HONDA
CB250RS

# HOW TO USE THIS MANUAL

This manual is based on the E (UK) model. For other than E Model, descriptions are preceded by any of the following abbreviations whenever discrepancies occur: DK (General export), GI, GII (Germany), F (France, Belgium), ED (European direct sales), SW (Switzerland), U (Australia) and SA (South Africa).

Section 1 through 3 apply to the whole motorcycle, while section 4 through 18 describe parts of the motorcycle, grouped according to location.

Find the section you want on this page, then turn to the table of contents on page 1 of that section.

Most sections start with an assembly or system illustration and all the required specifications, torques, working practices, tools and troubleshooting for the section. The subsequent pages give detailed procedures for the section.

If you are not familiar with this motorcycle, first read through the TECHNICAL FEATURES section 19. If you don't know the source of the trouble, go to section 20, TROUBLESHOOTING.

ALL INFORMATION, ILLUSTRATIONS, DIRECTIONS AND SPECIFICATIONS INCLUDED IN THIS PUBLICATION ARE BASED ON THE LATEST PRODUCT INFORMATION AVAILABLE AT THE TIME OF APPROVAL FOR PRINTING.
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# CONTENTS


| | | |
|---|---|---|
| | GENERAL INFORMATION | 1 |
| | LUBRICATION | 2 |
| | INSPECTION/ADJUSTMENT | 3 |
| ENGINE | FUEL SYSTEM | 4 |
| ENGINE | ENGINE REMOVAL/INSTALLATION | 5 |
| ENGINE | CYLINDER HEAD/VALVES | 6 |
| ENGINE | CYLINDER/PISTON | 7 |
| ENGINE | CLUTCH/OIL PUMP | 8 |
| ENGINE | A.C. GENERATOR | 9 |
| ENGINE | CRANKCASE | 10 |
| ENGINE | CRANKSHAFT/BALANCER | 11 |
| ENGINE | TRANSMISSION | 12 |
| CHASSIS | FRONT WHEEL/STEERING/ SUSPENSION | 13 |
| CHASSIS | REAR WHEEL/BRAKE/SUSPENSION | 14 |
| CHASSIS | HYDRAULIC DISC BRAKE (FRONT) | 15 |
| ELECTRICAL | BATTERY/CHARGING SYSTEM | 16 |
| ELECTRICAL | IGNITION SYSTEM | 17 |
| ELECTRICAL | SWITCHES | 18 |
| | TECHNICAL FEATURES | 19 |
| | TROUBLESHOOTING | 20 |

# 1. GENERAL INFORMATION




| | |
|---|---|
| GENERAL SAFETY | 1–1 |
| SERVICE RULES | 1–1 |
| SPECIFICATIONS | 1–2 |
| TORQUE VALUES | 1–6 |
| TOOLS | 1–10 |
| WIRING DIAGRAMS | 1–12 |
| CABLE & HARNESS ROUTING | 1–15 |
| MAINTENANCE SCHEDULE | 1–16 |


## GENERAL SAFETY

**WARNING**

*If the engine must be running to do some work, make sure the area is well-ventilated. Never run the engine in a closed area. The exhaust contains poisonous carbon monoxide gas.*

**WARNING**

*Gasoline is extremely flammable and is explosive under certain conditions. Do not smoke or allow flames or sparks in your working area.*

**WARNING**

*The battery electrolyte contains sulfuric acid. Protect your eyes, skin and clothing. In case of contact, flush thoroughly with water and call a doctor if your eyes were exposed.*

**WARNING**

*The battery generates hydrogen gas which can be highly explosive. Do not smoke or allow flames or sparks near the battery, especially while charging it.*

## SERVICE RULES

1. Use genuine HONDA or HONDA-recommended parts and lubricants or their equivalent. Parts that don't meet HONDA's design specifications may damage the motorcycle.
2. Use the special tools designed for this product.
3. Install new gaskets, O-rings, cotter pins, lock plates, etc. when reassembling.
4. When torquing bolts or nuts, begin with larger-diameter or inner bolt first, and tighten to the specified torque diagonally in 2-3 steps, unless a particular sequence is specified.
5. Clean parts in non-flammable or high flash point solvent upon disassembly. Lubricate any sliding surfaces before reassembly.
6. After reassembly, check all parts for proper installation and operation.
7. Use only metric tools when servicing this motorcycle. Metric bolts, nuts, and screws are not interchangeable with English fasteners. The use of incorrect tools and fasteners may damage the motorcycle.

# SPECIFICATIONS

| ITEM | | | | AREA (TYPE) |
|---|---|---|---|---|
| DIMENSIONS | Overall length | | 2,070 mm (81.5 in ) | E, GI, GII, F, SW, SA, U, D |
| | | | 2,120 mm (83.5 in ) | ED only |
| | Overall width | | 730 mm (28.7 in ) | |
| | Overall height | | 1,060 mm (41.7 in ) | |
| | Wheelbase | | 1,350 mm (53.1 in ) | |
| | Seat height | | 770 mm (30.3 in ) | |
| | Ground clearance | | 160 mm ( 6.3 in ) | |
| | Dry weight | | 125 kg (276 lb) | |
| FRAME | Type | | Diamond frame | |
| | Front suspension, travel | | Telescopic 140.0 mm (5.5 in ) | |
| | Rear suspension, travel | | Swingarm 81.2 mm (3.2 in ) | |
| | Front tire size | | 3.00S18-4PR | |
| | Rear tire size | | 4.00S18-4PR | |
| | Tires pressures (cold) | | | |
| | Driver, | front | 175 kPa (1,75 kg/cm$^2$, 24 psi) | |
| | | rear | 225 kPa (2,25 kg/cm$^2$, 32 psi) | |
| | Driver and one passenger, | front | 175 kPa (1,75 kg/cm$^2$, 24 psi) | |
| | | rear | 250 kPa (2,50 kg/cm$^2$, 36 psi) | |
| | Front brake, swept area | | Single disc brake, 478 cm$^2$ (74 sq in ) | |
| | Rear brake, swept area | | Internal expanding shoes, 176 cm$^2$ (27 sq in ) | |
| | Fuel capacity | | 13.0 $l$ (3.4 US gal, 2.9 Imp gal) | |
| | Fuel reserve capacity | | 3.0 $l$ (2.6 US qt, 3.2 Imp qt) | |
| | Caster | | 63°30′ | |
| | Trail | | 85 mm (3.3 in ) | |
| | Front fork oil capacity | | 158 cm$^3$ (5.3 US ozs, 4.4 Imp ozs) | |
| ENGINE | Type | | Gasoline, air-cooled 4-stroke OHC | |
| | Cylinder arrangement | | Single cylinder inclined 15° | |
| | Bore x stroke | | 74.0 x 57.8 mm (2.91 x 2.28 in ) | E, GI, GII, ED, SW, SA, U, D |
| | | | 72.5 x 57.8 mm (2.85 x 2.28 in.) | F |
| | Displacement | | 248 cm$^3$ (15.1 cu in) | E, GI, GII, ED, SW, SA, U, D |
| | | | 239 cm$^3$ (14.6 cu in) | F |
| | Compression ratio | | 9.3 : 1 | |
| | Valve train | | OHC chain driven 4-valve | |
| | Maximum horsepower | <DIN> | 19 kW (26 PS)/8,500 min$^{-1}$ (rpm) | E, GI, ED, SW, SA, U, D, |
| | | | 18.5 kW (25.1 PS)/8,500 min$^{-1}$ (rpm) | F |
| | | | 12.5 kW (17 PS)/7,000 min$^{-1}$ (rpm) | GII |
| | Maximum torque | | 22 N·m (2.24 kg-m, 16.2 ft-lb)/ 7,000 min$^{-1}$ (rpm) | E, GI, ED, SW, SA, U, D |
| | | | 21.5 N·m (2.2 kg-m, 15.9 ft-lb)/ 7,500 min$^{-1}$ (rpm) | F |
| | | | 19 N·m (1.94 kg-m, 13.7 ft-lb)/ 4,000 min$^{-1}$ (rpm) | GII |
| | Oil capacity | | 2.0 $l$ (2.1 US qt, 1.8 Imp qt) | |
| | Lubrication system | | Forced pressure and wet sump | |
| | Air filtration system | | Oiled polyurethane foam | |
| | Cylinder compression | | 1,372.9 ± 245.2 kPa (14.0 ± 2.5 kg/ cm$^2$, (199 ± 35.6 psi) | |
| | Intake valve | Opens | 5° (B.T.D.C.) at 1 mm lift | 58° (B.T.D.C.) at 0 lift |
| | | Closes | 30° (A.B.D.C.) | 96° (A.B.D.C.) |

| ITEM | | | AREA (TYPE) |
|---|---|---|---|
| ENGINE | Exhaust valve | Opens 35° (B.B.D.C.) 83° (B.B.D.C.)<br>Closes 5° (A.T.D.C.) 65° (A.T.D.C.) | |
| | Valve clearance | Intake 0.05 mm (0.002 in )<br>Exhaust 0.10 mm (0.004 in ) | |
| | Weight | 37 kg (82 lb) | |
| CARBURETION | Type | Piston valve type | |
| | Identification number | PD70C | |
| | Main jet | #120 | |
| | Pilot screw initial opening | 1-3/4 | |
| | Float level | 14.5 mm (0.57 in ) | |
| | Idle speed | 1,200 ± 100 $min^{-1}$ (1,200 ± 100 rpm) | |
| DRIVE TRAIN | Clutch | Wet multi-plate type | |
| | Transmission | 5-speed constant mesh | |
| | Primary reduction | 2.464 : 1 (69/28) | |
| | Gear ratio I | 2.800 : 1 (42/15) | |
| | Gear ratio II | 1.850 : 1 (37/20) | |
| | Gear ratio III | 1.375 : 1 (33/24) | |
| | Gear ratio IV | 1.111 : 1 (30/27) | |
| | Gear ratio V | 0.931 : 1 (27/29) | |
| | Final reduction | 3.142 : 1 (44/14) | |
| | Gearshift pattern | Left foot operated return system, 1-N-2-3-4-5 | |
| | Drive chain | DID520 DS | |
| ELECTRICAL | Ignition | CDI | |
| | Ignition timing Initial | 12° BTDC at 1,200 $min^{-1}$ (rpm) (F mark) | |
| | Full advance | 37 ± 2° BTDC at 3,300 $min^{-1}$ (rpm) | |
| | Starting system | Primary kickstarter | |
| | Generator | A.C. Generator 0.11 kW/5,000 $min^{-1}$ (rpm) | |
| | Battery capacity | 12 V – 9 AH | |
| | Spark plug | For cold climate (Below 5°C, 41°F): NGK DR8ES-L, ND X24ESR-U<br>Standard: NGK DR8ES, ND X27ESR-U<br>For extended high speed driving: NGK D8EA, ND X24ES-U / NGK D9EA, ND X27ES-U | E, F, GI, GII, ED, SW, SA, D<br>U |
| | Spark plug gap | 0.6–0.7 mm (0.024–0.028 in.) | |
| | Fuse | 15 A (Main), 7 A (Headlight, Taillight) | |
| LIGHTS | Headlight (High/Low beam) | 45/40 W | E, F, GI, GII, ED, SW, D |
| | | 50/40 W | U, SA |
| | Tail/Stoplight | 5/21 W | E, F, GI, GII, ED, SW, D |
| | | 8/23 W | U, SA |
| | Turn signal (Front/Rear) | 21/21 W | E, F, GI, GII, ED, SW, D |
| | | 23/23 W | U, SA |
| | Speedometer | 3.4 W | |
| | Tachometer | 3.4 W | |
| | Neutral indicator | 3.4 W | |
| | Turn signal indicator | 3.4 W | |
| | High beam indicator | 3.4 W | |
| | Position | 4 W | E, F, GI, GII, ED, SW, D |
| | | 3.4 W | U, SA |

# TORQUE VALUES

- ENGINE

| No. | TIGHTENING POINTS | Q'TY | THREAD. DIA. (mm) | TORQUE N·m (kg-m, ft-lb) |
|---|---|---|---|---|
| 1 | Kickstarter stopper plate (spring hook pin) | 1 | 8 | 22–30 (2.2–3.0, 16–22) |
| 2 | Kickstarter stopper plate | 1 | 6 | 8–12 (0.8–1.2, 6–9) |
| 3 | Bearing set plate | 2 | 6 | 9–13 (0.9–1.3, 7–9) |
| 4 | Oil pump set plate | 2 | 6 | 8–12 (0.8–1.2, 6–9) |
| 5 | Upper crankcase | 7 | 6 | 10–14 (1.0–1.4, 7–10) |
| 6 | Upper crankcase | 1 | 8 | 20–26 (2.0–2.6, 14–19) |
| 7 | Lower crankcase | 4 | 8 | 22–28 (2.2–2.8, 16–20) |
| 8 | Lower crankcase | 4 | 6 | 10–14 (1.0–1.4, 7–10) |
| 9 | Balancer chain guide | 2 | 6 | 8–12 (0.8–1.2, 6–9) |
| 10 | Balancer shaft holder flange | 1 | 8 | 20–26 (2.0–2.6, 14–19) |
| 11 | Cam chain tensioner | 3 | 6 | 8–12 (0.8–1.2, 6–9) |
| 12 | Spark advancer | 1 | 18 | 45–60 (4.5–6.0, 33–43) |
| 13 | Clutch center locknut | 1 | 18 | 45–60 (4.5–6.0, 33–43) |
| 14 | Clutch lifter plate | 4 | 6 | 8–12 (0.8–1.2, 6–9) |
| 15 | Right crankcase cover | 13 | 6 | 8–12 (0.8–1.2, 6–9) |
| 16 | A.C. generator flywheel | 1 | 12 | 100–120 (10.0–12.0, 72–87) |
| 17 | Left crankcase cover | 10 | 6 | 8–12 (0.8–1.2, 6–9) |
| 18 | Cylinder | 2 | 6 | 8–12 (0.8–1.2, 6–9) |
| 19 | Cylinder head bolt | 4 | 8 | 30–36 (3.0–3.6, 22–26) |
| 20 | Cylinder head nut | 2 | 8 | 22–28 (2.2–2.8, 16–20) |
| 21 | Cam sprocket | 2 | 7 | 17–23 (1.7–2.3, 12–17) |
| 22 | Tappet adjuster locknut | 4 | 5 | 8–12 (0.8–1.2, 6–9) |
| 23 | Stator spacer | 4 | 6 | 9–13 (0.9–1.3, 7–9) |
| 24 | A.C. generator stator | 3 | 6 | 8–12 (0.8–1.2, 6–9) |
| 25 | Cylinder head cover | 10 | 6 | 10–14 (1.0–1.4, 7–10) |
| | Cylinder head cover (Copper washer) | 3 | 6 | 10–12 (1.0–1.2, 7–9) |
| 26 | Tappet hole cap | 4 | 6 | 8–12 (0.8–1.2, 6–9) |
| 27 | Carburetor insulator band | 1 | 5 | 3–5 (0.3–0.5, 2–4) |
| 28 | Spark plug | 1 | 12 | 15–20 (1.5–2.0, 11–14) |
| 29 | Drain plug | 1 | 12 | 20–30 (2.0–3.0, 14–22) |
| 30 | A.C. generator cord clamp | 1 | 6 | 8–12 (0.8–1.2, 6–9) |
| 31 | Breather plate | 4 | 6 | 8–12 (0.8–1.2, 6–9) |
| 32 | Shift drum stopper plate | 1 | 6 | 10–14 (1.0–1.4, 7–10) |
| 33 | Gearshift drum | 1 | 6 | 10–14 (1.0–1.4, 7–10) |
| 34 | Drive sprocket | 2 | 6 | 8–12 (0.8–1.2, 6–9) |

- FRAME

| No. | TIGHTENING POINTS | Q'TY | THREAD. DIA. (mm) | TORQUE N·m (kg-m, ft-lb) |
|---|---|---|---|---|
| 1 | Steering stem nut | 1 | 24 | 90–120 (9.0–12.0, 65–87) |
| 2 | Front fork top bridge | 2 | 7 | 9–13 (0.9–1.3, 6.5–9.4) |
| 3 | Steering lock | 2 | 6 | 8–14 (0.8–1.4, 6–10) |
| 4 | Handlebar upper holder | 4 | 8 | 18–30 (1.8–3.0, 13–22) |
| 5 | Front fork top bridge | 2 | 8 | 18–25 (1.8–2.5, 13–18) |
| 6 | Front axle nut | 1 | 14 | 50–80 (5.0–8.0, 36–58) |
| 7 | Front axle holder nut | 2 | 8 | 18–25 (1.8–2.5, 13–18) |
| 8 | Engine hanger bolt | 5 | 10 | 45–70 (4.5–7.0, 33–51) |
| 9 | Engine hanger bolt | 4 | 8 | 20–35 (2.0–3.5, 14–25) |
| 10 | Rear axle nut | 1 | 16 | 70–100 (7.0–10.0, 51–72) |
| 11 | Final driven sprocket | 5 | 10 | 60–70 (6.0–7.0, 43–51) |
| 12 | Rear brake torque link | 2 | 8 | 18–25 (1.8–2.5, 13–18) |
| 13 | Rear shock absorber | 4 | 10 | 30–40 (3.0–4.0, 22–29) |
| 14 | Foot peg | 2 | 10 | 50–70 (5.0–7.0, 36–51) |
| 15 | Gearshift arm | 1 | 6 | 8–14 (0.8–1.4, 6–10) |
| 16 | Swingarm pivot bolt | 1 | 14 | 60–80 (6.0–8.0, 43–58) |
| 17 | Rear brake pedal | 1 | 8 | 18–25 (1.8–2.5, 13–18) |
| 18 | Front brake disc | 5 | 8 | 27–38 (2.7–3.8, 20–27) |
| 19 | Caliper | 4 | 10 | 30–45 (3.0–4.5, 22–33) |
| 20 | Fuel tank | 1 | 8 | 15–25 (1.5–2.5, 11–18) |

Torque specifications listed above are important tightening points. Others should be torqued to standard torque below.

- STANDARD TORQUES

| TYPE | TORQUE N·m (kg-m, ft-lb) | TYPE | TORQUE N·m (kg-m, ft-lb) |
|---|---|---|---|
| 5 mm bolt, nut | 4.5–6.0 (0.45–0.6, 3.3–4.3) | 5 mm screw | 3.5–5 (0.35–0.5, 2.5–3.6) |
| 6 mm bolt, nut | 8–12 (0.8–1.2, 6–9) | 6 mm screw | 7–11 (0.7–1.1, 5–8) |
| 8 mm bolt, nut | 18–25 (1.8–2.5, 13–18) | 6 mm flange bolt, nut | 10–14 (1.0–1.4, 7–10) |
| 10 mm bolt, nut | 30–40 (3.0–4.0, 22–29) | 8 mm flange bolt, nut | 20–30 (2.0–3.0, 17–22) |
| 12 mm bolt, nut | 50–60 (5.0–6.0, 36–43) | 10 mm flange bolt, nut | 30–40 (3.0–4.0, 22–29) |

# TOOLS

- COMMON TOOLS

| TOOL NO. | TOOL NAME | | REF. PAGE |
|---|---|---|---|
| 07702–0010000 | Pin spanner | | 13–18, 13–20 |
| 07708–0030100 | Valve adjusting wrench | 8 x 9 mm | 3–5 |
| 07708–0030400 | Valve adjuster | | 3–5 |
| 07716–0020400 | Locknut wrench | 30 x 32 mm | 13–18, 13–21 |
| 07716–0020500 | Extension bar | | 13–18, 13–21 |
| 07742–0010100 | Valve guide remover | 5.5 mm | 6–13 |
| 07733–0020001 | Rotor puller | | 9–4 |
| 07725–0010101 | Universal holder | | 9–4 |
| 07746–0010200 | Bearing driver outer | 37 x 40 mm | 14–9 |
| 07746–0010300 | Bearing driver outer | 42 x 47 mm | 13–9 |
| 07746–0010400 | Bearing driver outer | 52 x 55 mm | 14–9 |
| 07746–0040300 | Driver pilot 15 | | 13–9 |
| 07746–0040400 | Driver pilot 17 | | 14–9 |
| 07749–0010000 | Driver handle outer A | | 13–20, 14–9 |
| 07746–0030100 | Bearing driver handle C | | — |
| 07746–0030200 | Bearing driver inner 25 mm | | — |
| 07746–0020100 | Bearing driver handle B | | — |
| 07747–0010100 | Fork seal driver body | | 13–16 |
| 07747–0010600 | Fork seal driver attachment D | | 13–16 |
| 07757–0010000 | Valve spring compressor | | 6–11, 6–18 |
| 07959–3290001 | Shock absorber compressor | | 14–11, 14–12 |
| 07401–0010000 | Float level gauge | | 4–9 |

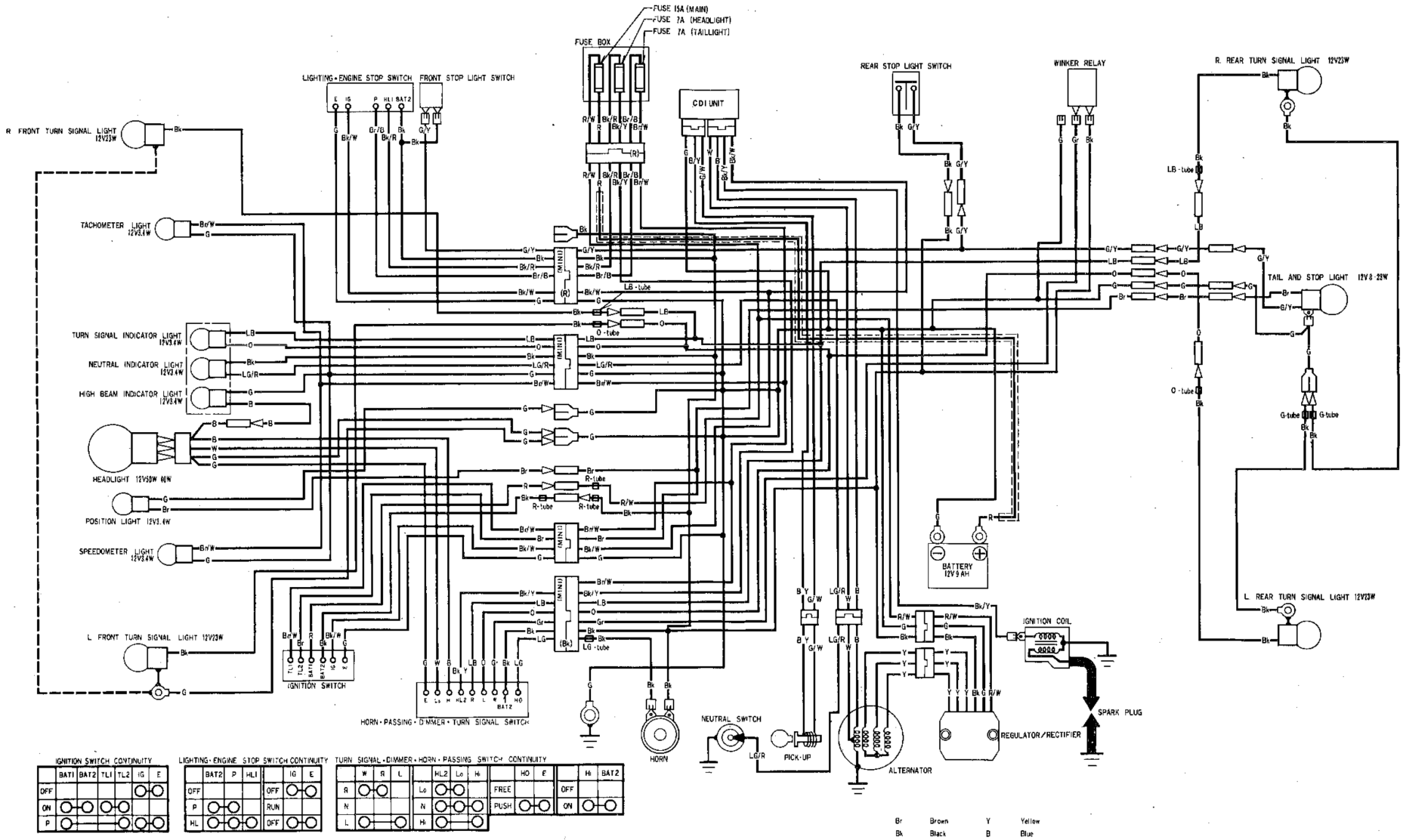
- SPECIAL TOOLS

| TOOL NO. | TOOL NAME | REF. PAGE |
|---|---|---|
| 07914–3230001 | Snap ring pliers | 14–7 |
| 07917–3230000 | 6 mm Hollow wrench | 13–14, 13–16 |
| 07923–4280000 | Clutch center holder | 8–7, 8–10 |
| 07946–3290000 | Ball race driver | 13–20 |
| 07945–3330100 | Ball race driver attachment | 13–20 |
| 07953–3330000 | Ball race remover | 13–19 |
| 07984–2000000 | Valve guide reamer 5.5 mm | 6–14 |

# MEMO

HONDA
CB250RS

# CB250RS (U)




IGNITION SWITCH CONTINUITY

| | BAT1 | BAT2 | TL1 | TL2 | IG | E |
|---|---|---|---|---|---|---|
| OFF | | | | | ○ | ○ |
| ON | ○ | ○ | ○ | ○ | | |
| P | ○ | | | | ○ | ○ |

LIGHTING • ENGINE STOP SWITCH CONTINUITY

| | BAT2 | P | HL1 | | IG | E |
|---|---|---|---|---|---|---|
| OFF | | | | OFF | ○ | ○ |
| P | ○ | ○ | | RUN | | |
| HL | ○ | ○ | ○ | OFF | ○ | ○ |

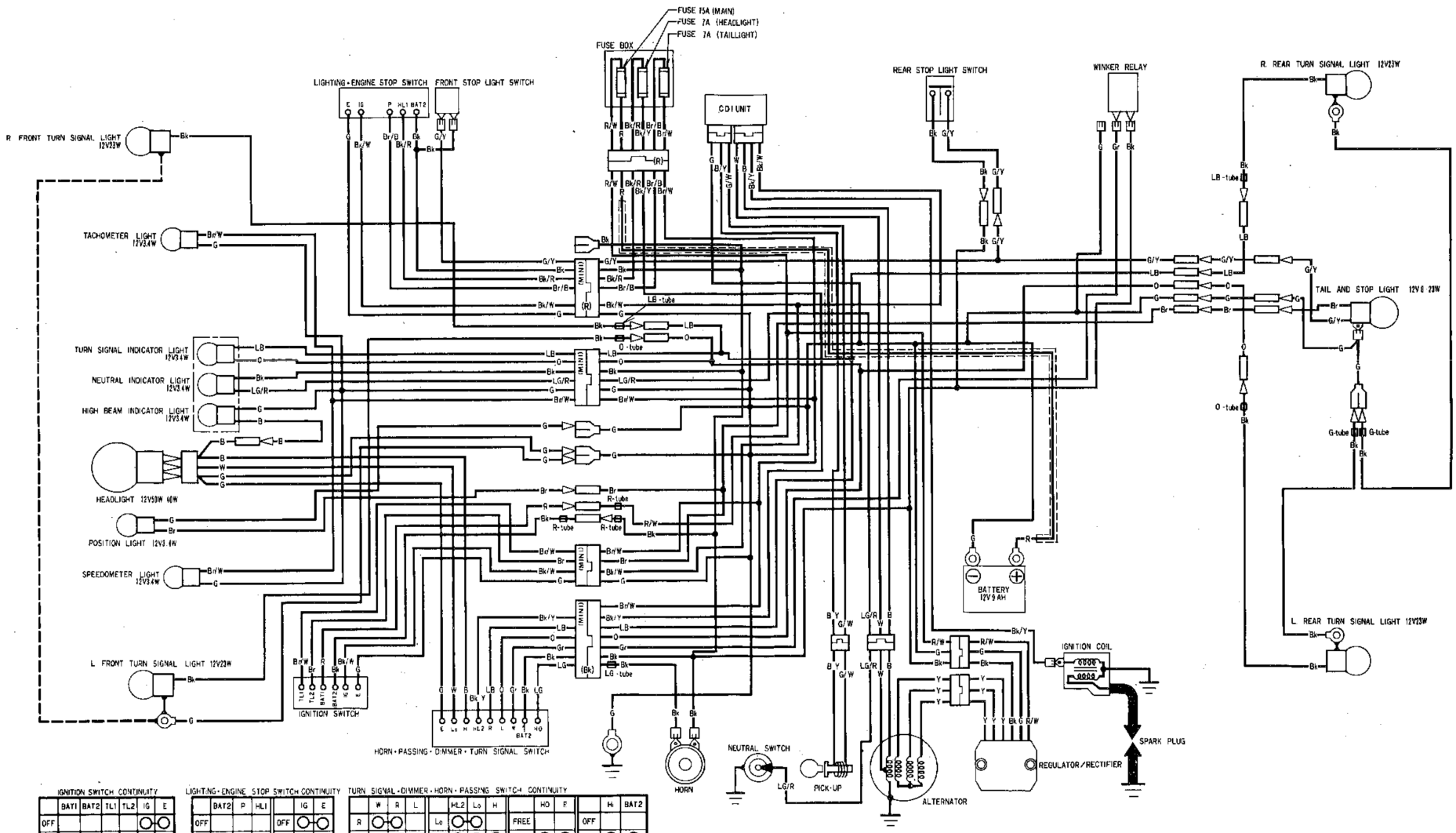
TURN SIGNAL • DIMMER • HORN • PASSING SWITCH CONTINUITY

| | W | R | L | | HL2 | Lo | Hi | | HO | E | | Hi | BAT2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| R | ○ | ○ | | Lo | ○ | ○ | | FREE | | | OFF | | |
| N | | | | N | ○ | ○ | ○ | PUSH | ○ | ○ | ON | ○ | ○ |
| L | ○ | | | Hi | | ○ | ○ | | | | | | |

| | | | |
|---|---|---|---|
| Br | Brown | Y | Yellow |
| Bk | Black | B | Blue |
| W | White | Gr | Grey |
| LG | Light Green | LB | Light Blue |
| R | Red | O | Orange |
| G | Green | P | Pink |

0030Z-471-6503

# CB250RS (U)




IGNITION SWITCH CONTINUITY

| | BAT1 | BAT2 | TL1 | TL2 | IG | E |
|---|---|---|---|---|---|---|
| OFF | | | | | ○ | ○ |
| ON | ○ | ○ | ○ | ○ | | |
| P | ○ | | | ○ | | ○ |

LIGHTING • ENGINE STOP SWITCH CONTINUITY

| | BAT2 | P | HL1 | | IG | E |
|---|---|---|---|---|---|---|
| OFF | | | | OFF | ○ | ○ |
| P | ○ | | ○ | RUN | | |
| HL | ○ | ○ | | OFF | ○ | ○ |

TURN SIGNAL • DIMMER • HORN • PASSING SWITCH CONTINUITY

| | W | R | L |
|---|---|---|---|
| R | ○ | | |
| N | | | |
| L | ○ | | ○ |

| | HL2 | Lo | H |
|---|---|---|---|
| Lo | ○ | | |
| N | | | |
| Hi | | | ○ |

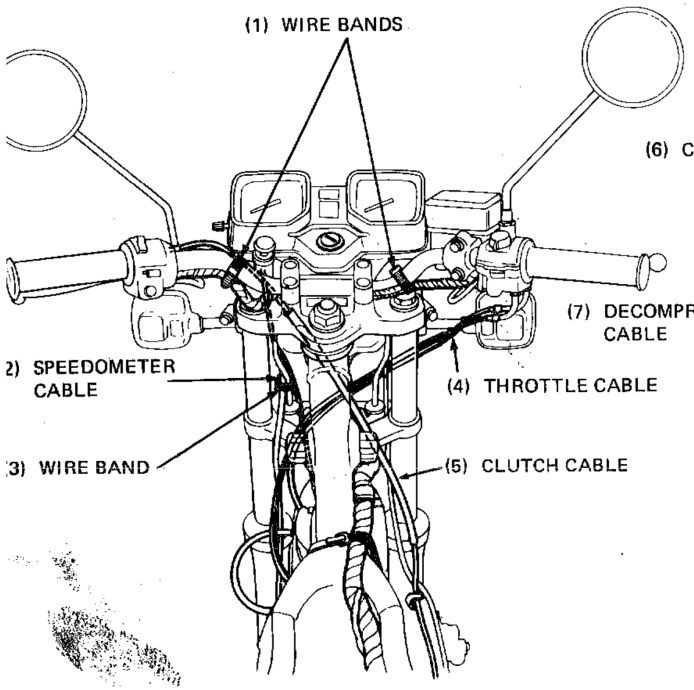
| | HO | P |
|---|---|---|
| FREE | | |
| PUSH | ○ | ○ |

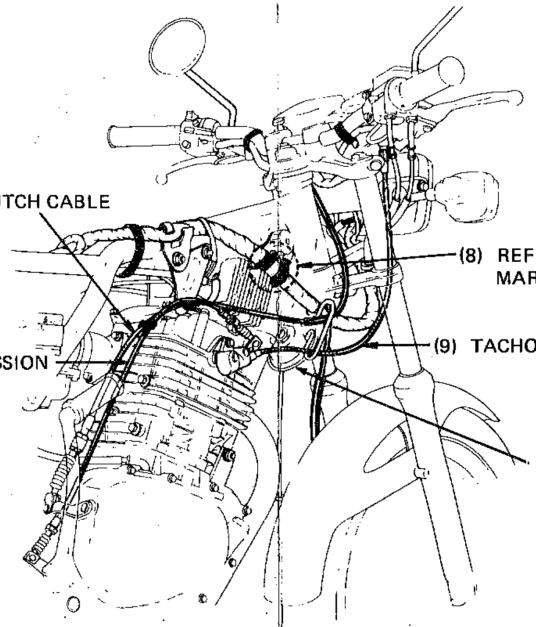
| | Hi | BAT2 |
|---|---|---|
| OFF | | |
| ON | ○ | ○ |

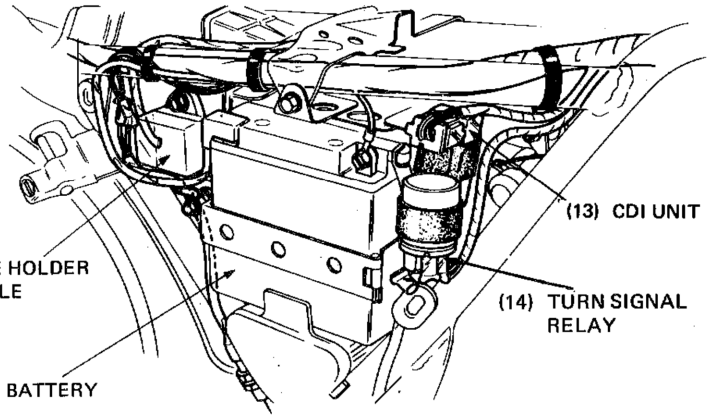
| | | | |
|---|---|---|---|
| Br | Brown | Y | Yellow |
| Bk | Black | B | Blue |
| W | White | Gr | Grey |
| LG | Light Green | LB | Light Blue |
| R | Red | O | Orange |
| G | Green | P | Pink |

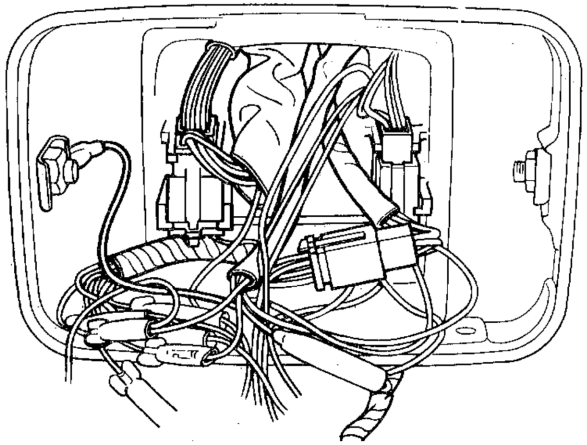
## ABLE & HARNESS ROUTING

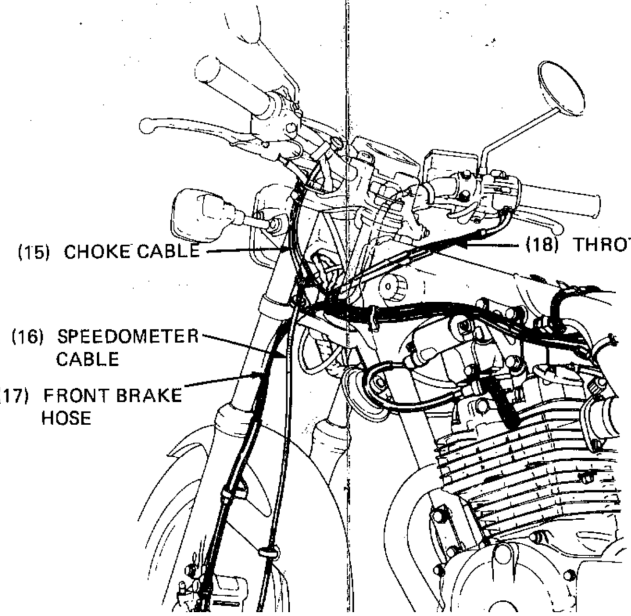
CABLES

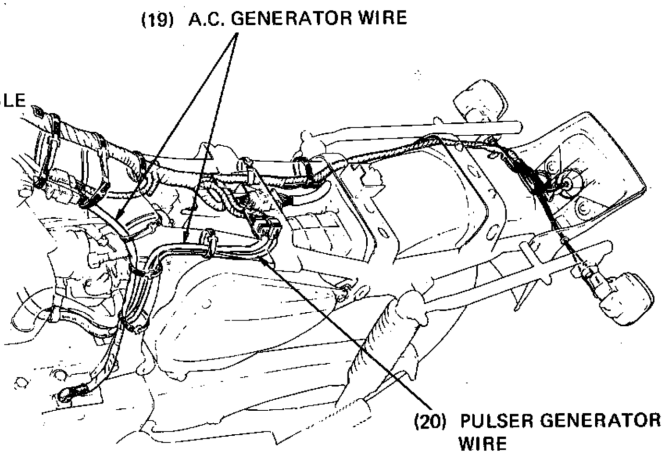




# MAINTENANCES SCHEDULE

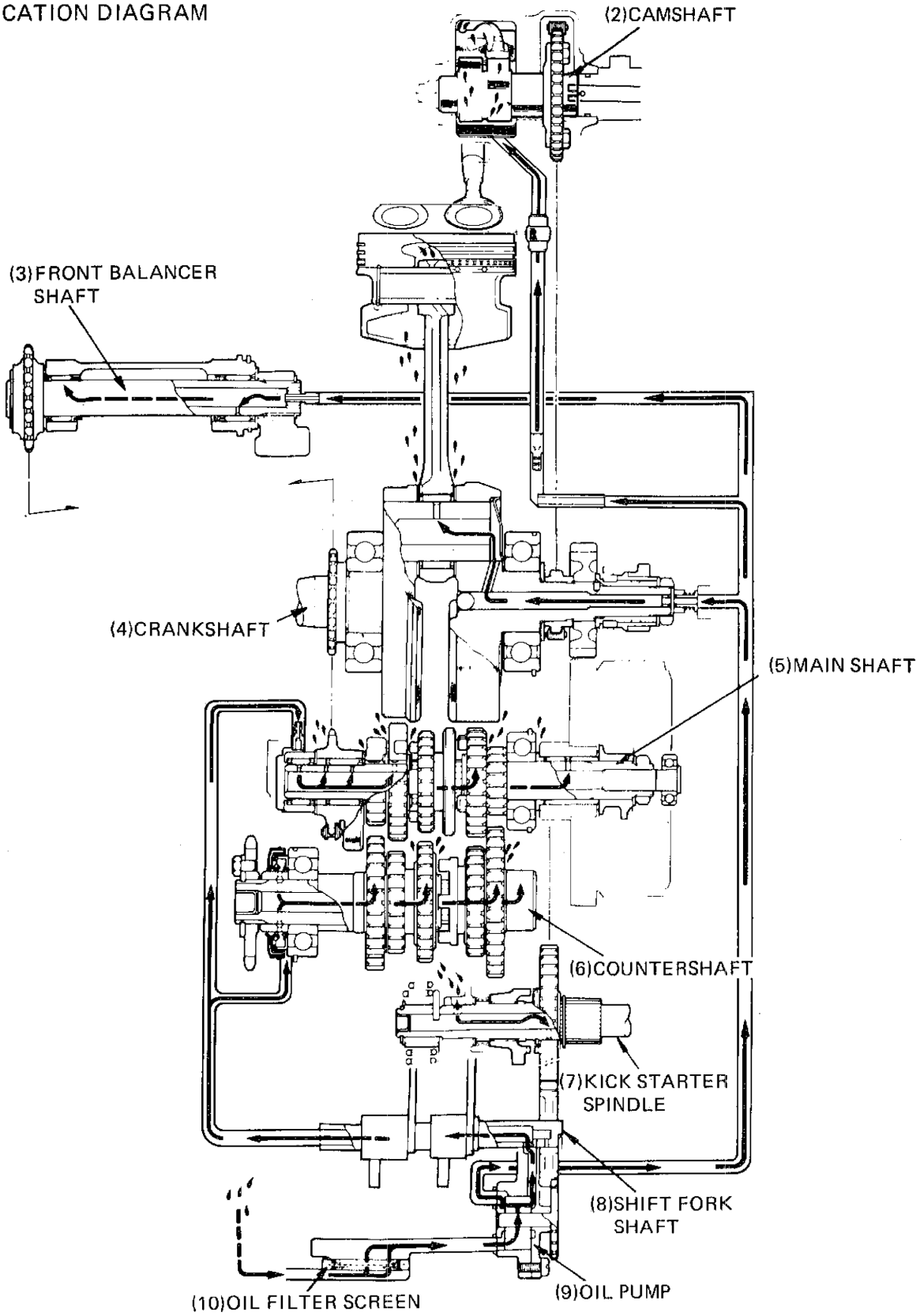
| | (1) | (2) | | | | |
|---|---|---|---|---|---|---|
| | | 1,000 km (600 miles) | 6,000 km (3,600 miles) | 12,000 km (7,200 miles) | 18,000 km (10,800 miles) | (32) |
| (3) | * | R | (30) | | | 2–3 |
| * (4) | | | | C | | 2–4 |
| (5) | (28) | | C | C | C | 3–3 |
| * (6) | | | I | I | I | 3–4 |
| (7) | | | I | R | I | 3–4 |
| * (8) | | I | I | I | I | 3–5 |
| * (9) | | I | I | I | I | 3–6 |
| * (10) | | I | I | I | I | 3–8 |
| * (11) | | I | I | I | I | 3–9 |
| * (12) | | | I | I | I | 3–9 |
| ** (13) | | | | A | | 3–6 |
| (14) | (29) | (31) | | | | 3–11 |
| (15) | ** | I | I | I | I | 3–13 |
| (16) | *** | I | I | I | I | 3–13 |
| * (17) | | | | | R | 3–13 |
| (18) | | | I | I | I | 3–14<br>3–15 |
| (19) | | I | I | I | I | 3–14 |
| * (20) | | I | I | I | I | 3–15 |
| * (21) | | I | I | I | I | 3–15 |
| (22) | | I | I | I | I | 3–16 |
| (23) | | | I | I | I | 3–17 |
| * (24) | | I | I | I | I | 3–17 |
| * (25) | | I | I | I | I | 3–18 |
| ** (26) | | I | I | I | I | 3–18 |
| ** (27) | | I | | I | | 3–18 |

Perform Pre-ride Inspection in the Owner's Manual at each scheduled maintenance period.

(1) WHICHEVER COMES FIRST
(2) ODOMETER READING
For higher odometer readings, repeat at the frequency interval established here.
(3) ENGINE OIL
(4) ENGINE OIL FILTER SCREEN
(5) AIR CLEANER
(6) FUEL LINE
(7) SPARK PLUG
(8) VALVE CLEARANCE
(9) STARTER DECOMPRESSOR
(10) THROTTLE OPERATION
(11) CARBURETOR IDLE SPEED
(12) CARBURETOR CHOKE/FAST IDLE
(13) BALANCER CHAIN TENSION
(14) DRIVE CHAIN
(15) BATTERY ELECTROLYTE
(16) BRAKE FLUID LEVEL
(17) BRAKE FLUID
(18) BRAKE SHOES/PADS
(19) BRAKE FREE PLAY
(20) BRAKE LIGHT SWITCH
(21) HEADLIGHT AIM
(22) CLUTCH FREE PLAY
(23) SIDE STAND
(24) SUSPENSION
(25) NUTS, BOLTS, FASTENERS
(26) WHEELS/SPOKES
(27) STEERING HEAD BEARING
(28) More frequent service may be required when riding in dusty areas.
(29) Initial service period: 300 km (180 miles)
(30) Replace every 3,000 km (1,800 miles)
(31) Inspect every 1,000 km (600 miles)
(32) Refer to page

** IN THE INTEREST OF SAFETY, WE RECOMMEND THESE ITEMS BE SERVICED ONLY BY AN AUTHORIZED HONDA DEALER.
* SHOULD BE SERVICED BY AN AUTHORIZED HONDA DEALER, UNLESS THE OWNER HAS PROPER TOOLS AND IS MECHANICALLY QUALIFIED.
★ Every year
★★ Every month
★★★ Every 2 years
I — Inspect and clean, adjust, lubricate or replace if necessary.
R — Replace
C — Clean
A — Adjust

(1) LUBRICATION DIAGRAM



| | |
|---|---|
| SERVICE INFORMATION | 2–2 |
| TROUBLESHOOTING | 2–2 |
| ENGINE OIL LEVEL CHECK | 2–3 |
| ENGINE OIL CHANGE | 2–3 |
| OIL FILTER SCREEN CLEANING | 2–4 |
| LUBRICATION POINTS | 2–5 |

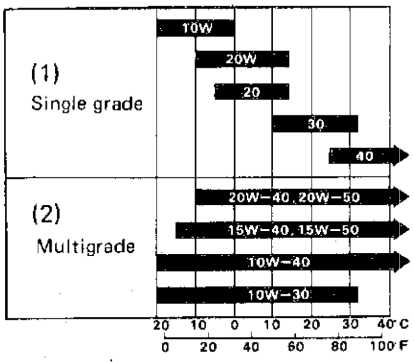
# SERVICE INFORMATION

## • WORKING PRACTICE

This section describes inspection and replacement of engine oil and cleaning of the oil filter screen.
Servicing procedure of the oil pump is described in Section 8.

