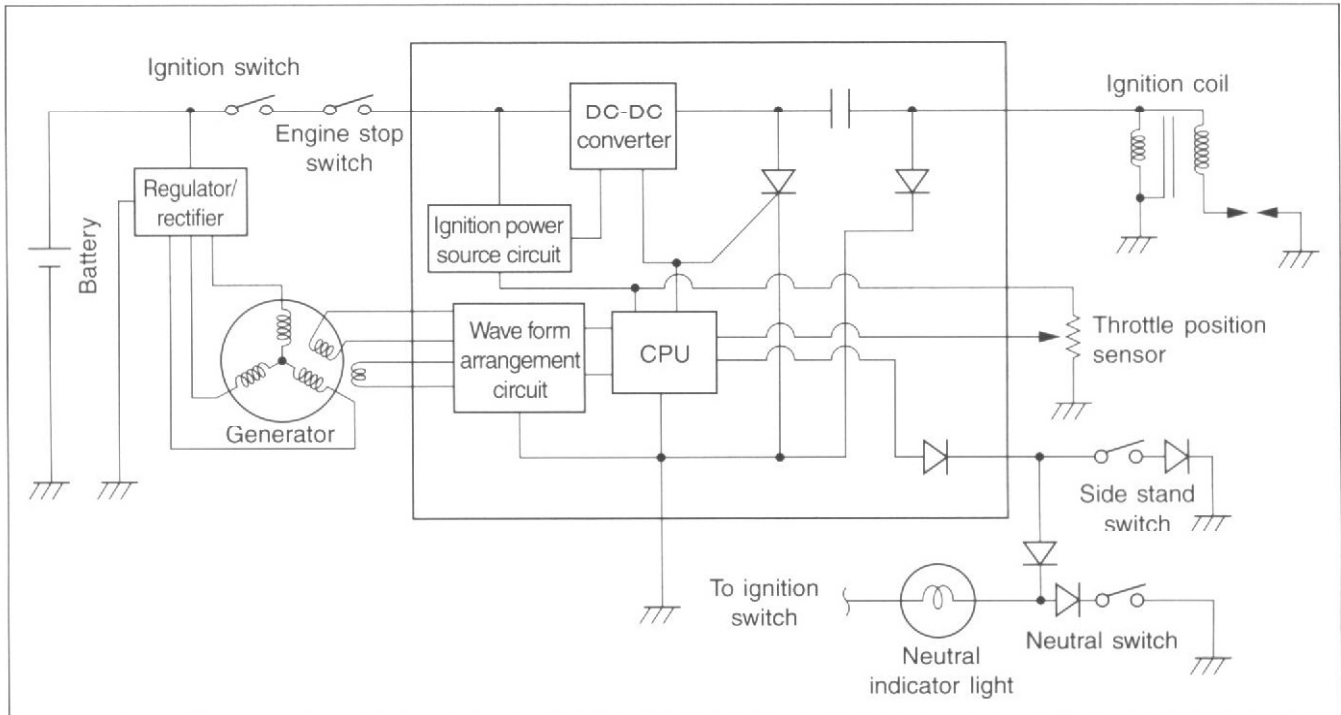
NOTE:

If the multi circuit tester reads under 1.4 V, replace its battery when the tester probes are not connected.



IGNITION SYSTEM DESCRIPTION

In the capacitor discharged ignition system, the electrical energy generated by the generator charges the capacitor. This energy is released in a single surge at the specified ignition timing point and the current flows through the primary side of the ignition coil. A high voltage is induced in the secondary windings of the ignition coil, resulting in a strong spark between the spark plug gap.



TROUBLESHOOTING

No spark or poor spark

Check the ignition system couplers for poor connections.

Loose

- Improper coupler connection

Correct

Measure the battery voltage between input lead wires (O/W and B/W) at the CDI unit with the ignition switch in the "ON" position and the engine stop switch in the "RUN" position.

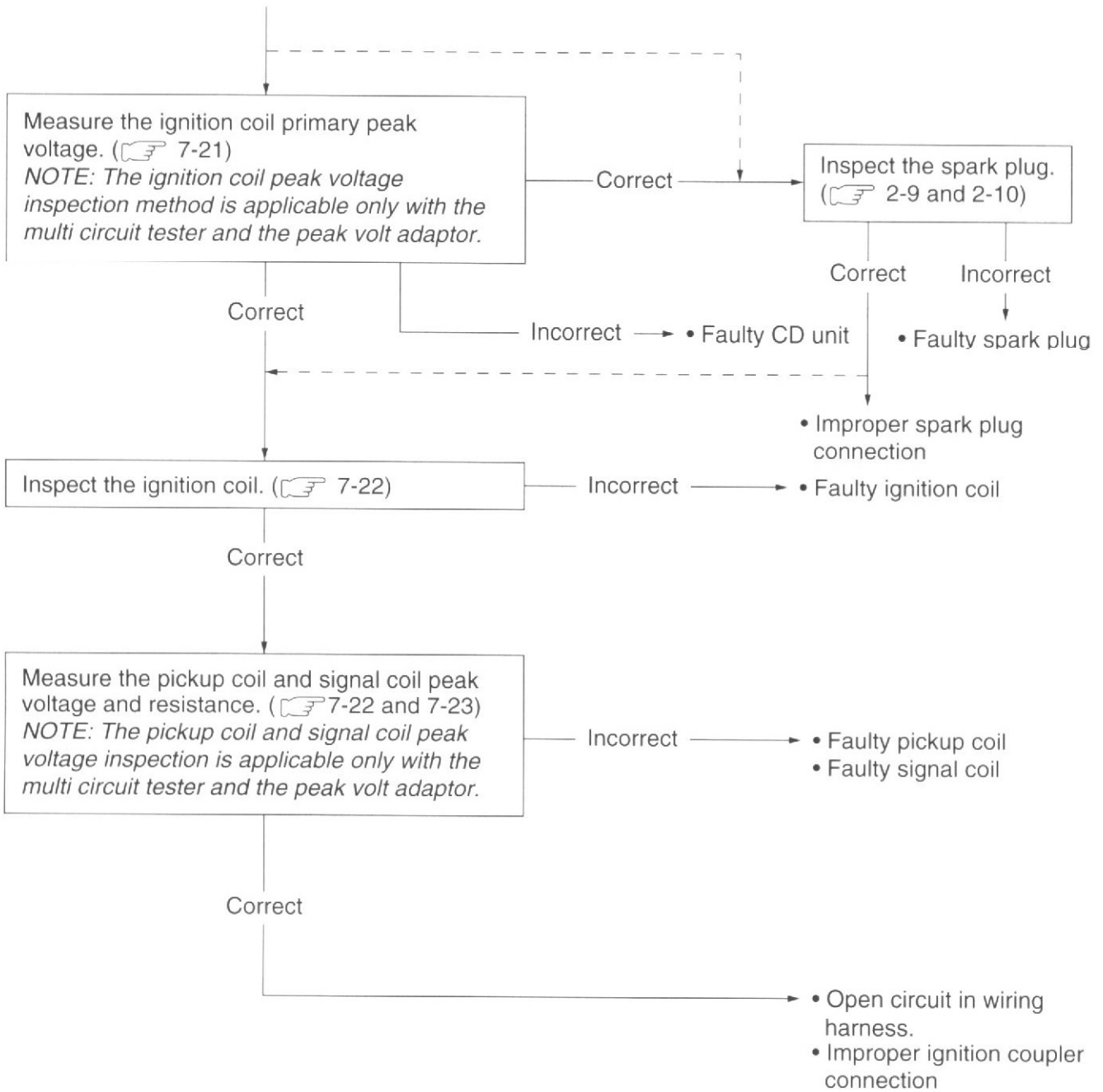
Incorrect

- Faulty ignition switch
- Faulty engine stop switch
- Broken wire harness or poor connection of related circuit couplers

Correct

Continued on next page

* Make sure the transmission is in the neutral position. Also, make sure the fuse is not blown and the battery is fully charged before diagnosing.