## • SPECIFICATIONS

Oil capacity: 2.0 *l* (2.1 US qt, 1.8 Imp qt) after disassembly
1.7 *l* (1.8 US qt, 1.5 Imp qt) after draining
Recommended oil: HONDA 4-stroke oil or equivalent
API service classification: SE




Oil pump delivery: 7,200 $cm^3$ (439.2 cu in)/8,000 $min^{-1}$ (rpm)

## • TORQUE

Oil drain bolt: 20–30 N·m (2.0–3.0 kg-m, 14–22 ft-lb)

# TROUBLESHOOTING

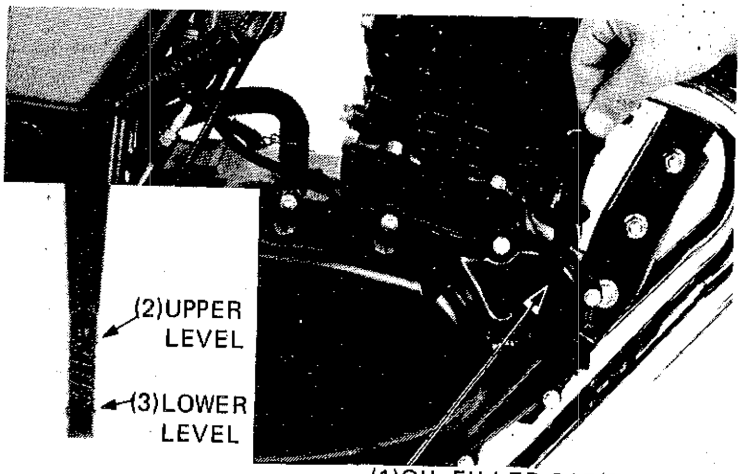
**Oil Level Too Low**
1. Normal oil consumption
2. External oil leaks
3. Worn piston rings

**Oil Contamination**
1. Oil not changed often enough
2. Faulty head gasket

# ENGINE OIL LEVEL CHECK

Run the engine and allow it to idle for 2–3 minutes.
Stop the engine and support the motorcycle upright on level ground with its side stand extended.
Check the oil level with the oil filler cap/dipstick.

Do not screw in the cap when making this check.
If the oil level is below the lower level mark on the dipstick, fill to the upper level mark with the recommended oil.



(1)OIL FILLER CAP/DIPSTICK

# ENGINE OIL CHANGE

NOTE

Drain the oil with the engine at normal operating temperature and vehicle on its side stand to assure complete and rapid draining.

Remove the oil filler cap and drain plug, and drain the oil.

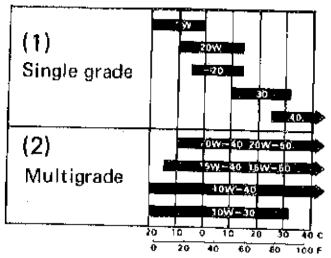
Operate the kickstarter several times to drain any oil which may be left in the recesses of the engine.
Install the drain plug, making sure the sealing washer is in good condition.

**DRAIN PLUG TORQUE:**
**20–30 N·m (2.0–3.0 kg-m, 14–22 ft-lb)**

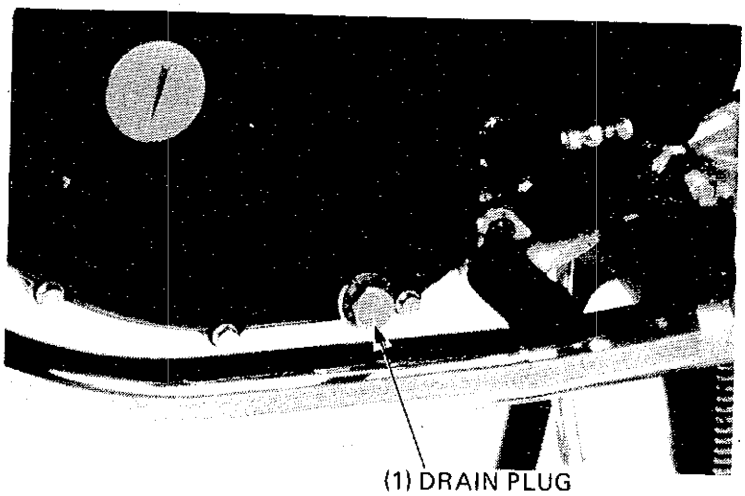
Fill the crankcase with the recommended grade oil.

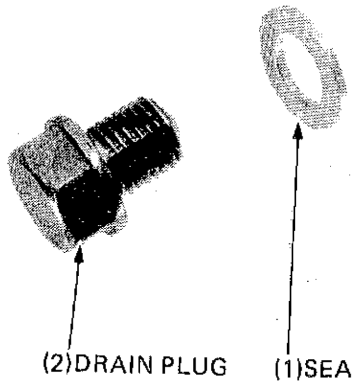
**ENGINE OIL CAPACITY:**
**1.7 l (1.8 US qt, 1.5 Imp qt) after draining**

**RECOMMENDED OIL:**
**HONDA 4-stroke oil or equivalent**




Install the oil filler cap.
Start the engine and allow to idle for a few minutes.
Stop the engine, make sure the oil level is at the upper level mark with the vehicle in an upright position and there are no oil leaks.


(1) DRAIN PLUG


(2)DRAIN PLUG (1)SEALING WASHER

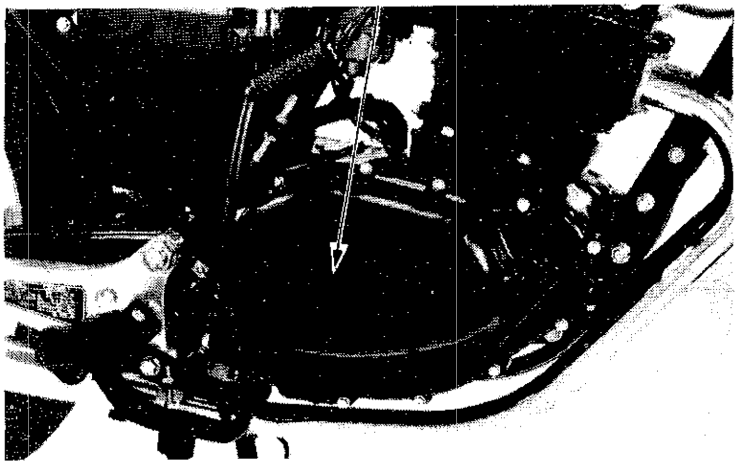
# OIL FILTER SCREEN CLEANING

NOTE

Clean the oil filter screen before adding oil.

Remove the right crankcase cover (Page 8-4).

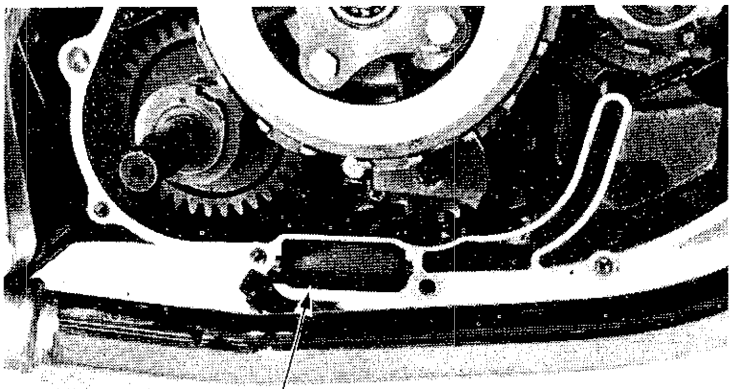
(1)RIGHT CRANKCASE COVER



Pull out the oil filter screen, and clean it.
Reinstall the oil filter screen.

NOTE

Install the oil filter screen with the thick end facing the outside.
Install the right crankcase cover while lifting the cam follower lever up.
Adjust the balancer chain (Page 3-6) while the crankcase cover is off.

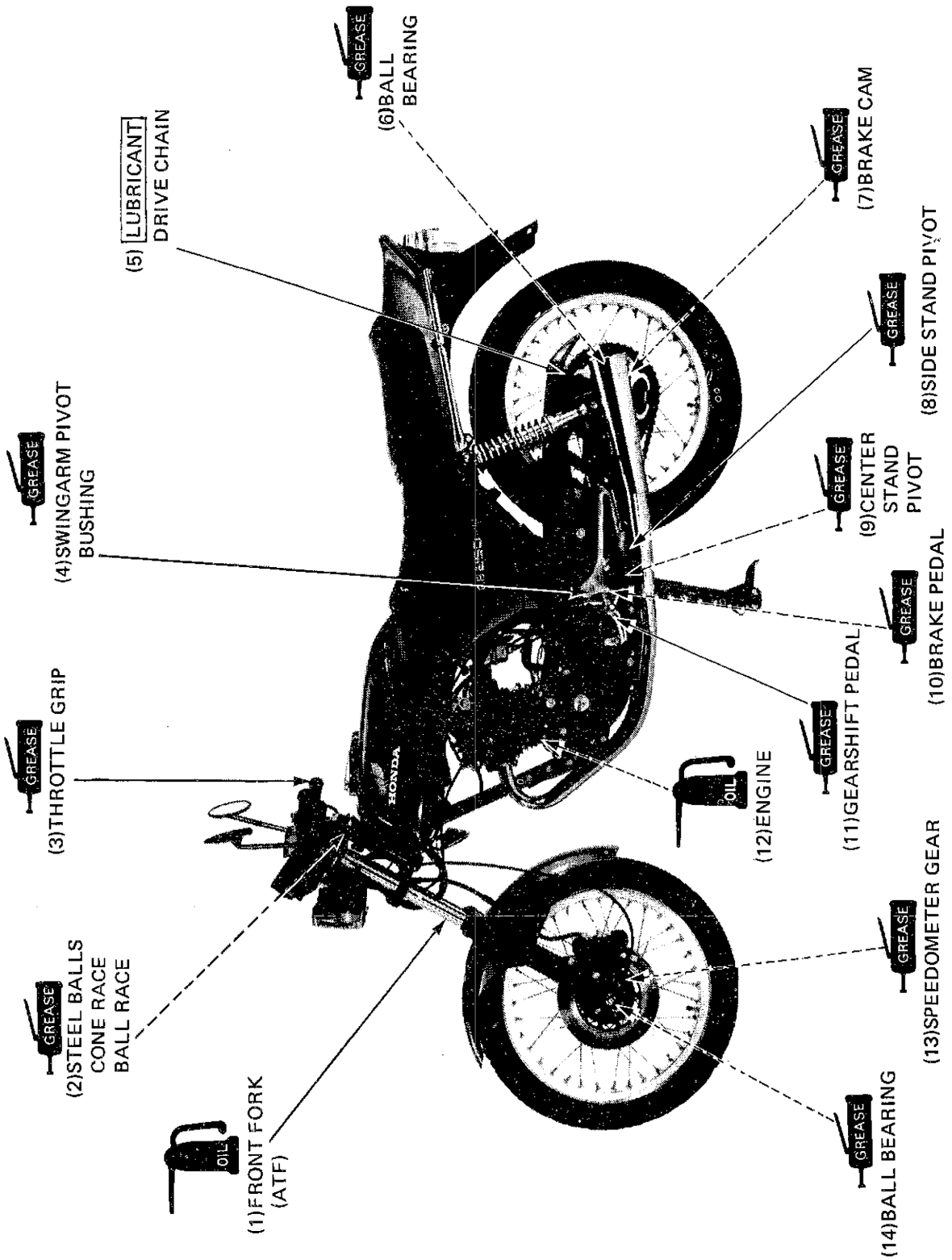


(1)OIL FILTER SCREEN

Install the right crankcase cover (Page 8-16).
Adjust the rear brake pedal free play (Page 3-14).
Adjust the clutch lever free play (Page 3-16).
Adjust the starter decompressor (Page 3-6).
Fill the crankcase with the recommended oil.
Start the engine and allow to idle for a few minutes.
Stop the engine, check the oil level and inspect for oil leaks.
Check the clutch operation.

# LUBRICATION POINTS

Use the general purpose grease when not specified here. Apply oil or grease to the other sliding surfaces and cables not shown here.



# INSPECTION AND ADJUSTMENT 3.


| | | | |
|---|---|---|---|
| SERVICE INFORMATION | 3–2 | ≪ CHASSIS ≫ | |
| ≪ ENGINE ≫ | | DRIVE CHAIN | 3–11 |
| AIR CLEANER | 3–3 | BATTERY | 3–13 |
| FUEL LINE | 3–4 | FRONT BRAKE | 3–13 |
| SPARK PLUG | 3–4 | REAR BRAKE | 3–14 |
| VALVE CLEARANCE | 3–5 | BRAKE LIGHT SWITCH | 3–15 |
| STARTER DECOMPRESSOR | 3–6 | HEADLIGHT AIM | 3–15 |
| BALANCER CHAIN TENSION | 3–6 | CLUTCH | 3–16 |
| THROTTLE OPERATION | 3–8 | SIDE STAND | 3–17 |
| CHOKE MECHANISM | 3–9 | SUSPENSION | 3–17 |
| CARBURETOR IDLE SPEED | 3–9 | WHEEL/SPOKES | 3–18 |
| FAST IDLE SPEED | 3–9 | STEERING HEAD BEARING | 3–18 |
| IGNITION TIMING | 3–10 | NUTS, BOLTS, FASTENERS | 3–18 |
| CYLINDER COMPRESSION | 3–10 | | |

# SERVICE INFORMATION

## • WORKING PRACTICE

Engine oil level check . . . . . Page 2-3
Engine oil change . . . . . Page 2-3
Oil filter screen cleaning . . . . . Page 2-4

## • SPECIFICATIONS

ENGINE

| | | |
|---|---|---|
| Ignition timing: | Initial | 12° B.T.D.C at 1,200 rpm (F mark) |
| | Full advance: | 37 ± 2° B.T.D.C at 3,300 rpm |
| Spark plug: | plug gap: | 0.6–0.7mm (0.024–0.028 in) |
| | plug type: | |

[ ] U only

| For cold climate (Below 5°C, 41°F) | | Standard | | For extended high speed driving | |
|---|---|---|---|---|---|
| ND | NGK | ND | NGK | ND | NGK |
| X24ESR-U | DR8ES-L | X27ESR-U | DR8ES | | |
| | | [X24ES-U] | [D8EA] | [X27ES-U] | [D9EA] |

Valve clearance:

| | |
|---|---|
| INTAKE: | 0.05 mm (0.002 in) |
| EXHAUST: | 0.10 mm (0.004 in) |
| Throttle grip free play: | 2–6 mm (0.08–0.24 in) |
| Idle speed: | 1,200 ± 100 $min^{-1}$ (1,200 ± 100 rpm) |
| Decompression lever free play: | 1–3 mm (0.04–0.12 in) |
| Cylinder compression: | 1,373 ± 196 kPa (14 ± 2 $kg/cm^2$, 196 ± 28 psi) |

CHASSIS

| | |
|---|---|
| Drive chain slack: | 15–25 mm (5/8–1 in) |
| Front brake lever free play: | 10–20 mm (3/8–3/4 in) |
| Rear brake pedal free play: | 20–30 mm (3/4–1-1/4 in) |
| Clutch lever free play: | 10–20 mm (3/8–3/4 in) |
| Side stand spring tension: | 2–3 kg (4.4–6.6 lb) |

Cold tire pressures
kPa ($kg/cm^2$, psi)

| | | |
|---|---|---|
| Driver and one passenger | Front | 175 (1.75, 24) |
| | Rear | 250 (2.50, 36) |
| Driver only | Front | 175 (1.75, 24) |
| | Rear | 225 (2.25, 32) |
| Tire size | Front | 3.00S18–4PR |
| | Rear | 4.10S18–4PR |

## • TORQUES

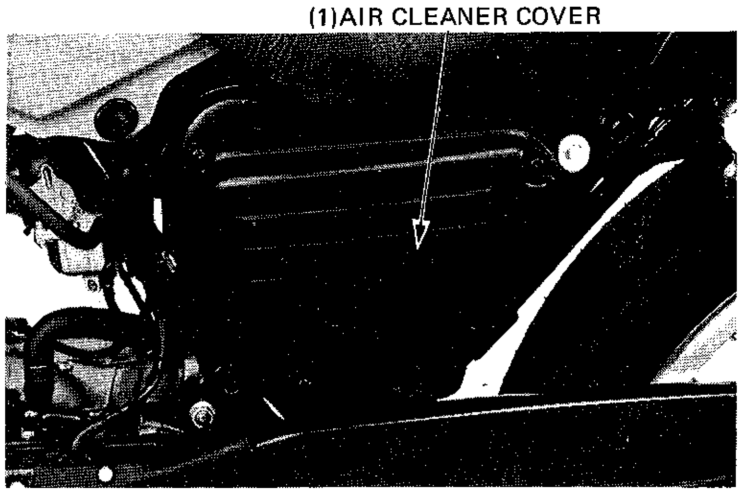
| | |
|---|---|
| Balancer holder lock bolt: | 20–26 N·m (2.0–2.6 kg-m, 14–19 ft-lb) |
| Rear axle nut: | 70–100 N·m (7.0–10.0 kg-m, 51–72 ft-lb) |
| Spoke nipple: | 2.5–5.0 N·m (25–50 kg-cm, 22–43 in-lb) |

## • TOOL

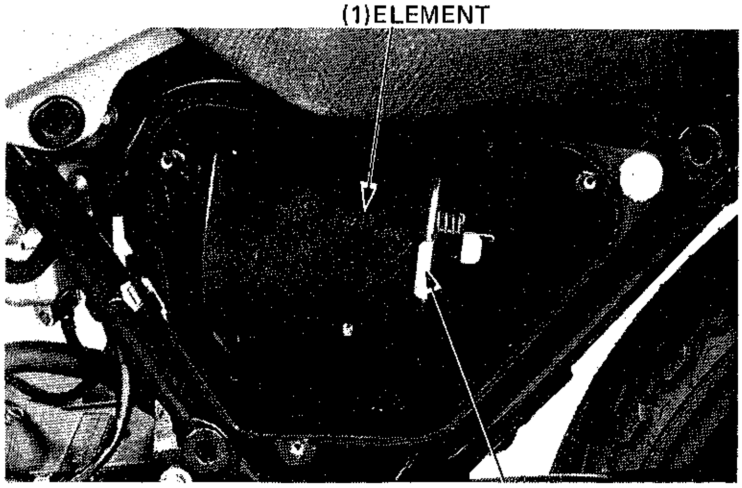
| | |
|---|---|
| Valve adjusting wrench | No. 07908–0010000 |

# AIR CLEANER

Remove the left side cover.
Remove the air cleaner cover by removing the attaching screws.




Pull out the element holder.
Remove the air cleaner element from the holder.

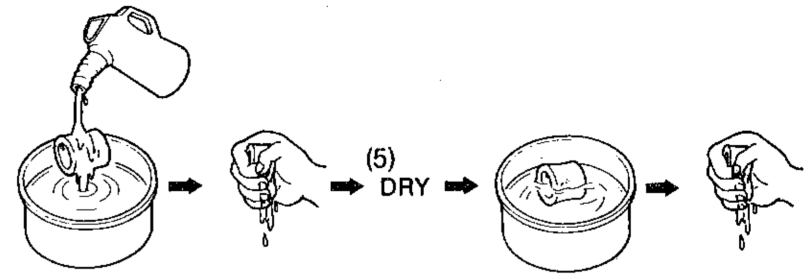



Wash the element in non-flammable or high flash point solvent, and allow to dry.

***WARNING***

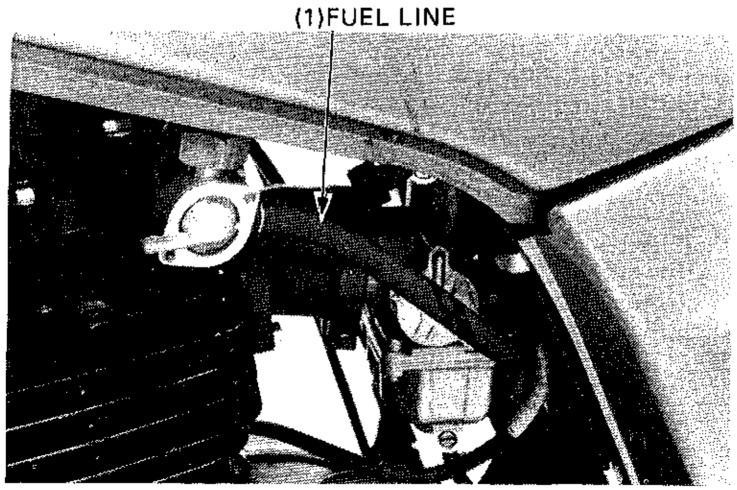
***Never use gasoline or low flash point solvents for cleaning the air cleaner element. A fire or explosion could result.***

Soak the element in gear oil (SAE 80-90) and squeeze out excess.
Install the air cleaner element on the element holder.
Install the element holder.
Install the air cleaner cover.



## FUEL LINE

Replace any parts which show signs of deterioration, damage or leakage.




## SPARK PLUG

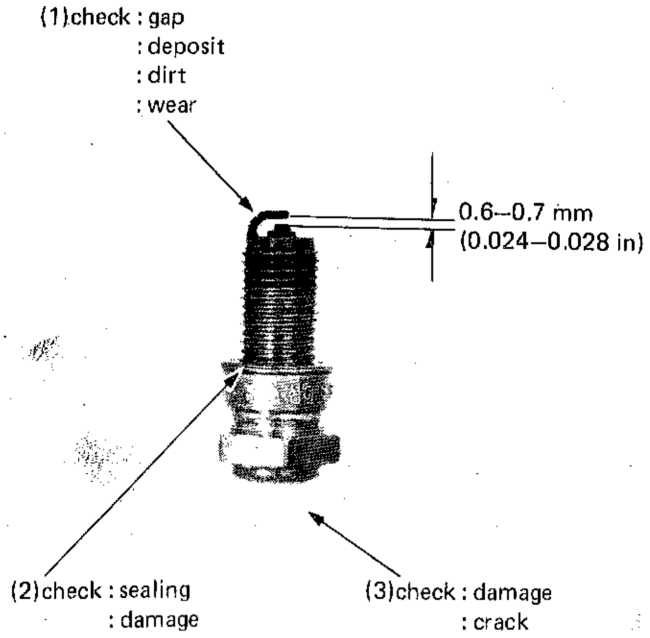
Disconnect the spark plug cap, and remove the spark plug.
Visually inspect the spark plug electrodes for wear. The center electrode should have square edges and the side electrode should not be eroded. Discard the spark plug if there is apparent wear or if the insulator is cracked or chipped. If the spark plug deposits can be removed by sandblasting, the spark plug can be reused. Inspect the gap with a gauge, and adjust by bending the side electrode.

**SPARK PLUG GAP: 0.6—0.7 mm (0.024—0.028 in)**

**RECOMMENDED SPARK PLUG**

| | | |
|---|---|---|
| For cold climate | X24ESR-U | ND |
| | DR8ES-L | NGK |
| Standard | X27ESR-U [X24ES-U] | ND |
| | DR8ES [D8EA] | NGK |
| For extended high speed driving | [X27ES-U] | ND |
| | [D9EA] | NGK |

[ ] U only




Check the spark plug sealing washer and replace with a new one if damaged.
Reinstall the spark plug and connect the spark plug cap.

NOTE

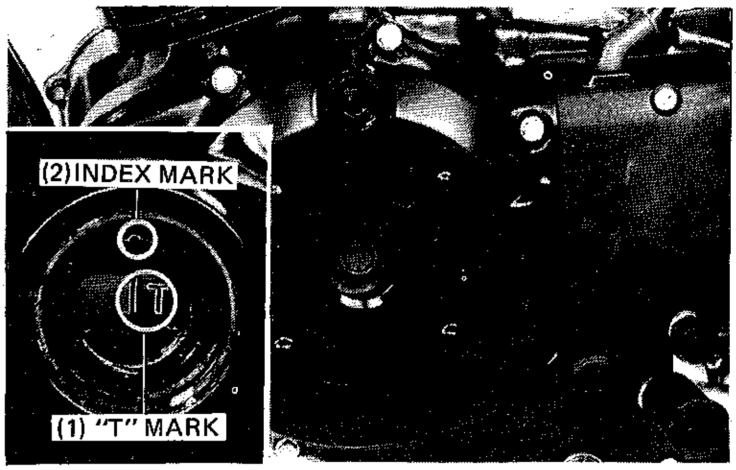
To install, turn finger tight then tighten with a spark plug wrench.

# VALVE CLEARANCE

NOTE

Inspect and adjust valve clearance while the engine is cold (below 35°C/95°F).

Remove the seat.
Turn the fuel valve "OFF" and disconnect the fuel line.
Remove the fuel tank.
Remove the crankshaft hole cap and timing mark hole cap.
Remove the valve adjuster covers.

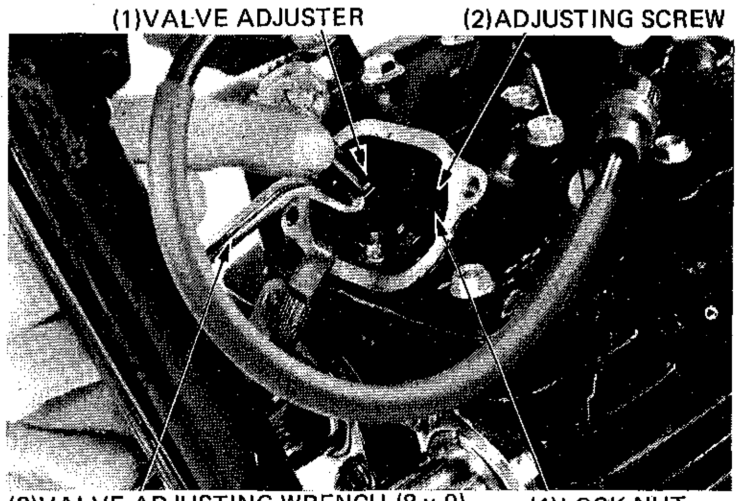



Rotate the crankshaft counterclockwise and align the "T" mark on the generator rotor with the index mark on the left crankcase cover. The piston must be at T.D.C. (Top Dead Center) of the compression stroke. Make sure the decompressor valve lifter has some free play.
Inspect the intake and exhaust valve clearance by inserting a feeler gauge between the adjusting screw and valve stem.

**VALVE CLEARANCES:**

| | |
|---|---|
| **INTAKE:** | **0.05 ± 0.02 mm (0.002 ± 0.0008 in)** |
| **EXHAUST:** | **0.1 ± 0.02 mm (0.004 ± 0.0008 in)** |

Adjust by loosening the lock nut and turning the adjusting screw until there is a slight drag on the feeler gauge.
Hold the adjusting screw and tighten the lock nut.



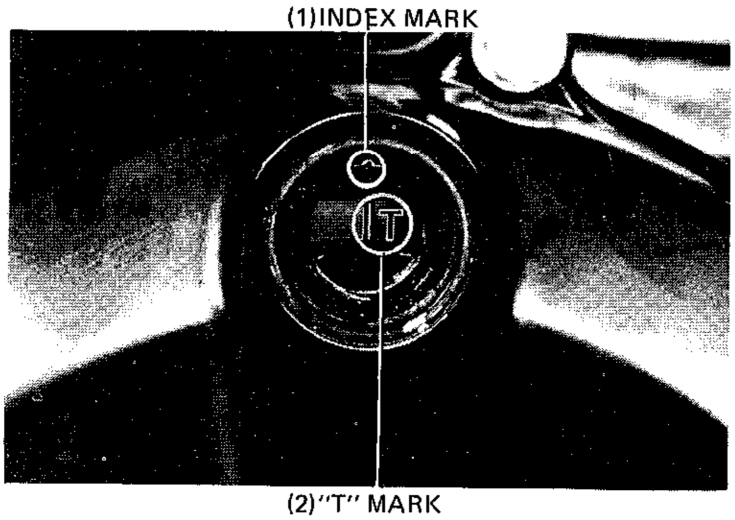

Recheck the valve clearance.
Adjust starter decompressor valve lifter lever free play (Page 3–6).
Reinstall the valve adjuster covers, timing mark hole cap and crankshaft hole cap.
Reinstall the fuel tank and seat.

# STARTER DECOMPRESSOR

NOTE

Perform the starter decompressor adjustment after the valve clearance has been adjusted.

Remove the crankshaft hole cap and timing mark hole cap.
Rotate the crankshaft counterclockwise and align the "T" mark on the generator rotor with the index mark on the left crankcase cover. Be sure that the piston is at T.D.C. (Top Dead Center) of the compression stroke.



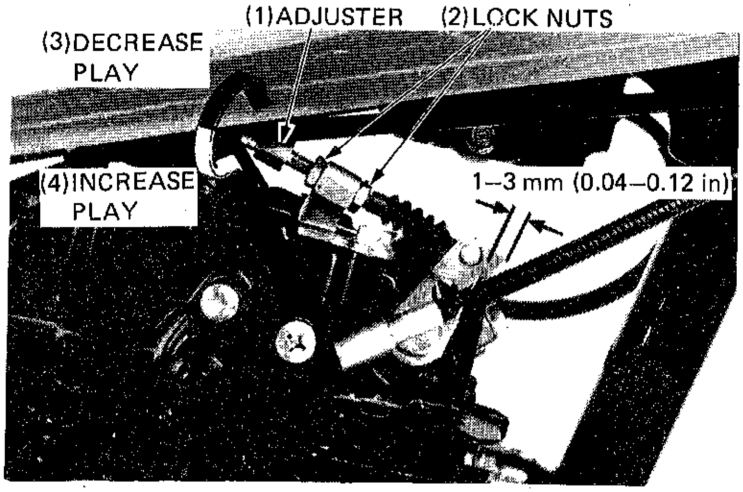

Measure the free play at the tip of the decompression upper lever.

**FREE PLAY: 1–3 mm (0.04–0.12 in)**

To adjust, loosen the lock nuts and turn the adjuster.

*CAUTION*

*Excessive free play causes hard starting. Insufficient free play may cause erratic engine idle and valve burning.*




# BALANCER CHAIN TENSION

Remove the drain plug, and drain oil from the engine.
Remove the right crankcase cover (Page 8–4).
Loosen the balancer holder lock bolt. When the lock bolt is loosened, the spring will pull the balancer holder to the right.

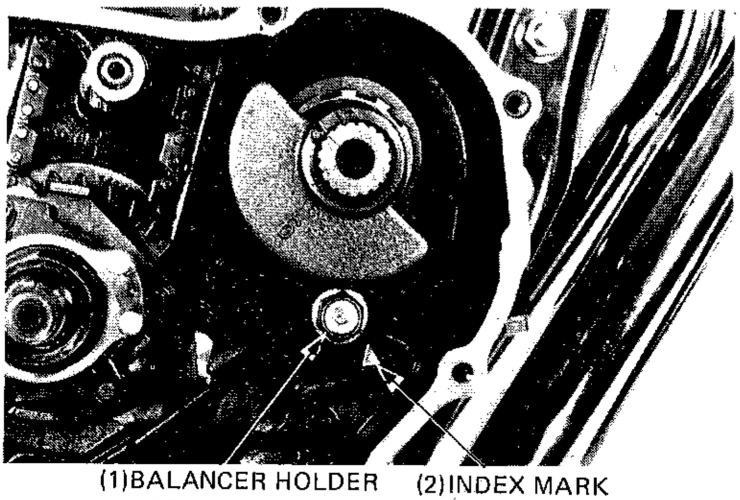
NOTE

Remove the lock bolt if it keeps the holder from moving.

Move the holder to the left one graduation from where it stops.

*CAUTION*

*If the balancer holder travel is limited by the bolt contacting the end of the slot, the balancer holder must be reset to provide a required chain tension.*



Retighten the lock bolt.

**TORQUE: 20–26 N·m (2.0–2.6 kg-m; 14–19 ft-lb)**

NOTE

Clean the oil filter screen (Page 2–4) while the right crankcase cover is off.

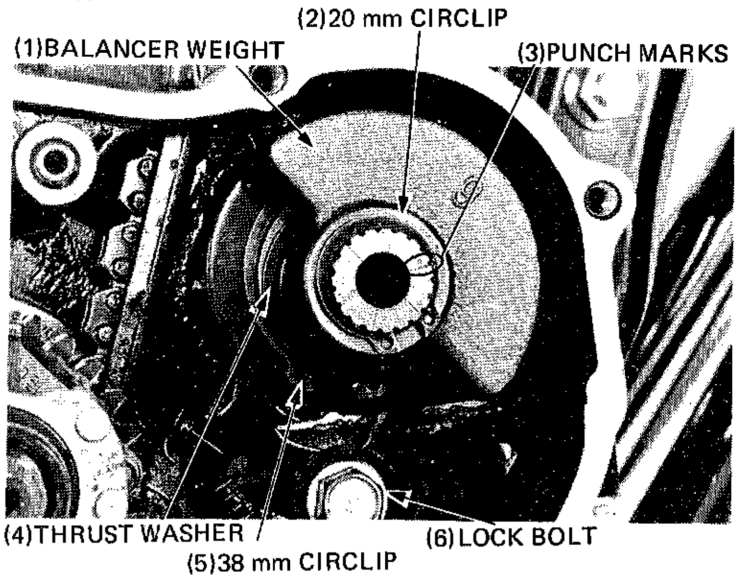
Reinstall the right crankcase cover.

Fill the engine with the recommended oil.

NOTE

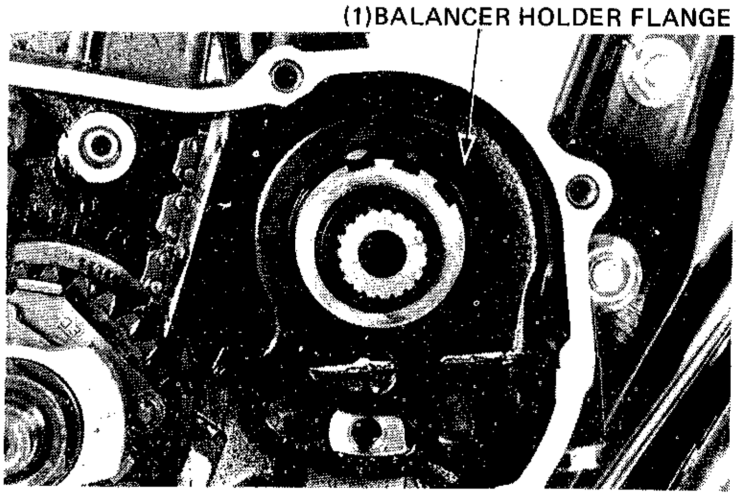
If the left edge of the balancer holder slot contacts the tensioner lock bolt, reset it as described here.

Remove the 20 mm circlip, balancer weight, and thrust washer.
Remove the 38 mm circlip, and balancer holder flange.
Reinstall the balancer holder so that it is one graduation to the left away from the original position.




NOTE

Replace the balancer chain if the balancer holder flange can no longer be relocated in clockwise direction.




Reinstall the 38 mm circlip, thrust washer, balancer weight, and 20 mm circlip.

NOTE

Install the balancer aligning with the punch mark on the balancer and balancer shaft.

Attach the balancer holder spring.
Move the balancer holder one graduation to the left, and tighten the holder lock bolt.

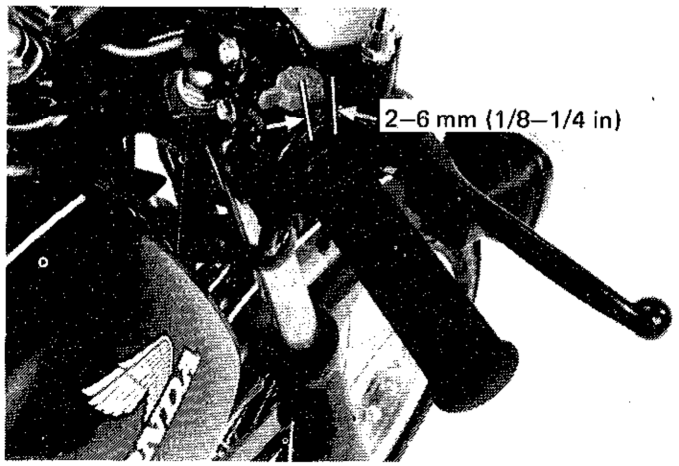
**TORQUE: 20–26 N·m (2.0–2.6 kg-m, 14–19 ft-lb)**

NOTE

Clean the pulser rotor thoroughly.

# THROTTLE OPERATION

Make sure that there is no deterioration, damage, or kinks in the throttle cables, and that the throttle grip free play is 2–6 mm (1/8–1/4 in) on the outer edge of the throttle grip flange.




Check for smooth throttle grip full opening and automatic full closing in all steering positions. Adjust if necessary.

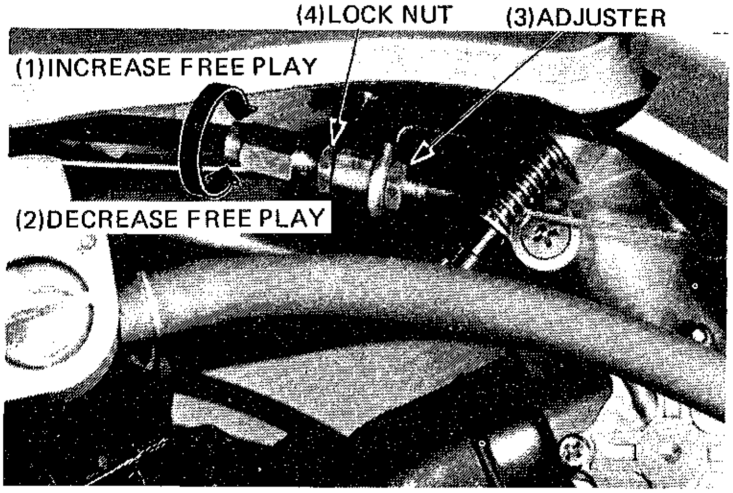
If the throttle operation is not smooth, lubricate with cable lubricant.

NOTE

The accelerator pump may flood the carburetor during this inspection.

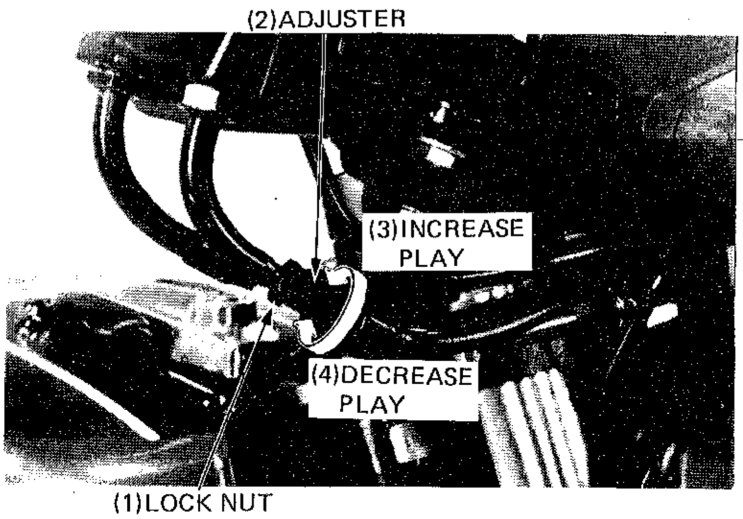
Major adjustments are made with the lower adjuster. To adjust, loosen the grip play adjuster lock nut and turn the adjuster.

Tighten the lock nut.



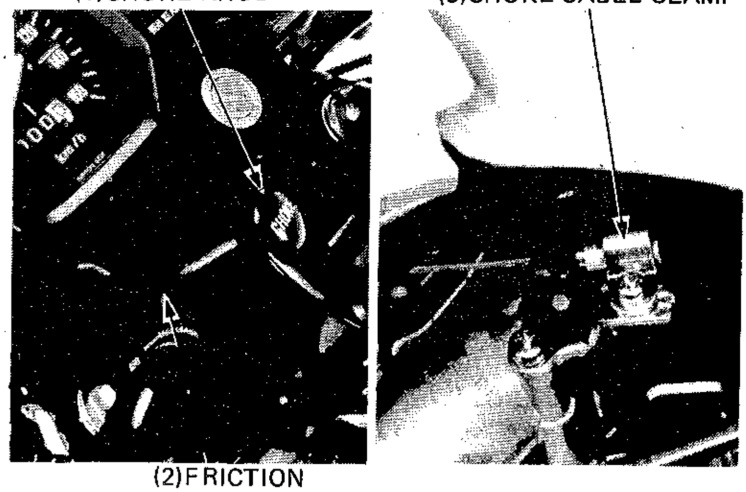

Minor adjustments are performed with the upper adjuster in the same manner.

Recheck throttle operation.
Replace any damaged parts.



## CHOKE MECHANISM

Check for smooth choke operation.
Pull the choke knob out to "fully closed" and make sure that the choke valve is fullly closed by moving the choke lever on the carburetor.
Adjust by loosening the choke cable clamp on the carburetor.
Retighten the clamp, holding the choke lever "fully closed."
Recheck the choke operation.
The choke knob must move smoothly and stay where positioned.
Adjust the choke friction by turning the adjuster.




## CARBURETOR IDLE SPEED

NOTE

Check the idle speed after all other maintenance items have been performed.

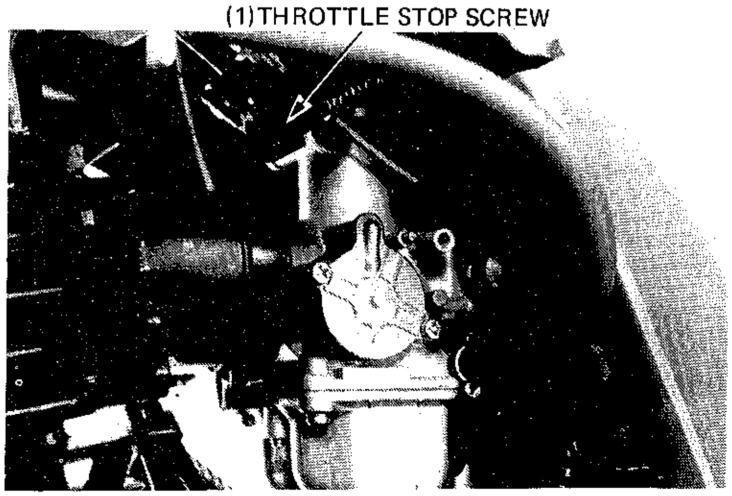
Warm up the engine.
Shift the transmission into neutral.

NOTE

The engine must be warm for accurate idle speed adjustment. Stop and go driving for ten minutes is sufficient.

Support the vehicle in an upright position.
Turn the throttle stop screw as required to obtain specified idle speed.

**IDLE SPEED: 1,200 ± 100 min$^{-1}$ (rpm)**

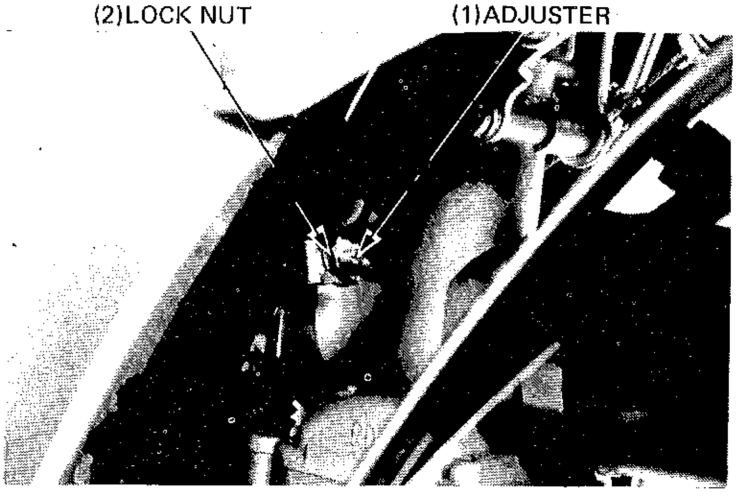



## FAST IDLE SPEED

Check the fast idle speed by pulling the choke knob all the way up.

**FAST IDLE SPEED:**
**2,000–2,500 min$^{-1}$ (rpm)**

To adjust, loosen the lock nut and turn the adjuster in either direction.

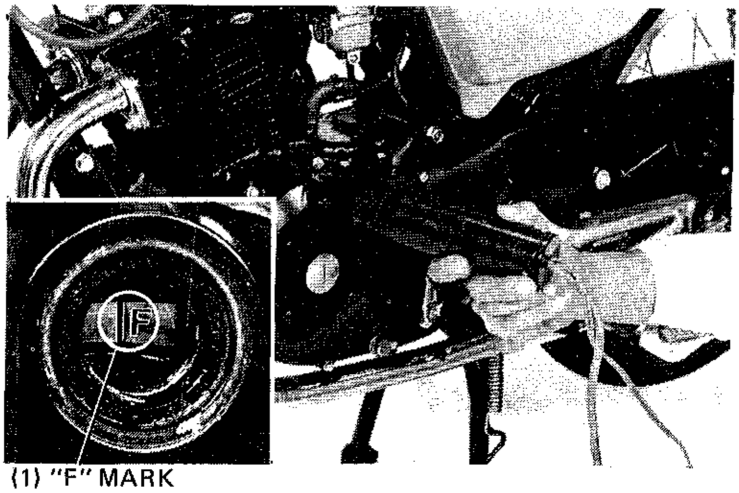


# IGNITION TIMING

NOTE

The Capacitive Discharge Ignition system is factory pre-set and cannot be adjusted. To inspect the function of the C.D.I. components, ignition timing inspection procedures are given here.

Remove the timing hole cap.
Connect the tachometer and timing light.
Start the engine and allow to idle. Check the ignition timing.
Timing is correct if the index mark aligns with the "F" mark at idle.
If the ignition timing is incorrect, check the C.D.I. unit, pulser rotor and pulser generator, and replace faulty parts.



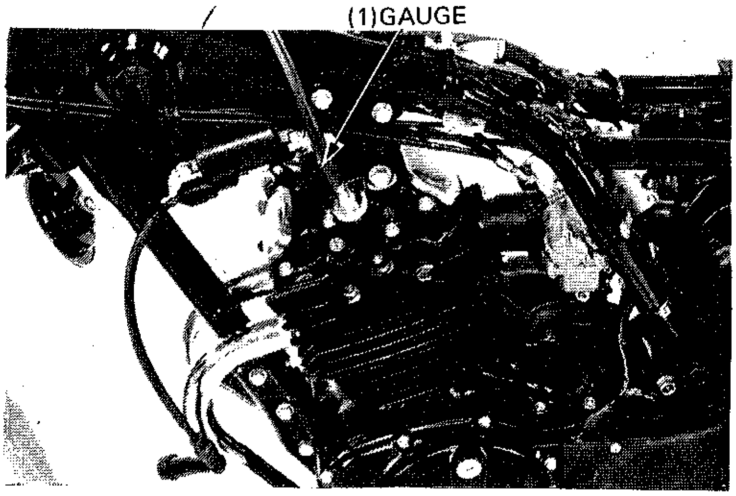
(1) "F" MARK

# CYLINDER COMPRESSION

Warm up the engine.
Stop the engine and remove the spark plug.
Insert a compression gauge.
Push the choke knob in.
Open the throttle grip fully.
Operate the kickstarter several times.

NOTE

Watch for compression leaking at the gauge connection.


(1)GAUGE

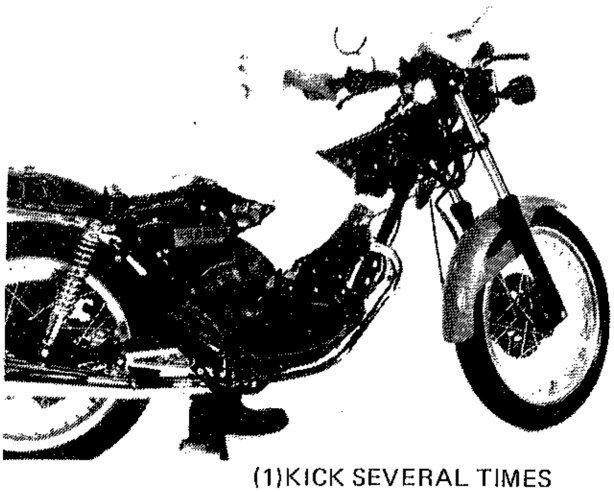
**COMPRESSION: 1,373 ± 196 kPa**
**(14 ± 2 kg/cm$^2$, 196 ± 28 psi)**

**Low compression can be caused by:**

Improper valve adjustment
Valve leakage
Blown cylinder head gasket
Worn piston rings or cylinder
Improperly adjusted decompression mechanism.

**High compression can be caused by:**

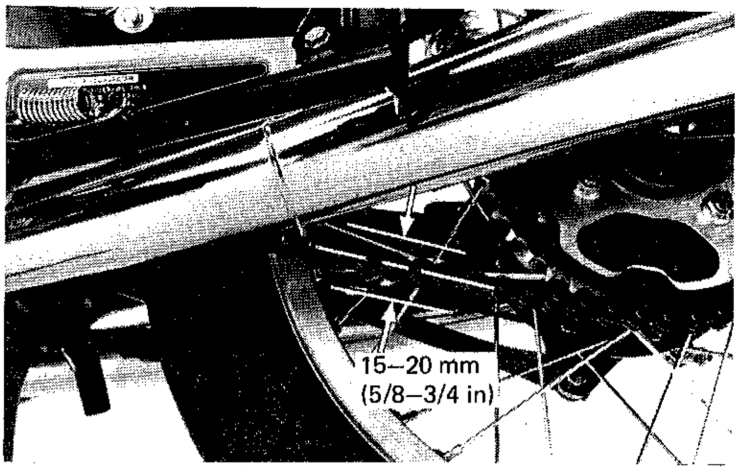
Carbon deposits in combustion chamber or on piston head.


(1)KICK SEVERAL TIMES

# DRIVE CHAIN

Place the vehicle on its center stand and shift the transmission into neutral.
Inspect drive chain free play midway between the sprockets on the lower chain run.

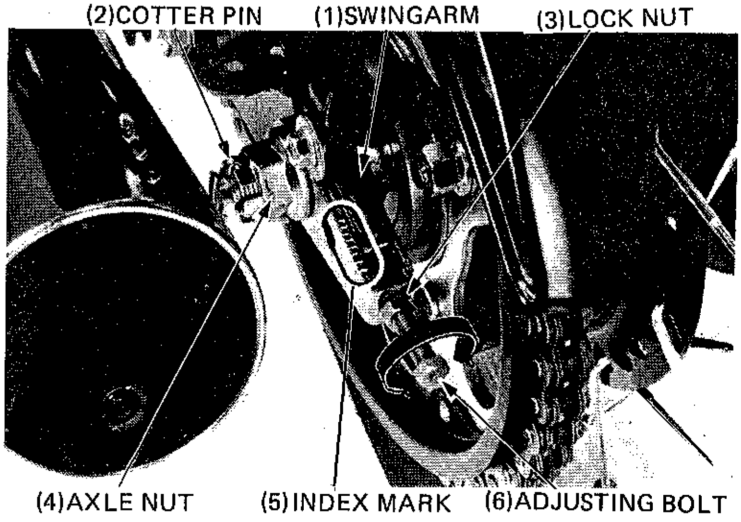
**FREE PLAY: 15–20 mm (5/8–3/4 in)**




Adjust as follows:
Remove the cotter pin and loosen the axle nut.
Loosen the lock nuts and turn the adjusting bolts on both sides an equal number of turns.

*CAUTION*

*Be sure the index mark aligns with the same graduation on the scale on both sides of the swingarm.*




Tighten the axle nut and install a new cotter pin.

**TORQUE: 70–110 N·m (7.0–11.0 kg-m, 51–80 ft-lb)**

Recheck free play and free wheel rotation.
Tighten the adjuster lock nuts.

When the drive chain becomes extremely dirty, it should be removed and cleaned prior to lubrication.

**Endless type**

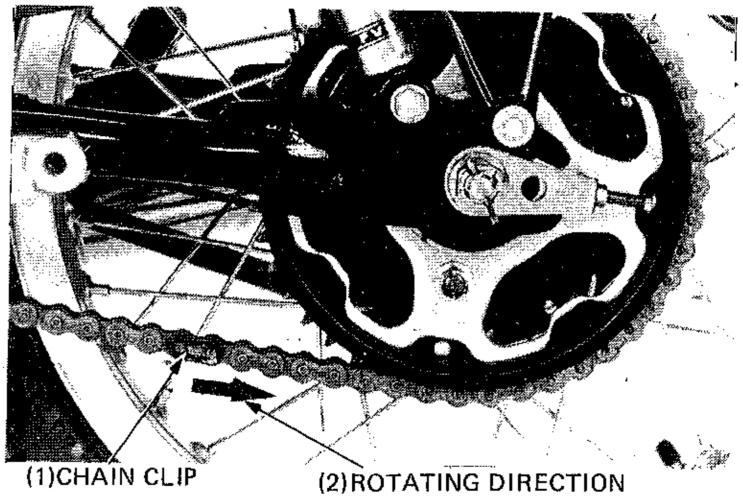
Remove the rear wheel (Page 14–4).
Remove the swing arm. (Page 14–13).
Remove the drive sprocket cover.
Remove the drive chain.

**Joint type**

Loosen the rear axle nut and drive chain adjuster.
Remove the chain clip and master link and disconnect the drive chain.
Remove the drive chain cover and drive chain.

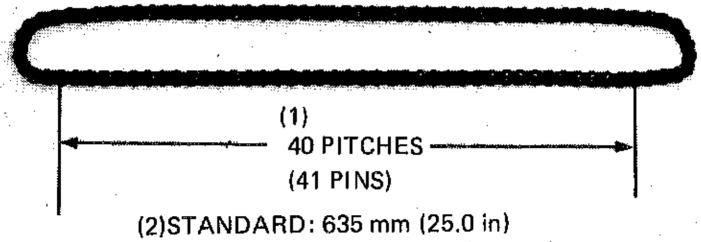
NOTE

When installation, note the direction of the chain clip.



Clean the drive chain in non-flammable or high flash point solvent and brush and allow to dry. Inspect the drive chain for possible wear or damage.
Replace any chain that is excessively worn or damaged.

Measure the drive chain distance between a span of pins from pin center to pin center with the chain held taut and any still joints straightened.

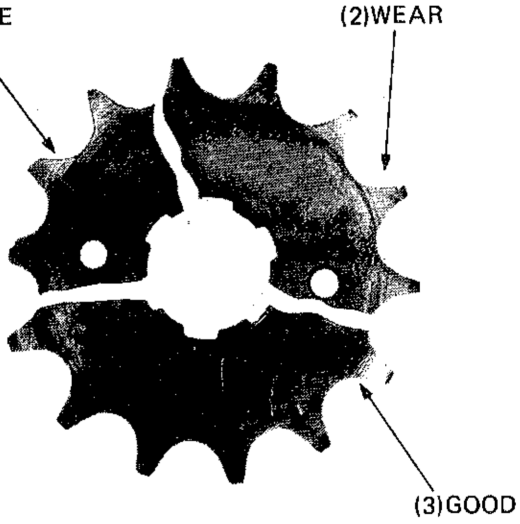



(2)STANDARD: 635 mm (25.0 in)
(3)SERVICE LIMIT: 648 mm (25.5 in)

Inspect the sprocket teeth for excessive wear or damage. Replace if necessary.

NOTE

Never install a new drive chain on worn sprockets or worn chain on new sprockets. Both chain and sprocket must be in good condition, or the new replacement chain or sprockets will wear rapidly.

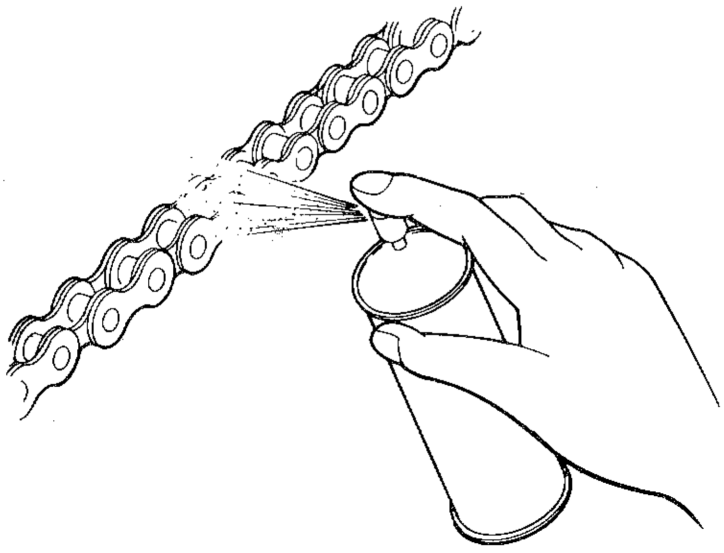



Lubricate the drive chain.

NOTE

Commercial aerosol type drive chain lubricant is recommended.

Reinstall the drive chain.
Adjust the drive chain. (Page 3–11)



# BATTERY

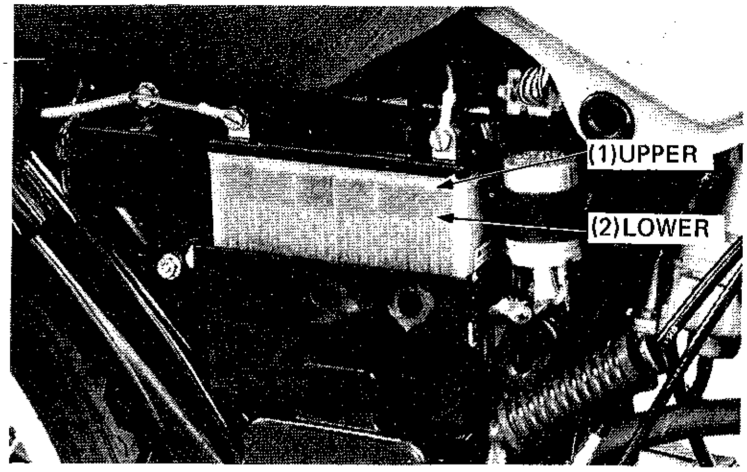
Remove the right side cover.
Inspect the battery fluid level.
When the fluid level nears the lower level, add distilled water to the upper level.

NOTE

Add only distilled water. Tap water will shorten the service life of the battery.

***WARNING***

***The battery electrolyte contains sulphuric acid. Protect your eyes, skin, and clothing. In case of contact, flush thoroughly with water and call a doctor if your eyes were eposed.***



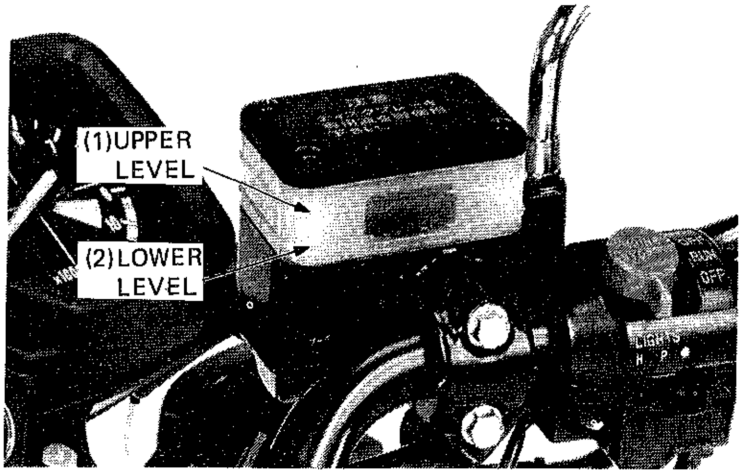

# FRONT BRAKE

- BRAKE FLUID INSPECTION

Check the front brake fluid reservoir level.
If the level nears the lower level mark, fill the reservoir with SAE J1703 or DOT–3 BRAKE FLUID to the upper level mark.
Check the entire system for leaks, if the level is low.

*CAUTION*

- *Do not mix different brands of fluid in the reservoir. Stay with one fluid as they are not compatible.*
- *Do not remove the cover until the handlebar has been turned so that the reservoir is level.*
- *Avoid operating the brake lever with the cap removed.*
  *Brake fluid will squirt out if the lever is pulled.*

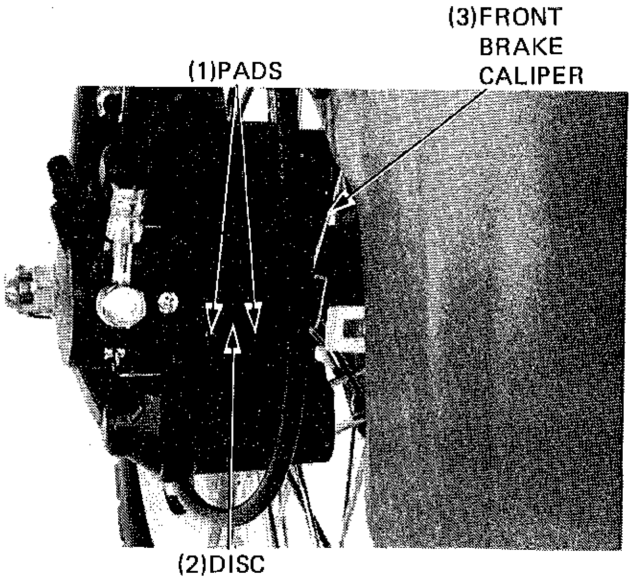



- BRAKE PAD WEAR

Remove the cap from the caliper and check for brake pad wear.
Replace the brake pads if the red line on the top of the pads reaches the edge of the brake disc. (Refer to Section 15).

*CAUTION*

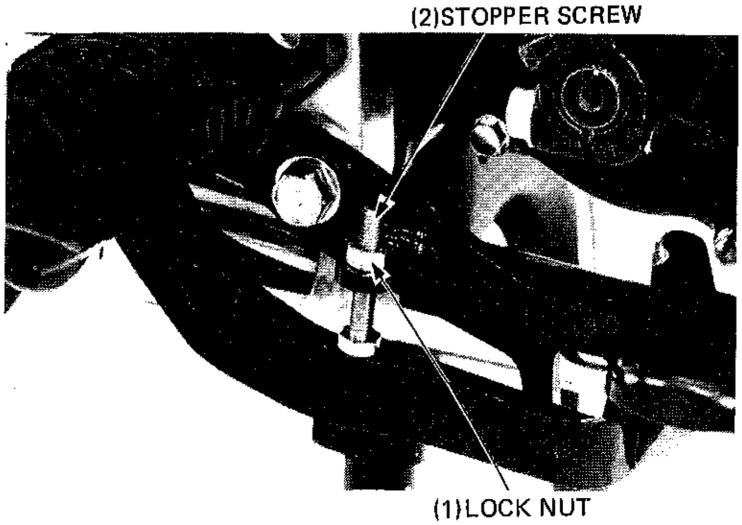
*Always replace the brake pads in pairs to assure even disc pressure.*



# REAR BRAKE

## • BRAKE PEDAL HEIGHT

Loosen the lock nut and adjust the pedal height by turning the stopper screw.
Retighten the lock nut.
Adjust brake pedal free play and the brake light switch.



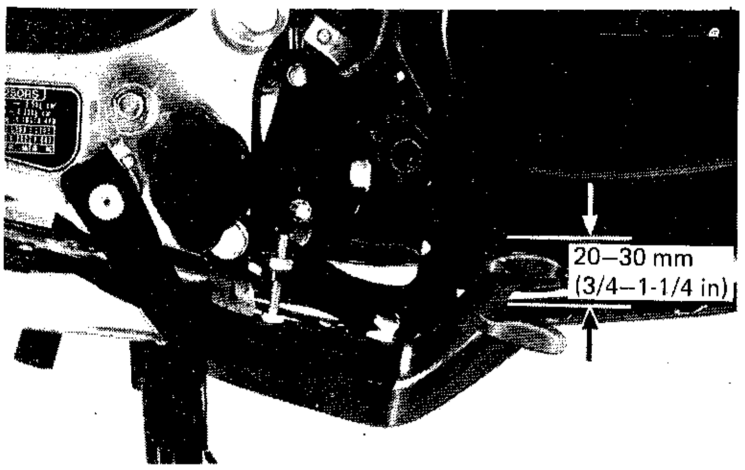

## • BRAKE PEDAL FREE PLAY

NOTE

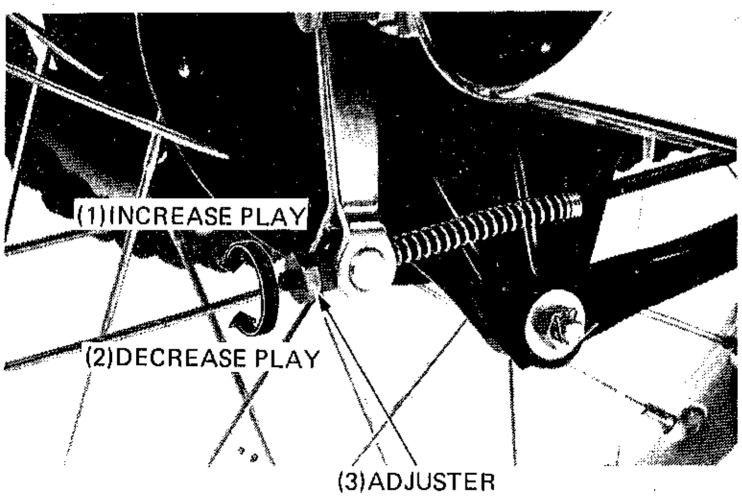
Adjust the rear brake pedal free play after adjusting the brake pedal height.

Measure the rear brake pedal free play.

**FREE PLAY:**
**20–30 mm (3/4–1-1/4 in)**

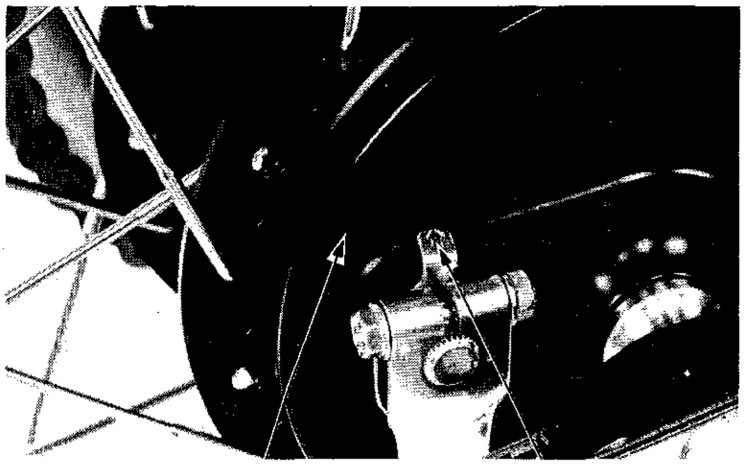



Adjust the free play by turning the adjuster.



### • BRAKE SHOE WEAR

Replace the brake shoes if the arrow on the indicator plate aligns with the "△" on the brake panel when the brake is applied.



(1)"△" MARK (2)ARROW

## BRAKE LIGHT SWITCH

NOTE

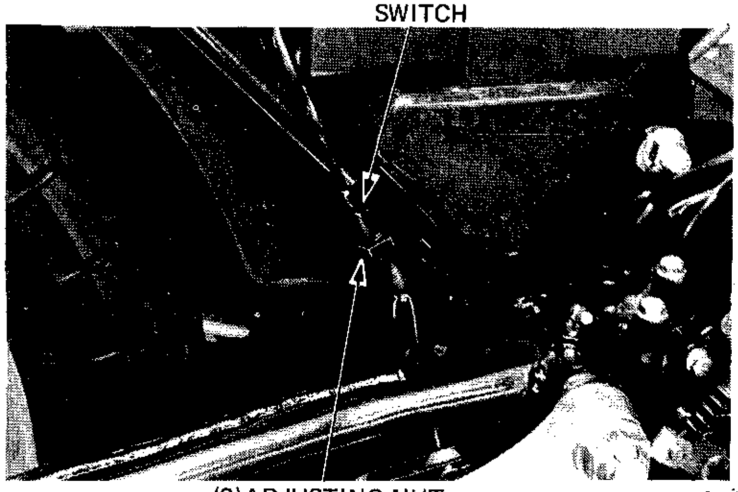
Perform this adjustment after adjusting brake pedal height and free play.

The brake light should come on when the brake pedal is depressed 20 mm (3/4 in) where the brake just starts.
Adjust by turning the adjusting nut.

NOTE

Do not turn the switch body. The front brake light switch does not require adjustment.

(1)BRAKE LIGHT SWITCH



(2)ADJUSTING NUT

## HEADLIGHT AIM

Adjust vertically by loosening both headlight case mounting bolts.
Adjust horizontally by turning the adjusting screw on the headlight rim.

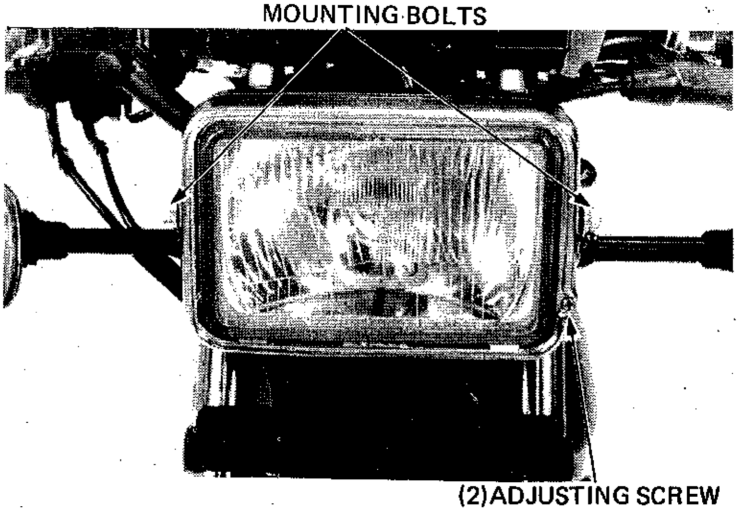
*WARNING*

*An improperly adjusted headlight may blind oncoming drivers, or it may fail to light the road for a safe distance.*

NOTE

Adjust the headlight beam as specified by local laws and regulations.

(1)HEADLIGHT CASE MOUNTING BOLTS

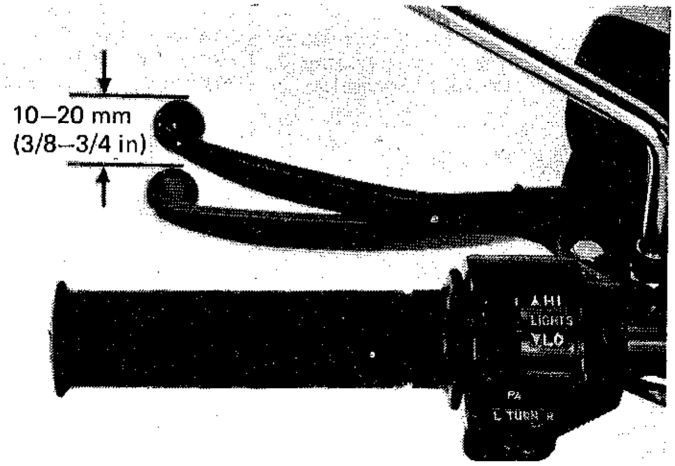


(2)ADJUSTING SCREW

# CLUTCH

Measure the clutch free play at the lever end.

**FREE PLAY: 10–20 mm (3/8–3/4 in)**

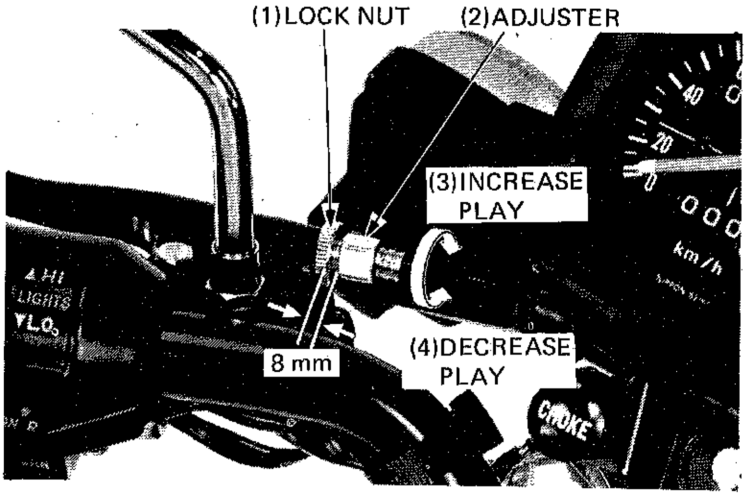



Minor adjustments are made with the upper adjuster.
Loosen the lock nut and turn the adjuster.
Retighten the lock nut and reinstall the rubber protector.

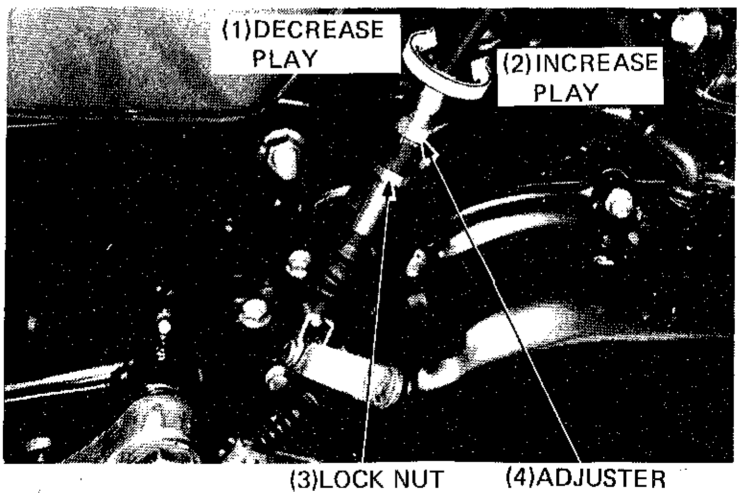
NOTE

Do not expose the adjusting bolt threads more than 8 mm (5/16 in).

If adjustment cannot be made with the clutch lever adjusting bolt, screw the adjusting bolt all the way in.
Adjustment must be made at the clutch housing.

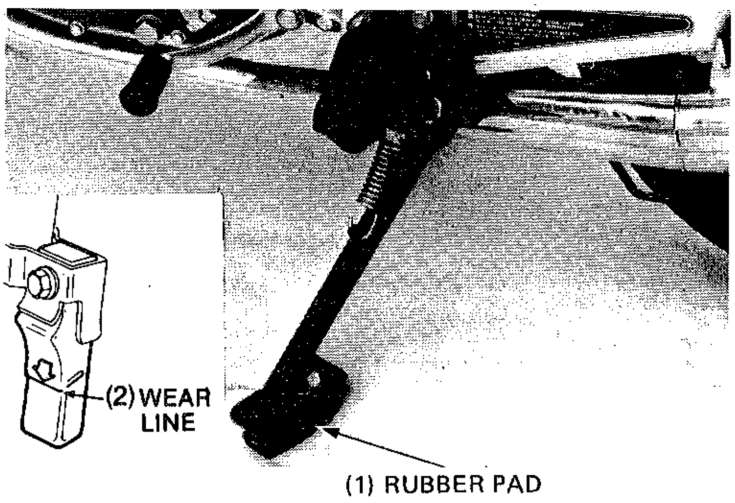



Major adjustments are made with the lower adjuster.
Loosen the lock nut and turn the adjuster.
Tighten the lock nut.
Check clutch operation.



## SIDE STAND

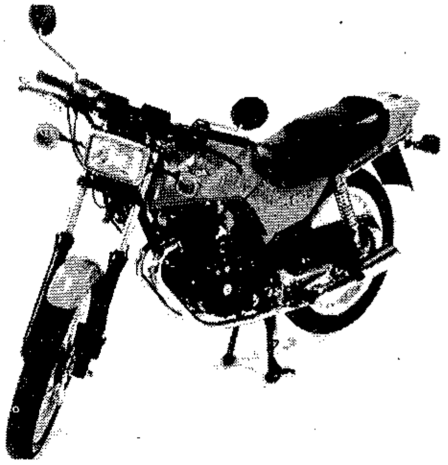
Check the rubber pad for deterioration and wear.
Replace if wear extends to the wear line as shown.
Check the side stand spring for damage and loss of tension, and the side stand assembly for freedom of movement and bending.




## SUSPENSION

***WARNING***

***Do not ride a vehicle with faulty suspension. Loose, worn or damaged suspension parts impair vehicle stability and control.***



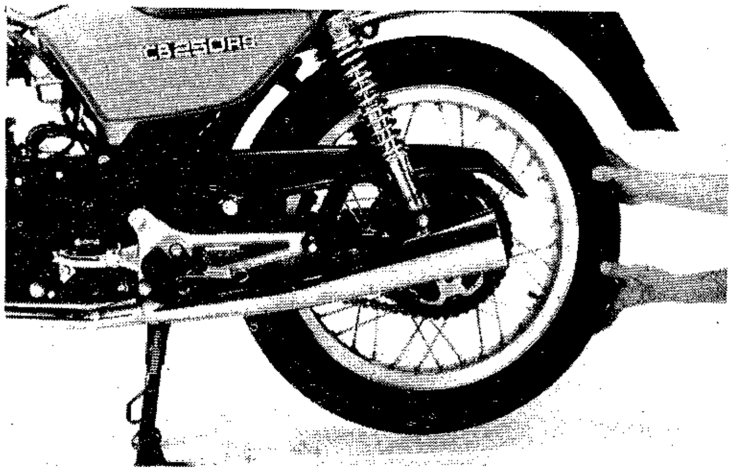
- FRONT

Check the action of the front forks by compressing them several times.
Check the entire fork assembly for signs of leaks, or damage.
Replace any components which are unrepairable.
Torque all nuts and bolts.

- REAR

Place the vehicle on its center stand.
Move the rear wheel sideways with force to see if the swingarm bushings are worn.
Replace if excessively worn.
Check the entire suspension assembly, being sure it is securely mounted and not damaged or distorted.
Torque all nuts and bolts.

Grease the swingarm pivot bushing through the grease fitting on the swingarm.



# WHEEL/SPOKES

- TIRE PRESSURE

NOTE

Tire pressure should be checked when the tires are COLD.

Check the tires for cuts, imbedded nails, or other sharp objects.

**RECOMMENDED TIRE PRESSURE AND TIRE SIZE:** kPa (kg/cm², psi)

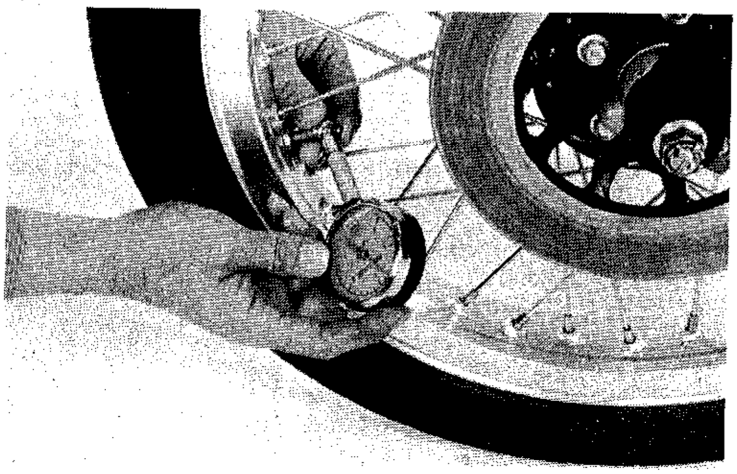
| | |
|---|---|
| Driver and one passenger | Front: 175 (1.75, 24)<br>Rear: 250 (2.50, 36) |
| Driver only | Front: 175 (1.75, 24)<br>Rear: 225 (2.25, 32) |
| Tire size | Front: 3.00 S18–4PR<br>Rear: 4.00 S18–3PR |
| Tire brand | Front: BRIDGESTONE L303<br>YOKOHAMA Y992<br>Rear: BRIDGESTONE L302<br>YOKOHAMA Y983 |

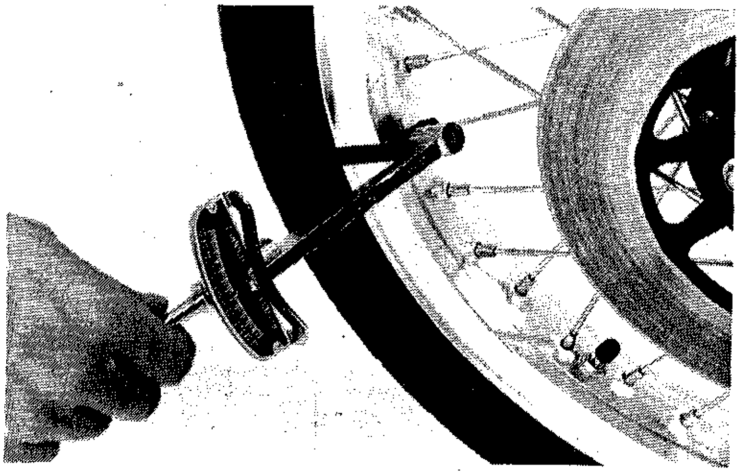
Check the front and rear wheels for trueness.
Retighten the wheel spokes periodically.

**TORQUE: 2,5–5,0 N·m (25–50 kg-cm, 22–43 in-lb)**

**Measure the tread depth at the center of the tires.**
**Replace the tires if the tread depth reaches the following limit.**

**Minimum tread depth:**
**Front: 1.5 mm (1/16 in)**
**Rear: 2.0 mm (3/32 in)**



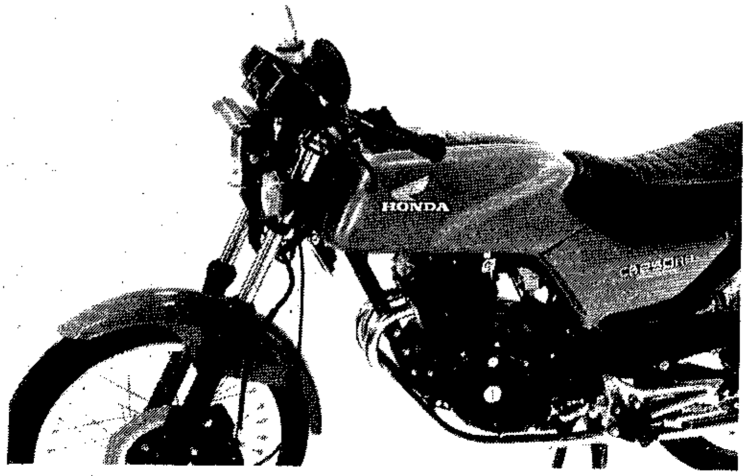


# STEERING HEAD BEARING

NOTE

Check that the control cables do not interfere with the rotation of the handlebars.

Raise the front wheel off the ground.
Check that the handlebar rotates freely.
If the handlebar moves unevenly, binds or has vertical movement, adjust the steering head bearing by turning the steering head adjusting nut with a hook spanner.

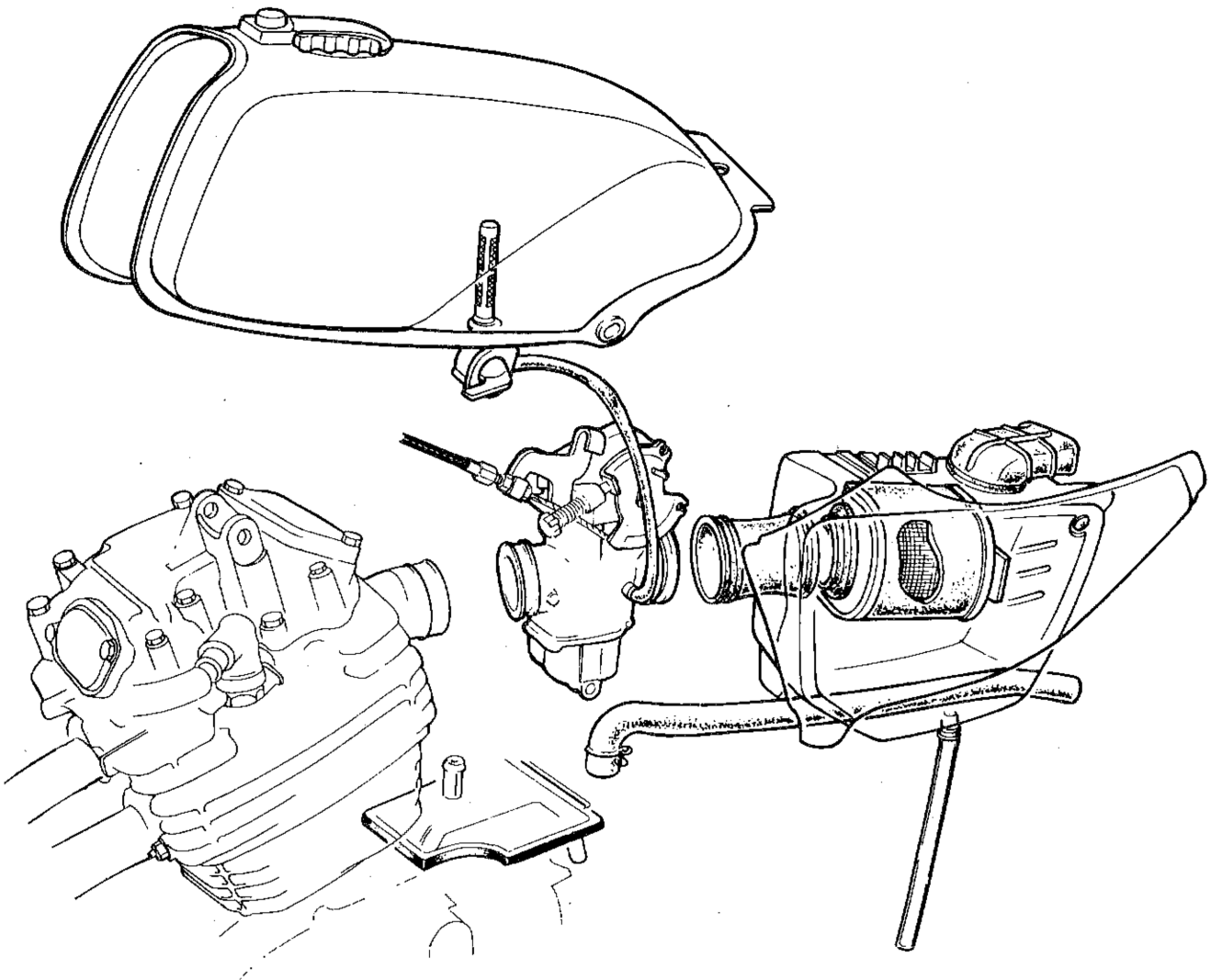



# NUTS, BOLTS, FASTENERS

Retighten the bolts, nuts and fasteners at regular intervals shown in the Maintenance Schedule. For retightening torques, refer to Page 1-16.
Check that all chassis nuts and bolts are tightened to their correct torque values (Page 1-6). Check all cotter pins and safety clips.

# 4. FUEL SYSTEM





| | |
|---|---|
| SERVICE INFORMATION | 4–2 |
| TROUBLESHOOTING | 4–3 |
| FUEL TANK | 4–4 |
| AIR CLEANER | 4–5 |
| CARBURETOR REMOVAL | 4–7 |
| CARBURETOR DISASSEMBLY | 4–7 |
| FLOAT LEVEL ADJUSTMENT | 4–9 |
| CARBURETOR ASSEMBLY | 4–9 |
| ACCELERATOR PUMP ADJUSTMENT | 4–10 |
| CARBURETOR INSTALLATION | 4–10 |
| CARBURETOR ADJUSTMENT | 4–10 |

# SERVICE INFORMATION

## • WORKING PRACTICE

Use caution when working with gasoline. Always work in well-ventilated area away from sparks of flames. When disassembling fuel system parts, note the locations of the O-rings. Replace them with new ones on reassembly. The carburetor float bowl has a drain plug that can be removed to drain residual gasoline.