INSPECTION

IGNITION COIL PRIMARY PEAK VOLTAGE

- Remove the fuel tank. (☞ 4-2)
- Remove the spark plug cap and spark plug.
- Connect a new spark plug to the spark plug cap and ground it to the cylinder head.

NOTE:

Make sure that the spark plug cap and spark plug are connected properly.

CAUTION

Do not let the spark plug touch the cylinder head cover, otherwise the cylinder head cover may be damaged.

Measure ignition coil primary peak voltage using the multi circuit tester in the following procedure.

- Connect the multi circuit tester with the peak voltage adaptor as follows.

Ignition coil:

Black/White terminal – Black/Yellow
 (⊕ probe) (⊖ probe)

NOTE:

Do not disconnect the ignition coil primary wire.

TOOL 09900-25008: Multi circuit tester set

CAUTION

Before using the multi circuit tester and peak volt adaptor, be sure to refer to the appropriate instruction manual.

- Shift the transmission into neutral, and then turn the ignition switch to the "ON" position.
- Pull the clutch lever.
- Press the starter button and allow the engine to crank for a few seconds, and then measure the ignition coil primary peak voltage.
- Repeat the above procedure a few times and measure the highest ignition coil primary peak voltage.

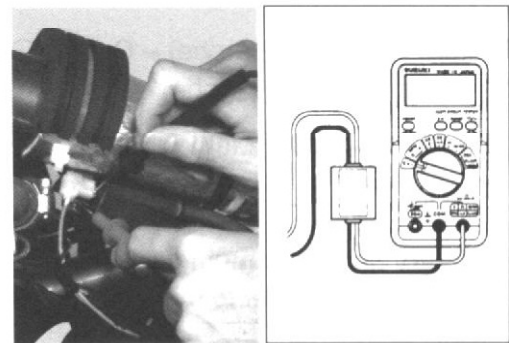
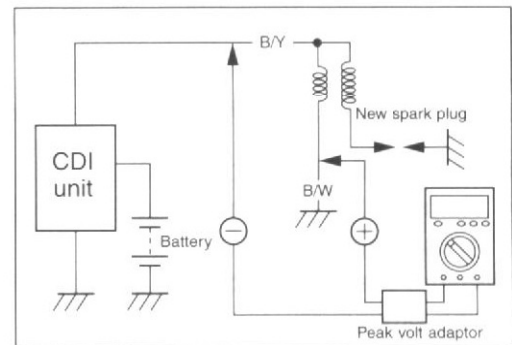
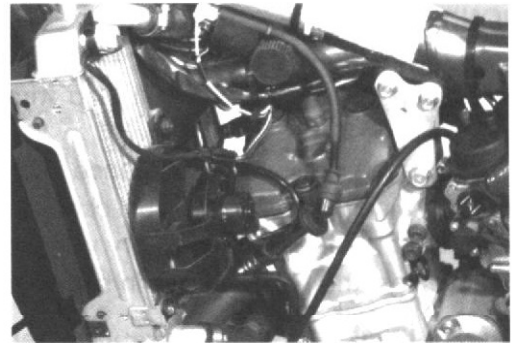
Tester knob indication: Voltage (V)

DATA Ignition coil primary peak voltage: More than 150 V

WARNING

While testing, do not touch the tester probes and spark plug to prevent receiving an electric shock.

If the voltage is lower than the specified values, inspect the ignition coil. (☞ 7-22)



IGNITION COIL RESISTANCE

- Remove the fuel tank. (☞ 4-2)
- Disconnect the ignition coil lead wire, and then remove the ignition coil.

Measure the ignition coil resistance in both the primary and secondary windings using the multi circuit tester. If the resistance in both the primary and secondary windings is close to the specified values, the windings are in sound condition.

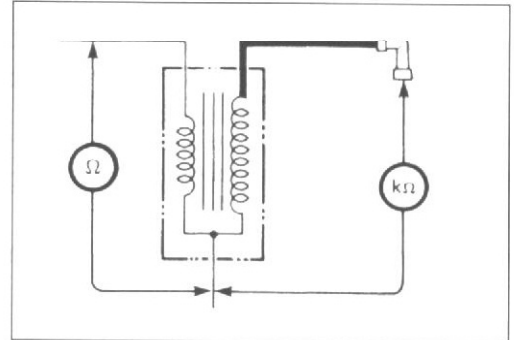
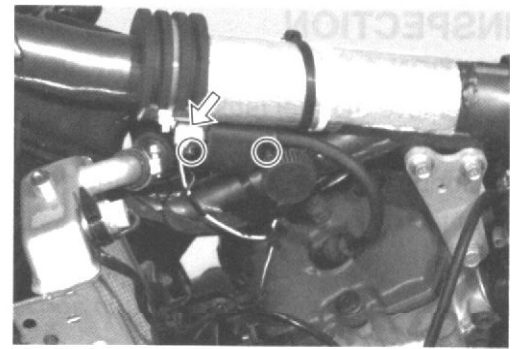
TOOL 09900-25008: Multi circuit tester set

Tester knob indication: Resistance (Ω)

DATA Ignition coil resistance

Primary: 0.1 – 1.0 Ω (terminal – ground)

Secondary: 12 – 20 k Ω (terminal – spark plug cap)



PICKUP COIL AND SIGNAL COIL PEAK VOLTAGE

NOTE:

Make sure that all of the couplers are connected properly.

- Remove the seat. (☞ 6-2)
- Remove the CDI unit cover ① and disconnect the wire harness coupler ②.

Measure the pickup coil and signal coil peak voltage in the following procedure.

- Connect the multi circuit tester with the peak volt adaptor as follows.

Pickup coil: Blue (+ probe) – Green (– probe)

Signal coil: Black (+ probe) – White (– probe)

TOOL 09900-25008: Multi circuit tester set

CAUTION

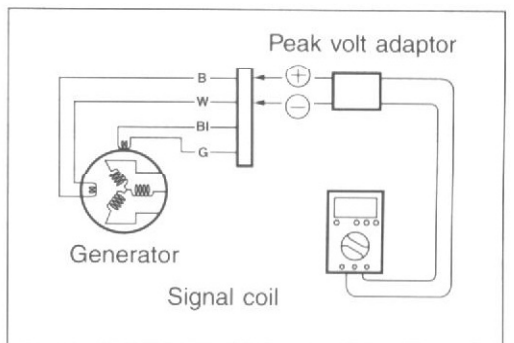
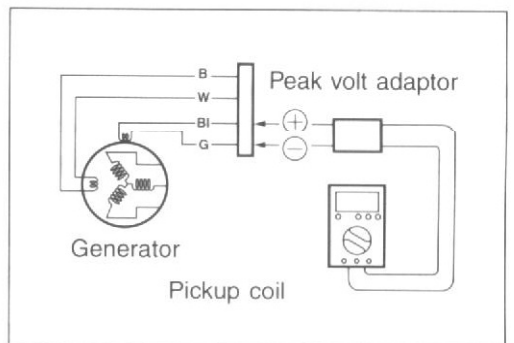
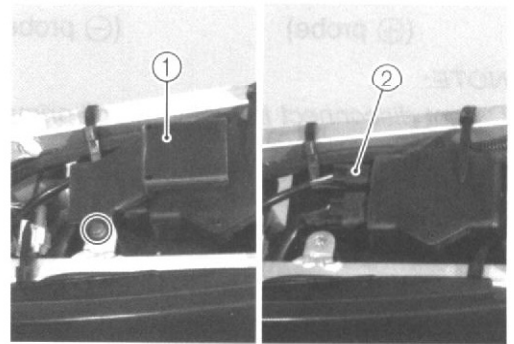
Before using the multi circuit tester and peak volt adaptor, be sure to refer to the appropriate instruction manual.