## • SPECIFICATIONS

| | |
|---|---|
| Fuel Tank capacity: | 13.0 ℓ (3.4 US gal, 2.9 Imp gal) |
| Reserve capacity: | 3.0 ℓ (0.79 US gal, 0.66 Imp gal) |
| Carburetor: | Piston valve type |
| Vernturi dia.: | 30 mm (1.18 in) |
| Identification mark: | PD 70A [PD70B GI, PD70C GII] |
| Float level: | 14.5 mm (0.57 in) |
| Pilot screw initial opening: | 1-3/4 turns |
| Idle speed: | 1,200 ± 100 $min^{-1}$ (1,200 ± 100 rpm) |
| Main jet: | #122 |
| Throttle valve dia.: | 28 mm (1.10 in) |
| Slow jet: | #40 |
| Throttle grip free play: | 2-6 mm (1/8–1/4 in) |
| Fast idle speed: | 2,000–2,500 $min^{-1}$ (2,000–2,500 rpm) |
| Accelerator pump delivery: | 0.15 cc/stroke |
| Jet needle clip: | 4th groove [3rd groove GII] |

## • TOOL

| | |
|---|---|
| Float level gauge: | No. 07401–0010000 |

# TROUBLESHOOTING

**Engine Cranks But Won't Start**

1. No fuel in tank
2. No fuel to cylinder
3. Too much fuel getting to cylinder
4. No spark at plug (ignition malfunction)
5. Air cleaner clogged

**Engine Idles Roughly, Stalls, or Runs Poorly**

1. Idle speed incorrect
2. Ignition malfunction
3. Low compression
4. Rich mixture
5. Lean mixture
6. Air cleaner clogged
7. Air leaking into manifold
8. Fuel contaminated

**Lean Mixture**

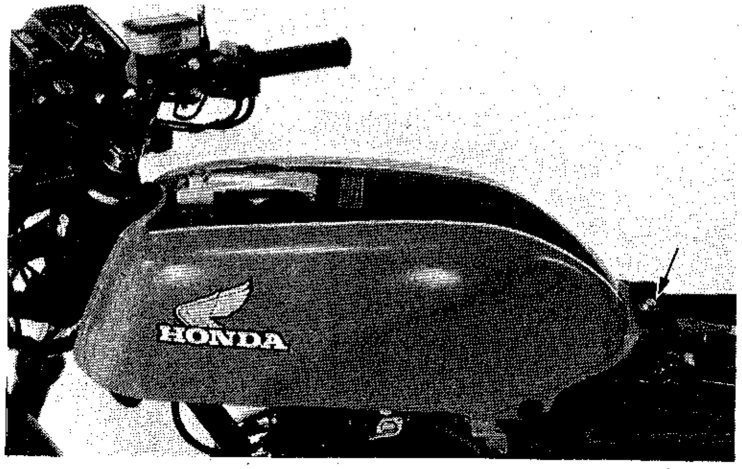
1. Carburetor fuel jets clogged
2. Fuel cap vent blocked
3. Fuel filter clogged
4. Fuel line kinked or restricted
5. Float valve faulty
6. Float level too low

**Rich Mixture**

1. Choke stuck closed
2. Float valve faulty
3. Float level too high
4. Carburetor air jets clogged
5. Sticking float
6. Dirty air cleaner

# FUEL TANK

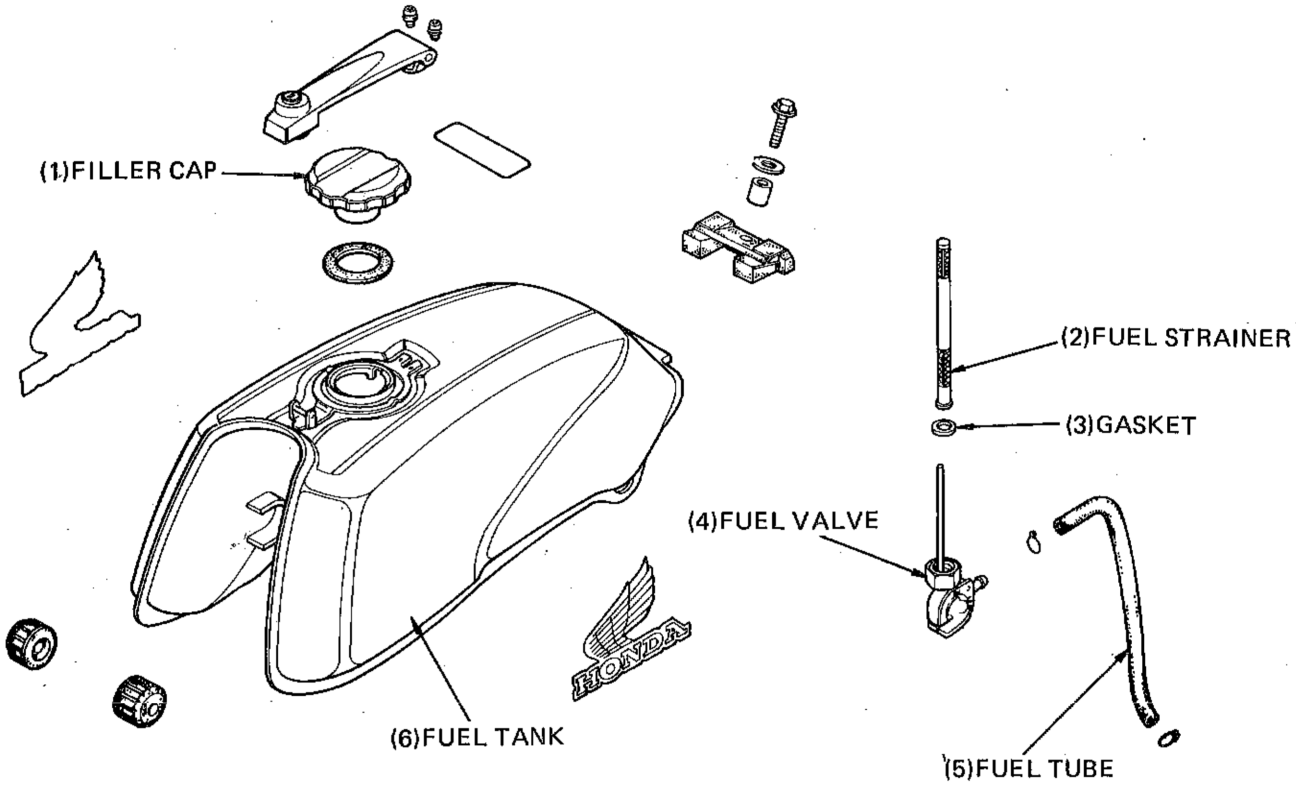
Remove the seat.
Turn the fuel valve "OFF" and disconnect the fuel tube.
Remove the tank.
Check the vent hole of the fuel cap for blockage.




**WARNING**

***Keep gasoline away from flames or sparks.***
***Wipe up spilled gasoline at once.***

Check that fuel flows out of fuel valve freely. If flow is restricted, clean the fuel strainer.
Install the fuel tank.
Connect the fuel tube.
Install the seat.

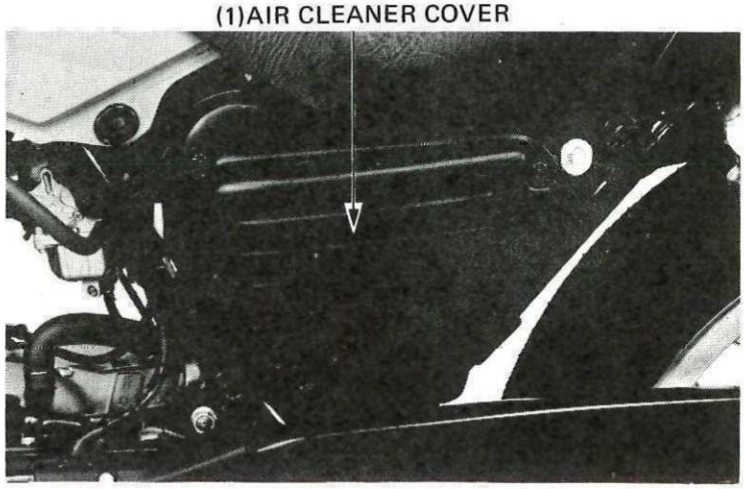


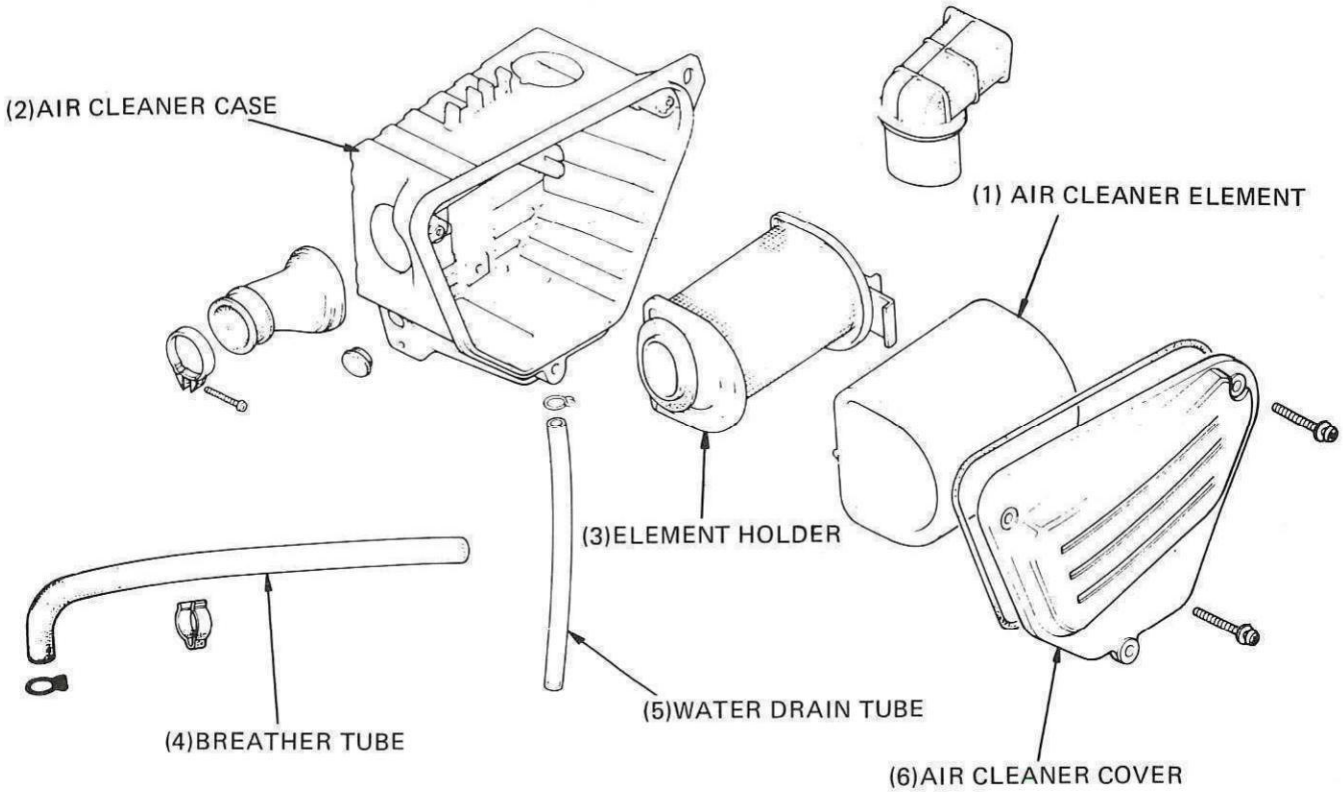

NOTE

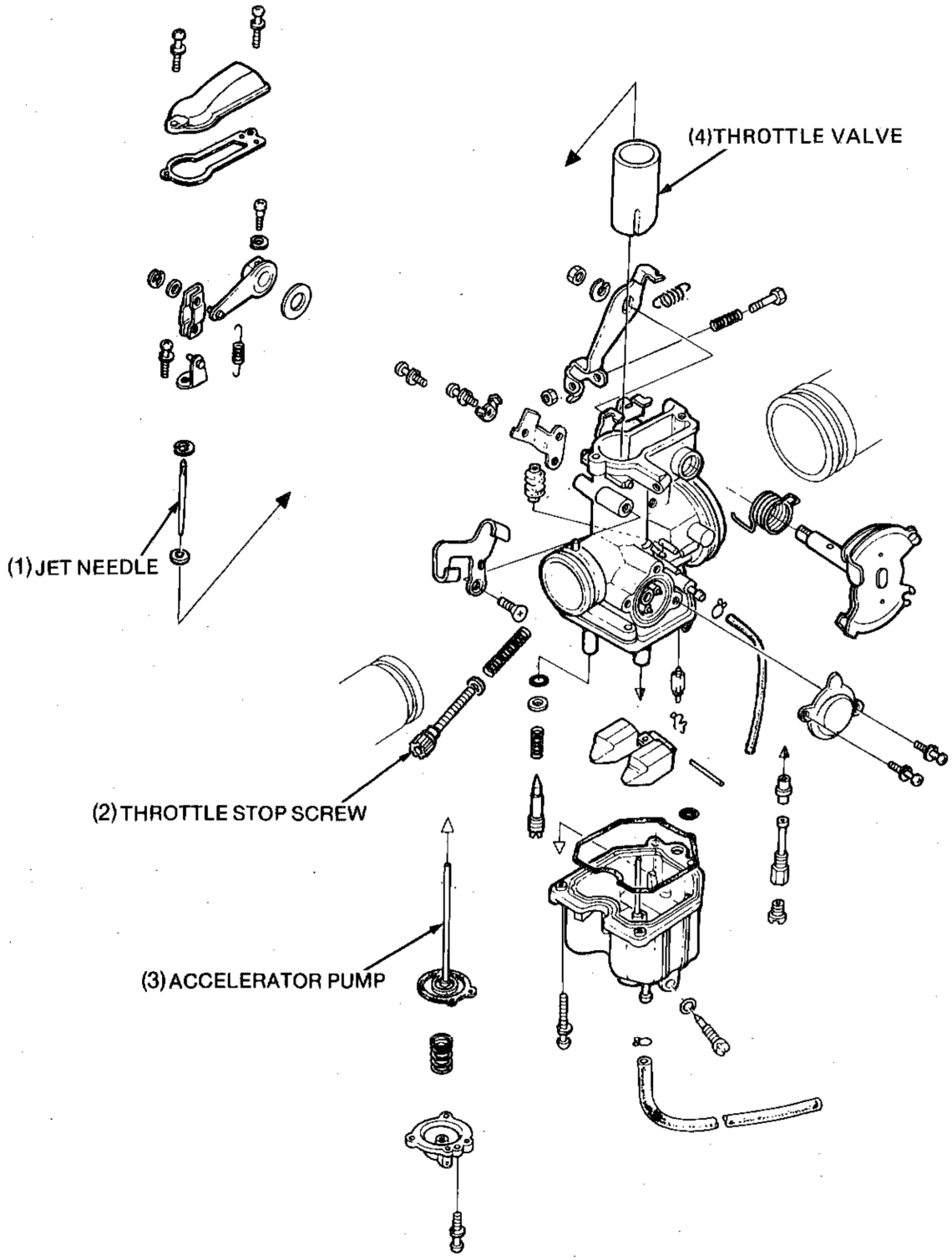
- After assembling, make sure there are no fuel leaks.
- Do not overtighten the fuel valve locknut.

# AIR CLEANER

Remove the right and left side covers.
Remove the seat.
Remove the air cleaner cover.
Disconnect the intake tube band.
Remove the air cleaner case.




(4)THROTTLE VALVE
(1)JET NEEDLE
(2)THROTTLE STOP SCREW
(3)ACCELERATOR PUMP

# CARBURETOR REMOVAL

Remove the seat and fuel tank.

NOTE

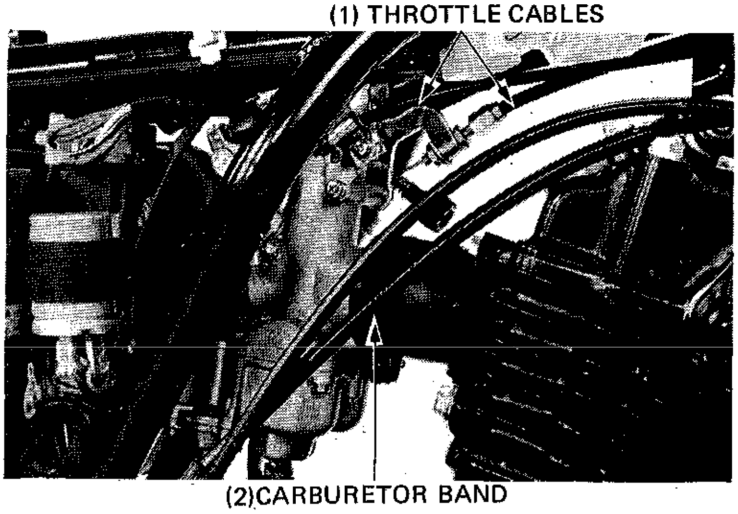
Loosen the drain screw to drain fuel from the carburetor.

Disconnect the throttle cables.
Disconnect the choke cable.
Loosen the screws securing the carburetor bands.

Remove the carburetor.

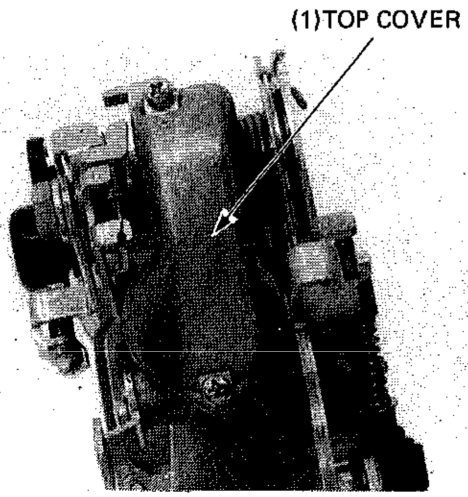
NOTE

Do not pry between the insulator and engine. Carefully pull it backward away from the engine.

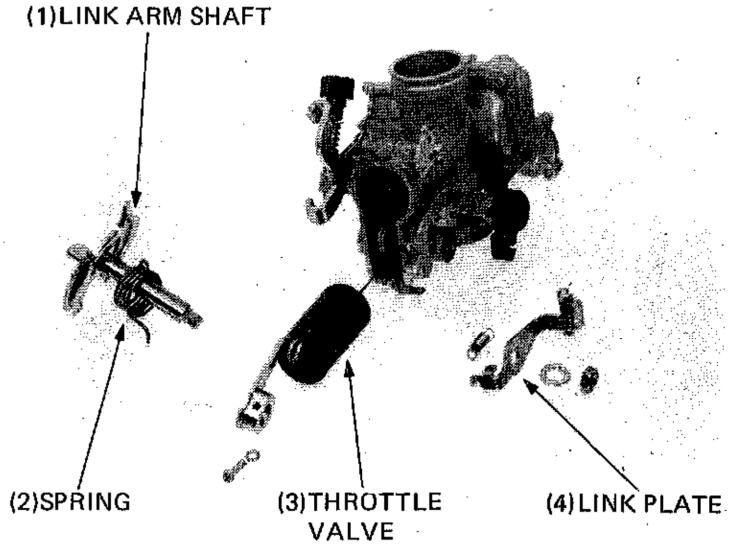



# CARBURETOR DISASSEMBLY

Remove the carburetor top cover.

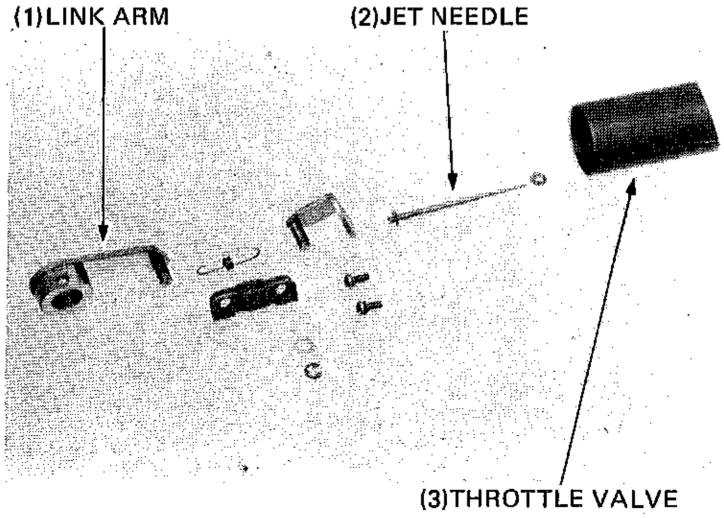



Remove the link plate.
Remove the screw, and remove the link arm shaft, spring and throttle valve.



## • THROTTLE VALVE DISASSEMBLY

Remove the link arm.
Remove the jet needle.
Check the throttle valve for wear or damage.

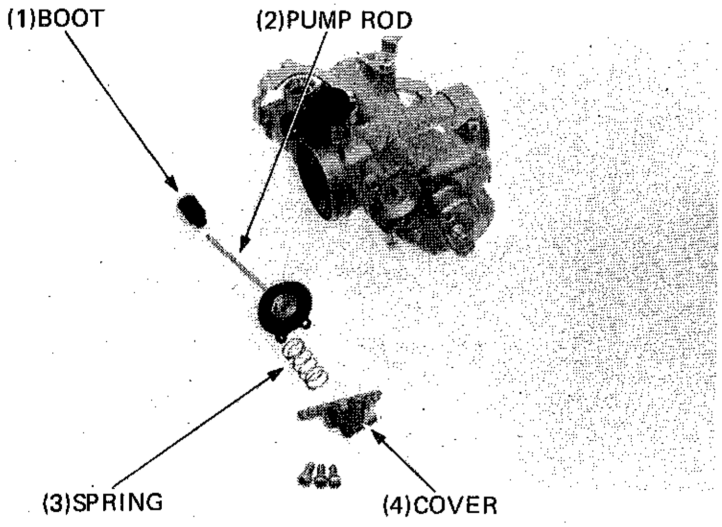



## • ACCELERATOR PUMP DISASSEMBLY

Remove the cover, pump rod and spring.
Remove the boot.
Check the diaphragm and rubber boot for tears or pin holes.

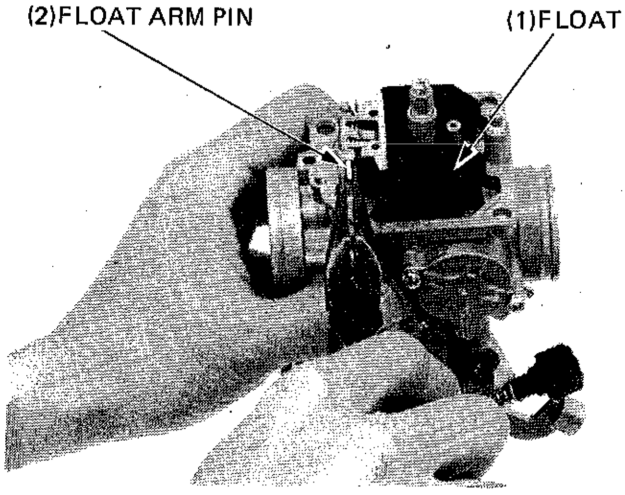
NOTE

Check the accelerator pump for freedom of operation.




## • FLOAT, FLOAT VALVE, JETS

Remove the float chamber body.
Pull out the float pin and remove the float.



Remove the float valve.
Remove the main jet.
Remove the needle jet holder.
Remove the needle jet.

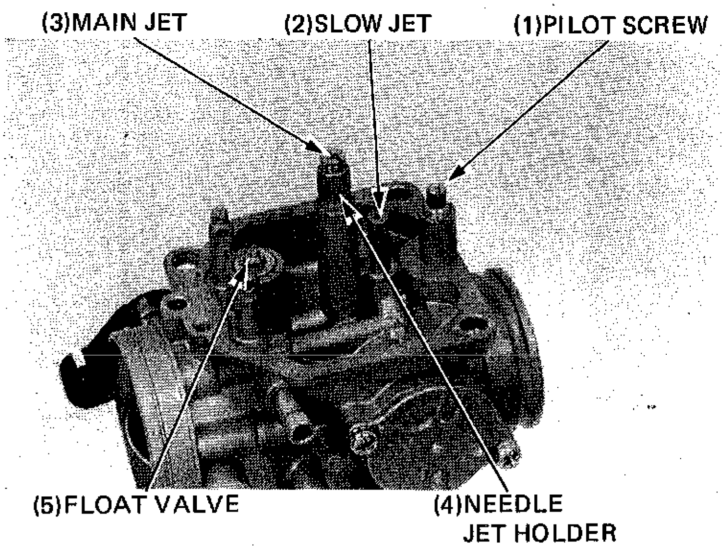
NOTE

The slow jet cannot be removed since it is a tight pressure fit.

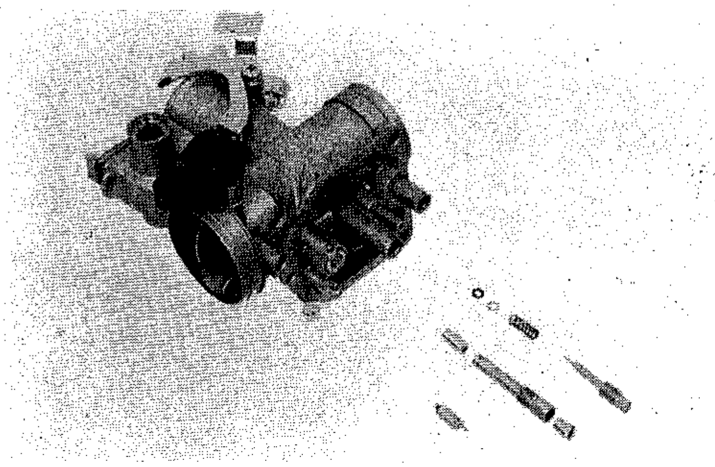
Remove the pilot screw.

NOTE

Before removing the pilot screw, record the number of rotations until it rests lightly, so it can be returned to its original position.




Check each part for wear or damage.
Blow open all jets and body opening switch compressed air.



## FLOAL LEVEL ADJUSTMENT

To adjust the float level, bend the float arm carefully until the float tip just contacts the float valve.

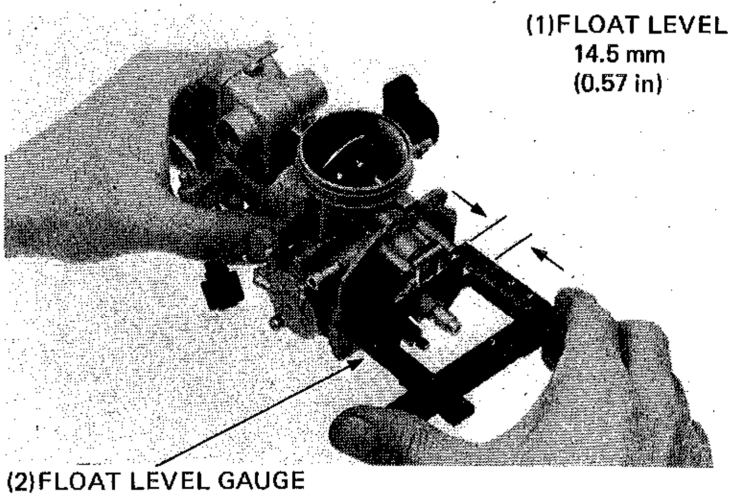
**FLOAT LEVEL: 14.5 mm (0.57 in)**

## CARBURETOR ASSEMBLY

Carburetor assembly is essentially the reverse order of disassembly.

NOTE

Use new O-rings whenever the carburetor is reassembled.
Handle all jets and needles with care. They can easily be scored or scratched.
Set the pilot screw of the position recorded during disassembly.

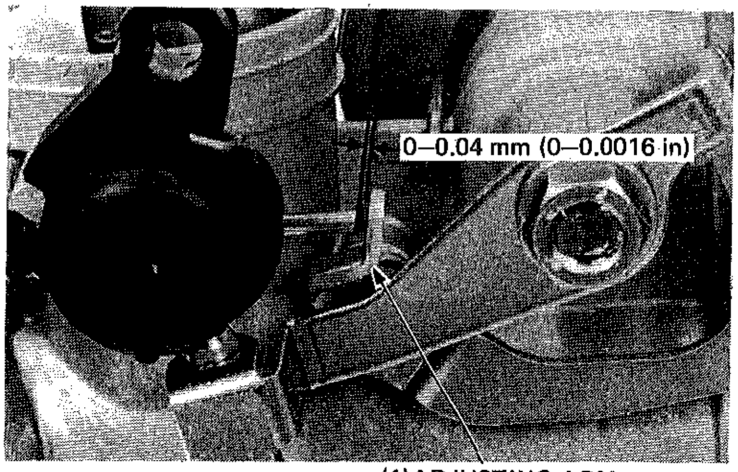


# ACCELERATOR PUMP ADJUSTMENT

Measure the clearance between the accelerator pump rod and adjusting arm with the throttle valve closed.

**CLEARANCE:**
**0–0.04 mm (0–0.0016 in)**

Adjust by bending the adjusting arm.



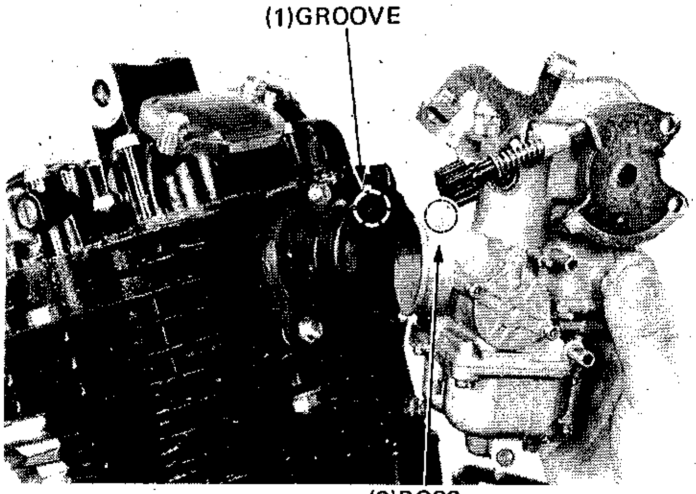

(1)ADJUSTING ARM

# CARBURETOR INSTALLATION

Carburetor installation is essentially the reverse order of removal.

NOTE

Make sure the end of the carburetor air horn properly seats in the insulator groove.




Adjust the throttle grip free play and choke cable (Page 3–9).

# CARBURETOR ADJUSTMENT

- IDLE SPEED ADJUSTMENT

NOTE

The pilot screw adjustment is not necessary unless the carburetor is overhauled.

Before installation, turn the pilot screw clockwise until it seats and then back it out 1-3/4 turns.

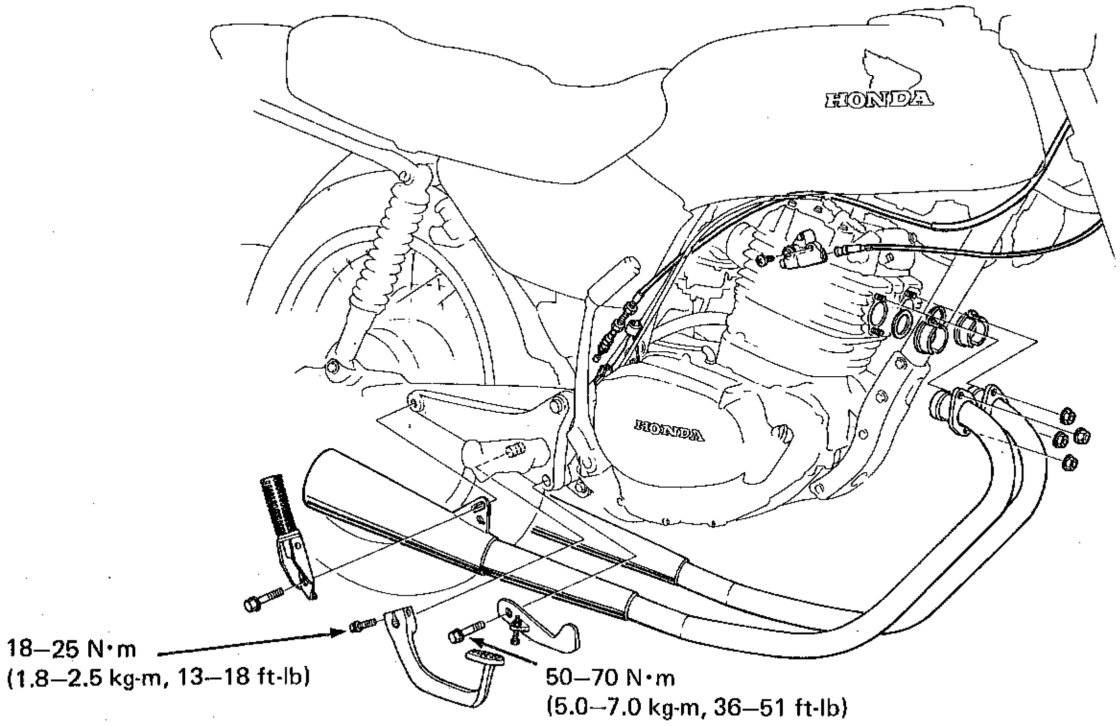
*CAUTION*

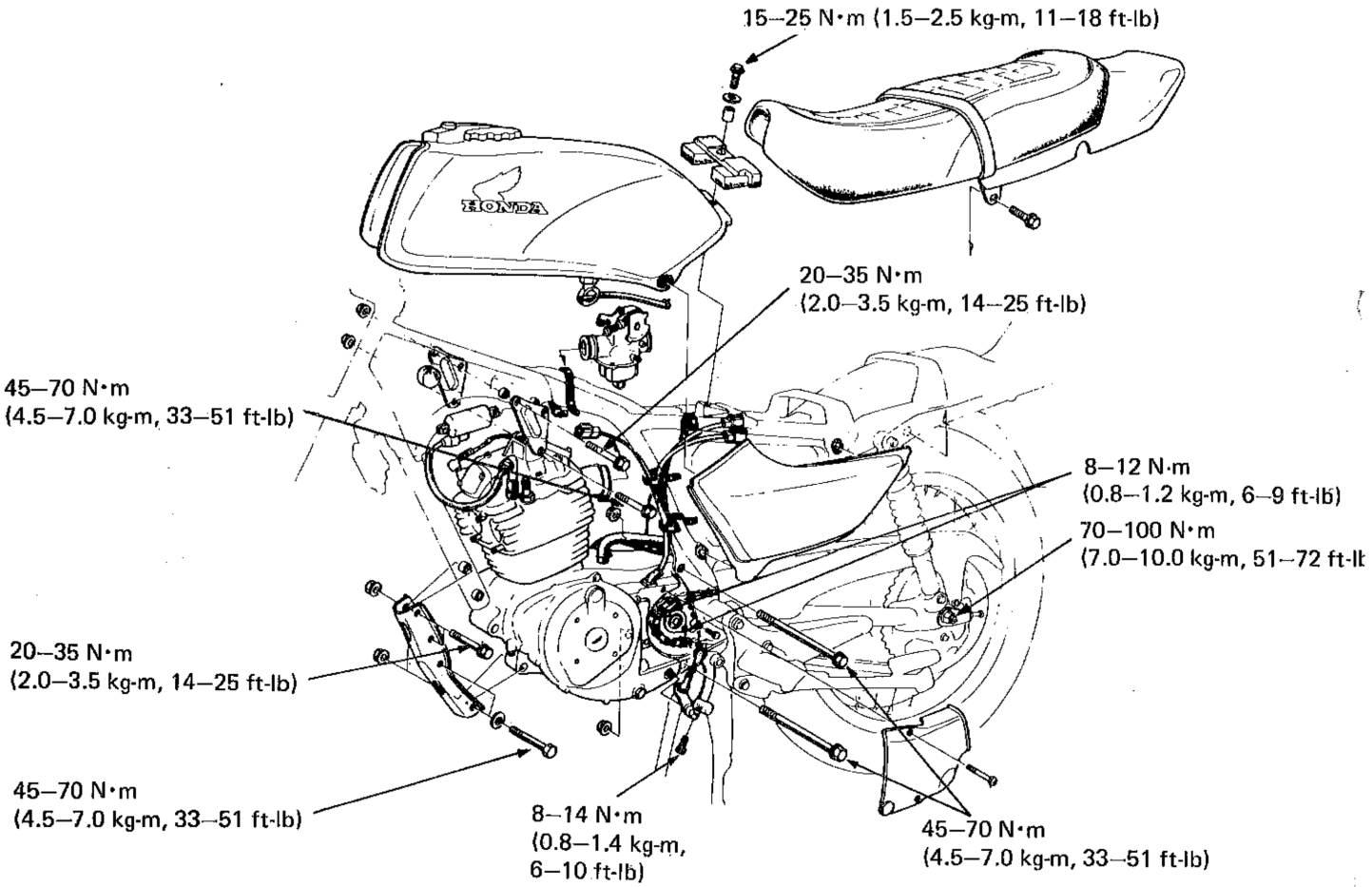
*Damage to the pilot screw seat will occur if the pilot screw is tightened against the seat.*

Warm the engine to operating temperature. Stop the engine and connect a tachometer. Start the engine and adjust the idle speed to 1,200 ± 100 rpm with the throttle stop screw. Check that engine speed increases smoothly by operating the throttle grip.

Turn the pilot screw clockwise until the engine stops, and then back it out 1 turn.
Set the idle speed to 1,200 rpm with the throttle stop screw.
Repeat the above steps if the engine still runs unevenly.

# MEMO


HONDA
HONDA
18–25 N·m
(1.8–2.5 kg-m, 13–18 ft-lb)
50–70 N·m
(5.0–7.0 kg-m, 36–51 ft-lb)


15–25 N·m (1.5–2.5 kg-m, 11–18 ft-lb)
HONDA
20–35 N·m
(2.0–3.5 kg-m, 14–25 ft-lb)
45–70 N·m
(4.5–7.0 kg-m, 33–51 ft-lb)
8–12 N·m
(0.8–1.2 kg-m, 6–9 ft-lb)
70–100 N·m
(7.0–10.0 kg-m, 51–72 ft-lb)
20–35 N·m
(2.0–3.5 kg-m, 14–25 ft-lb)
45–70 N·m
(4.5–7.0 kg-m, 33–51 ft-lb)
8–14 N·m
(0.8–1.4 kg-m,
6–10 ft-lb)
45–70 N·m
(4.5–7.0 kg-m, 33–51 ft-lb)

| | |
|---|---|
| SERVICE INFORMATION | 5–2 |
| ENGINE REMOVAL | 5–3 |
| ENGINE INSTALLATION | 5–7 |

# SERVICE INFORMATION

## • WORKING PRACTICE

During removal and installation, support vehicle with suitable blocks.
A jack or adjustable support is required to maneuver the engine.

Parts requiring engine removal for servicing:

| | |
|---|---|
| Crankshaft | (Section 11) |
| Balancer | (Section 11) |
| Transmission | (Section 12) |

## • SPECIFICATIONS

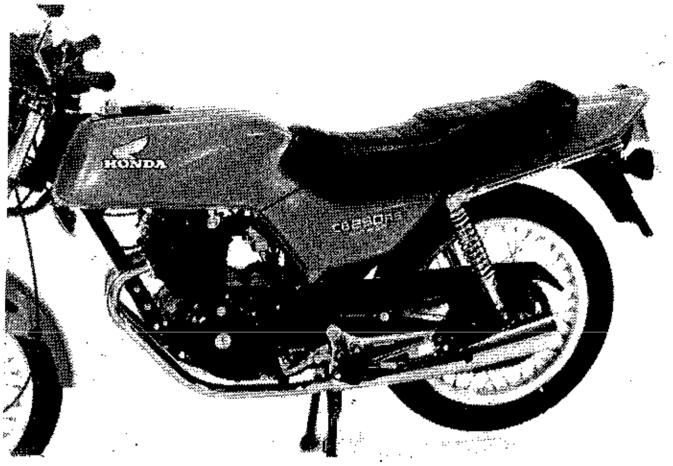
| | | | |
|---|---|---|---|
| Engine weight | : 37 kg | (81.6 lb) | |
| Oil capacity | : 2.0 ℓ | (2.1 US qt, 1.8 Imp qt) | after assembly |
| | 1.7 ℓ | (1.8 US qt, 1.5 Imp qt) | after draining |

## • TORQUE VALUES

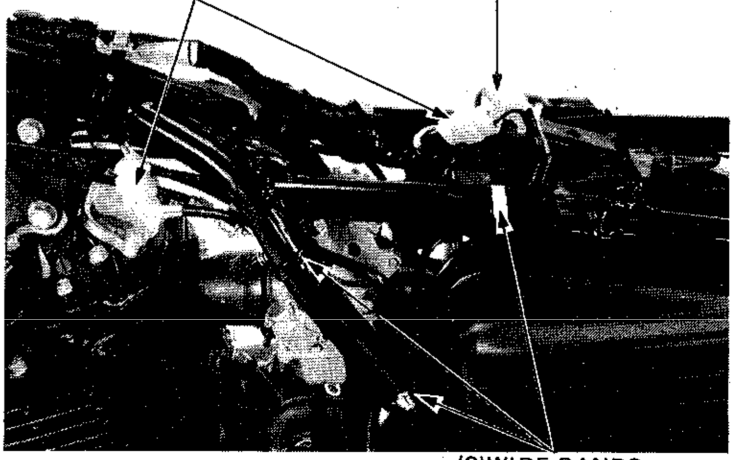
| | | |
|---|---|---|
| Engine hanger bolts | | |
| 8 mm bolt | : | 20–35 N·m (2.0–3.5 kg-m, 14–25 ft-lb) |
| 10 mm bolt | : | 45–70 N·m (4.5–7.0 kg-m, 33–51 ft-lb) |
| Rear axle nut | : | 70–100 N·m (7.0–10.0 kg-m, 51–72 ft-lb) |
| Brake pedal stopper plate | : | 50–70 N·m (5.0–7.0 kg-m, 36–51 ft-lb) |
| Rear brake pedal | : | 18–25 N·m (1.8–2.5 kg-m, 13–18 ft-lb) |
| Gearshift arm | : | 8–14 N·m (0.8–1.4 kg-m, 6–10 ft-lb) |
| Fuel tank | : | 15–25 N·m (1.5–2.5 kg-m, 11–18 ft-lb) |

# ENGINE REMOVAL

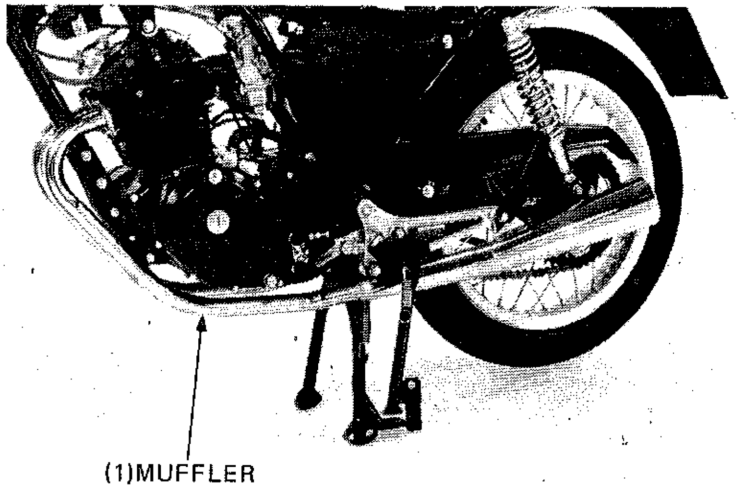
Drain oil from the engine.
Remove the seat and fuel tank.
Remove the left and right side covers.



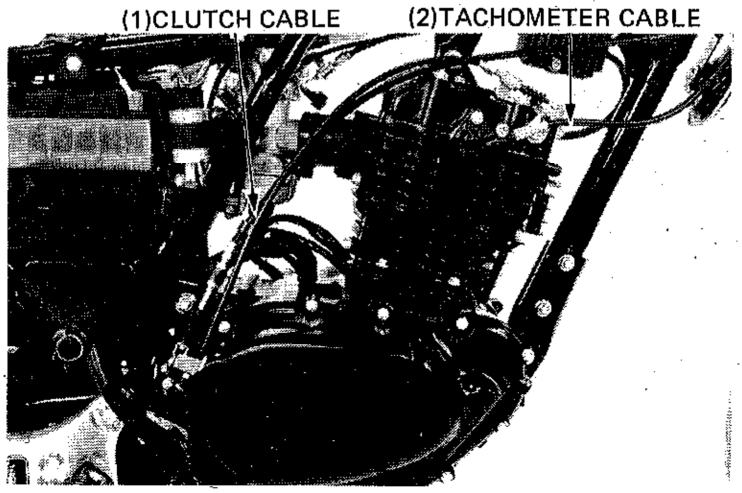
Disconnect the A.C. generator and pulser generator wires at the coupler.



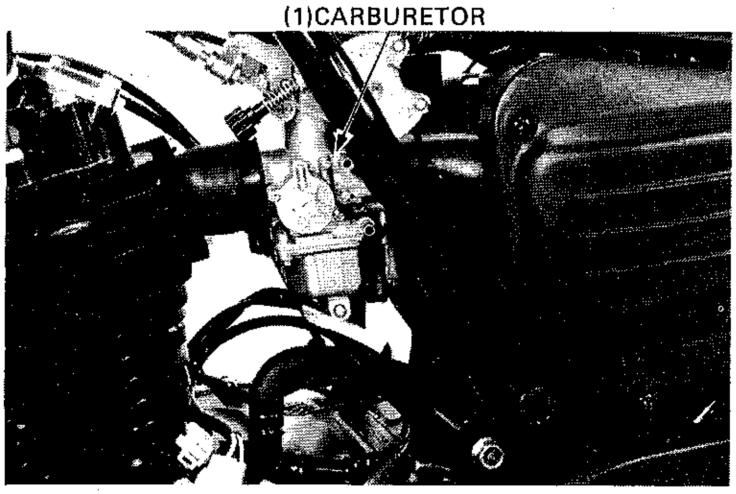

Remove the left and right mufflers.



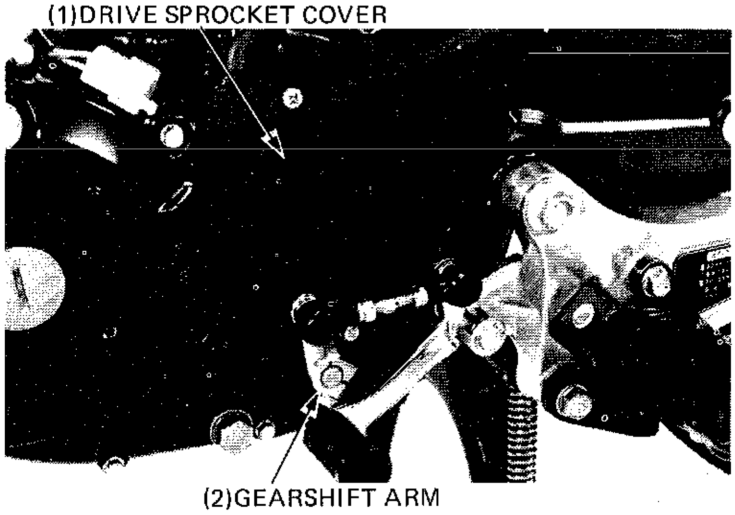
Disconnect the tachometer and clutch cables.
Remove the spark plug cap.




Remove the carburetor.

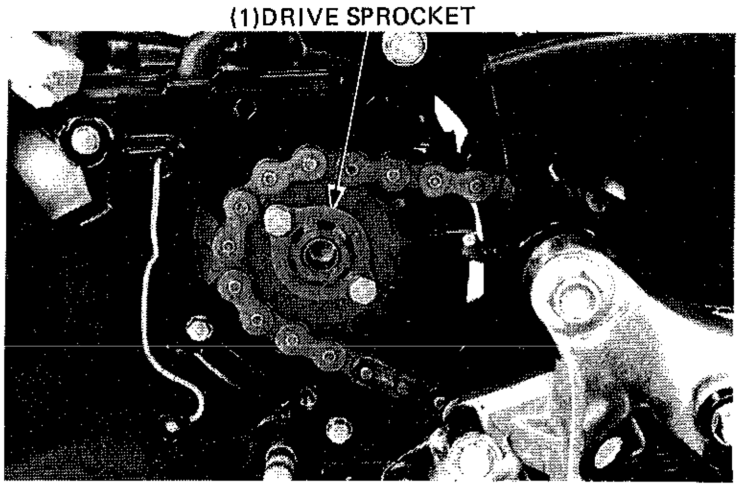



Remove the gearshift arm.
Remove the drive sprocket cover.

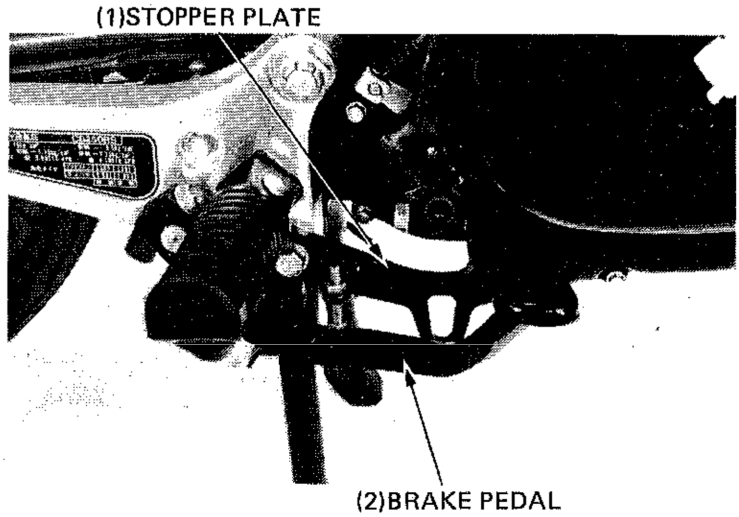


Remove the rear axle nut cotter pin.
Loosen the rear axle nut and drive chain adjusters and move the rear wheel forward.

Remove the drive sprocket bolts.
Remove the drive sprocket.

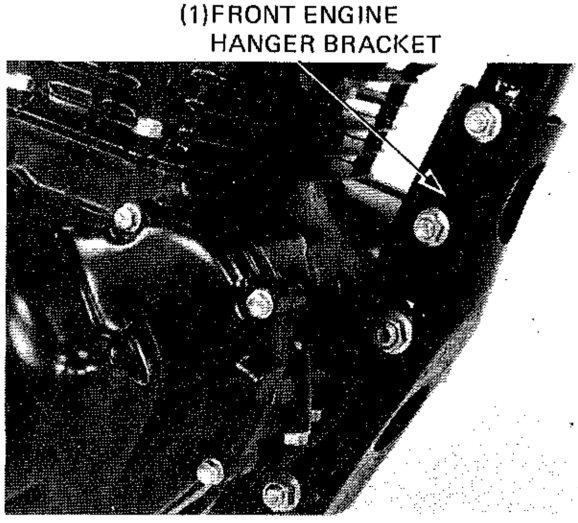



Remove the rear bracket pedal and stopper plate.

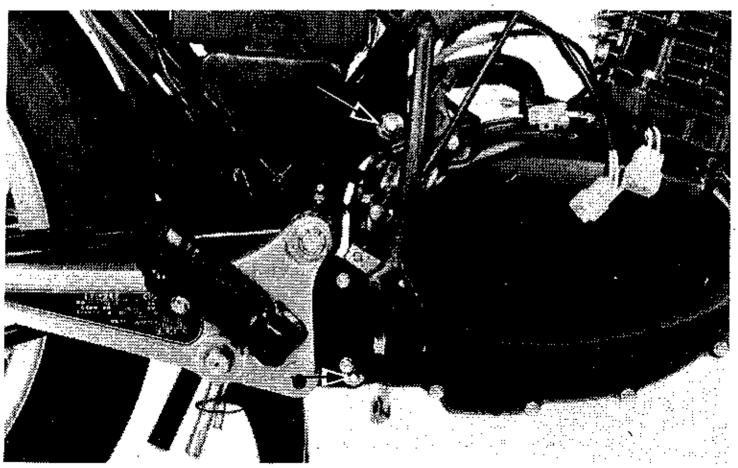



Place a jack or padded block under the engine.

Remove the front engine hanger bracket.



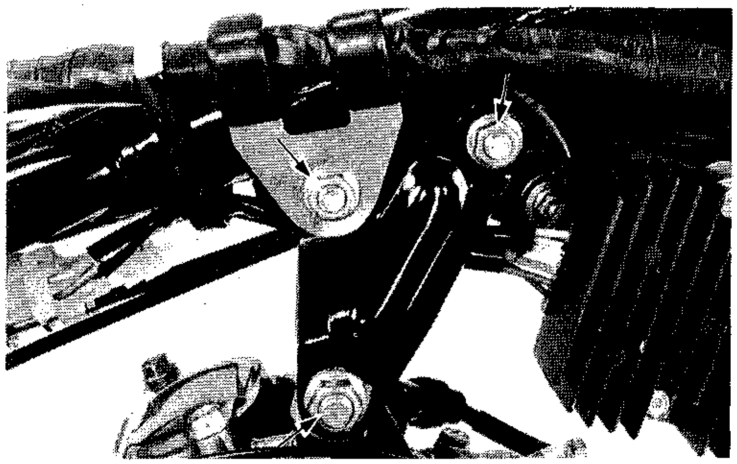
Remove the rear engine hanger bolts.



Remove the upper engine hanger bolts.
Remove the engine.

NOTE

Jack height must be continuously adjusted during engine removal and installation to prevent damage to mounting bolt threads, wire harnesses and cables.

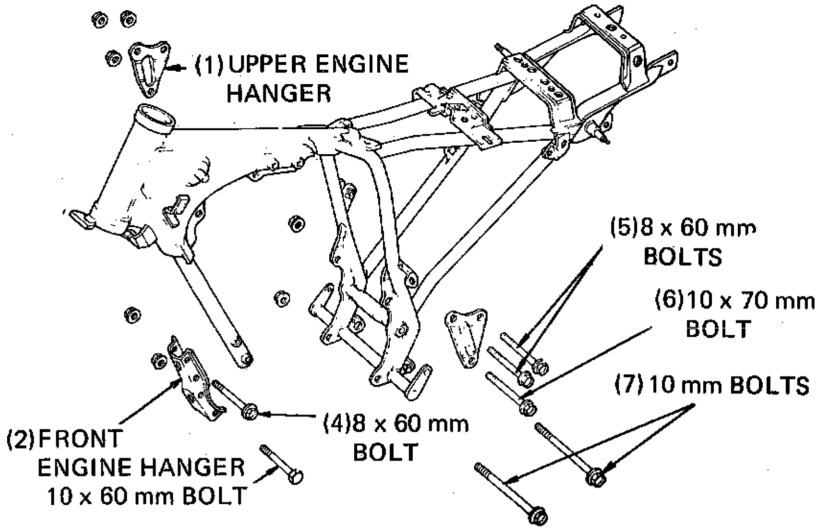


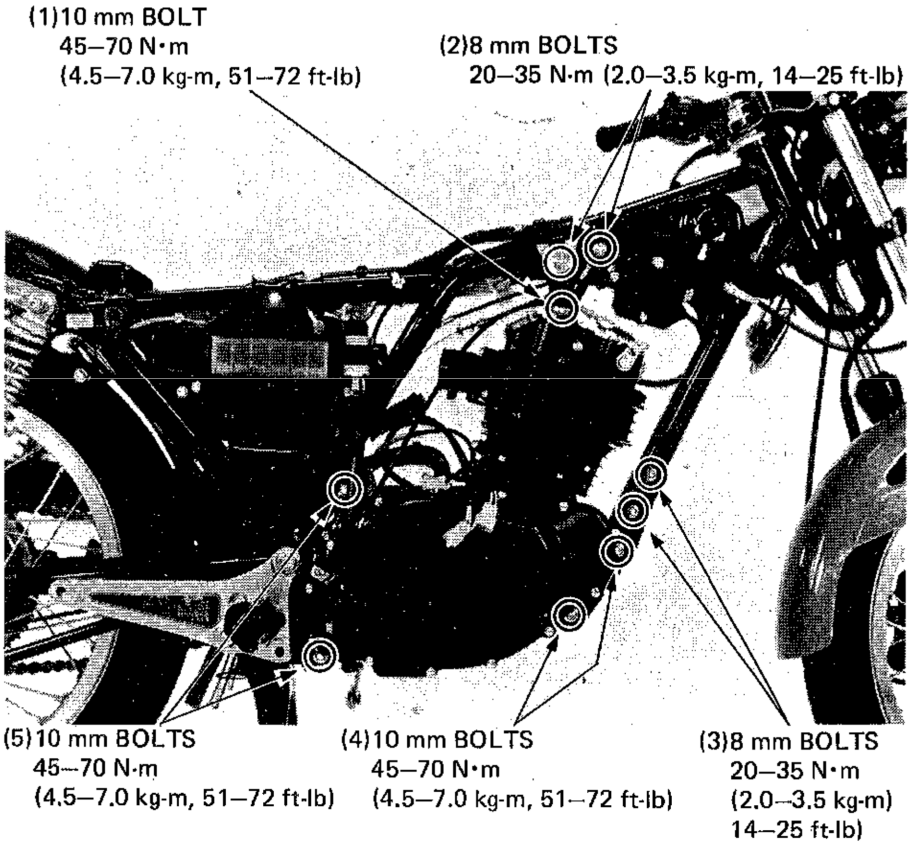
# ENGINE INSTALLATION

The installation sequence is essentially the reverse of removal.

NOTE

- Install the engine hanger bolts as shown in the illustration.
- After temporarily tightening the bolts, torque them.
- Route all wire harnesses and cables properly (Page 1-15).
- Be sure the exhaust pipe gaskets are not damaged or leaking.

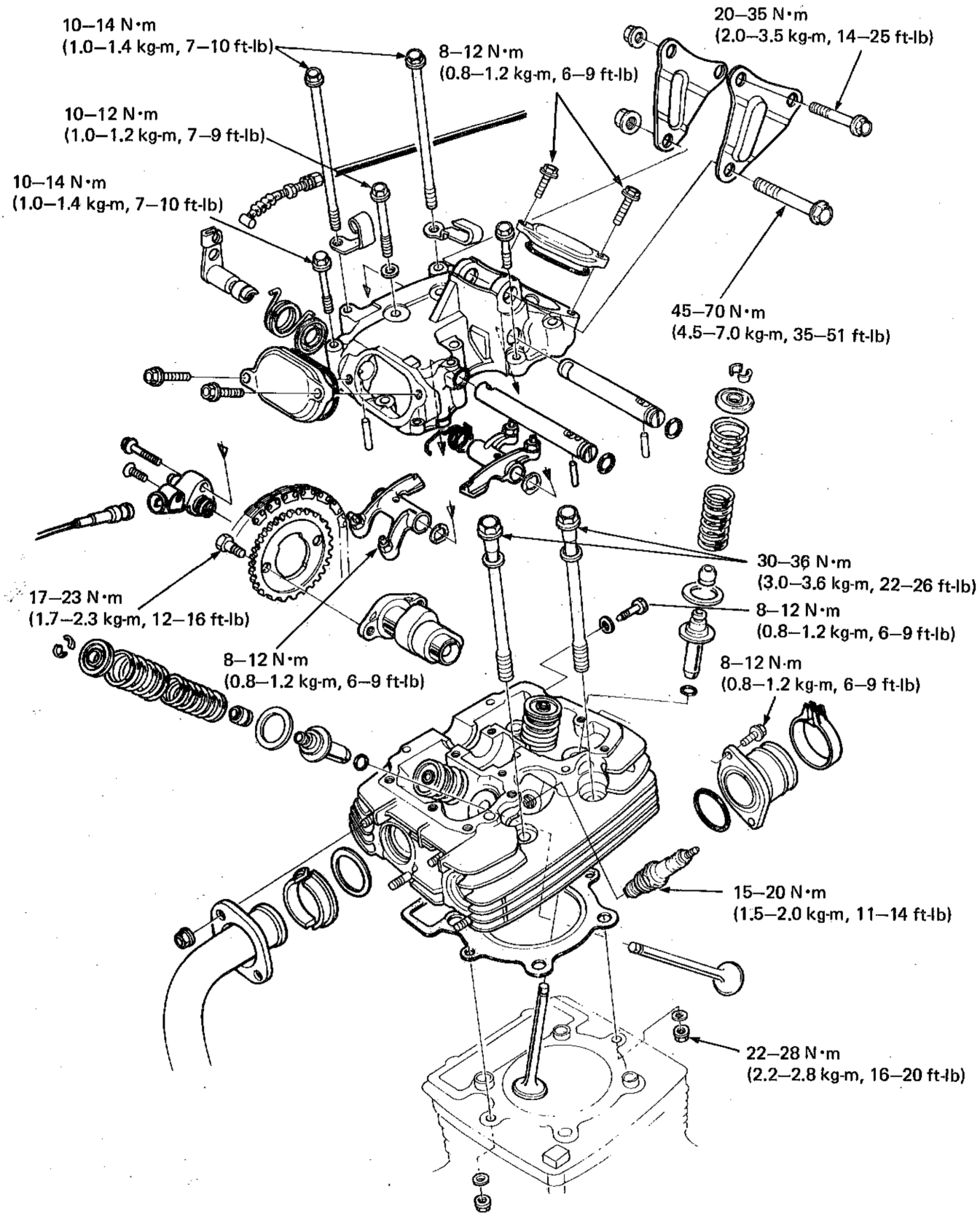



NOTE

Perform the following inspections and adjustments:

| | |
|---|---|
| Engine oil | (Page 2-3) |
| Throttle grip free play | (Page 3-8) |
| Clutch lever free play | (Page 3-16) |
| Rear brake pedal free play | (Page 3-14) |
| Drive chain | (Page 3-11) |
| Check all electrical equipment. | |


10–14 N·m
(1.0–1.4 kg-m, 7–10 ft-lb)
8–12 N·m
(0.8–1.2 kg-m, 6–9 ft-lb)
20–35 N·m
(2.0–3.5 kg-m, 14–25 ft-lb)
10–12 N·m
(1.0–1.2 kg-m, 7–9 ft-lb)
10–14 N·m
(1.0–1.4 kg-m, 7–10 ft-lb)
45–70 N·m
(4.5–7.0 kg-m, 35–51 ft-lb)
30–36 N·m
(3.0–3.6 kg-m, 22–26 ft-lb)
8–12 N·m
(0.8–1.2 kg-m, 6–9 ft-lb)
17–23 N·m
(1.7–2.3 kg-m, 12–16 ft-lb)
8–12 N·m
(0.8–1.2 kg-m, 6–9 ft-lb)
8–12 N·m
(0.8–1.2 kg-m, 6–9 ft-lb)
15–20 N·m
(1.5–2.0 kg-m, 11–14 ft-lb)
22–28 N·m
(2.2–2.8 kg-m, 16–20 ft-lb)

| | |
|---|---|
| SERVICE INFORMATION | 6–2 |
| TROUBLESHOOTING | 6–4 |
| CYLINDER HEAD COVER REMOVAL | 6–5 |
| CYLINDER HEAD COVER DISASSEMBLY | 6–6 |
| CAMSHAFT REMOVAL | 6–8 |
| CYLINDER HEAD REMOVAL | 6–10 |
| CYLINDER HEAD DISASSEMBLY | 6–11 |
| VALVE SEAT INSPECTION AND REFACING | 6–14 |
| CYLINDER HEAD ASSEMBLY | 6–18 |
| CYLINDER HEAD INSTALLATION | 6–19 |
| CAMSHAFT INSTALLATION | 6–20 |
| CYLINDER HEAD COVER ASSEMBLY | 6–22 |
| CYLINDER HEAD COVER INSTALLATION | 6–23 |

# SERVICE INFORMATION

## • WORKING PRACTICE

This Section covers maintenance of the cylinder head, valves, camshaft and rocker arms. All these services can be accomplished with the engine installed.
Secure the wedge A with the 2 mm pin when removing the camshaft and sprocket.
Camshaft lubricating oil is fed to the cylinder head through an oil control orifice in the engine case. Be sure these orifices are not clogged and that the O-rings and dowel pins are in place before installing the cylinder head.
Before assembly, apply molybdenum disulfide grease to the camshaft bearings to provide initial lubrication.
Pour clean engine oil into the oil pockets in the cylinder head to lubricate the cams.

## • TOOLS

| | |
|---|---|
| SPECIAL TOOL | |
| Valve guide reamer 5.5 mm | No. 07984–2000000 |
| COMMON TOOLS | |
| Valve guide remover 5.5 mm | No. 07742–0010100 |
| Valve guide driver B | No. 07742–0020200 |
| Valve spring compressor | No. 07757–0010000 |
| Valve seat cutter | |
| Flat cutter (32°) | No. 07780–0012200 |
| Seat cutter (45°) | No. 07780–0014000 |
| Interior cutter (60°) | No. 07780–0010300 |
| Cutter holder | No. 07781–0010100 |

## • TORQUE VALUES

| | |
|---|---|
| Engine hanger | |
| 8 mm bolt | 20–35 N·m (2.0–3.5 kg-m, 14–25 ft-lb) |
| 10 mm bolt | 45–70 N·m (4.5–7.0 kg-m, 35–51 ft-lb) |
| Cylinder head cover bolt | 10–14 N·m (1.0–1.4 kg-m, 7–10 ft-lb) |
| (with copper washer) | 10–12 N·m (1.0–1.2 kg-m, 7–9 ft-lb) |
| Cylinder head bolt | 30–36 N·m (3.0–3.6 kg-m, 22–26 ft-lb) |
| Cylinder head nut | 22–28 N·m (2.2–2.8 kg-m, 16–20 ft-lb) |
| Cam sprocket bolt | 17–23 N·m (1.7–2.3 kg-m, 12–16 ft-lb) |
| Carburetor insulator | 8–12 N·m (0.8–1.2 kg-m, 6–9 ft-lb) |
| Spark plug | 15–20 N·m (1.5–2.0 kg-m, 11–14 ft-lb) |
| Cam chain tensioner | 8–12 N·m (0.8–1.2 kg-m, 6–9 ft-lb) |
| Tappet hole cap | 8–12 N·m (0.8–1.2 kg-m, 6–9 ft-lb) |
| Tappet adjuster lock nut | 8–12 N·m (0.8–1.2 kg-m, 6–9 ft-lb) |

## • SPECIFICATIONS

| ITEM | | | STANDARD | SERVICE LIMIT |
|---|---|---|---|---|
| Compression | | | 1372.9 ± 196.1 kPa (14 ± 2 kg/cm², 199 ± 28 psi) | — |
| Camshaft | Cam lift | IN | 36.709 mm (1.4432 in) | 36.60 mm (1.441 in) |
| | | EX | 36.591 mm (1.4406 in) | 36.50 mm (1.437 in) |
| | Journal O.D. | Right | 23.954–23.975 mm (0.9431–0.9439 in) | 23.9 mm (0.94 in) |
| | | Left | 19.954–19.975 mm (0.9856–0.7864 in) | 19.9 mm (0.78 in) |
| Rocker arm | I.D. | | 12.000–12.018 mm (0.4724–0.4731 in) | 12.05 mm (0.474 in) |
| Rocker arm shaft | O.D. | | 11.966–11.984 mm (0.4711–0.4718 in) | 11.91 mm (0.469 in) |
| Valve spring | Free length | Inner | 38.1 mm (1.50 in) | 37.0 mm (1.46 in) |
| | | Outer | 36.24 mm (1.43 in) | 35.3 mm (1.39 in) |
| | Preload/length | Inner | 68.5–78.4 N/26.0 mm (6.99–7.99 kg/26.0 mm, 15.41–17.61 lb/1.024 in) | — |
| | | Outer | 121.5–137.2 N/29.0 mm (12.39–13.99 kg/29.0 mm, 27.31–30.84 lb/1.142 in) | — |
| Valve<br>Valve guide | Stem O.D. | IN | 5.475–5.490 mm (0.2037–0.2161 in) | 5.465 mm (0.2152 in) |
| | | EX | 5.455–5.470 mm (0.2148–0.2154 in) | 5.445 mm (0.2144 in) |
| | Guide I.D. | IN | 5.500–5.512 mm (0.2165–0.2170 in) | 5.53 mm (0.218 in) |
| | | EX | 5.500–5.512 mm (0.2165–0.2770 in) | 5.53 mm (0.218 in) |
| | Stem-to-guide clearance | IN | 0.010–0.047 mm (0.0004–0.0019 in) | 0.06 mm (0.0024 in) |
| | | EX | 0.030–0.057 mm (0.0012–0.0022 in) | 0.07 mm (0.0028 in) |
| | Valve face width | IN/EX | 1.2–1.4 mm (0.048–0.055 in) | 2.0 mm (0.08 in) |
| Cylinder head | Warpage | | — | 0.1 mm (0.004 in) |
| | Valve seat width | IN/EX | 1.2–1.4 mm (0.048–0.055 in) | 2.0 mm (0.08 in) |
| Camshaft bearing | I.D. | Left | 20.000–20.021 mm (0.7874–0.7882 in) | 20.05 mm (0.789 in) |
| | | Right | 24.000–24.021 mm (0.9449–0.9457 in) | 24.05 mm (0.947 in) |

# TROUBLESHOOTING

Engine top-end problems are usually performance-related and can be diagnosed by a compression test, or are engine noises which can usually be traced to the top-end with a sounding rod or stethoscope.

**Uneven Compression or Low Compression**

1. Valve troubles
   - Incorrect valve adjustment
   - Burned or bent valves
   - Incorrect valve timing
   - Broken valve spring
2. Cylinder head
   - Leaking or damaged head gasket
   - Warped or cracked cylinder head
3. Cylinder and piston (Refer to Section 7)
4. Decompressor mechanism out of adjustment

**High Compression**

1. Excessive carbon build-up on piston head or combustion chamber

**Excessive Noise**

1. Incorrect valve adjustment
2. Sticking valve or broken valve spring
3. Damaged or worn rocker arm or camshaft
4. Loose or worn cam chain
5. Worn or damaged cam chain tensioner
6. Loose balancer chain
7. Worn cam sprocket teeth
8. Insufficient starter decompression free play

**Poor Idling**

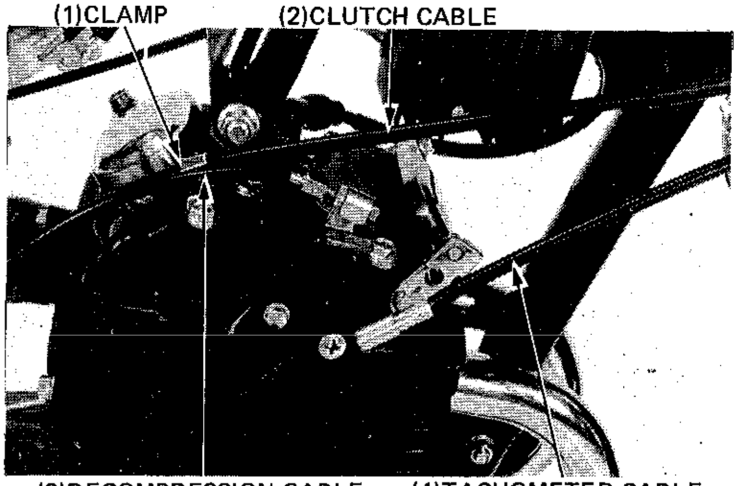
1. Compression too low
2. Decompressor mechanism out of adjustment

**Hard Kick Starting**

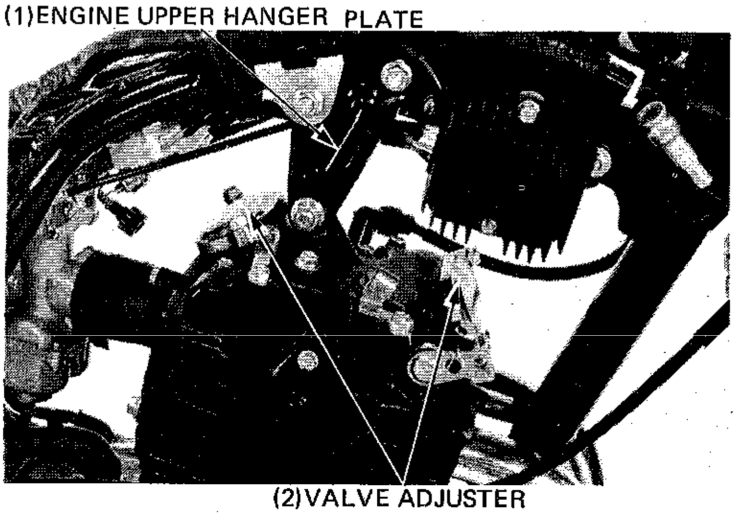
1. Decompressor mechanism out of adjustment

# CYLINDER HEAD COVER REMOVAL

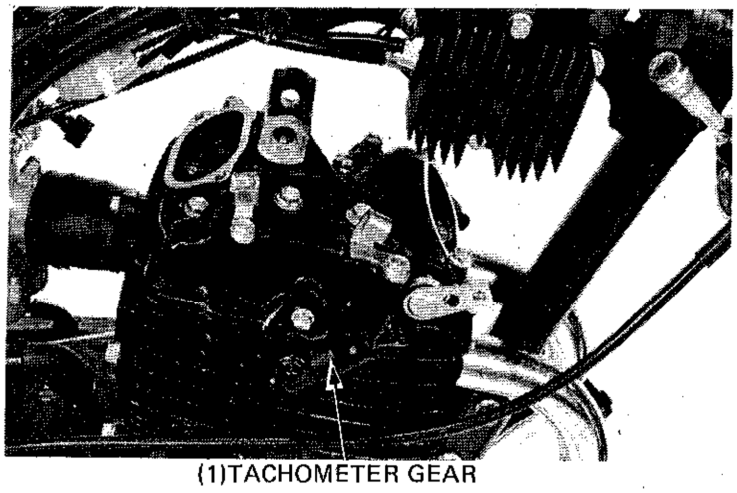
Remove the seat and fuel tank.
Remove the decompression cable.
Disconnect the tachometer cabre.
Remove the clutch cable from the clamp.




Remove the engine upper hanger plates.
Remove the valve adjuster cover.

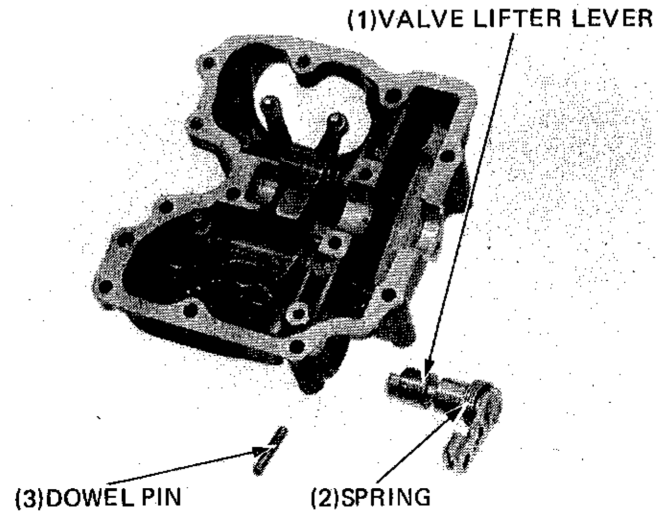



Remove the cylinder head.
Remove the tachometer gear.



# CYLINDER HEAD COVER DISASSEMBLY

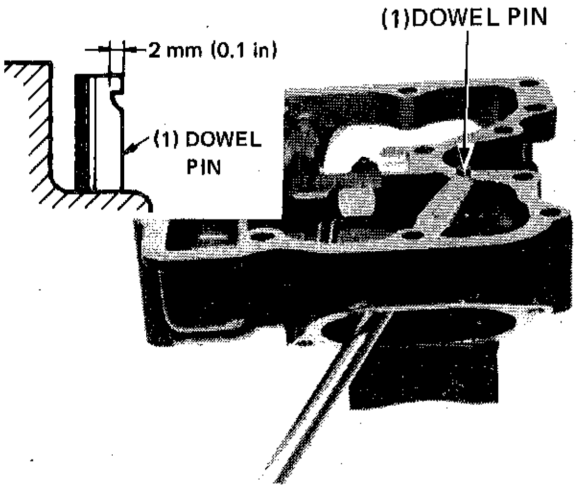
Remove the dowel pin.
Remove the valve lifter lever and spring.




Cut the dowel pin as shown.

NOTE

- Do not damage the cylinder head cover and rocker arm.
- Replace the dowel pin with new one whenever disassembled.

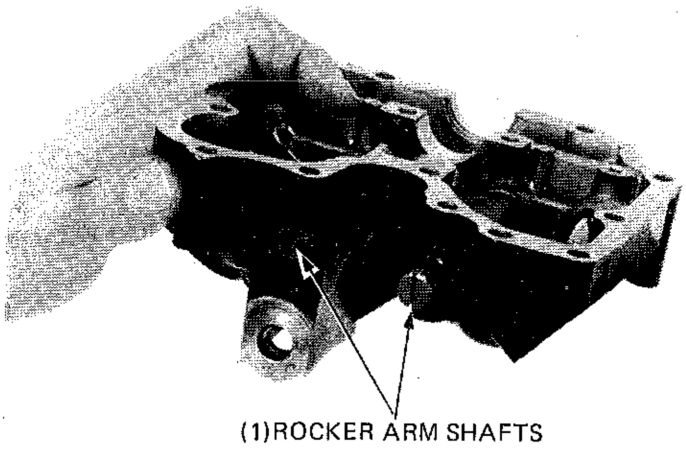



Remove the rocker arm shafts.

NOTE

Tap the cover with a plastic hammer to remove each rocker arm shaft.

Remove the rocker arms and wave washers.
Remove the valve lifter and spring.



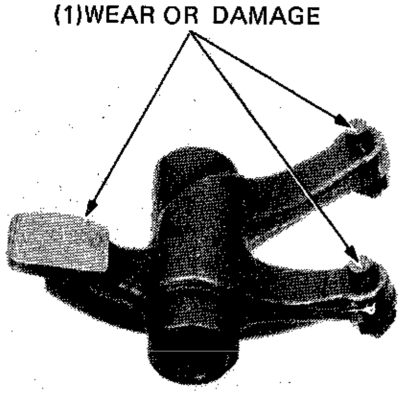
## • ROCKER ARM INSPECTION

Inspect the rocker arms for damage, wear or clogged oil holes.

NOTE

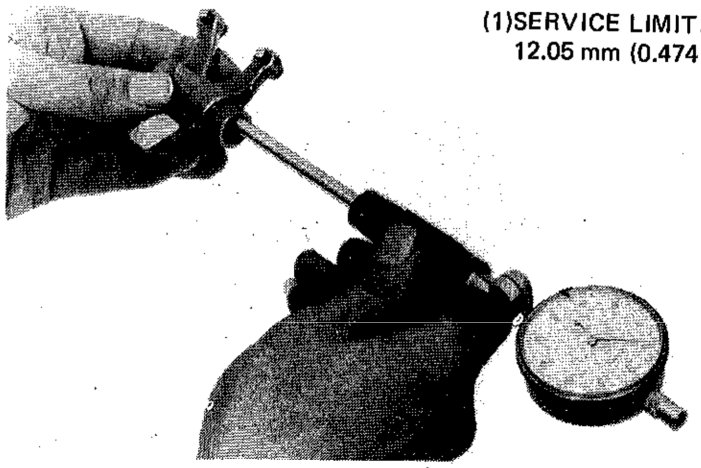
If any rocker arms require servicing or replacement, inspect the cam lobes for scoring, chipping or flat spots.

(1)WEAR OR DAMAGE



Measure the I.D. of each rocker arm.

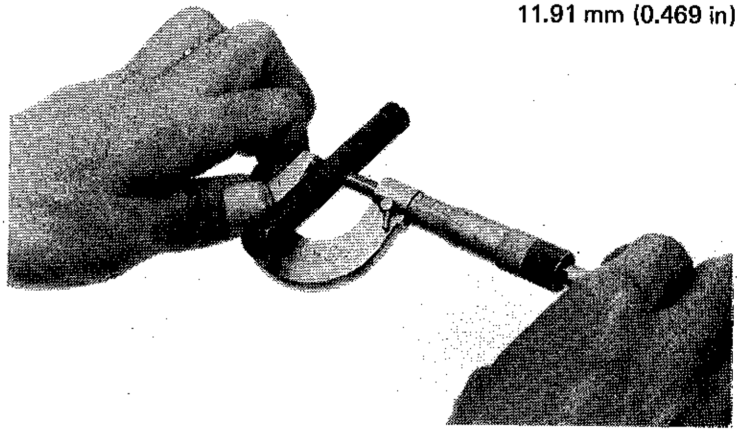
(1)SERVICE LIMIT:
12.05 mm (0.474 in)



## • ROCKER ARM SHAFT INSPECTION

Inspect rocker arm shafts for wear or damage.
Measure the O.D.

(1)SERVICE LIMIT:
11.91 mm (0.469 in)



# CAMSHAFT REMOVAL

Measure the wedge B projection above the cam chain tensioner top.
Replace the cam chain if the projection is in excess of 9 mm (0.36 in).

Drain engine oil and remove the right crankcase cover.
Remove the cam chain tensioner attaching bolt at the crankcase and pull up the wedge A while holding the wedge B.

NOTE

Do not fall the tensioner collar into the crankcase.

Hold the wedge A with the 2 mm pin.

NOTE

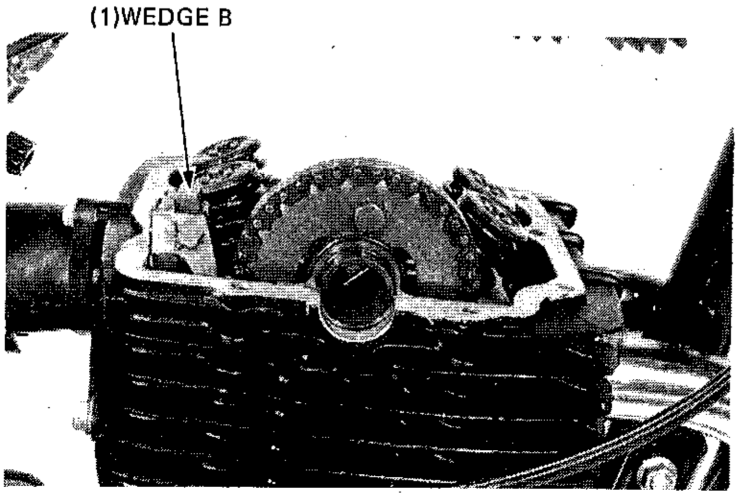
Remove the 2 mm pin after installing the cam sprocket.

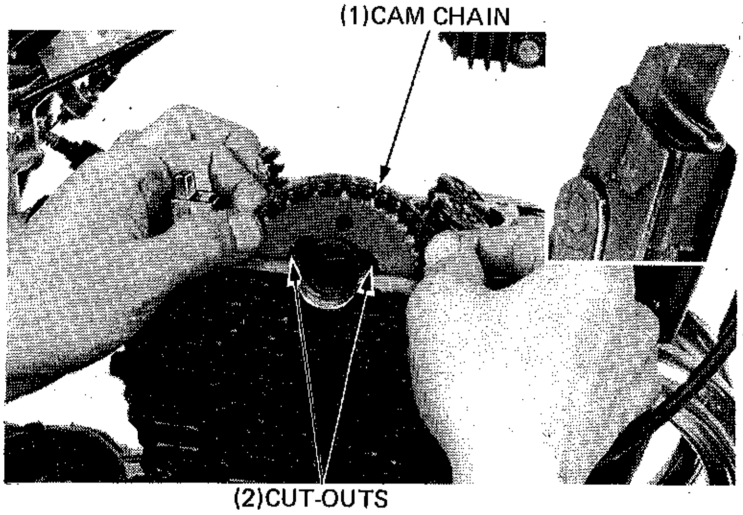
Remove the cam sprocket bolt.

NOTE

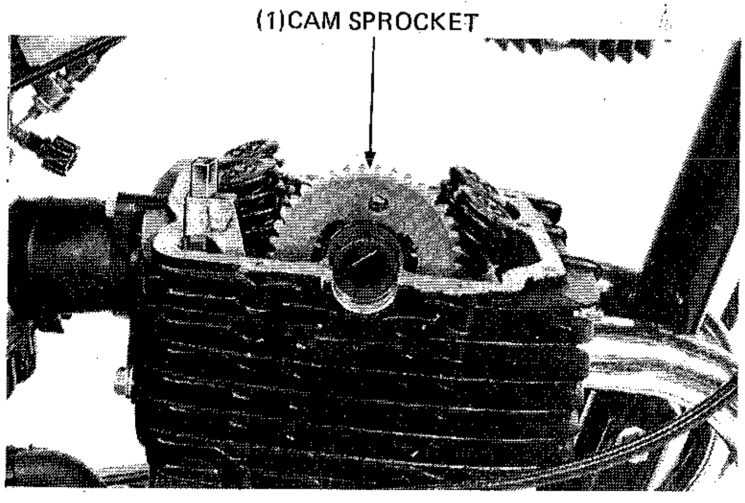
Do not fall the bolt into the crankcase.

Turn the crankshaft counterclockwise until the cam sprocket cut-outs are even with the end of the cylinder.
Remove the cam chain from the cam sprocket.



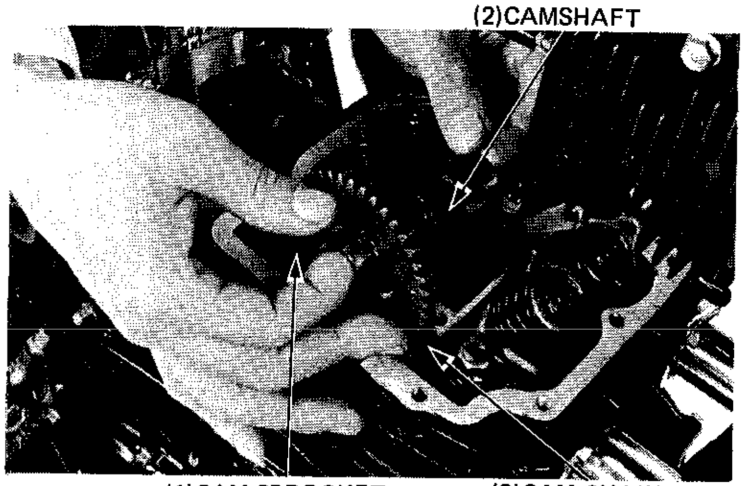

Reposition the cam sprocket in its normal position.



Remove the camshaft and cam sprocket.

NOTE

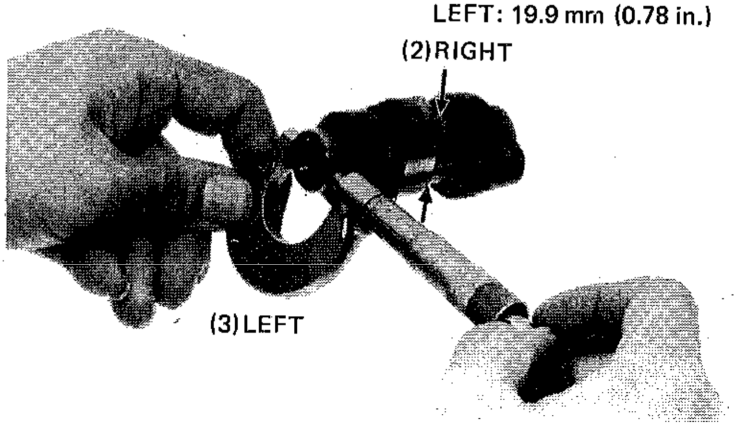
Suspend the cam chain with a piece of wire to keep it from falling into the cylinder.



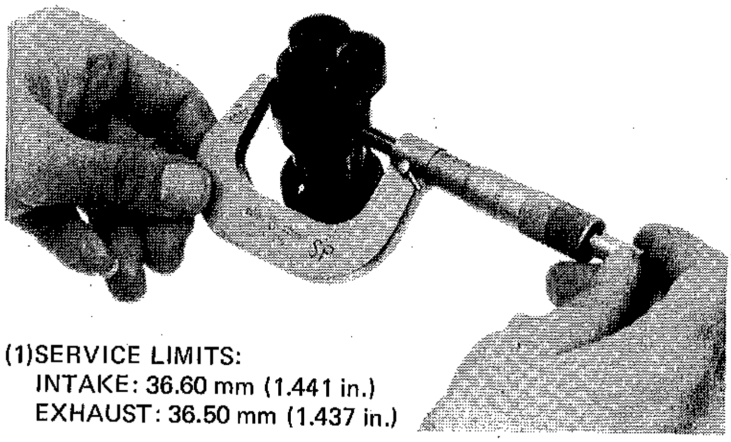

• CAMSHAFT INSPECTION

Check the camshaft journals for wear or damage.
Measure the O.D. of each journal.

(1)SERVICE LIMITS:
RIGHT: 23.9 mm (0.94 in.)
LEFT: 19.9 mm (0.78 in.)




Check each cam lobe for wear or damage.
Measure the cam height.



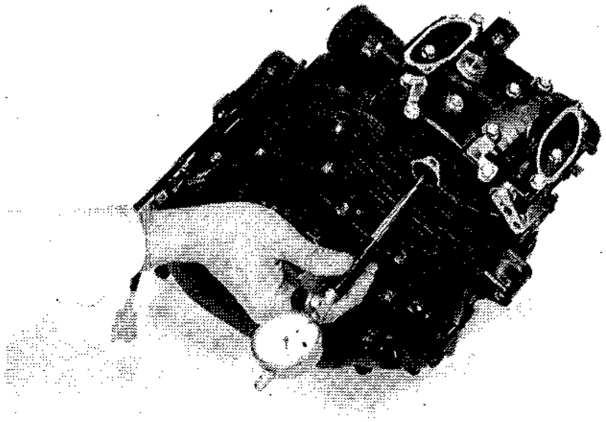
(1)SERVICE LIMITS:
INTAKE: 36.60 mm (1.441 in.)
EXHAUST: 36.50 mm (1.437 in.)

- CAMSHAFT BEARING INSPECTION

Check each camshaft bearing for wear or damage.
Temporarily install the cylinder head cover.

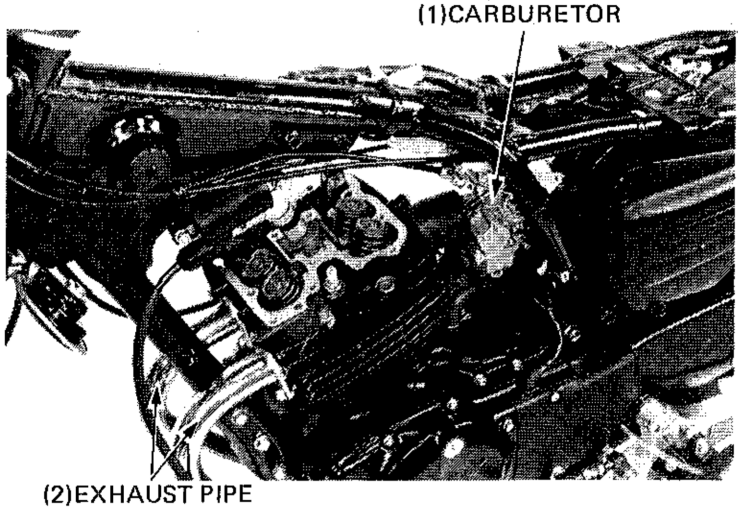
**TORQUE: 10–14 N·m**
**(1.0–1.4 kg-m, 7–10 ft-lb)**

Measure the cam shaft bearing I.D.

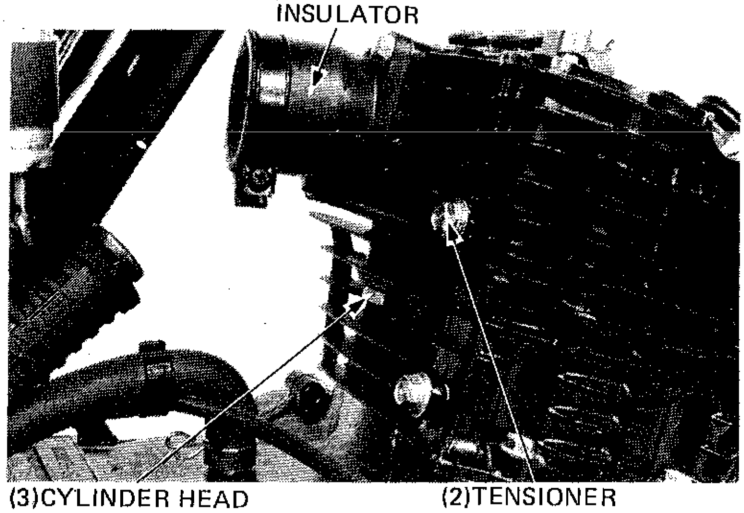


# CYLINDER HEAD REMOVAL

Remove the carburetor and exhaust pipe.




Remove the carburetor insulator.
Remove the tensioner set bolt.
Remove the cylinder head nuts.



Remove the cylinder head bolts.