- Shift the transmission into neutral, and then turn the ignition switch to the “ON” position.
- Pull the clutch lever.
- Press the starter button and allow the engine to crank for a few seconds, and then measure the pickup coil and signal coil peak voltage.
- Repeat the above procedure a few times and measure the highest pickup coil and signal coil peak voltage.

Tester knob indication: Voltage (V)

DATA Pickup coil peak voltage: More than 5.0 V

Signal coil peak voltage: More than 1.4 V



PICKUP COIL AND SIGNAL COIL RESISTANCE

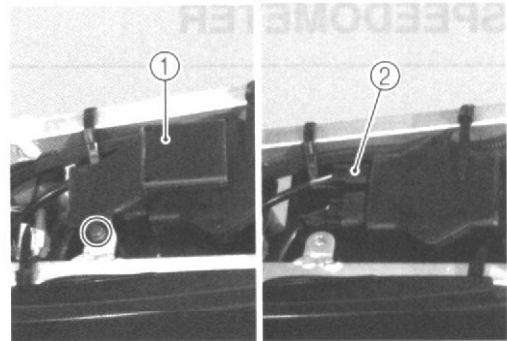
- Remove the seat. (☞ 6-2)
- Remove the CDI unit cover ① and disconnect the generator coupler ②.

Measure the resistance between the lead wires using the multi circuit tester. If the resistance is not within the specified value, the pickup coil and signal coil must be replaced.

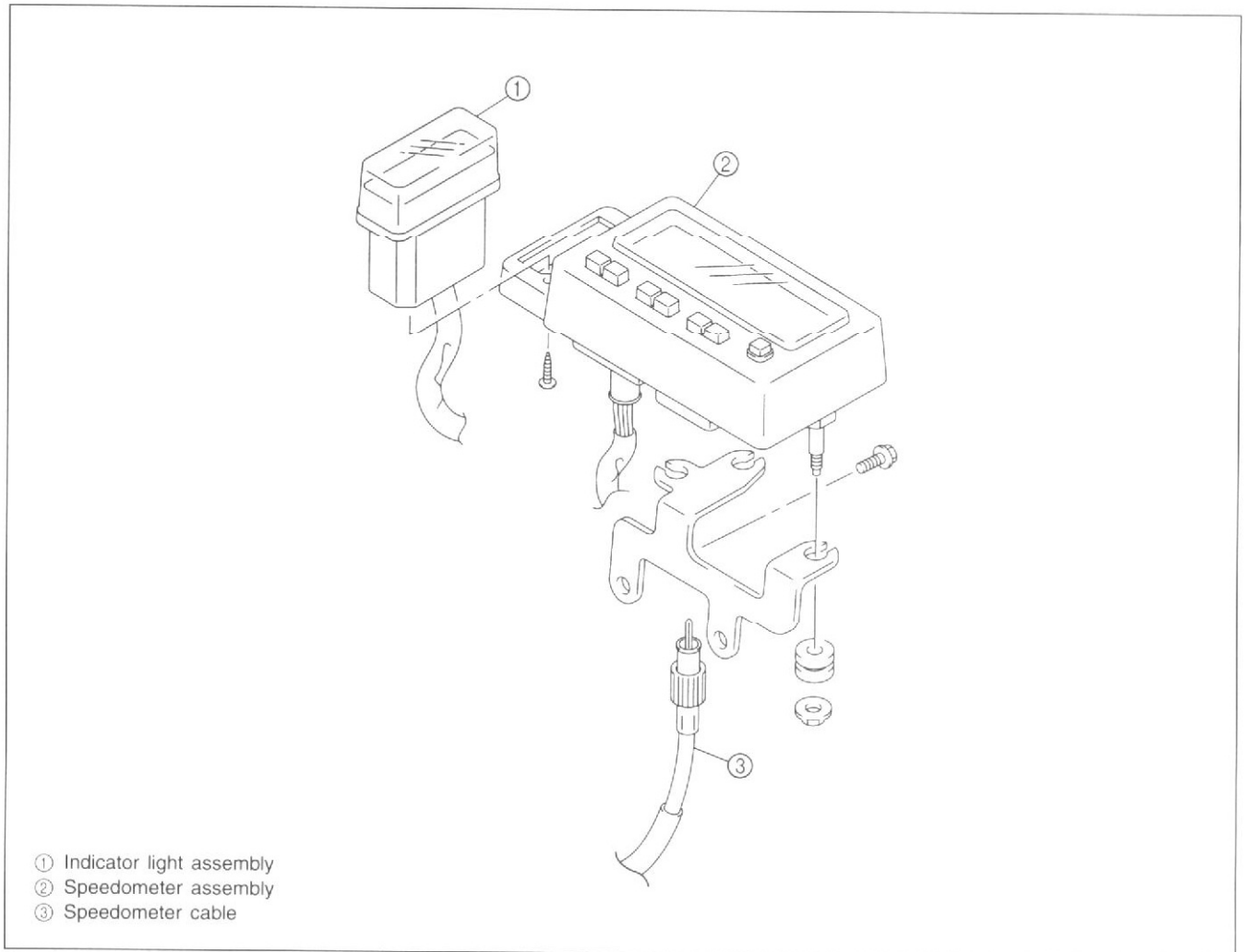
TOOL 09900-25008· Multi circuit tester set

Tester knob indication: Resistance (Ω)

DATA Pickup coil resistance: 390 – 600 Ω (Blue – Green)
Signal coil resistance: 0.05 – 0.20 Ω (Black – White)

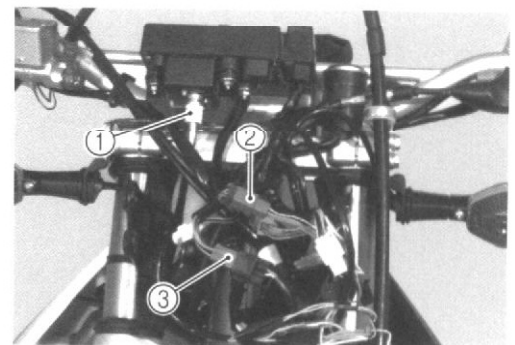


SPEEDOMETER

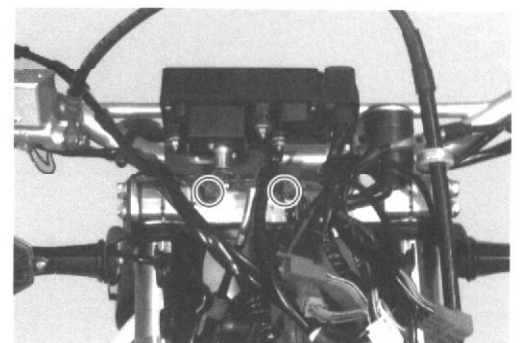


REMOVAL

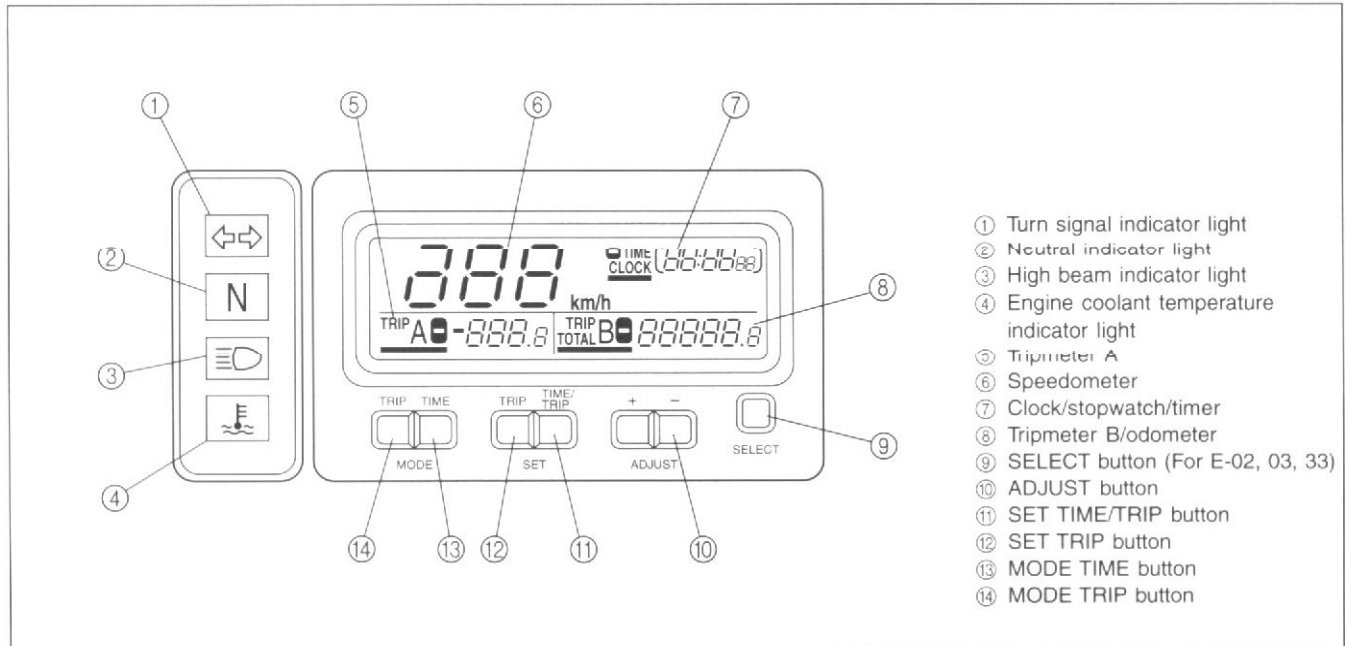
- Remove the headlight assembly. (☞ 7-29)
- Disconnect the speedometer cable ①, speedometer coupler ②, and indicator lights coupler ③.



- Remove the speedometer assembly.



PARTS NAMES



OPERATING PROCEDURE

INITIAL DISPLAY

When the ignition switch is set to ON, all indicators light up for one second.

NOTE:

If the power supply is cut (e.g., when the battery is replaced):

- * The speedometer, clock, tripmeter A and odometer are displayed after the initial display appears.
- * Since the clock resets to "1:00 00", it will need to be re-adjusted.
- * The odometer, tripmeter A and B, tripmeter calculation modes (addition and subtraction), and the calibration coefficients are not affected.

CHANGING THE DISPLAY MODE

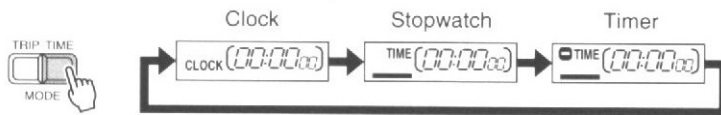
With each press of the MODE TRIP button, the display changes between tripmeter A, tripmeter B and the odometer as shown below.



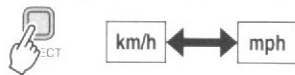
NOTE:

- * The cursor (—) indicates that the setting can be changed.
 The cursor appears at only one position at a time.

With each press of the MODE TIME button, the display changes between the clock, the stopwatch and the timer as shown below.



Hold down the SELECT button for three seconds to change the display as shown below. (For E-02, 03, 33)



⚠ WARNING

To avoid riding with only one hand, do not operate the buttons while riding.

NOTE:

- * *Make sure not to press more than one button at a time.*
- * *Before performing the operations described in this section, be sure to start the engine in order to prevent the battery from being drained.*

ODOMETER

- Displays the total distance travelled



TRIPMETER

- Displays the distance travelled since the tripmeter was last reset.

NOTE:

The tripmeters A and B can be used independently.



- Switching between addition and subtraction modes

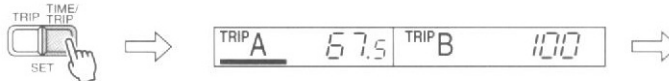


- Press the SET TRIP button to reset the tripmeter.



- Displays the distance with a calibration coefficient (70 – 130 %) applied

Hold down the SET TIME/TRIP button for three seconds.



→ Select the calibration coefficient.



→ Return to the normal display.



CLOCK

- Displays the time (hours, minutes and seconds) on a 24-hour clock



- Setting the time

Hold down the MODE TIME button for three seconds.



→ The setting that is flashing can be changed.



→ Select the correct time.

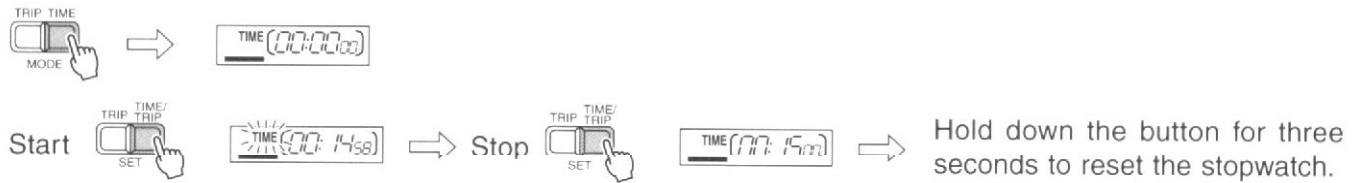


→ Return to the normal display.



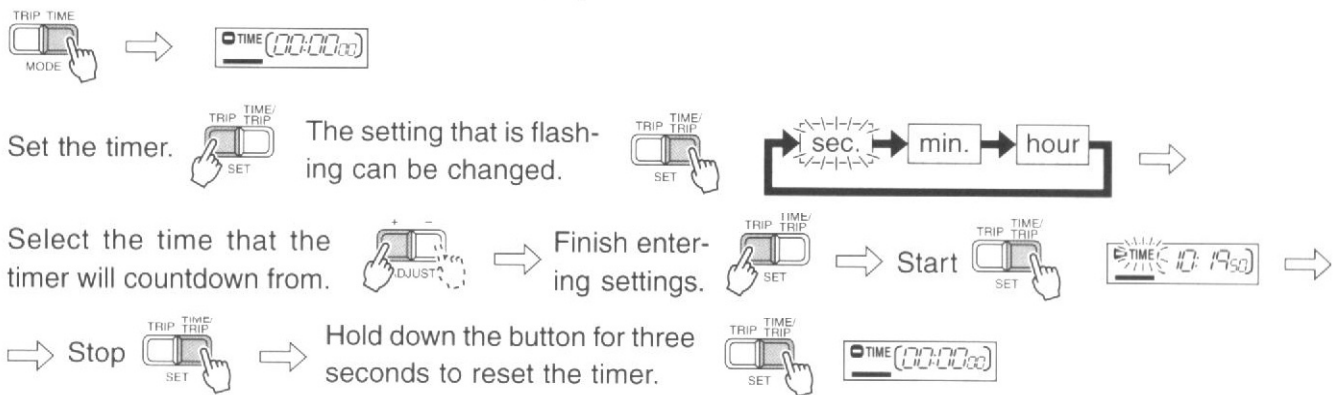
STOPWATCH

- This 24-hour stopwatch displays the minutes, seconds and 1/100 seconds up to one hour. After one hour, the hours, minutes and seconds are displayed.