NOTE

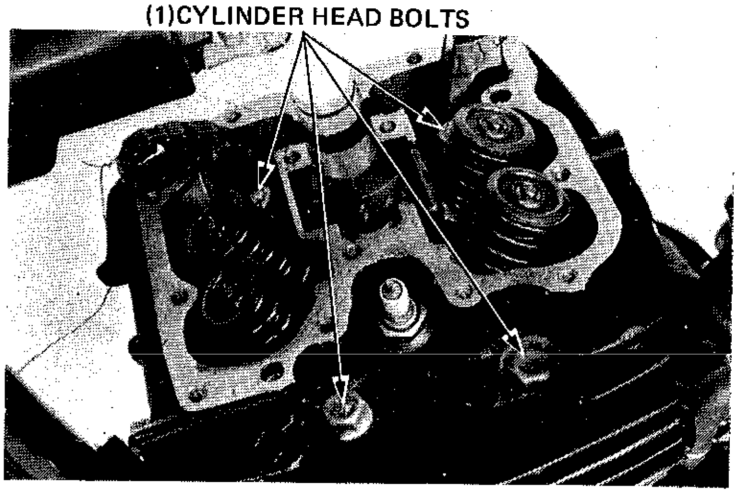
Loosen and remove the bolts in a cross pattern in two or more steps.

Remove the cylinder head.

NOTE

Avoid damaging the cylinder head mating surface.

(1)CYLINDER HEAD BOLTS



## CYLINDER HEAD DISASSEMBLY

Remove the valve spring cotters, retainers, springs, and valves with a valve spring compressor.

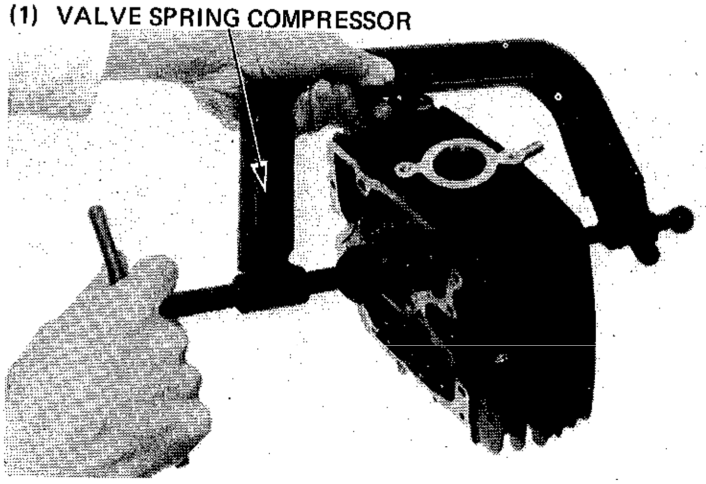
*CAUTION*

*To prevent loss of tension, do not compress the valve springs more than necessary to remove the valve spring cotters.*

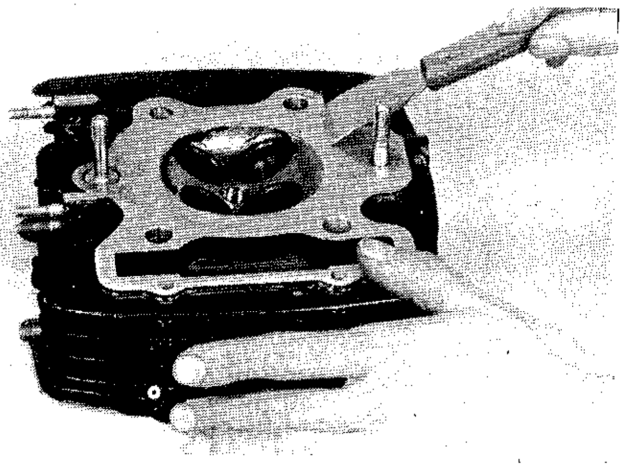
NOTE

Mark all parts to insure original assembly.

(1) VALVE SPRING COMPRESSOR

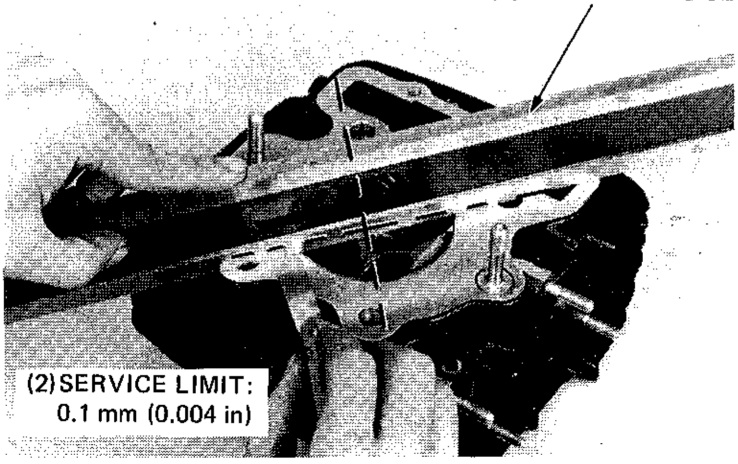


Remove the carbon deposits from the combustion chambers.



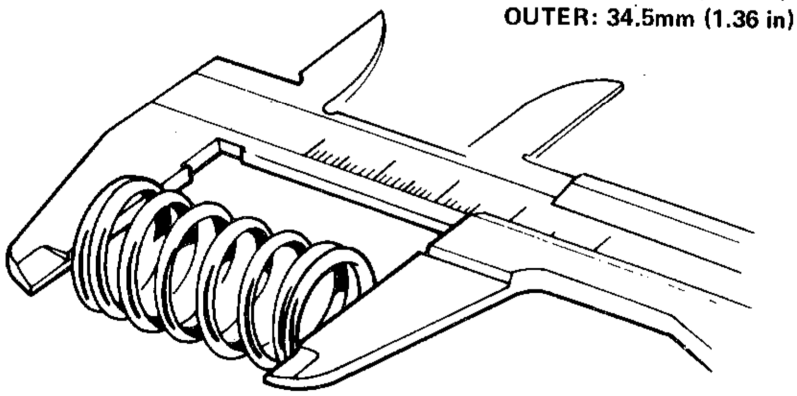
## • CYLINDER HEAD INSPECTION

Check the spark plug hole and valve area for cracks.
Check the cylinder head for warpage with a straight edge and a feeler gauge.



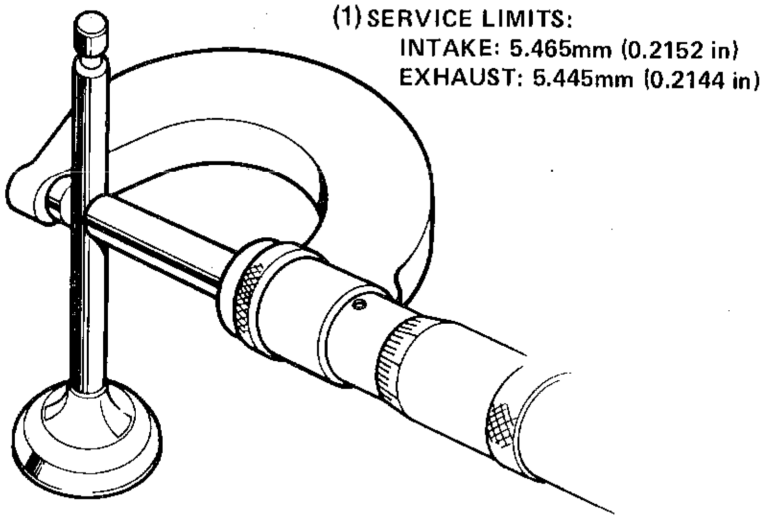

## • VALVE SPRING INSPECTION

Measure the free length of the inner and outer valve spring.




## • VALVE/VALVE GUIDE INSPECTION

Inspect each valve for trueness, burning, scratches or abnormal stem wear.
Check the valve movement in the guide.
Measure and record each valve stem O.D.



NOTE

Ream the guides to remove any carbon build-up before checking valve guide O.D.

Measure and record each valve guide I.D. using a ball gauge or inside micrometer.

Calculate the stem-to-guide clearance.

**VALVE-TO-GUIDE CLEARANCE**
**SERVICE LIMITS:**
**INTAKE: 0.06 mm (0.0024 in)**
**EXHAUST: 0.07 mm (0.0028 in)**

NOTE

If the stem-to-guide clearance exceeds the service limit, determine if a new guide with standard dimensions would bring the clearance within tolerance. If so, replace guides as necessary and ream to fit.

If stem-to-guide clearance still exceeds the service limit with new guides, replace the valves and guides.

NOTE

Reface valve seats whenever new valve guides are installed.

## • VALVE GUIDE REPLACEMENT

Support the cylinder head and drive out the guide from the valve port.

NOTE

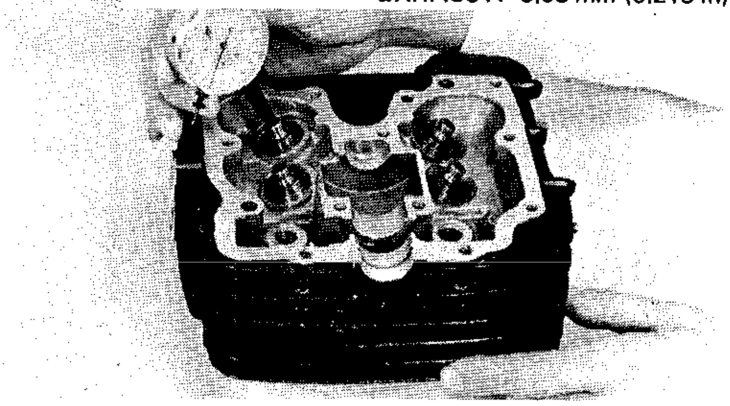
When driving out the valve guide, do not damage the head.

Install a new valve guide from the top of head.

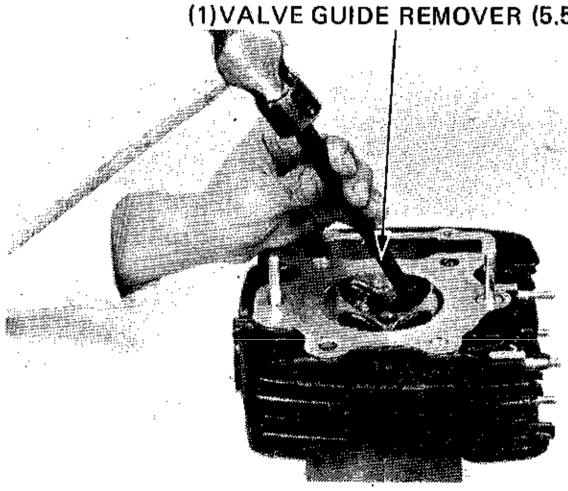
NOTE

Inspect the valve guide for damage.

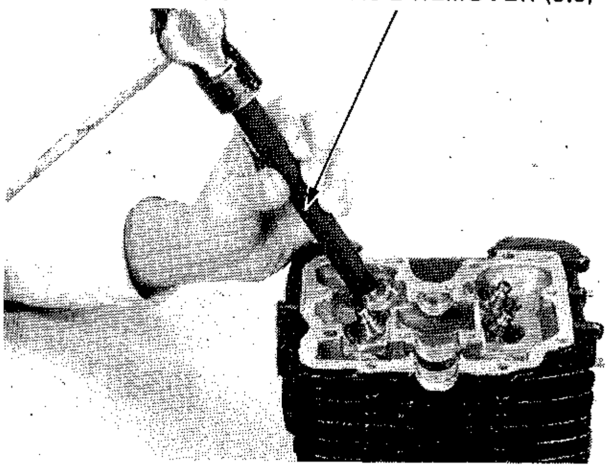
(1)SERVICE LIMITS: INTAKE: 5.53 mm (0.218 in)
EXHAUST: 5.53 mm (0.218 in)



(1)VALVE GUIDE REMOVER (5.5)



(1)VALVE GUIDE REMOVER (5.5)

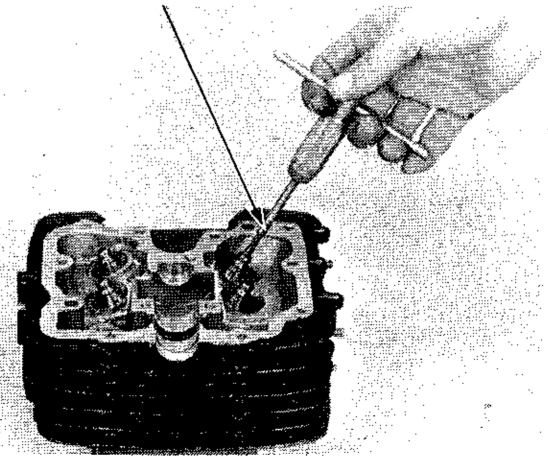


Ream the new valve guide after installation.

NOTE

Use cutting oil on the reamer during this operation.
Rotate the reamer when inserting and removing it.

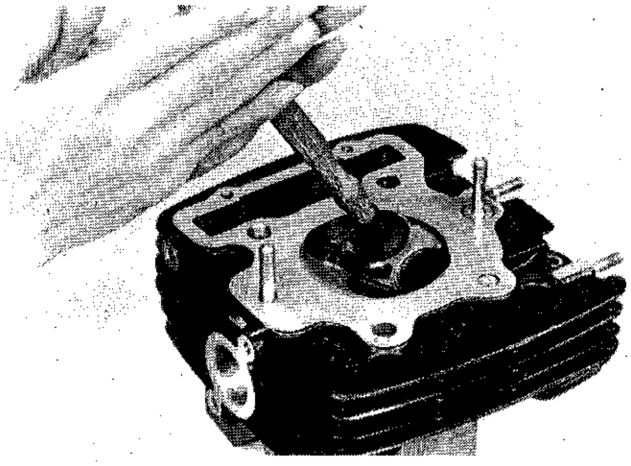
(1)VALVE GUIDE REAMER (5.5 mm)
No. 07984–2000000



Reface the valve seat (Page 6-15)
Clean the cylinder head thoroughly to remove any metal particles.

## VALVE SEAT INSPECTION AND REFACING

Clean all intake and exhaust valves thoroughly to remove carbon deposits.
Apply a light coating of Prussian Blue to each valve face. Lap each valve and seat using a rubber hose or other hand-lapping tool.

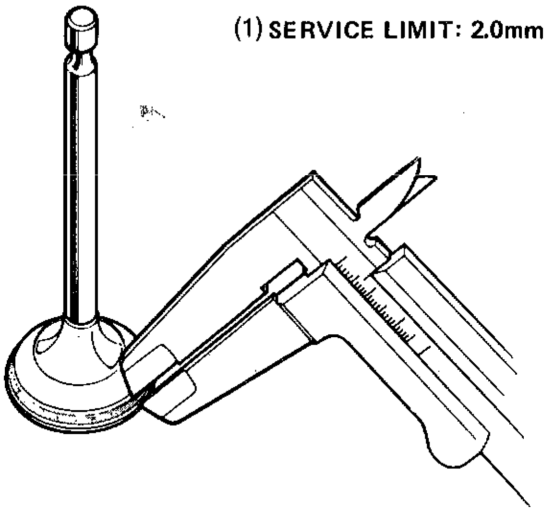


Remove the valve and inspect the face.
Measure the valve seat.

*CAUTION*

*The valve cannot be ground. If the valve face is burned or badly worn or if it contacts the seat unevenly, replace the valve.*

(1) SERVICE LIMIT: 2.0mm (0.08 in)



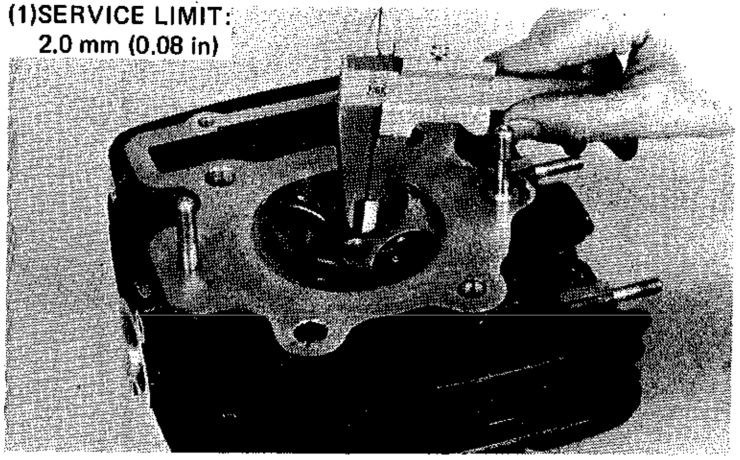
Inspect each valve seat.

If the seat is too wide, too narrow, or has low spots, the seat must be refinished for good sealing.

NOTE

Follow the refacer manufacturer's operating instruction.

(1)SERVICE LIMIT:
2.0 mm (0.08 in)



## • VALVE SEAT GRINDING

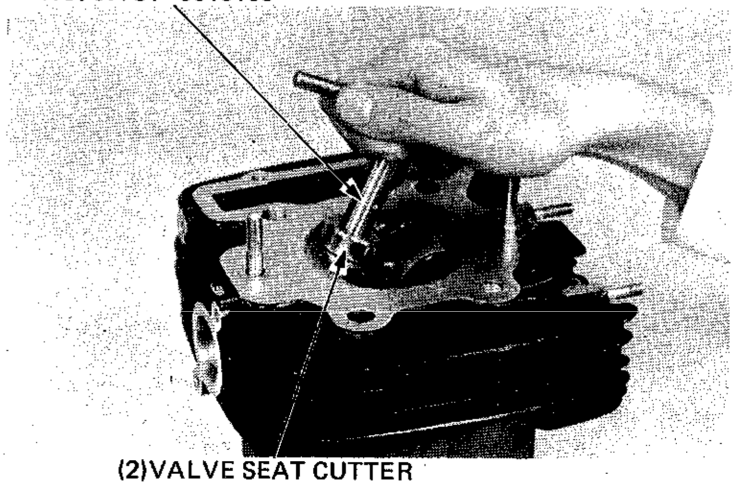
HONDA VALVE SEAT CUTTERS are recommended to correct a worn valve seat.

Using a 45 degree cutter, remove any roughness or irregularities from the seat.

NOTE

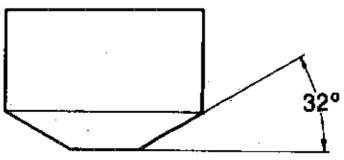
Reface the seat with a 45 degree cutter when the valve guide is replaced.

(1)CUTTER HOLDER
NO. 07781–0010100

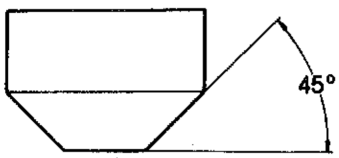


(2)VALVE SEAT CUTTER

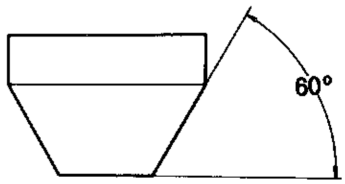
## • VALVE-SEAT CUTTERS




NO. 07780—0012200

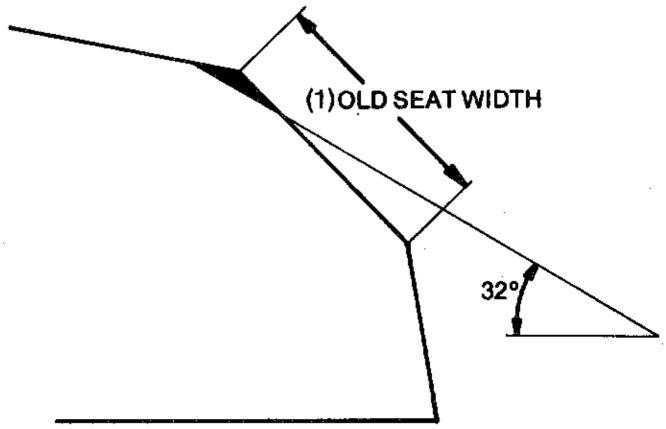



NO. 07780—0014000

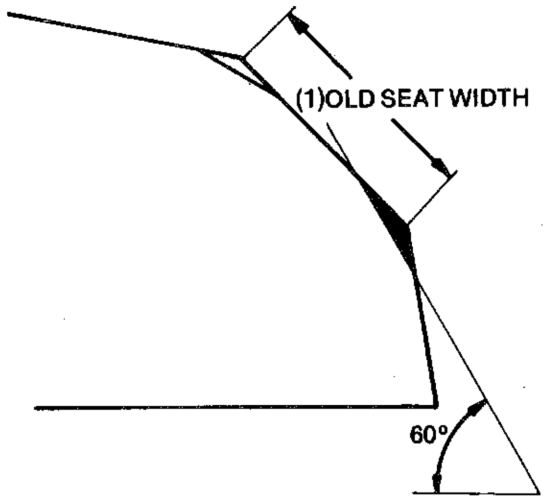



NO. 07780—0010300

Using a 32 degree cutter, remove 1/4 of the existing valve seat material.



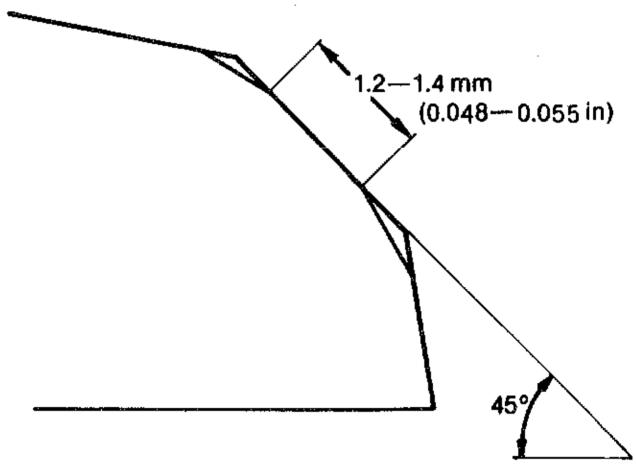

Use a 60 degree cutter and remove the bottom 1/4 of the old seat. Remove the cutter and inspect the area you have just removed.




Install a 45 degree finish cutter and cut the seat to the proper width.

NOTE

Make sure that all pitting and irregularities are removed. Refinish if necessary.

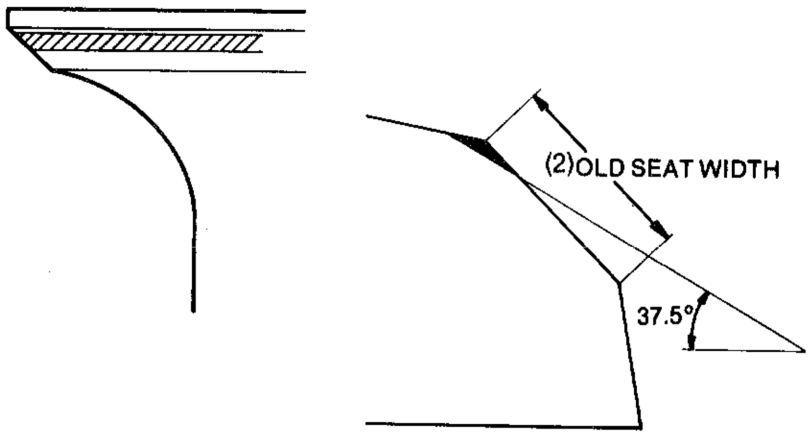


NOTE

The location of the valve seat in relation to the valve face is very important for good sealing.

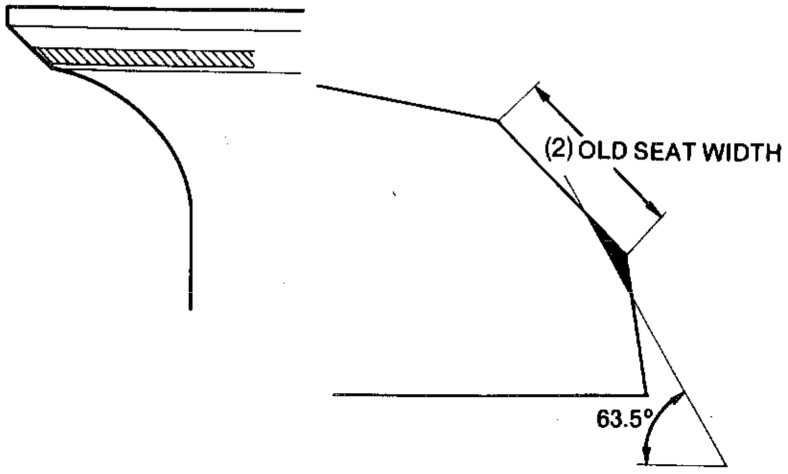
Apply a thin coating of Prussian Blue to the valve seat.
Press the valve through the valve guide and onto the seat to make a clear pattern.
Remove to inspect the valve.
If the contact area is too high on the valve, the seat must be lowered using a 32 degree flat cutter.

(1) CONTACT TOO HIGH

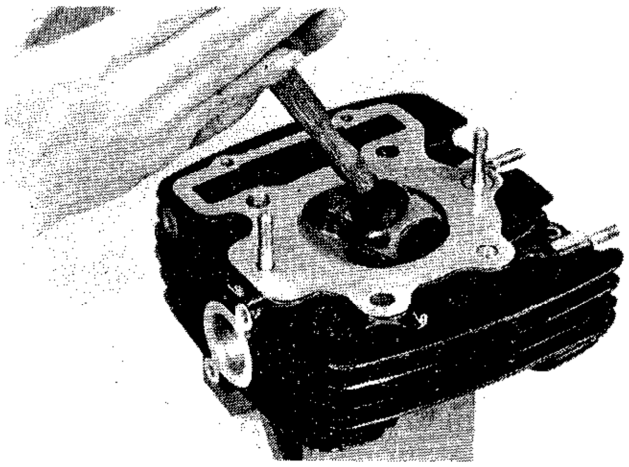



If the contact area is too low on the valve, the seat must be raised using a 60 degree inner cutter.
Refinish the seat to specifications, using a 45 degree finish cutter.

(1) CONTACT TOO LOW




After cutting the seat, apply lapping compound to the valve face, and lap the valve using light pressure.
After lapping, wash all residual compound off the cylinder head and valve.



# CYLINDER HEAD ASSEMBLY

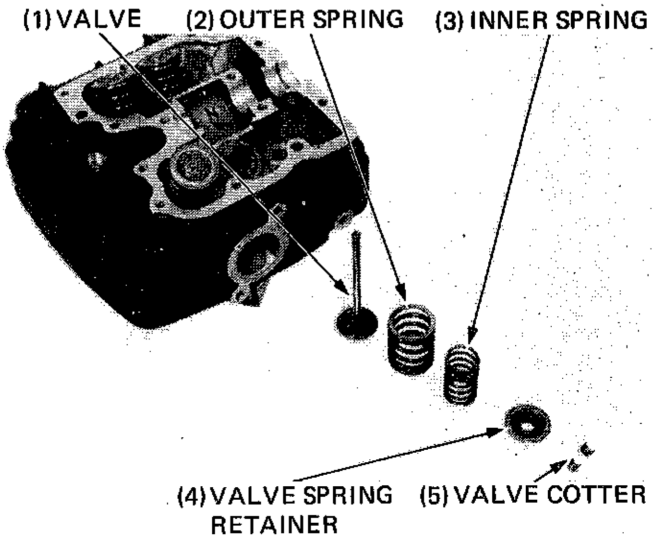
NOTE

Install new valve stem seals when disassembling.

Lubricate each valve stem with oil.
Insert the valves into the valve guides.
Install the valve springs and retainers.

NOTE

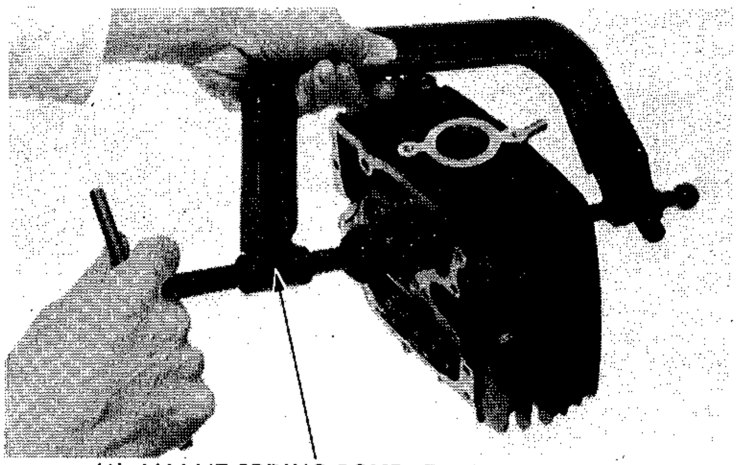
Install the valve springs with the tightly wound coils facing the cylinder head.




Install the valve cotters.

*CAUTION*

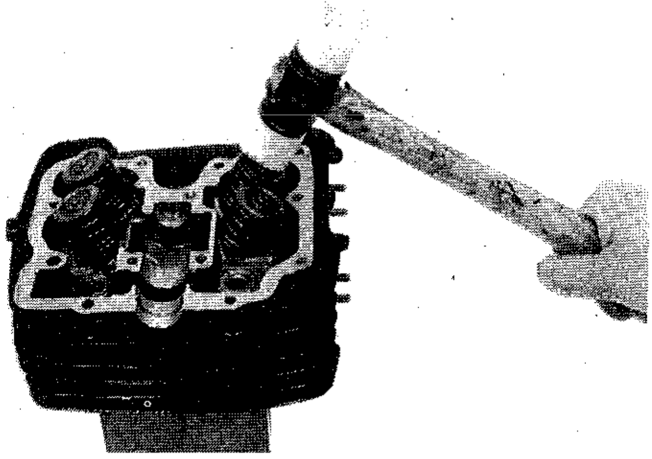
*To prevent loss of tension, do not compress the valve spring more than necessary.*




Tap the valve stems gently with a plastic hammer to firmly set the cotters.

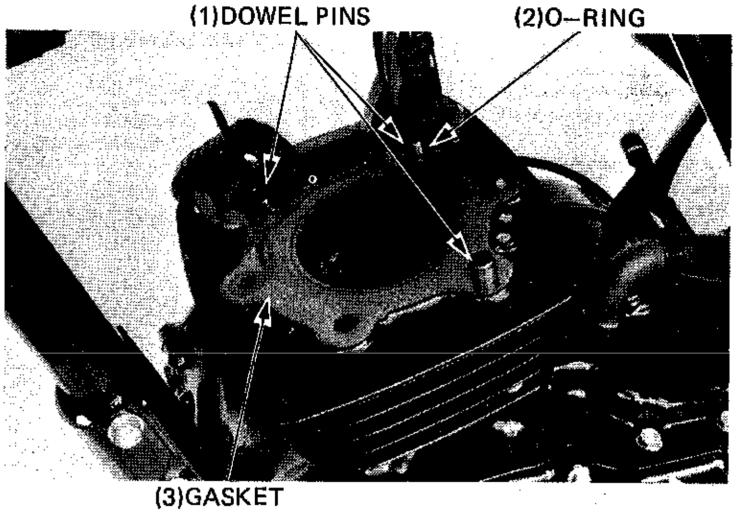
*CAUTION*

*Support the cylinder head above the working bench surface to prevent possible valve damage.*



# CYLINDER HEAD INSTALLATION

Clean the cylinder surface of any gasket material.
Install the O-rings, dowel pins and a new gasket.



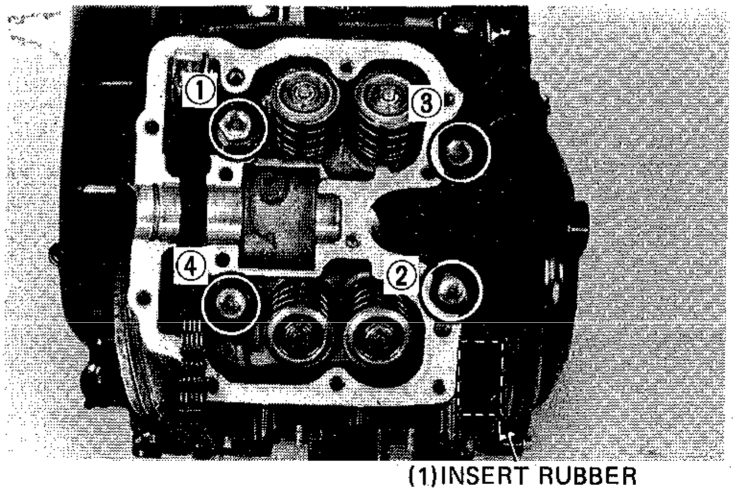

Install the cylinder head.
Apply new engine oil to the thread of the cylinder head bolts.
Tighten the cylinder head bolts in a criss-cross pattern in 2–3 steps.

**TORQUE: 30–36 N·m**
**(3.0–3.6 kg-m, 22–26 ft-lb)**

Tighten the cylinder head nuts.

**TORQUE: 22–28 N·m**
**(2.2–2.8 kg-m, 16–20 ft-lb)**

Insert the insert rubber between the cylinder head and cylinder as shown.

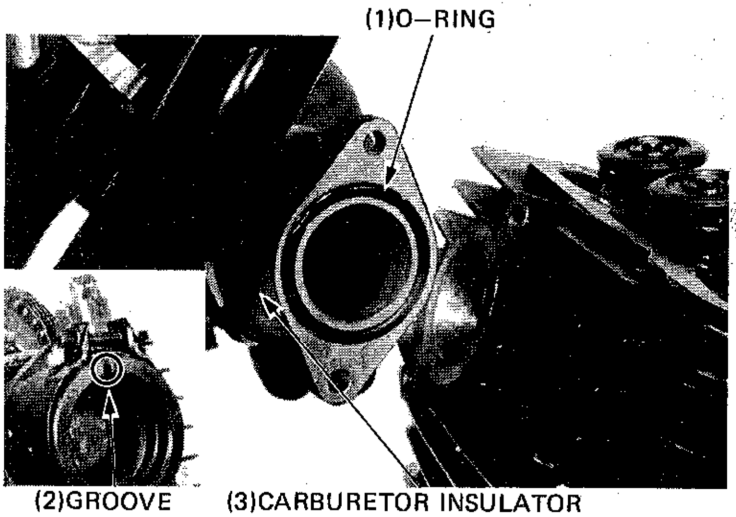



Install the carburetor insulator.

NOTE

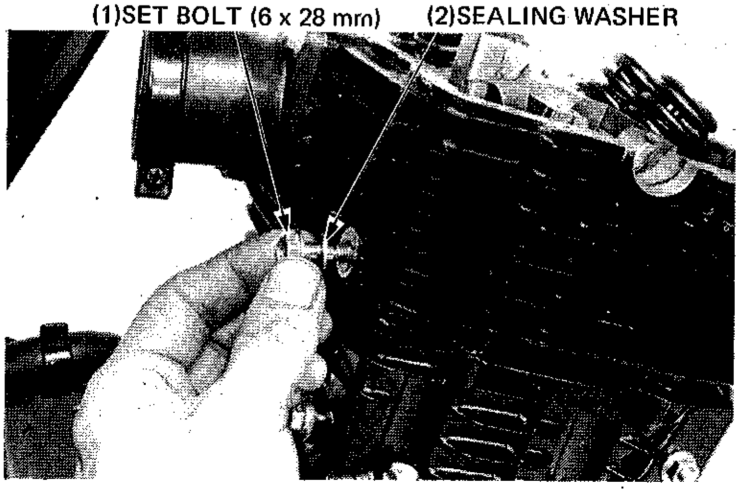
Install the insulator with the cutout facing up.

**TORQUE: 8–12 N·m**
**(0.8–1.2 kg-m, 6–9 ft-lb)**



Install the cam chain tensioner set bolt and sealing washer.

**TORQUE: 8–12 N·m**
**(0.8–1.2 kg-m, 6–9 ft-lb)**




## CAMSHAFT INSTALLATION

NOTE

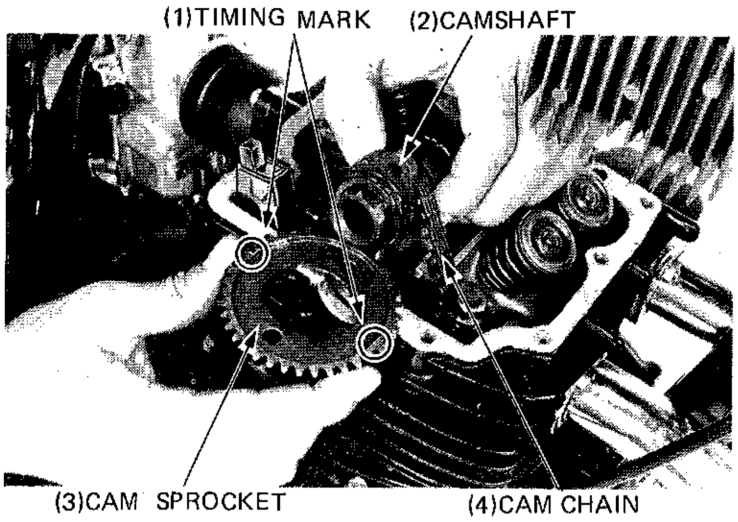
Do not remove the 2 mm pin before installing the cam sprocket.

Coat the camshaft journal with molybdenum disulfide grease.
Pass the camshaft through the cam chain.

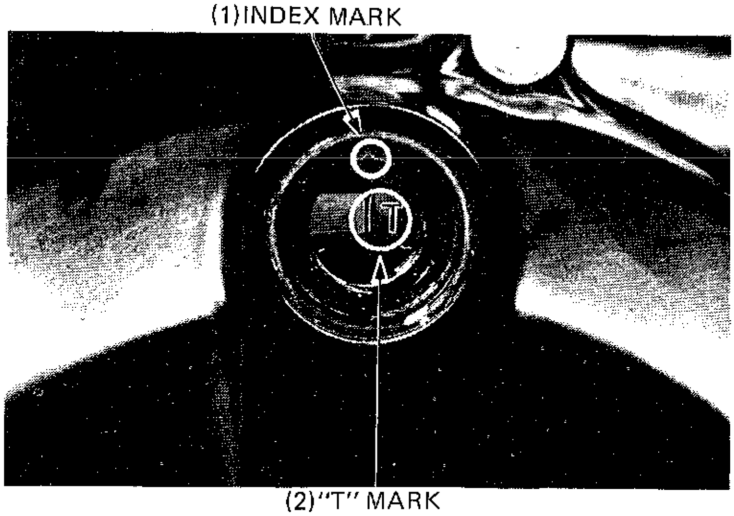
NOTE

Install the cam sprocket with the timing mark facing the inside.

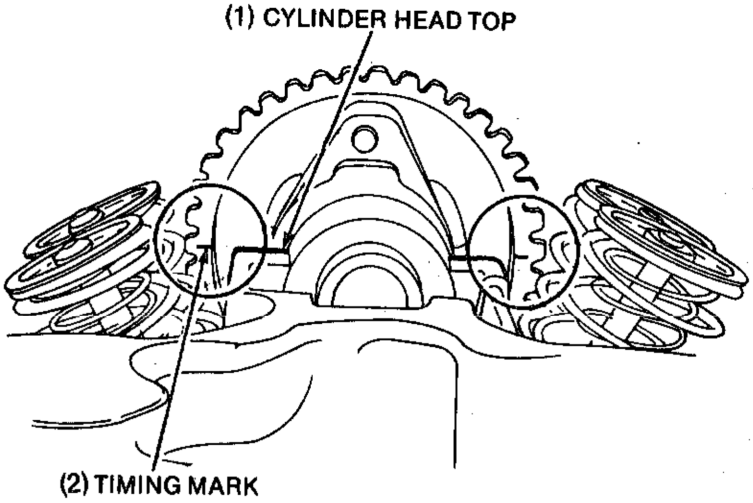
Rotate the crankshaft and align the index mark on the crankcase with the "T" mark on the flywheel.



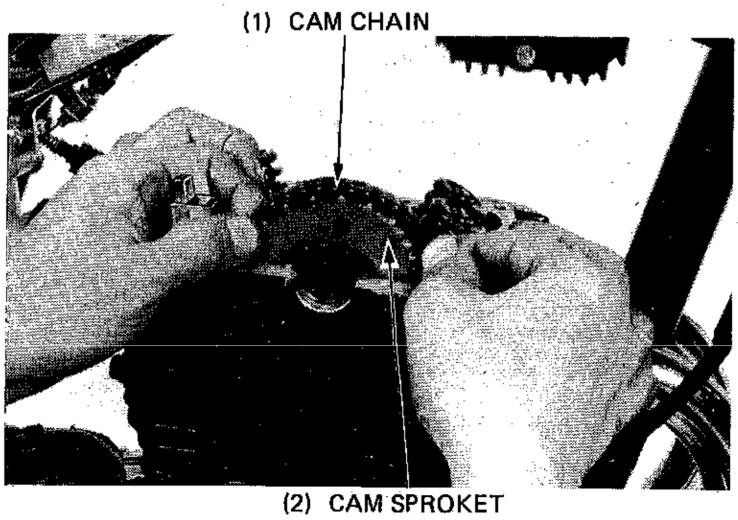

Turn the crankshaft and align the "T" mark on the generator rotor with the index mark on the left crankcase cover.



Align the timing marks on the cam sprocket with the top of the cylinder.




Slide the chain over the cam sprocket without rotating the sprocket.




Install the cam sprocket on the camshaft. Tighten the sprocket bolt to the specified torque.

**TORQUE: 17–23 N-m**
**(1.7–2.3 kg-m, 12–16 ft-lb)**

NOTE

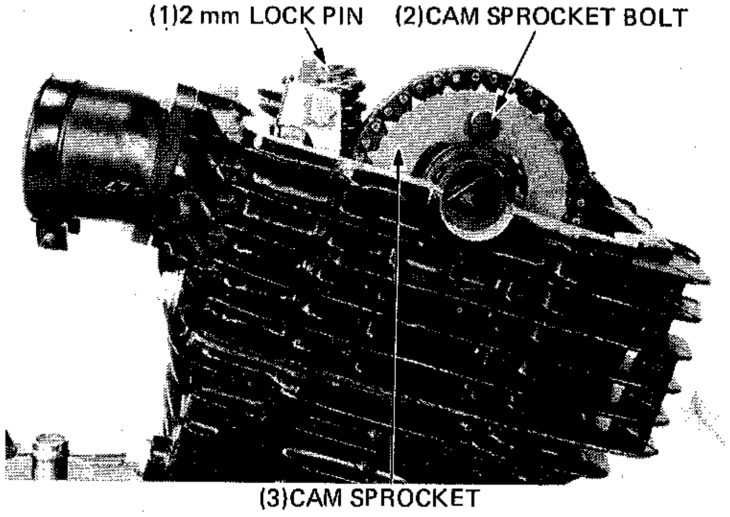
Do not fall the bolt into the crankcase.

Withdraw the tensioner set pin.

NOTE

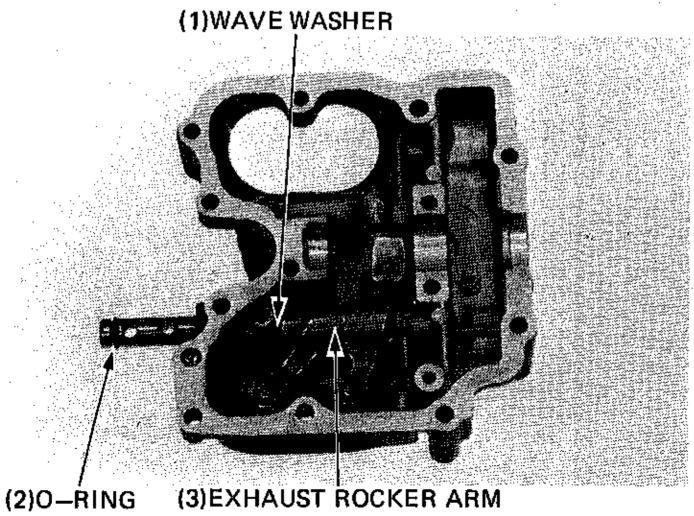
Let the wedge A fall by depressing on the wedge B if the wedge A is held in place when the pin is removed.

Pour fresh oil into the cylinder head until the cams are submerged in the oil.

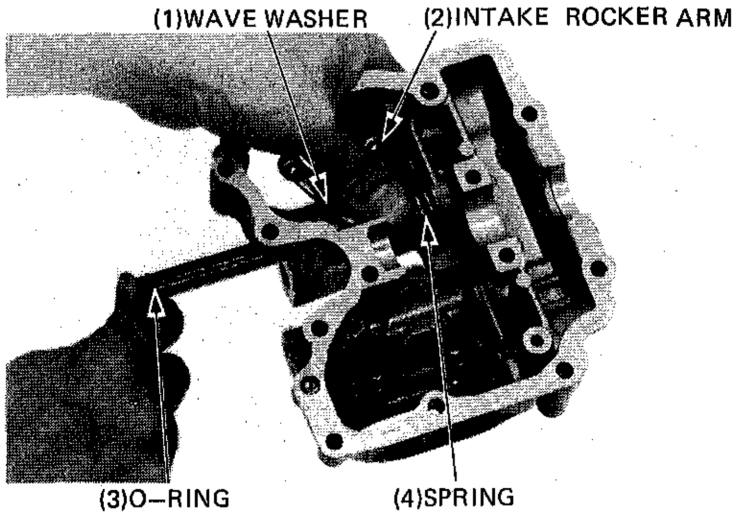


# CYLINDER HEAD COVER ASSEMBLY

Install the exhaust rocker arm and wave washer.
Apply to a new O-ring with engine oil and install it to the rocker arm shaft.
Install the rocker arm shaft.




Install the intake rocker arm, spring and wave washer as shown.
Apply engine oil to a new O-ring and install it to the rocker arm shaft.
Install the rocker arm shaft.