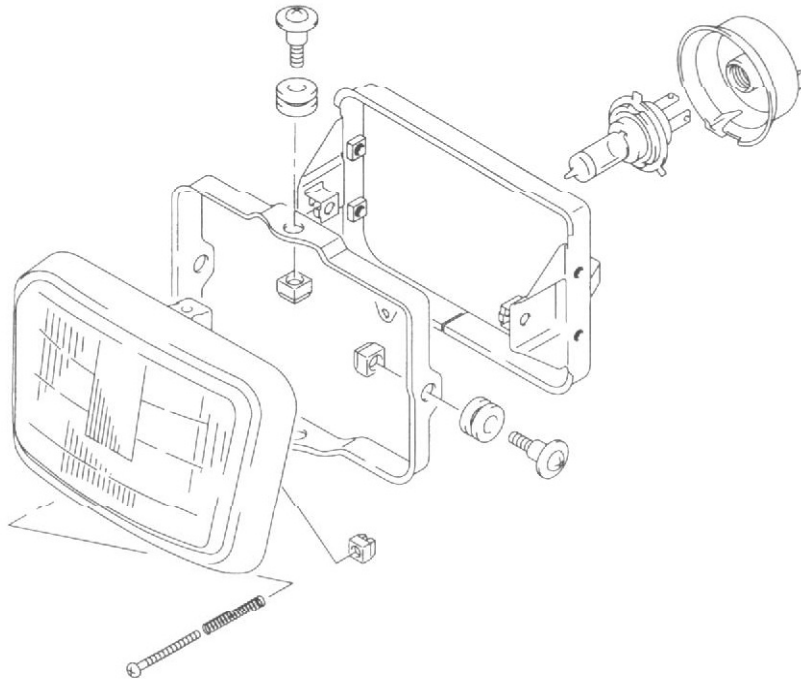


TIMER

- This 24-hour timer (or countdown timer) displays the minutes, seconds and 1/100 seconds up to one hour. After one hour, the hours, minutes and seconds are displayed.



LAMPS HEADLIGHT

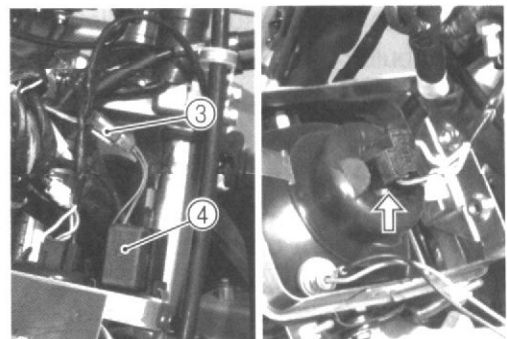
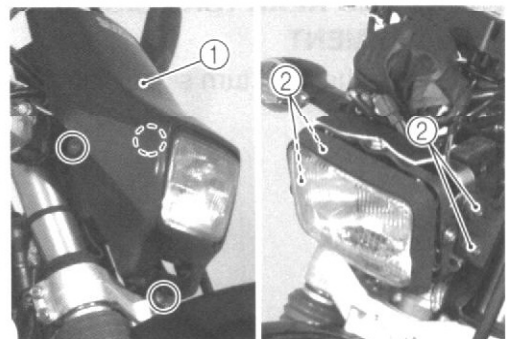


Headlight bulb : 12 V 60/55 W

Position light : 12 V 4 W (Except for E-03, 28, 33)

BULB REPLACEMENT

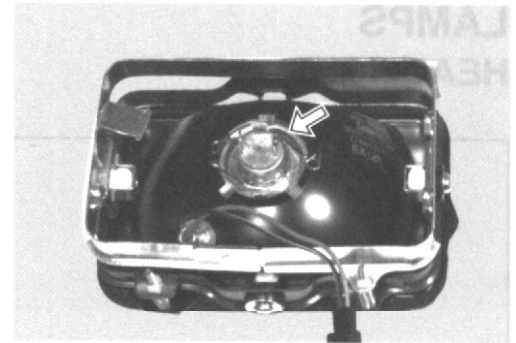
- Remove the headlight cover ① and headlight bracket mounting bolt ②.
- Remove the position light coupler ③. (For E-02, 19, 54)
- Remove the turn signal/side stand relay ④.
- Disconnect the headlight coupler and remove the headlight assembly.



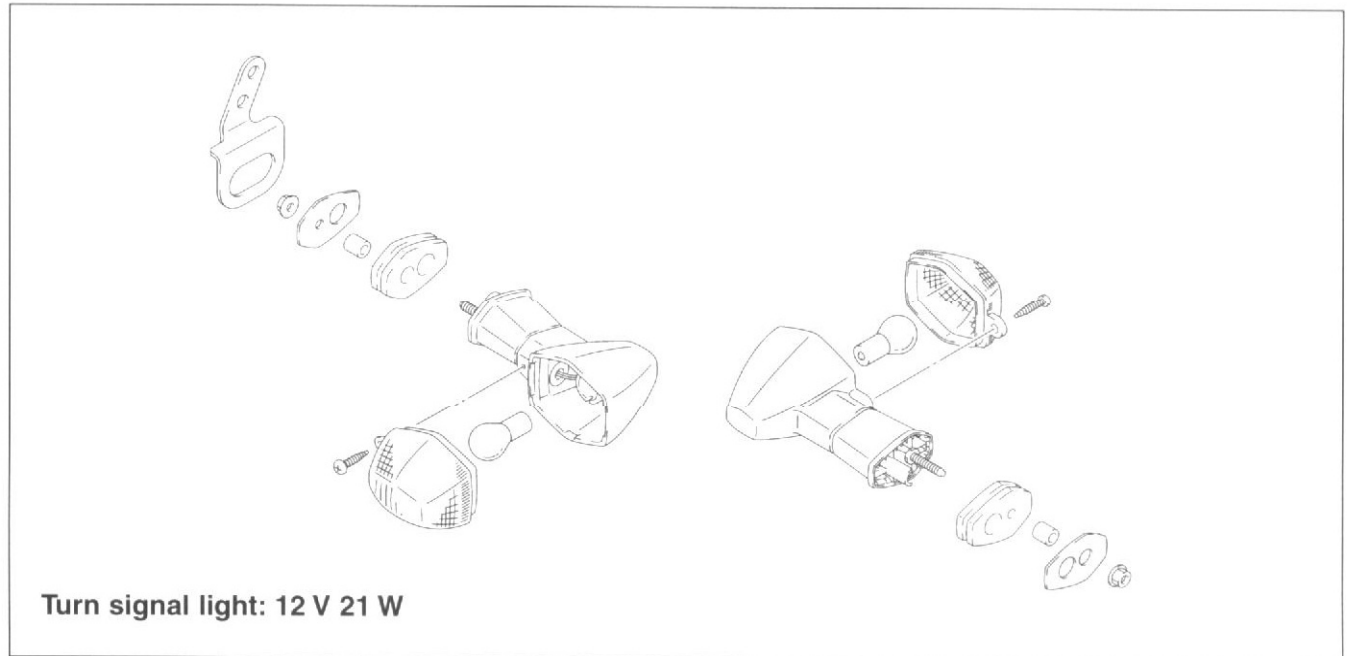
- Remove the rubber cap.
- Remove the bulb.
- Install the new bulb in the reverse order of removal.

CAUTION

If you touch the bulb with your bare hands, clean the bulb with a cloth moistened with alcohol or soapy water to prevent premature bulb failure.

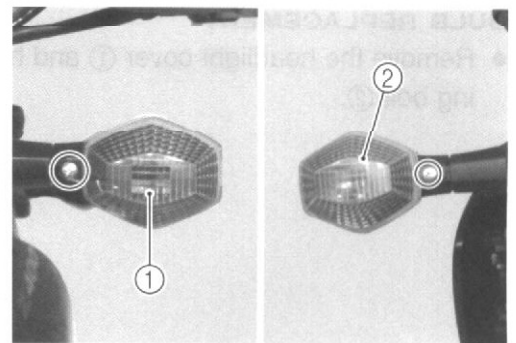


FRONT AND REAR TURN SIGNAL LIGHT



FRONT AND REAR TURN SIGNAL LIGHT BULB REPLACEMENT

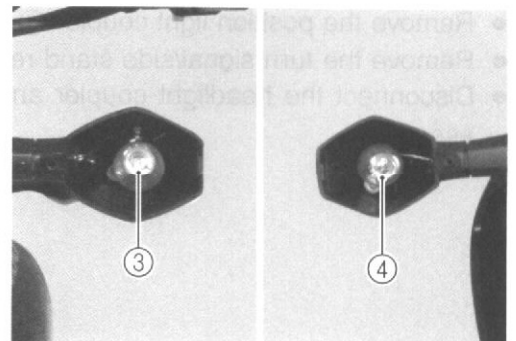
- Remove the front turn signal light lens ① and rear turn signal light lens ②.



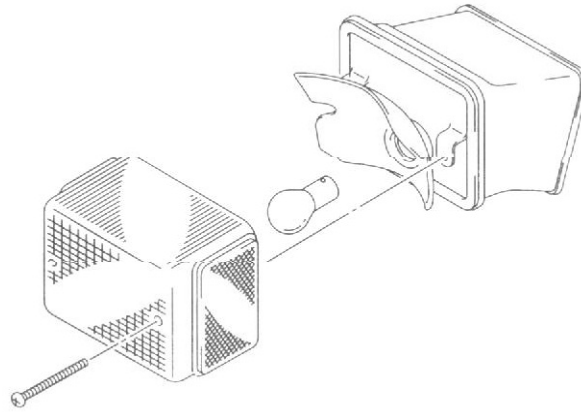
- Remove the front turn signal light bulb ③ and rear turn signal light bulb ④.

CAUTION

If you touch the bulb with your bare hands, clean the bulb with a cloth moistened with alcohol or soapy water to prevent premature bulb failure.



BRAKE LIGHT/TAILLIGHT



Brake light/taillight: 12 V 21/5 W

BRAKE LIGHT/TAILLIGHT BULB REPLACEMENT

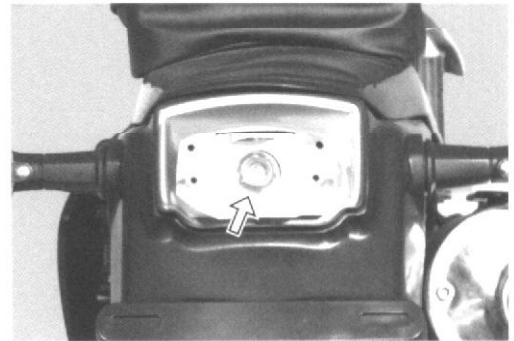
- Remove the brake light/taillight lens.



- Remove the brake light/taillight bulb.


⚠ CAUTION

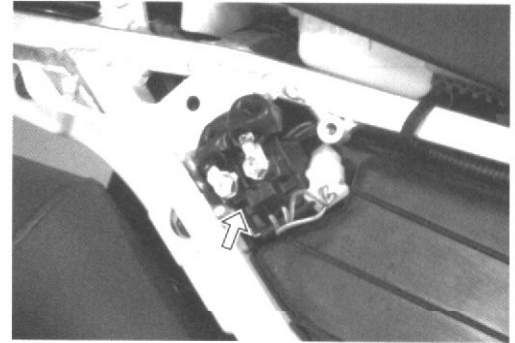
If you touch the bulb with your bare hands, clean the bulb with a cloth moistened with alcohol or soapy water to prevent premature bulb failure.



RELAYS

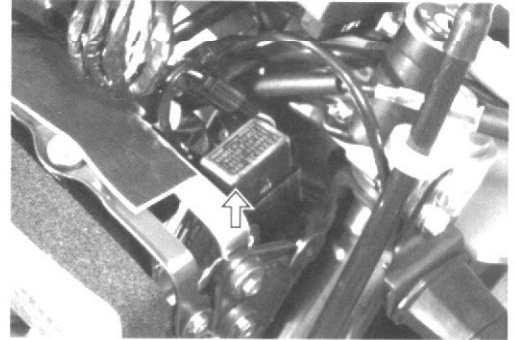
STARTER RELAY

The starter relay is located behind the right frame cover.
( 7-16)



TURN SIGNAL/SIDE STAND RELAY

The turn signal/side stand relay, which is located behind the headlight bracket, is composed of the turn signal relay, and the side stand relay and diode.



INSPECTION

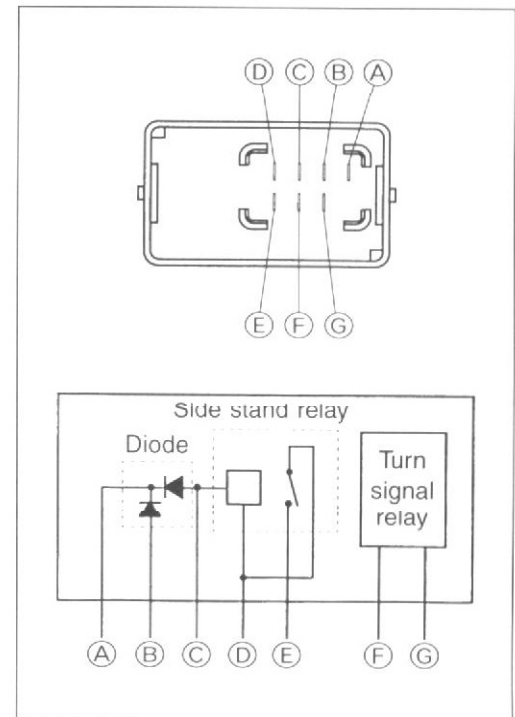
Before removing the turn signal/side stand relay, check the operation of the turn signal light.

If the turn signal light does not illuminate, inspect the bulb, turn signal switch and circuit connection.

If the bulb, turn signal switch and circuit connection are OK, the turn signal relay may be faulty; therefore, replace the turn signal/side stand relay with a new one.

NOTE:

Make sure that the battery is fully charged.



SWITCHES

Measure each switch for continuity using a multi circuit tester. If any abnormality is found, replace the respective switch assemblies with a new one.