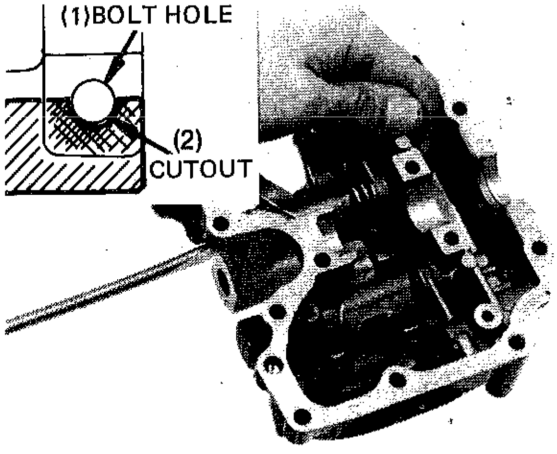

Align the cutout of the rocker arm shaft with the cylinder head cover bolt hole.

Drive new dowel pins in to the cylinder head cover.

NOTE

Avoid damaging the cylinder head cover mounting surface while driving the dowel pins.

Install the valve lifter lever, spring and dowel pin.

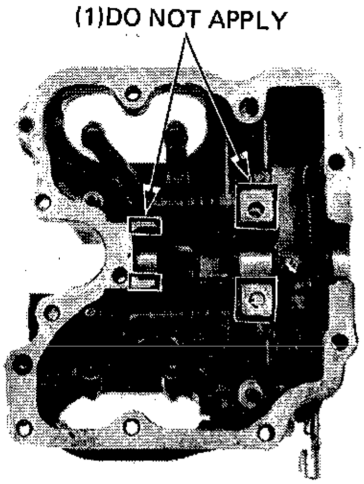


# CYLINDER HEAD COVER INSTALLATION

Apply liquid sealer to the head contacting faces of the cylinder head.

*CAUTION*

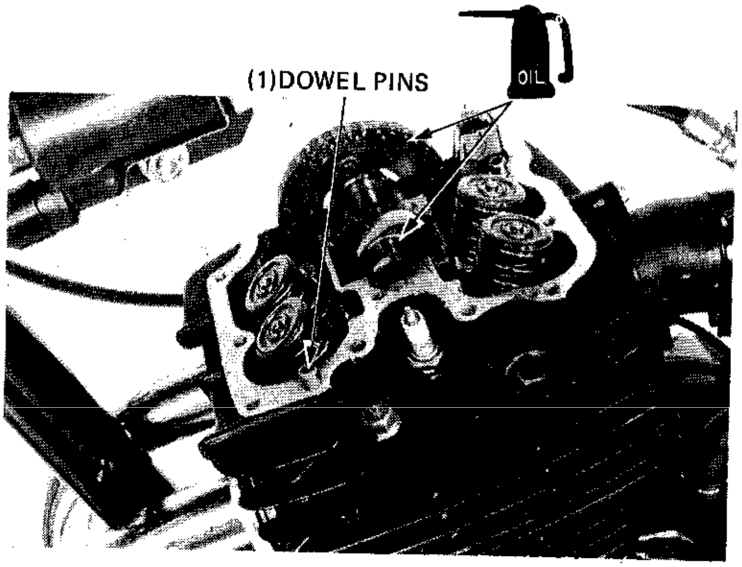
*Keep sealant away from the camshaft bearing surfaces.*




Install the dowel pins.

NOTE

Make sure that the cam lobes are submerged in oil in the oil pockets.



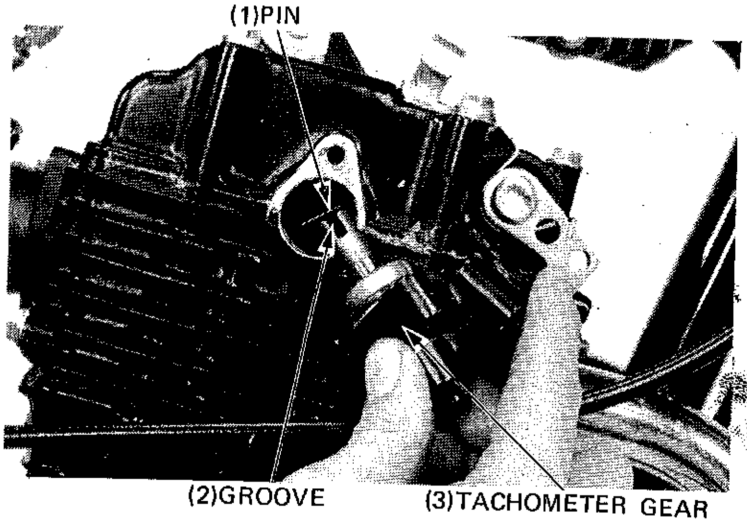

Loosen the valve adjusting screws and then install the cylinder head.
Tighten the cylinder head bolts temporarily.

Coat a new O-ring with grease and install it on the tachometer gearcase.

NOTE

- Engage the camshaft pin with the cut-out in the tachometer gear shaft.
- Clean excess grease thoroughly.

Apply locking agent to the bolt thread and install the tachometer gear. Tighten the bolt securely.

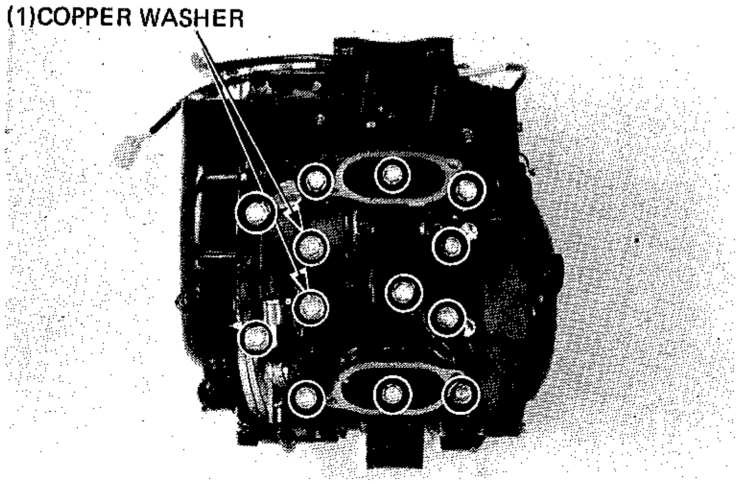


Tighten the cylinder bolts to the specified torque.

**TORQUE: 10–14 N·m**
**(1.0–1.4 kg-m, 7–10 ft-lb)**
**(COPPER WASHER): 10–12 N·m**
**(1.0–1.2 kg-m, 7–9 ft-lb)**

NOTE

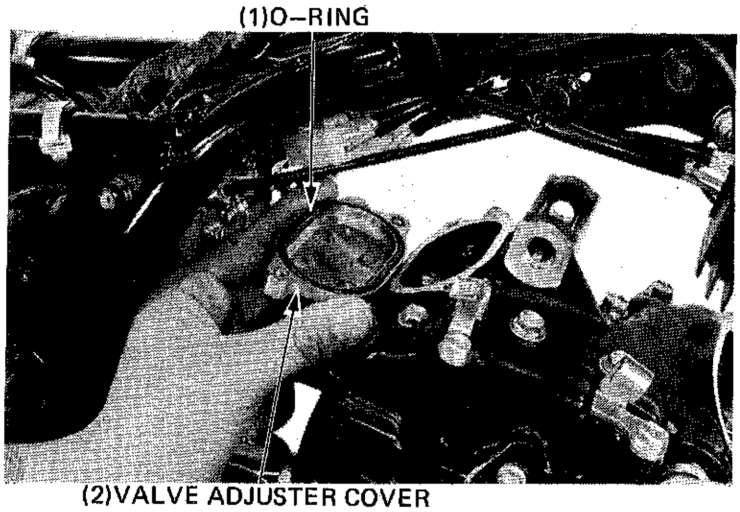
- Tighten the head bolts in a cross pattern in 2–3 steps.
- Clean excessive sealant from the head.
- Note the copper washer installed position.




Adjust valve clearance (Page 3-5).
Install the tappet hole cap.

NOTE

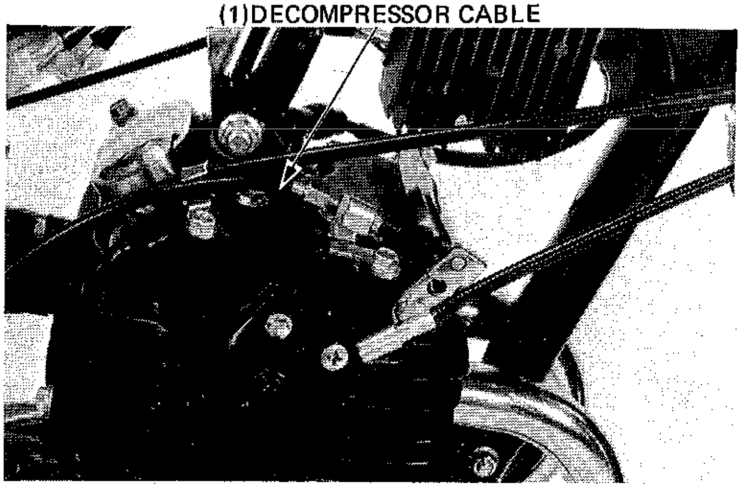
Make sure the O-ring is properly seated in the groove.




Install the upper engine hanger.

**TORQUE: 8 mm BOLTS: 20–35 N·m**
**(2.0–3.5 kg-m, 14–25 ft-lb)**
**10 mm BOLT: 45–70 N·m**
**(4.5–7.0 kg-m, 35–51 ft-lb)**

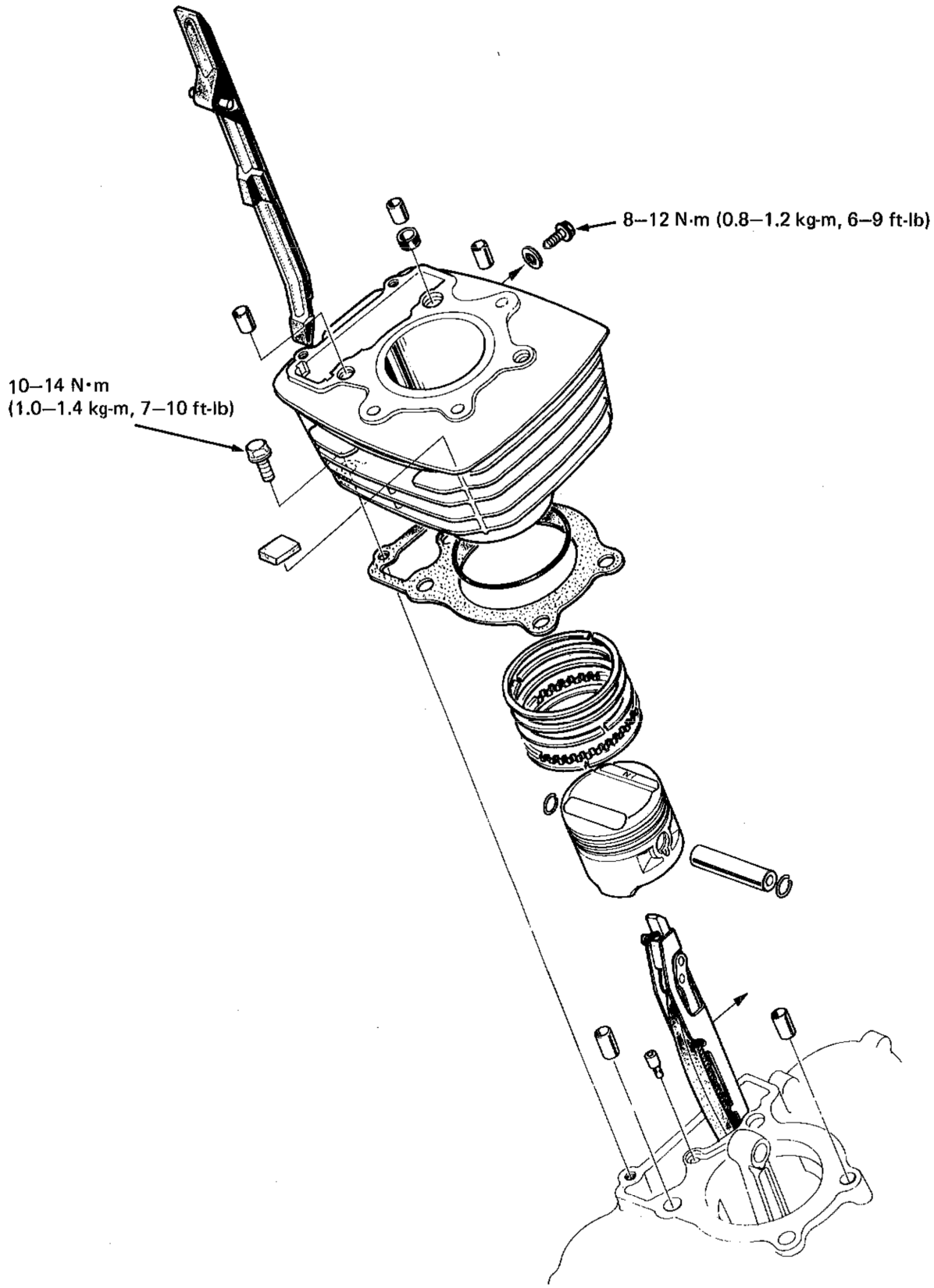
Connect the tachometer cable.
Connect the decompression wire.
Adjust the starter decompressor (Page 3-6).
Install the fuel tank, seat and side covers.



# MEMO

# 7. CYLINDER/PISTON

HONDA
CB250RS



| | |
|---|---|
| SERVICE INFORMATION | 7–2 |
| TROUBLESHOOTING | 7–2 |
| CYLINDER REMOVAL | 7–3 |
| PISTON REMOVAL | 7–5 |
| PISTON INSTALLATION | 7–8 |
| CYLINDER INSTALLATION | 7–8 |

# SERVICE INFORMATION

## • WORKING PRACTICE

All cylinder and piston maintenance and inspection can be accomplished with the engine in frame.
Camshaft lubricating oil is fed to the cylinder head through an orifice in the engine case. Be sure this orifice is not clogged and that the O-ring and dowel pins are in place before installing the cylinder head.

## • SPECIFICATIONS

| ITEM | | STANDARD | SERVICE LIMIT |
|---|---|---|---|
| Cylinder | I.D. | 74.00–74.01 mm (2.913–2.914 in) | 74.11 mm (2.918 in) |
| | Taper | — | 0.05 mm (0.002 in) |
| | Out of round | — | 0.05 mm (0.002 in) |
| | Warpage across top | — | 0.10 mm (0.004 in) |
| Piston, piston rings and piston pin | | | |
| | O.D. at skirt | 73.97–73.99 mm (2.912–2.913 in) | 73.88 mm (2.909 in) |
| | Piston pin bore | 19.002–19.008 mm (0.7481–0.7483 in) | 19.08 mm (0.751 in) |
| Piston ring end gap | | | |
| | Top/second | 0.15–0.35 mm (0.006–0.01 in) | 0.5 mm (0.02 in) |
| | Oil (Side Rail) | 0.2–0.9 mm (0.007–0.035 in) | — |
| Piston ring-to-ring groove clearance | | | |
| | Top/second | 0.015–0.045 mm (0.0006–0.0018 in) | 0.12 mm (0.006 in) |
| | Oil | 0.017 mm (0.0007 in) | — |
| Cylinder-to-piston | Clearance | 0.01–0.04 mm (0.0004–0.0016 in) | 0.1 mm (0.004 in) |
| Piston pin O.D. | | 18.994–19.000 mm (0.7478–0.7480 in) | 18.96 mm (0.747 in) |

## • TORQUE VALUES

Cylinder bolt: 10–14 N·m (1.0–1.4 kg-m, 7–10 ft-lb)
Cam chain tensioner bolt: 8–12 N·m (0.8–1.2 kg-m, 6–9 ft-lb)

# TROUBLESHOOTING

**Low or Unstable Compression**
1. Worn cylinder or piston rings

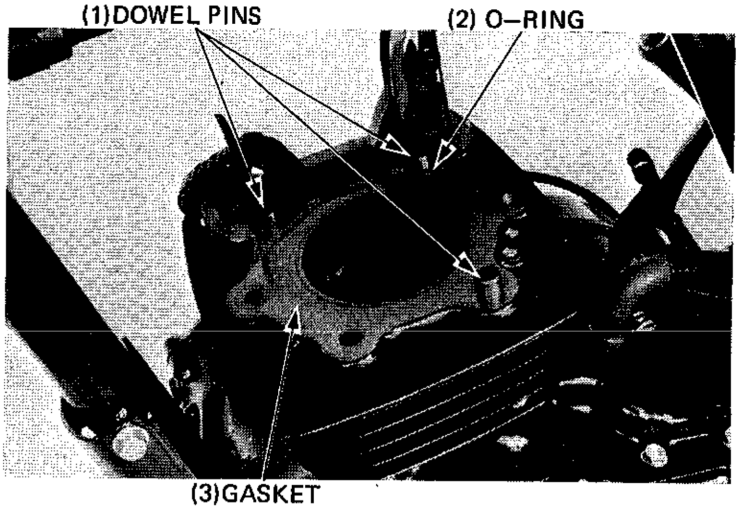
**Excessive Smoke**
1. Worn cylinder, piston, or piston rings
2. Improper installation of piston rings
3. Scored or scratched piston or cylinder wall

**Overheating**
1. Excessive carbon build-up on piston or combustion chamber wall

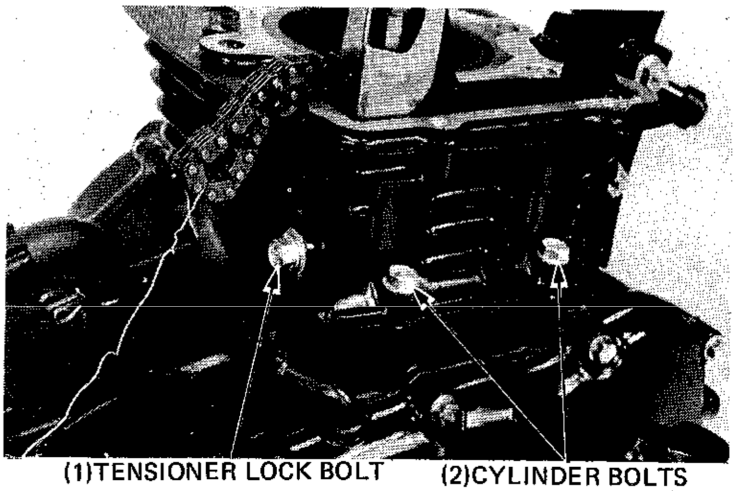
**Knocking or Abnormal Noise**
1. Worn piston and cylinder
2. Excessive carbon build-up

# CYLINDER REMOVAL

Remove the cylinder head (Section 6).
Remove the cylinder gasket, dowel pins and O-ring.



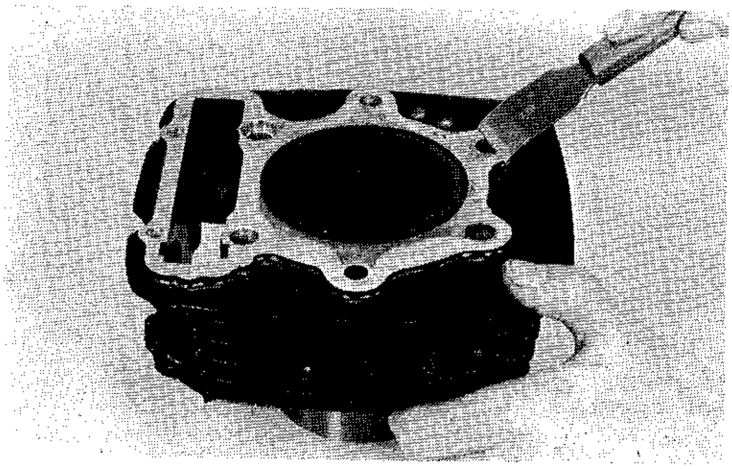

Remove the cam chain guide.
Remove the tensioner lock bolt and plain washer.
Remove the cylinder bolts and cylinder.




Clean the cylinder gasket surface of any gasket material.

NOTE

Gasket will come off easier if soaked in solvent.

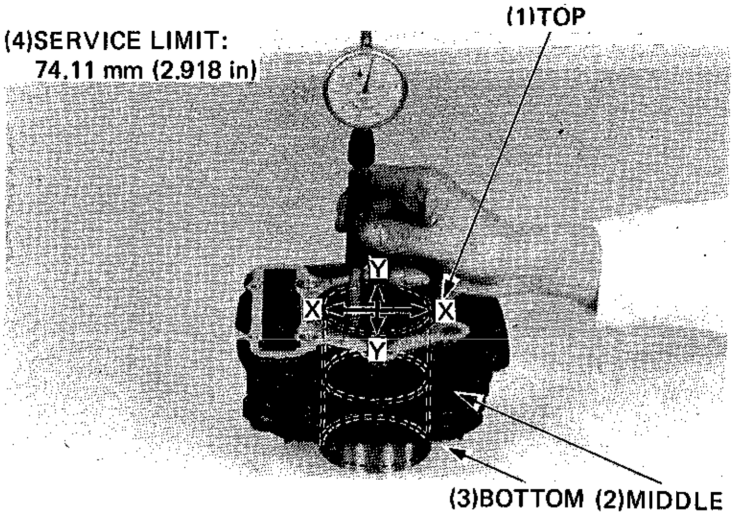


## • CYLINDER INSPECTION

Inspect the cylinder bore for wear or damage.
Measure the cylinder I.D.

NOTE

Check for out of round at X and Y axis at three locations.



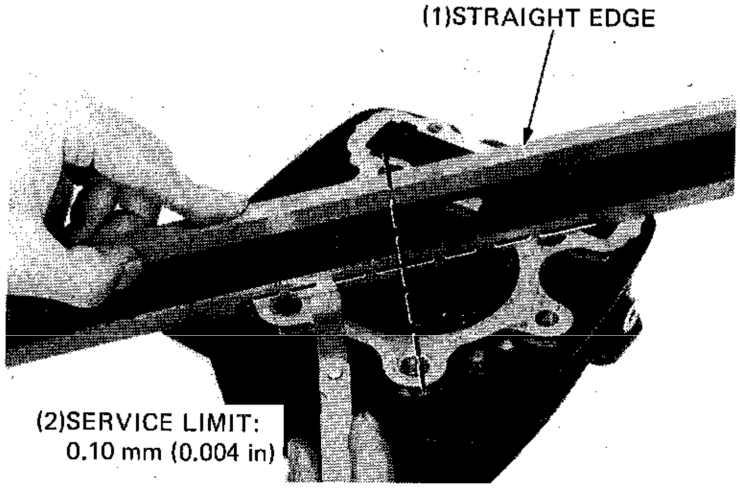

Calculate the taper and out of round.

**SERVICE LIMITS:**
**OUT OF ROUND: 0.05 mm (0.002 in)**
**TAPER: 0.05 mm (0.002 in)**

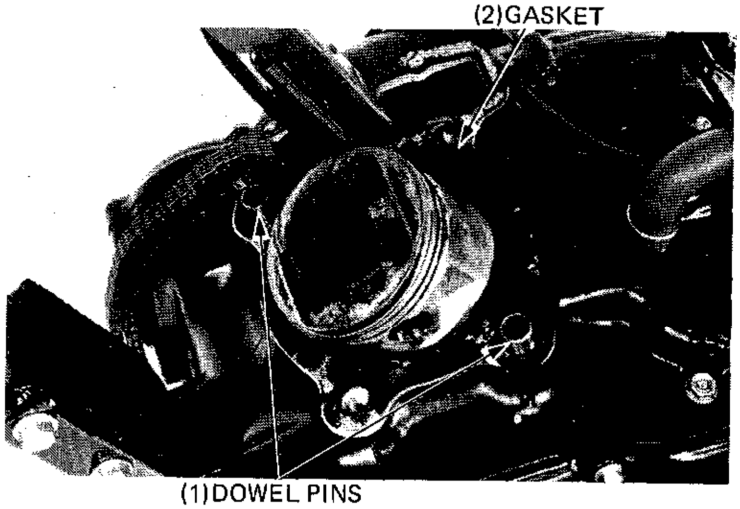
Inspect the top of the cylinder for warpage.

NOTE

Check in an X pattern as shown.




Remove the base gasket, dowel pins and oil control orifice.



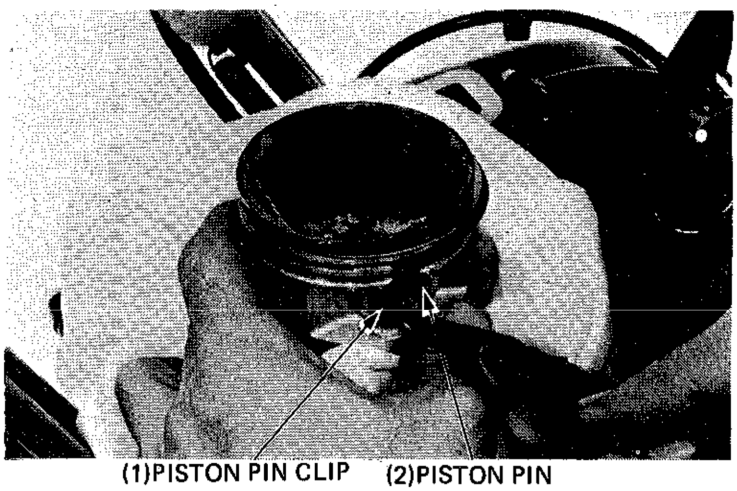
# PISTON REMOVAL

Remove the piston pin clip with pliers.

NOTE

Do not let the clips fall into the crankcase.

Press the piston pin out of the piston.

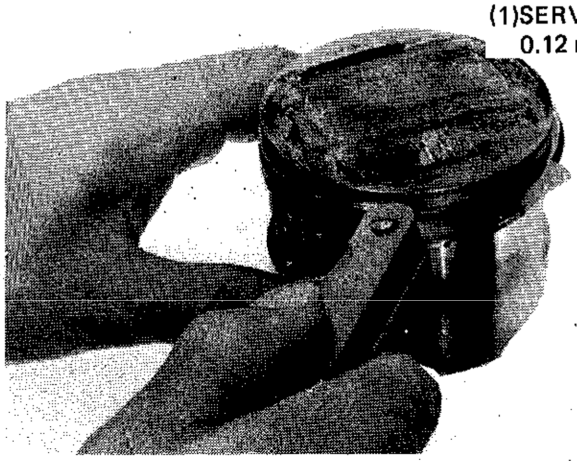


(1)PISTON PIN CLIP (2)PISTON PIN

- PISTON/PISTON RING INSPECTION

Measure the piston ring-to-groove clearance.

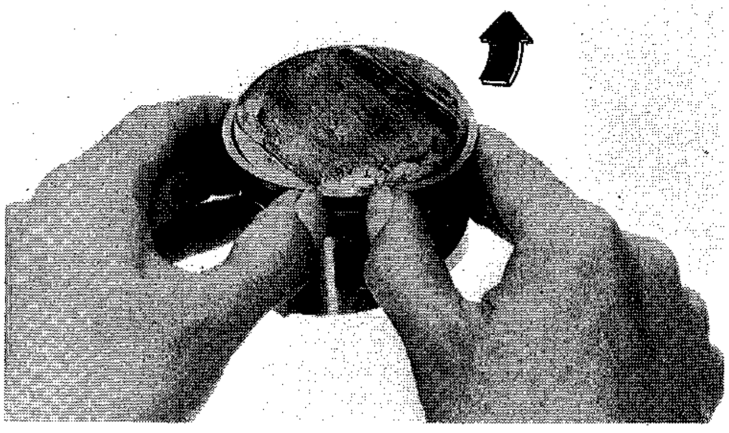
(1)SERVICE LIMIT: 0.12 mm (0.005 in)



Remove the piston rings.
Inspect the piston for damage and cracks; ring grooves for wear.

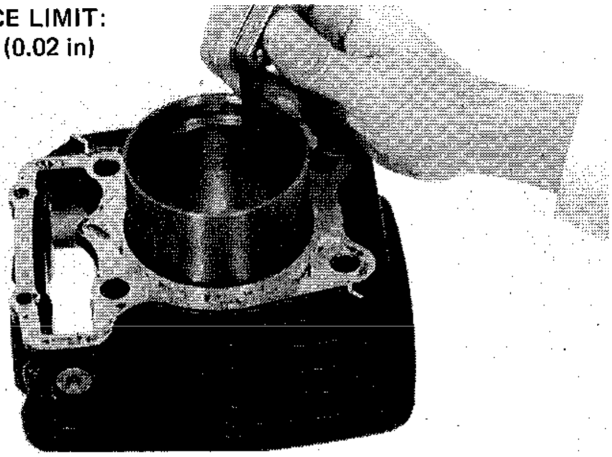
NOTE

Do not damage the piston rings during removal.



Insert each piston ring into the cylinder and measure the ring end gap.

(1)SERVICE LIMIT:
0.5 mm (0.02 in)



Measure each piston diameter at the skirt.

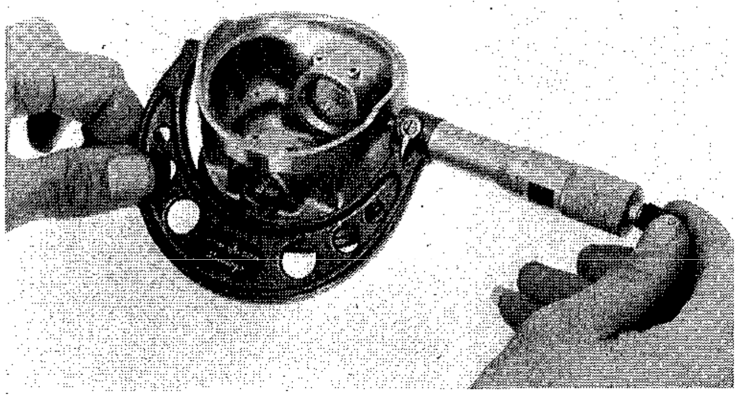
NOTE

Measure the piston diameter 10 mm from the bottom.

Calculate the piston-to-cylinder clearance.

**SERVICE LIMIT: 0.1 mm (0.004 in)**

(1)SERVICE LIMIT:
73.88 mm (2.909 in)

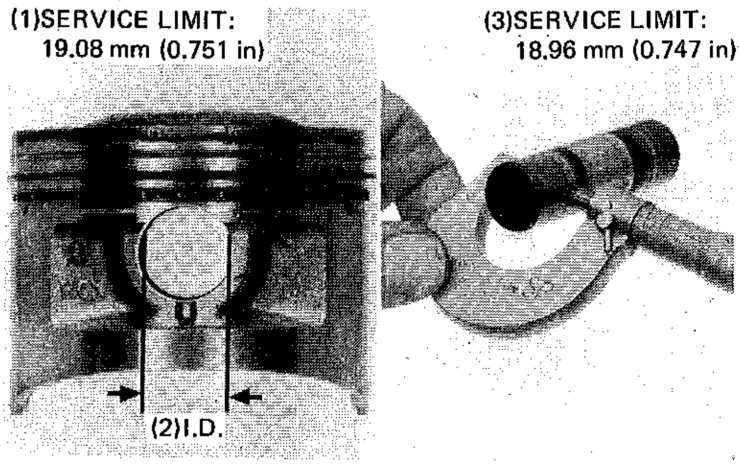


Measue the piston pin hole I.D.
Measure the piston pin O.D.
Calculate the piston-to-piston pin clearance.

**SERVICE LIMIT: 0.04 mm (0.0016 in)**

(1)SERVICE LIMIT:
19.08 mm (0.751 in)

(3)SERVICE LIMIT:
18.96 mm (0.747 in)

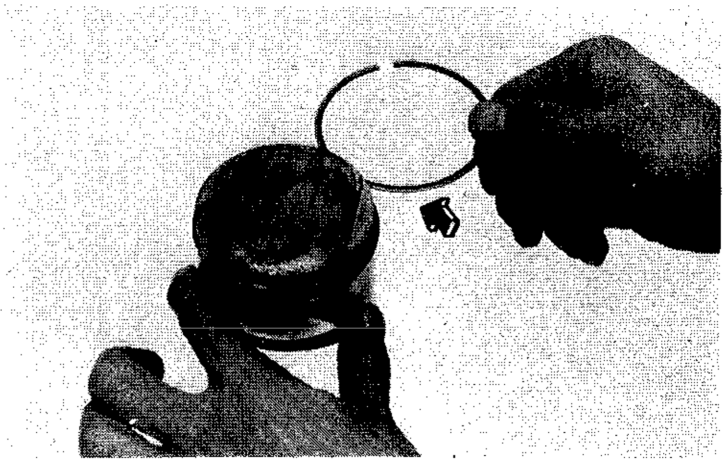


## • PISTON RING INSTALLATION

Clean the piston ring grooves thoroughly.

NOTE

Before installation, the rings should be free to rotate in the lands.



Install the piston rings with the marking facing up.

NOTE

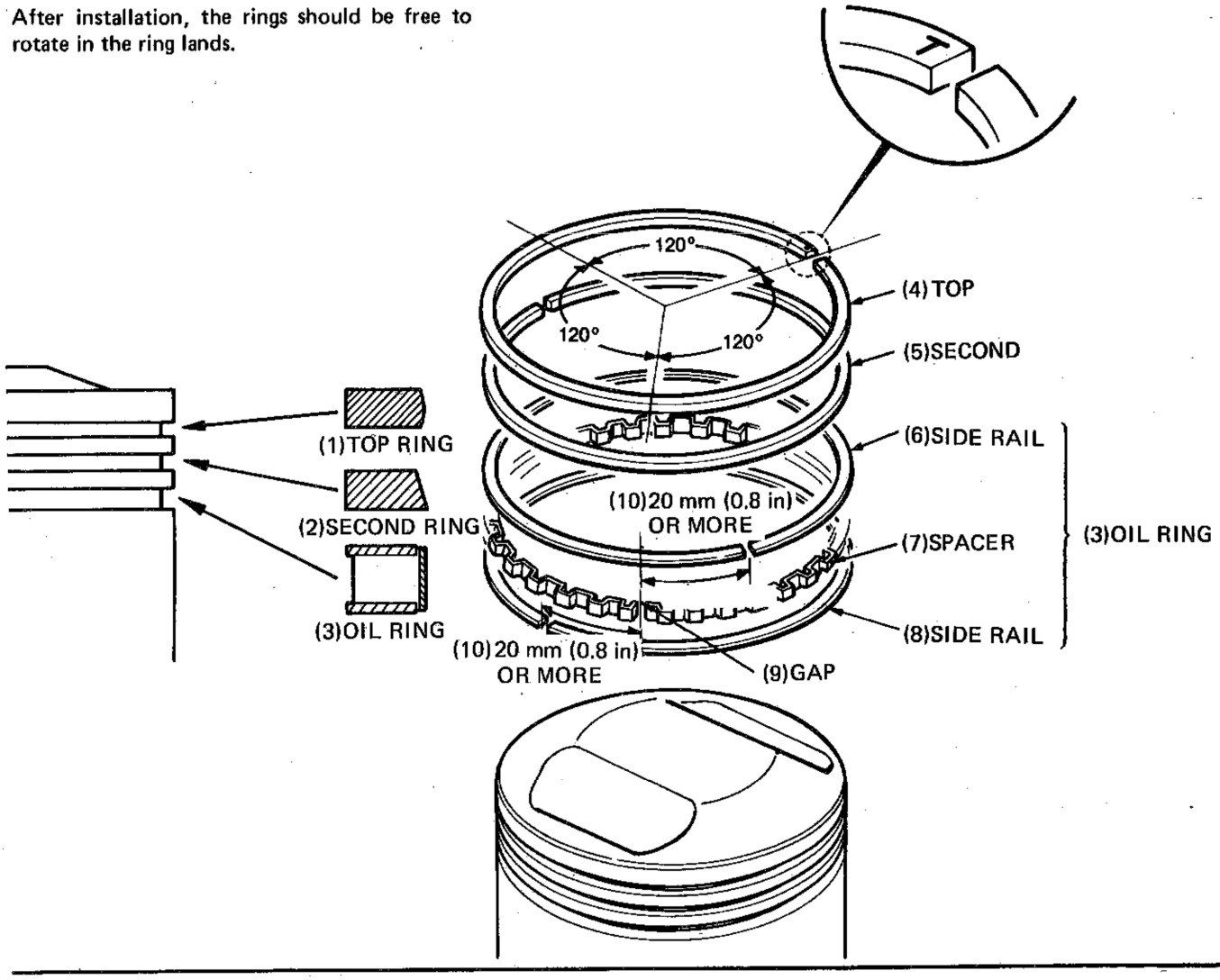
Avoid piston and piston ring damage during installation.

Space the piston ring end gaps 120 degrees apart. Do not align the gaps in the oil rings (side rails).

NOTE

Install the oil ring spacer first, then install the side rails.

After installation, the rings should be free to rotate in the ring lands.

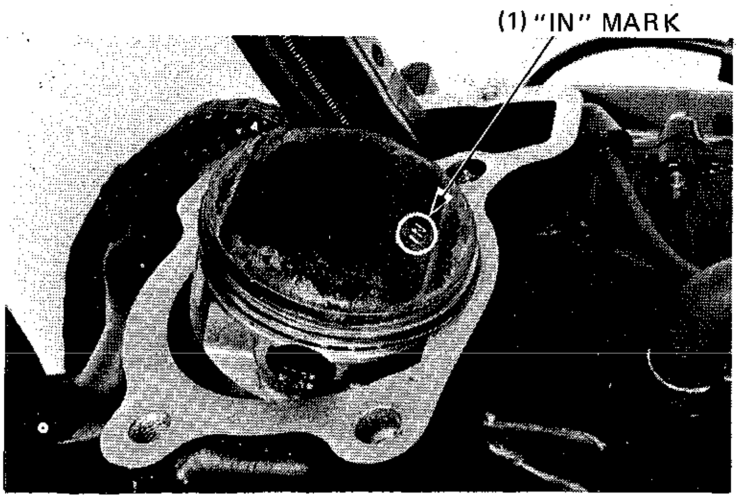


# PISTON INSTALLATION

Install the piston and piston pin.

NOTE

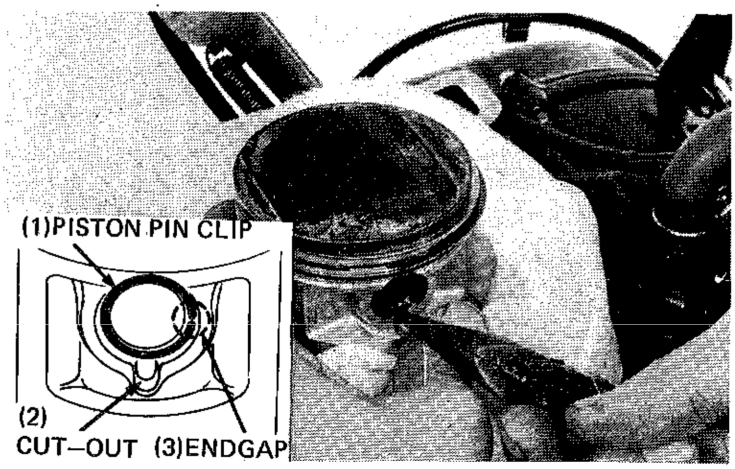
Position the piston "IN" mark on the intake valve side.




Install new piston pin clips.

NOTE

- Do not align the piston pin clip end gap with the piston cut-out.
- Do not let the clip fall into the crankcase.

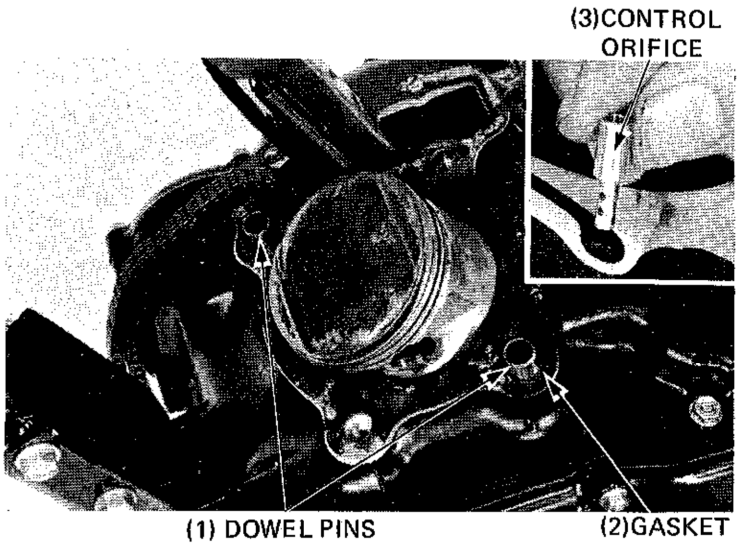



# CYLINDER INSTALLATION

Install the cylinder gasket, dowel pins and oil control orifice.

NOTE

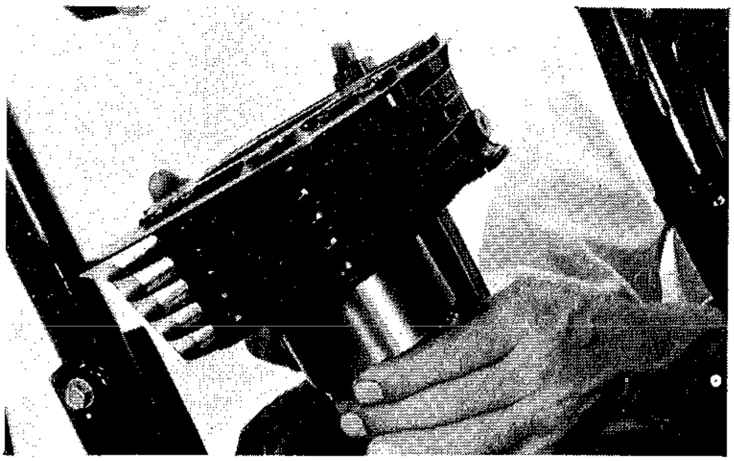
Check that the oil control orifice is not clogged.



Check that the O-ring are in place in the cylinder.
Coat the cylinder with engine oil.
Carefully lower the cylinder over the piston compressing the piston rings by hand.

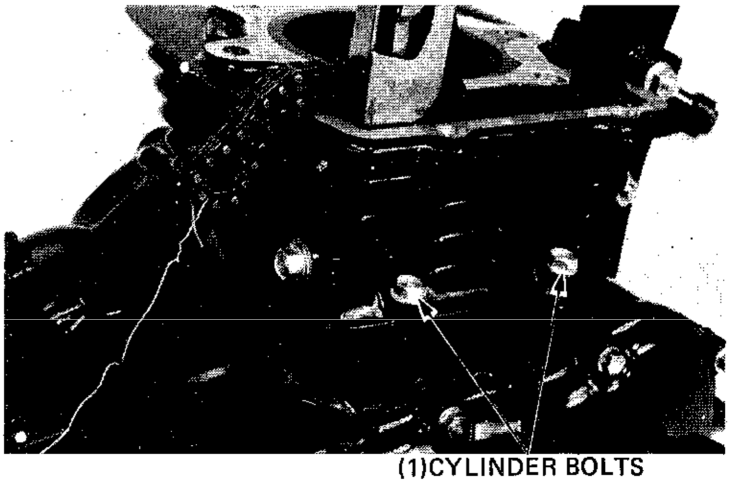
NOTE

Avoid piston ring damage during installation.



Install the cylinder bolts.

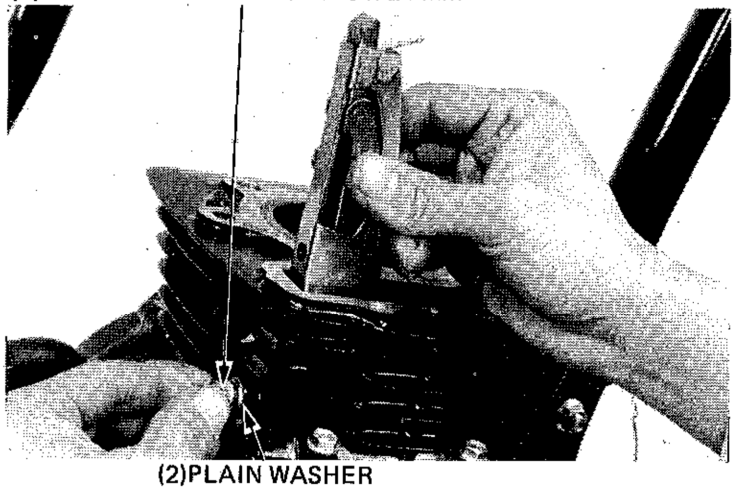
**TORQUE: 8–12 N·m**
**(0.8–1.2 kg-m, 6–9 ft-lb)**



(1)CYLINDER BOLTS

Install the sealing washer and 6 x 24 mm tensioner lock bolt.