 **09900-25008: Multi circuit tester set**

IGNITION SWITCH

| Color Position | R | O | Gr | Br |
|-------------------|-----|---|-----|-----|
| OFF | | | | |
| ON | ○—○ | | ○—○ | |
| P | ○—○ | | | ○—○ |

LIGHTING SWITCH (Except for E-03, 28, 33)

| Color Position | O | Gr | Y/W |
|-------------------|-----|-----|-----|
| OFF | | | |
| S | ○—○ | | |
| ON | ○—○ | ○—○ | ○—○ |

DIMMER SWITCH

| Color Position | Y/W | W | Y |
|-------------------|-----|-----|-----|
| HI (☰○) | ○—○ | | ○—○ |
| LO (☷○) | ○—○ | ○—○ | |

TURN SIGNAL SWITCH

| Color Position | Lg | Lbl | B |
|-------------------|-----|-----|---|
| L (↔) | | ○—○ | |
| PUSH | | | |
| R (↔) | ○—○ | | |

ENGINE STOP SWITCH

| Color Position | O/Y | O/W |
|-------------------|-----|-----|
| OFF (⊗) | | |
| RUN (○) | ○—○ | ○—○ |

PASSING LIGHT SWITCH (Except for E-03, 28, 33)

| Color Position | O/N | Y |
|-------------------|-----|-----|
| • | | |
| PUSH | ○—○ | ○—○ |

STARTER BUTTON

| Color Position | O/W | Y/G |
|-------------------|-----|-----|
| • | | |
| PUSH | ○—○ | ○—○ |

HORN BUTTON

| Color Position | B/BI | B/W |
|-------------------|------|-----|
| • | | |
| PUSH | ○—○ | ○—○ |

FRONT BRAKE LIGHT SWITCH

| Color Position | B | B/R |
|-------------------|-----|-----|
| OFF | | |
| ON | ○—○ | ○—○ |

REAR BRAKE LIGHT SWITCH

| Color Position | O | W/B |
|-------------------|-----|-----|
| OFF | | |
| ON | ○—○ | ○—○ |

CLUTCH LEVER POSITION SWITCH

| Color Position | Y/G | Y/G |
|-------------------|-----|-----|
| OFF | | |
| ON | ○—○ | ○—○ |

WIRE COLOR

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

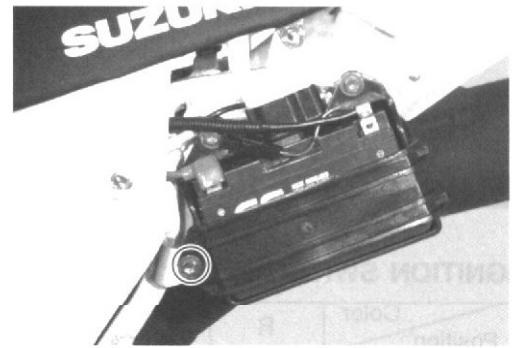
BATTERY REMOVAL

- Remove the battery cover. (☞ 6-2)
- Remove the battery holder.

- Remove the battery.

NOTE:

Disconnect the ⊖ battery lead wire, first.



SPECIFICATIONS

| | |
|------------------|------------------------------|
| Type designation | GT7B-4 |
| Capacity | 12 V, 23.4 kC (6.5 Ah)/10 HR |

SERVICING

Visually inspect the surface of the battery container. If any signs of cracking or electrolyte leakage from the sides of the battery have occurred, replace the battery with a new one. If the battery terminals are found to be coated with rust or an acidic white powdery substance, clean the battery terminals with sandpaper.

RECHARGING OPERATION

- Measure the battery voltage using the multi circuit tester or digital volt meter. If the voltage reading is less than the 12.6 V (DC), recharge the battery with a MF battery charger.

⚠ CAUTION

When recharging the battery, remove the battery from the motorcycle.

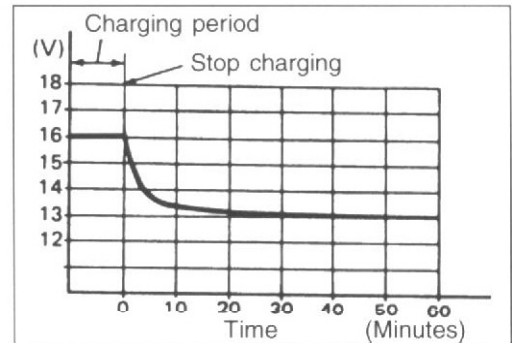
Recharging time: 0.65 A for 5 to 10 hours.

⚠ CAUTION

Do not attempt boost charging under any circumstances.

- After recharging, wait at least 30 minutes and then measure the battery voltage using the multi circuit tester. If the battery voltage is less than 12.6 V, recharge the battery again. If the battery voltage is still less than 12.6 V after recharging, replace the battery with a new one.

When a battery is left unused for a long time, its voltage needs to be regularly measured. When the motorcycle is not used for more than one month (especially during the winter season), measure the battery voltage at least once a month.



EMISSION CONTROL INFORMATION

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| <i>EVAPORATIVE EMISSION CONTROL SYSTEM (FOR E-33)</i> | <i>9- 3</i> |
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EMISSION CONTROL CARBURETOR COMPONENTS

The DR-Z400S is equipped with precision carburetors that control emission levels.

These carburetors require special mixture control components and precision adjustments to function properly.

There are several carburetor mixture control components in each carburetor assembly. Three jets (main, needle and pilot) are machined to much closer tolerances than standard machined jets. Do not replace these three jets with standard jets. To aid in identifying these jets, a different letter and number design is used. If replacement of the jets is needed, be sure to replace them only with the same type of jets as described below.

A jet needle with only one clip position, is also used. If jet needle replacement is necessary, only replace it with a jet needle of the same type. Suzuki recommends that Genuine Suzuki Parts be utilized whenever possible for the best possible performance and durability.

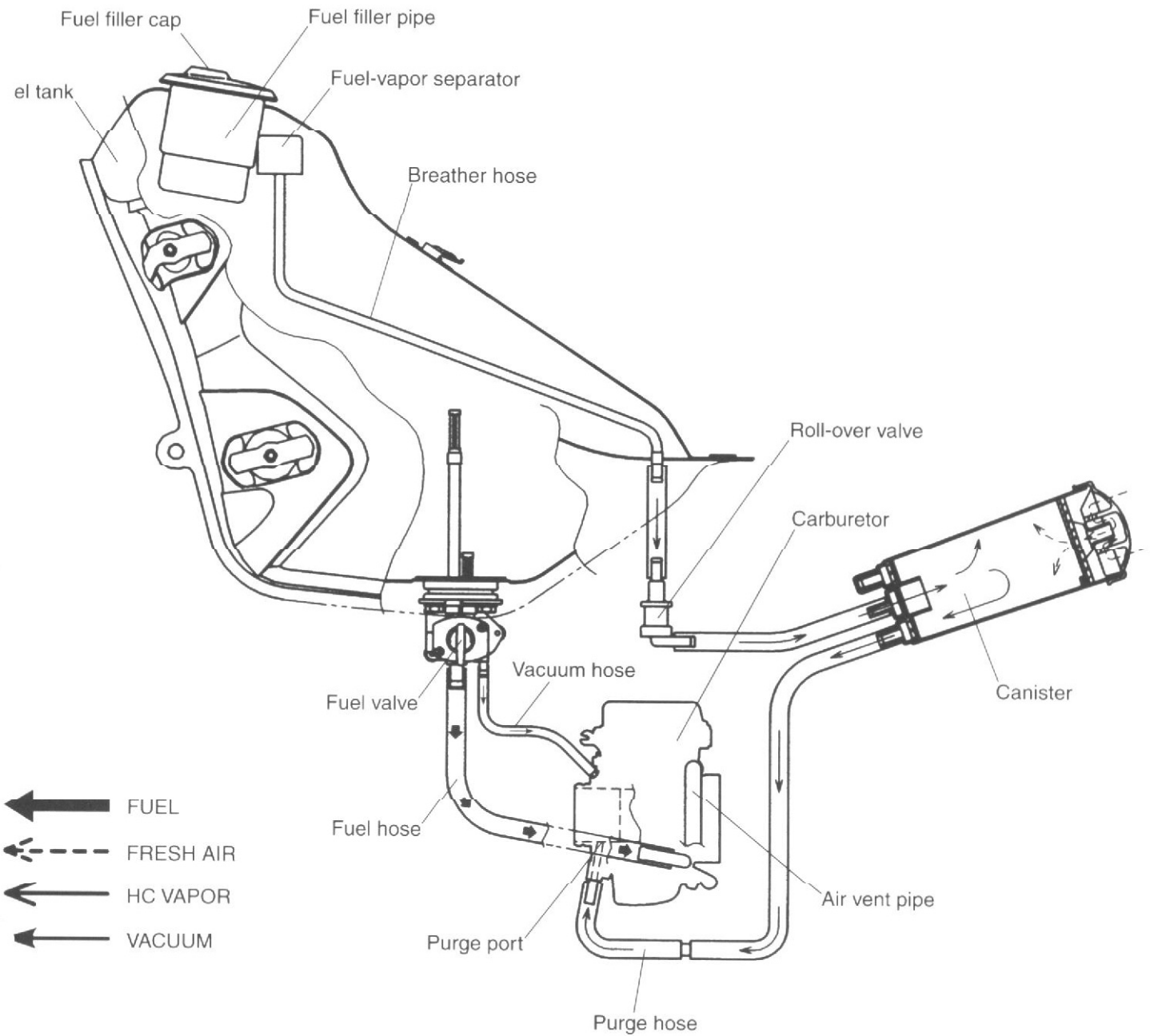
| | |
|--|----------------------------|
| Conventional figures used on standard tolerance jet components | 1 2 3 4 5 6 7 8 9 0 |
| Emission type figures used on close tolerance jet components | <i>1 2 3 4 5 6 7 8 9 0</i> |

The carburetor specifications for the emission-controlled DR-Z400S are as follows.

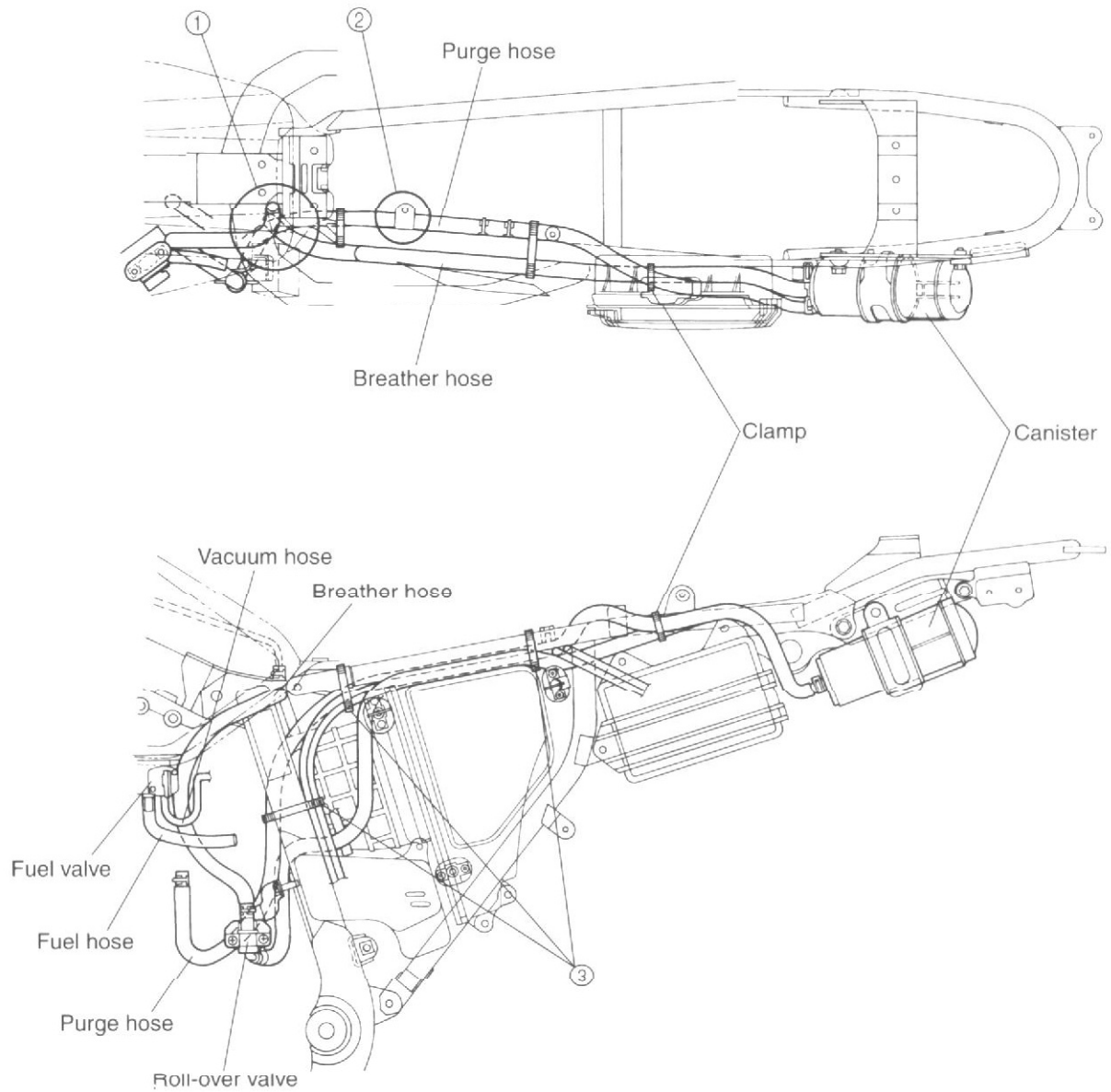
| Carburetor I.D. No. | Main Jet | Needle Jet | Jet Needle | Pilot Jet | Pilot Screw |
|---------------------------------|----------|------------|------------|-----------|-------------------------|
| 29FC (California model only) | # 142.5 | P-DM | 5DH37 | # 22.5 | PRESET DO NOT ADJUST |
| 29FB | # 142.5 | P-DM | 5DH37 | # 22.5 | |

Adjusting, interfering with, improper replacement, or resetting of any of the carburetor components may adversely affect carburetor performance and cause the motorcycle to exceed the exhaust emission level limits. If you are unable to effectively repair this motorcycle, contact the distributor's representative for further technical information and assistance.

EVAPORATIVE EMISSION CONTROL SYSTEM (FOR E-33)



CANISTER HOSE ROUTING



- ① Set the formed side of the hose to the fuel tank and face the exhaust end of the hose to the left.
- ② Pass the purge hose under the frame air cleaner fitting bracket.
- ③ Clamp the hose with the wire harness.

INSPECTION

- Remove the fuel tank. (☞ 4-2)

HOSES

Inspect the hoses for wear or damage. If any damages are found, replace the hoses with new ones.
Make sure that the hoses are properly connected.

CANISTER

Inspect the canister body for damage. If any damages are found, replace the canister with a new one.