(1)TENSIONER LOCK BOLT 6 x 24 mm

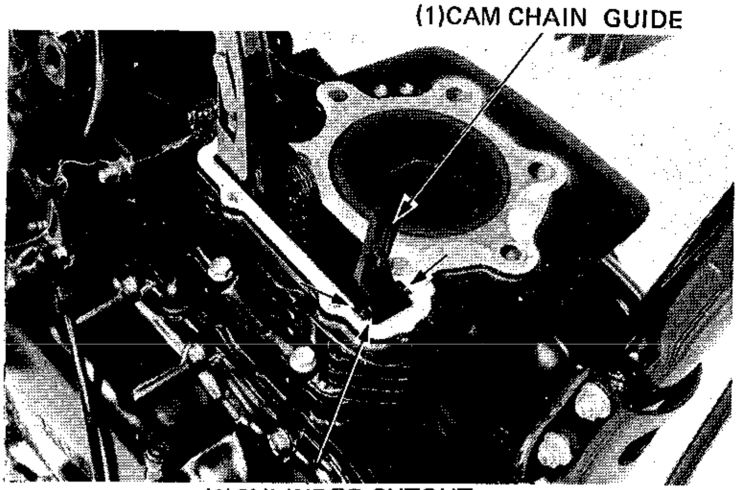


(2)PLAIN WASHER

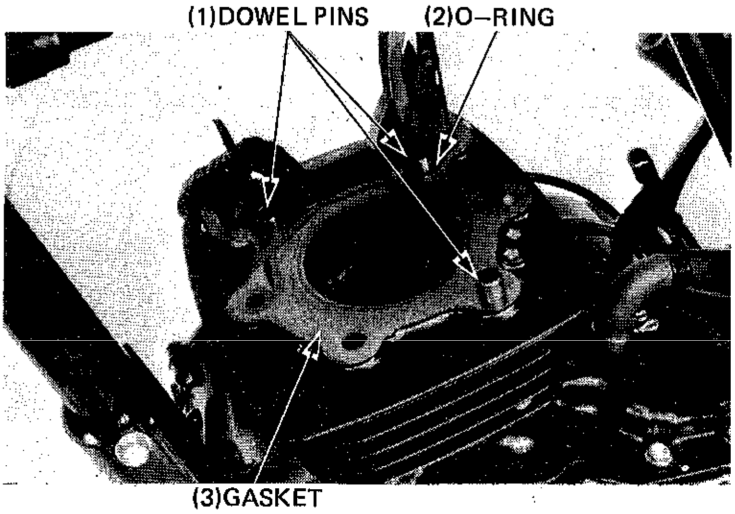
Install the cam chain guide.

NOTE

- Fit the cam chain guide tab in the cylinder cutout as shown.
- Push the guide in until it bottoms in the crankcase guide hole.



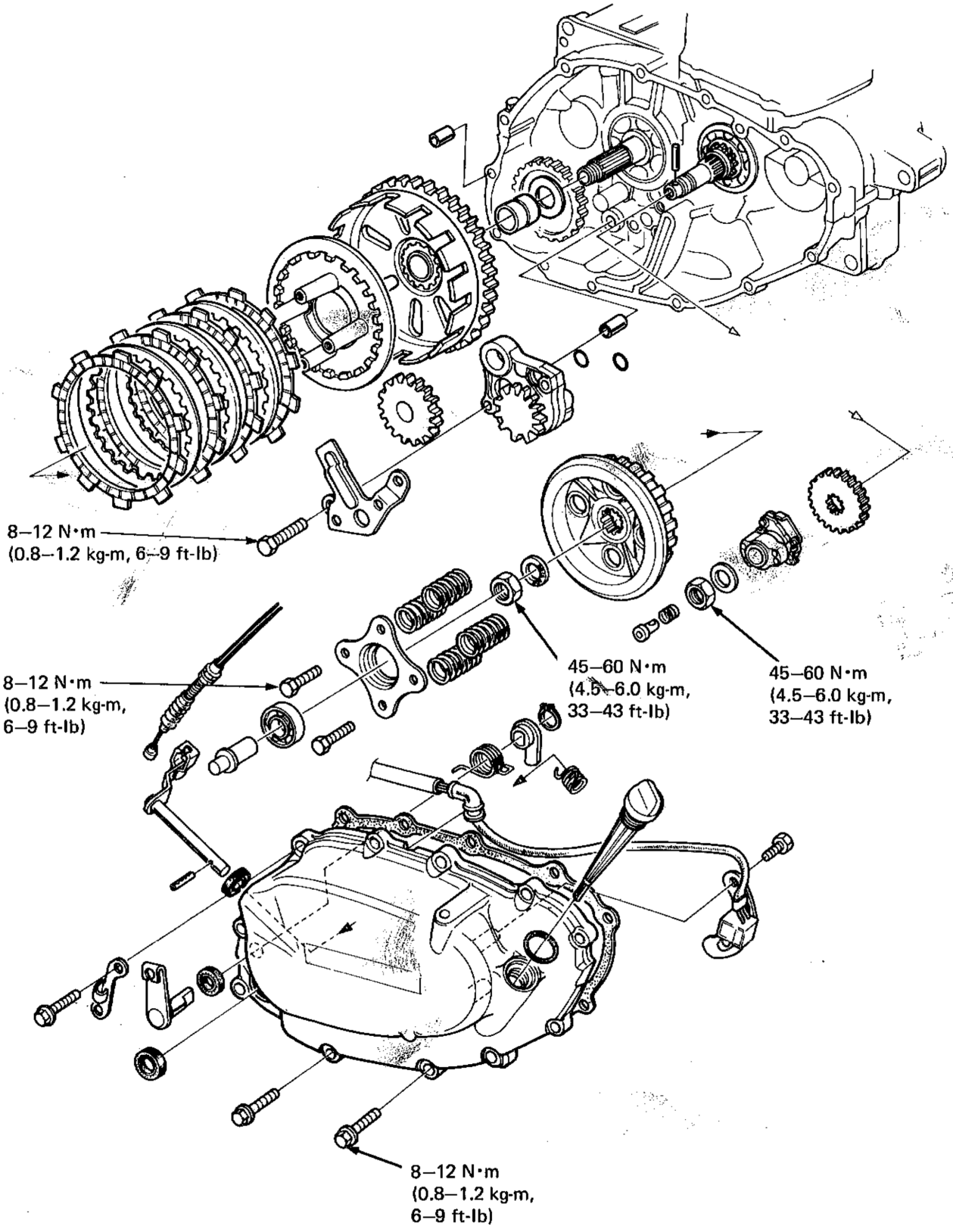

Install the O-ring and dowel pins in top of the cylinder.
Install a new cylinder head gasket.
Clean carbon deposits from the cylinder head.
Clean the head gasket surface of any gasket material.
Install the cylinder head (Page 6-19).



# MEMO

# 8. CLUTCH/OIL PUMP

HONDA
CB250RS



| | |
|---|---|
| SERVICE INFORMATION | 8–2 |
| TROUBLESHOOTING | 8–3 |
| RIGHT CRANKCASE COVER REMOVAL | 8–4 |
| CLUTCH | 8–6 |
| OIL PUMP | 8–10 |
| DRIVE GEAR REMOVAL | 8–14 |
| DRIVE GEAR INSTALLATION | 8–14 |
| RIGHT CRANKCASE COVER INSTALLATION | 8–16 |

# SERVICE INFORMATION

## • WORKING PRACTICE

This section covers removal and installation of the clutch and oil pump, starting with the right crankcase cover. All these operations can be accomplished with the engine installed. When the existing clutch discs are replaced, coat new discs with engine oil prior to assembly.

## • SPECIAL TOOL

Clutch center holder No. 07923–4280000

## • TORQUE VALUES

| | | |
|---|---|---|
| Clutch lock nut | : | 45–60 N·m (4.5–6.0 kg-m, 33–43 ft-lb) |
| Drive gear lock nut | : | 45–60 N·m (4.5–6.0 kg-m, 33–43 ft-lb) |
| Right crankcase | : | 8–12 N·m (0.8–1.2 kg-m, 6– 9 ft-lb) |
| Oil pump set plate | : | 8–12 N·m (0.8–1.2 kg-m, 6– 9 ft-lb) |
| Clutch lifter plate | : | 8–12 N·m (0.8–1.2 kg-m, 6– 9 ft-lb) |

## • SPECIFICATIONS

| ITEM | | STANDARD | SERVICE LIMIT |
|---|---|---|---|
| Clutch | Lever free play (at lever end) | 15–25 mm (0.6–1 in) | – |
| | Spring free length | 37.3 mm (1.46 in) | 35.8 mm (1.41 in) |
| | Spring preload/length | 226 ± 11 N/23.5 mm (23 ± 1.15 kg/23.5 mm, 50.7 ± 2.5 lb/0.93 in) | – |
| | Disc thickness | 2.62–2.78 mm (0.102–0.109 in) | 2.3 mm (0.091 in) |
| | Plate warpage | – | 0.3 mm (0.012 in) |
| | Clutch outer I.D. | 27.000–27.021 mm (1.0630–1.0638 in) | 27.05 mm (1.065 in) |
| | Outer guide O.D. | 26.959–26.980 mm (1.0614–1.0622 in) | 26.91 mm (1.059 in) |
| | I.D. | 22.000–22.035 mm (0.8661–0.8675 in) | 22.05 mm (0.868 in) |
| Oil pump | Inner rotor-to-outer rotor clearance | 0.15 mm (0.006 in) | 0.2 mm (0.008 in) |
| | Outer rotor-to-body clearance | 0.15–0.18 mm (0.006–0.007 in) | 0.25 mm (0.010 in) |
| | Rotor-to-body clearance | 0.01–0.07 mm (0.0004–0.0028 in) | 0.12 mm (0.0047 in) |
| Starter idler gear | I.D. | 15.016–15.034 mm (0.5912–0.5919 in) | 15.10 mm (0.595 in) |

# TROUBLESHOOTING

Faulty clutch operation can usually be corrected by adjusting the clutch lever free play.

## Clutch

**Clutch Slips When Accelerating**
1. No free play
2. Discs worn
3. Spring weak

**Clutch Will Not Disengage**
1. Too much free play
2. Plates warped

**Motorcycle Creeps With Clutch Disengaged**
1. Too much free play
2. Plates warped

**Excessive Lever Pressure**
1. Clutch cable kinked, damaged or dirty
2. Lifter mechanism damaged

**Clutch Operation Feels Rough**
1. Outer drum slots rough

**Low Oil Pressure**
1. Faulty oil pump
2. Oil pump drive gear broken

## Oil pump

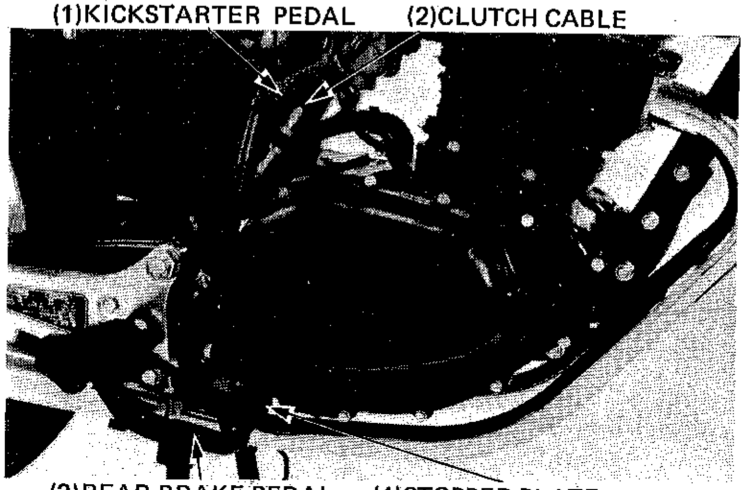
**Low Oil Pressure**
1. Plugged oil pick-up screen
2. Oil pump worn
3. External oil leaks
4. Oil level low

**High Oil Pressure**
1. Plugged oil filter, gallery, or mating orifice
2. Incorrect oil being used

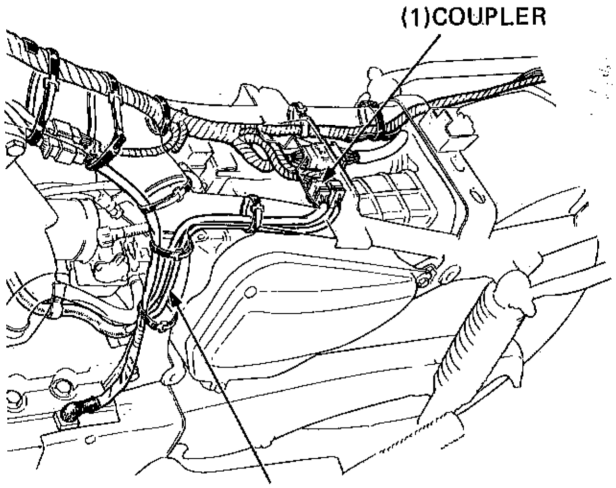
**No Oil Pressure**
1. Oil level low
2. Oil pump drive chain broken
3. Oil pump faulty
4. Internal oil leakage

# RIGHT CRANKCASE COVER REMOVAL

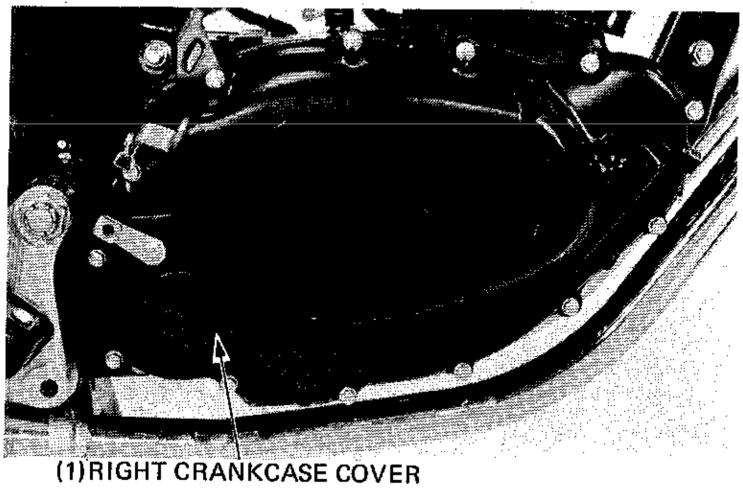
Remove the seat and fuel tank.
Drain oil from the engine.
Remove the kickstarter pedal.
Remove the rear brake pedal.
Remove the brake stopper plate.
Disconnect the clutch cable.
Disconnect the decompression cable.




Disconnect the pulser generator wire at the coupler.




Remove the bolts holding the right crankcase cover, and remove the cover.

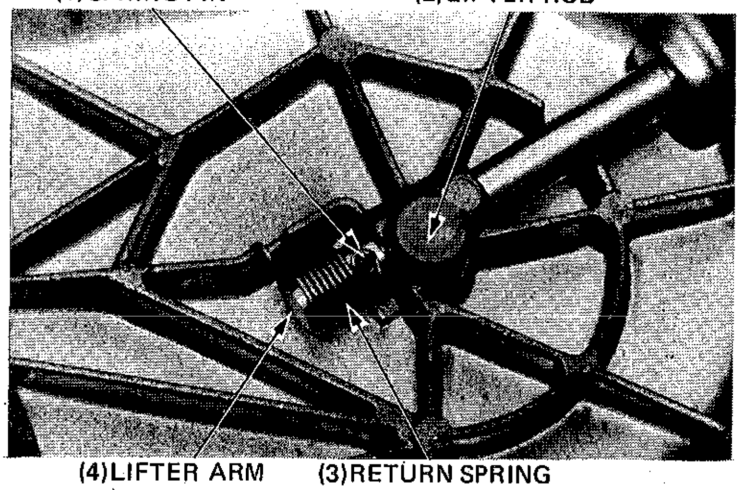


## • CLUTCH LIFTER ARM DISASSEMBLY

Remove the lifter rod.
Remove the spring pin.
Remove the lifter arm and return spring.

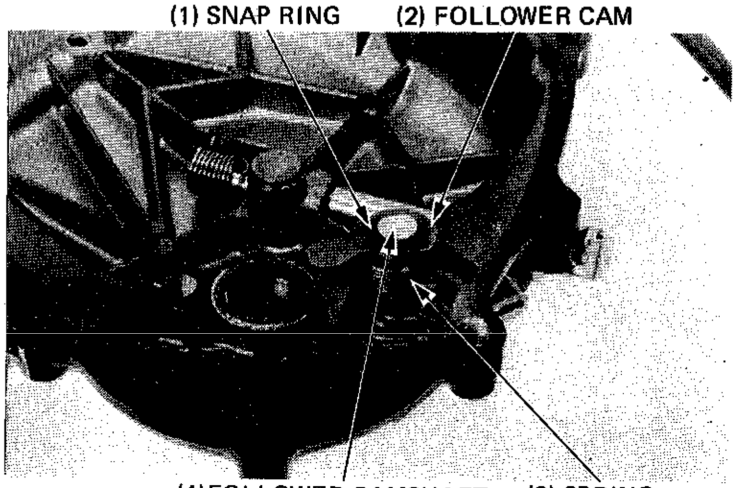
NOTE

Install the return spring as shown.




## • CAM FOLLOWER SHAFT DISASSEMBLY

Remove the snap ring, cam, return spring and camshaft.



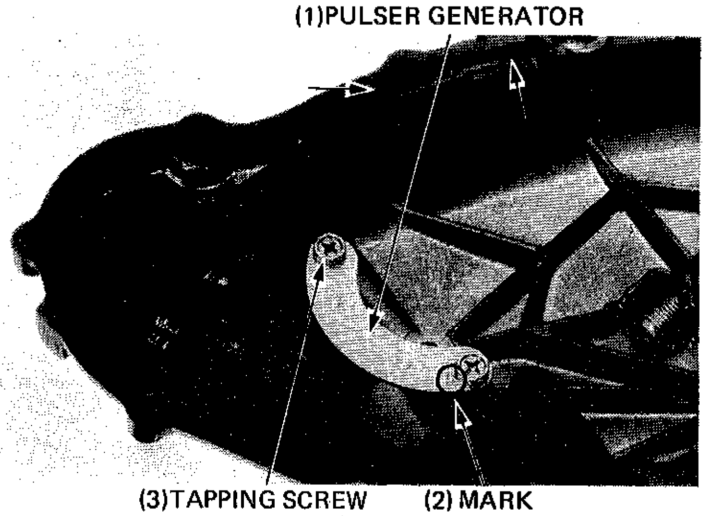

## • PULSER GENERATOR REPLACEMENT

*CAUTION*

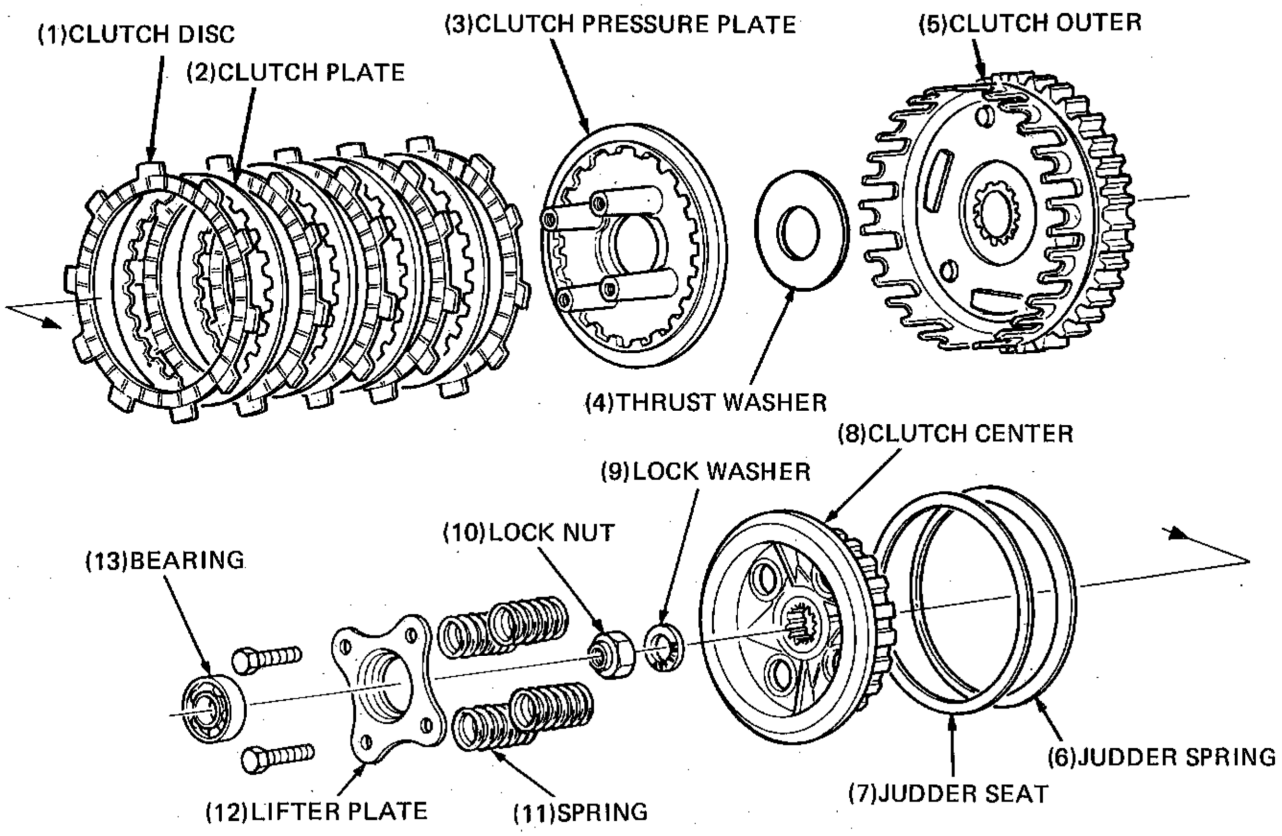
*Note the mark of a new pulser generator, if the existing generator is to be replaced. This mark should agree with that of the advancer rotor. Failure to do so will result in poor engine performance.*

Route the pulser generator wire in the crankcase cover cutout as shown.

When installing a new pulser generator, match the generator mark with the advancer rotor mark to prevent poor engine performance.



# CLUTCH

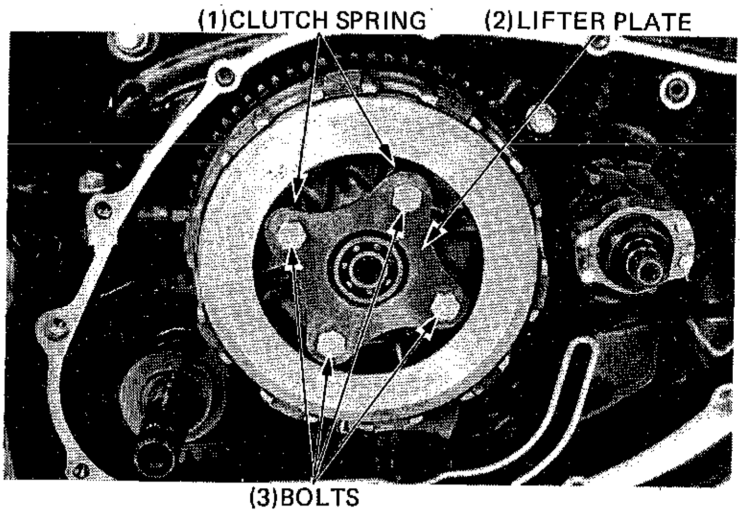



## • CLUTCH REMOVAL

Remove the four bolts.
Remove the clutch lifter plate and clutch springs.

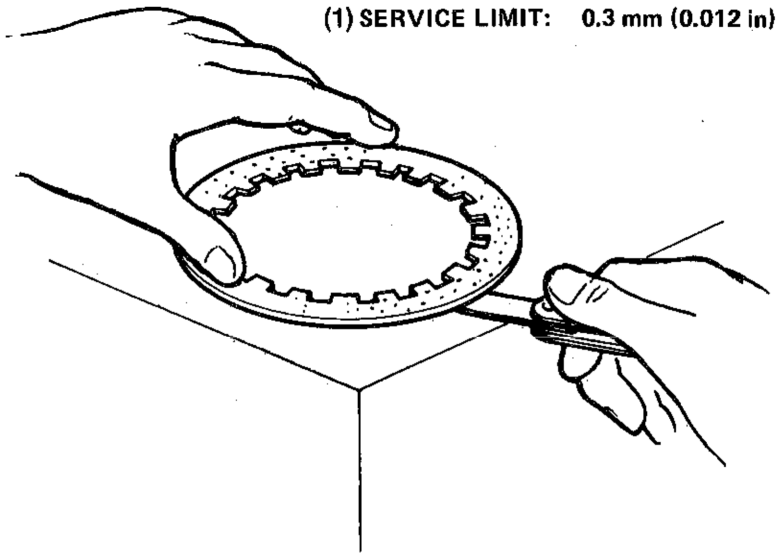
NOTE

Loosen the bolts in a cross pattern in 2-3 steps.



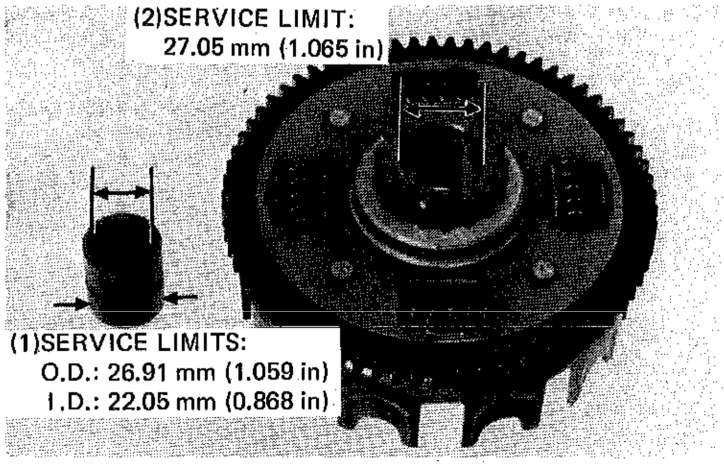
## • PLATE INSPECTION

Check for plate warpage on a surface plate, using a feeler gauge.




## • CLUTCH OUTER AND OUTER GUIDE INSPECTION

Check the slots in the outer drum for nicks, cuts or indentation made by the friction discs. Measure the I.D. of the clutch outer and the O.D. and I.D. of the outer guide.

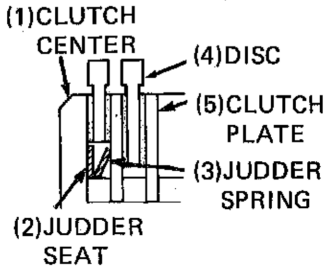


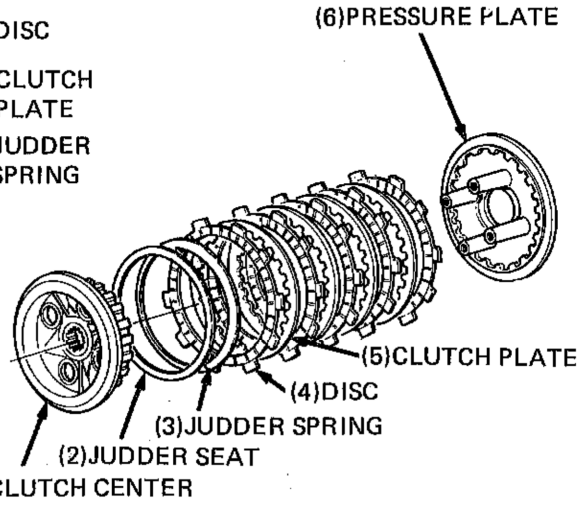

## • CLUTCH INSTALLATION

Install the clutch judder spring and seat, discs, clutch plates and pressure plate on the clutch center drum.

NOTE

- Stack the discs and plates alternately as shown.
- Coat new clutch discs with engine oil.
- Note the position of the judder spring.

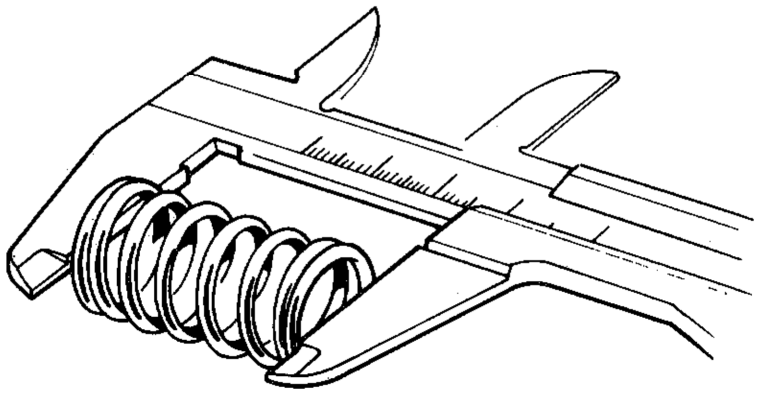


## • CLUTCH SPRING INSPECTION

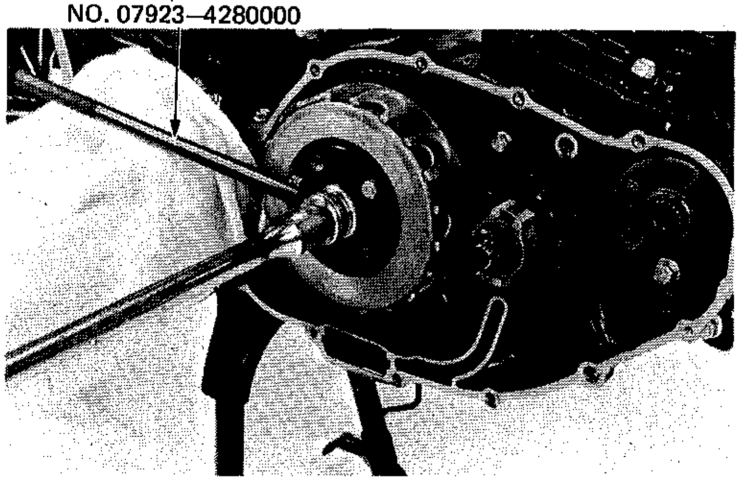
Measure the spring free length.

(1)SERVICE LIMIT: 35.8 mm (1.41 in)



Remove the clutch nut and lock washer.
Remove the clutch center, clutch discs, clutch plate, clutch pressure plate, clutch cover, clutch guide, and thrust washer.

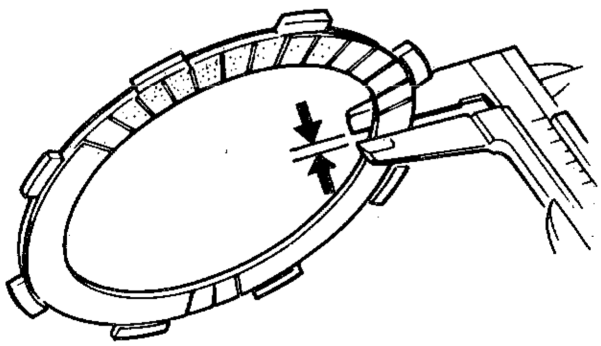
(1)CLUTCH CENTER HOLDER
NO. 07923–4280000



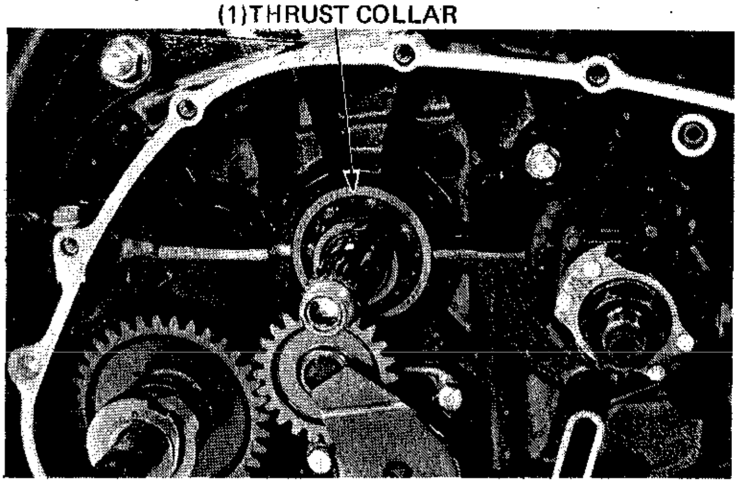
## • CLUTCH DISC INSPECTION

Replace the clutch discs if they show signs of scoring or discoloration.
Measure the disc thickness.

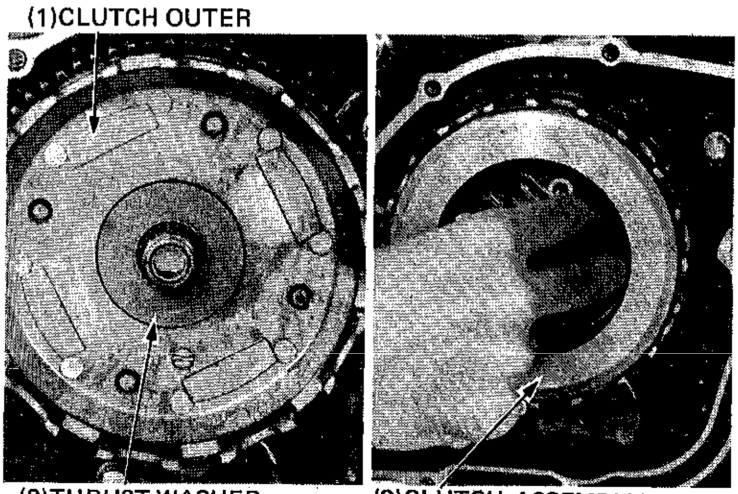
(1)SERVICE LIMIT: 2.3 mm (0.091 in)



Install the thrust collar.



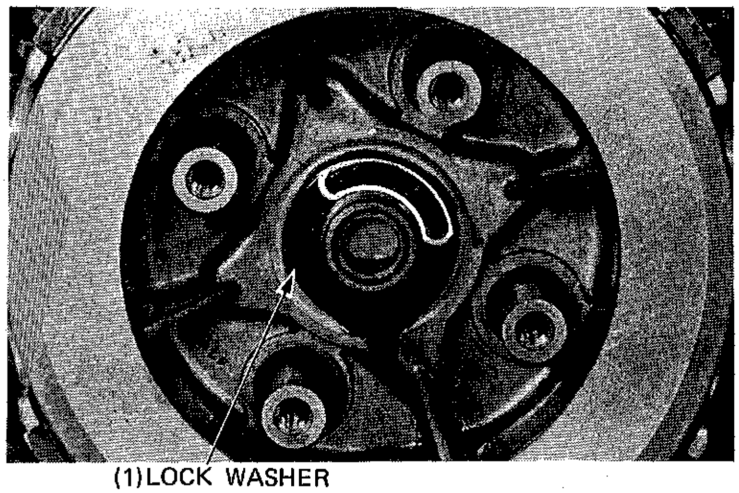

Install the clutch outer guide and clutch outer.
Install the thrust washer.
Install the clutch assembly.




Install the lock washer.

NOTE

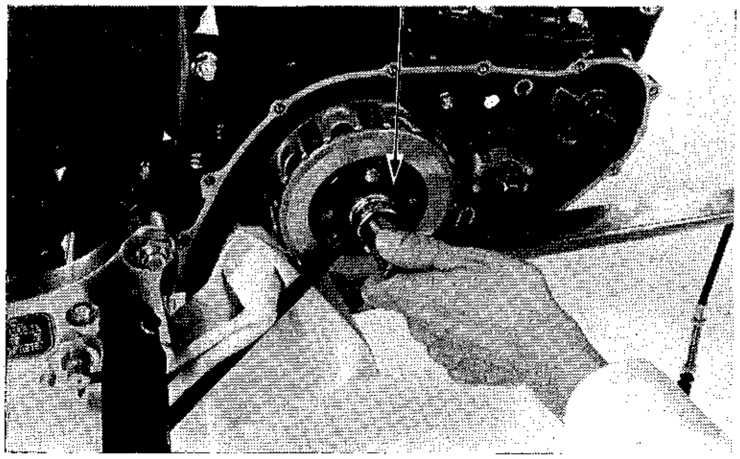
Note the lock washer direction.



Tighten the lock nut to the specified torque.

**TORQUE: 45–60 N·m (4.5–6.0 kg-m, 33–43 ft-lb)**

(1)CLUTCH CENTER HOLDER
NO. 07923–4280000



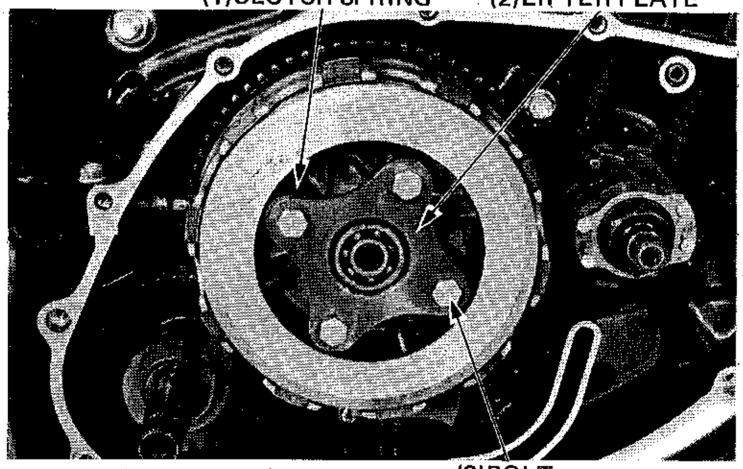
Install the clutch springs, lifter plate and lifter plate bolts.

NOTE

Tighten the bolts in a cross pattern in 2-3 steps.

Install the bearing.

(1)CLUTCH SPRING (2)LIFTER PLATE



(3)BOLT

# OIL PUMP

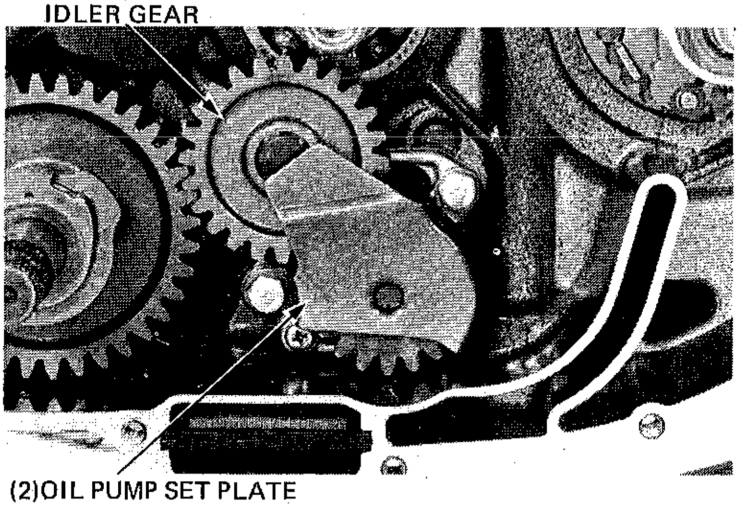
## • OIL PUMP REMOVAL

Remove the clutch (Page 8-6).
Remove the oil pump set plate.
Remove the starter idle gear.

NOTE

Do not remove the fork guide shaft from the engine case.

(1)STARTER IDLER GEAR

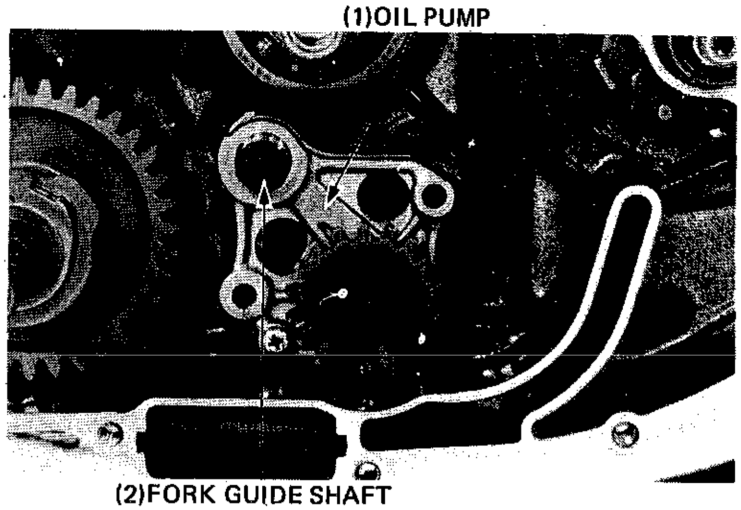


(2)OIL PUMP SET PLATE

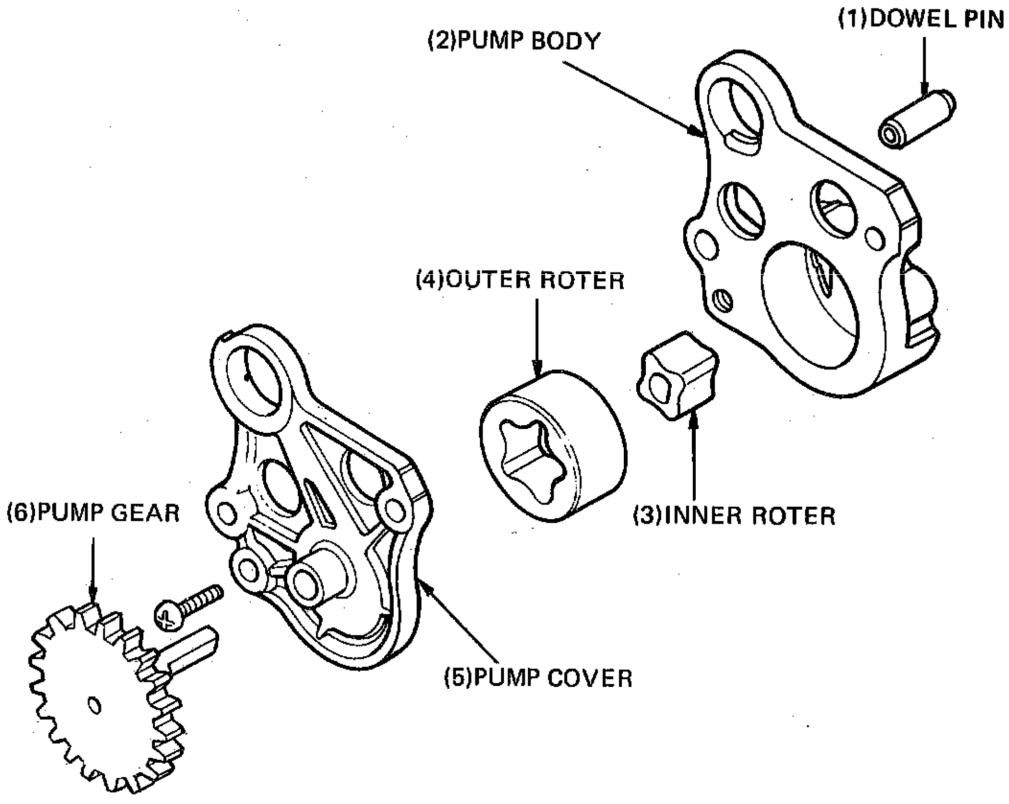
Remove the oil pump.

NOTE

Do not remove the fork guide shaft from the engine case.



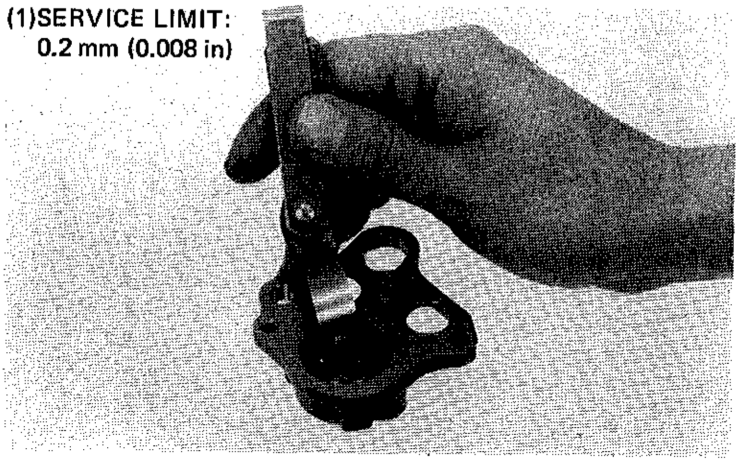

- OIL PUMP DISASSEMBLY



## • OIL PUMP INSPECTION

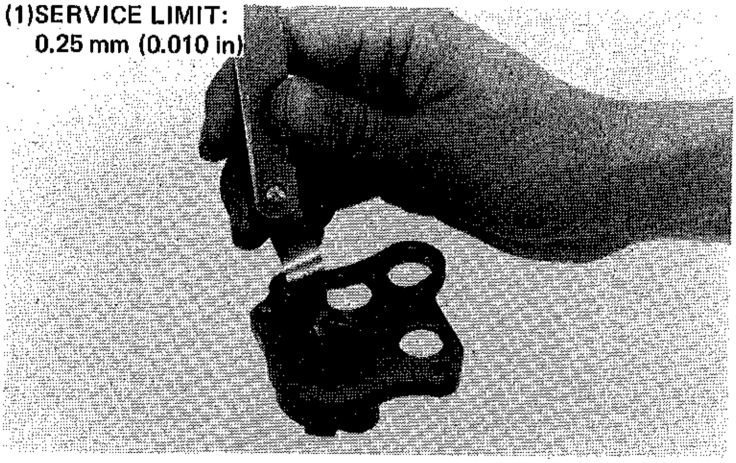
Measure the pump tip clearance.

(1)SERVICE LIMIT:
0.2 mm (0.008 in)



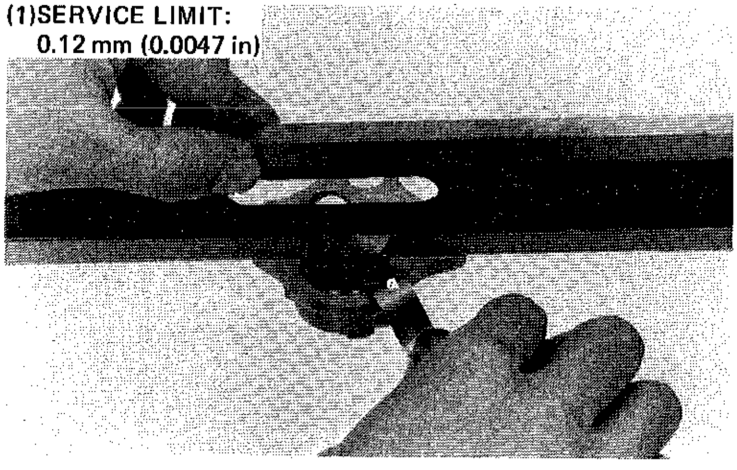
Measure the pump body clearance.

(1)SERVICE LIMIT:
0.25 mm (0.010 in)



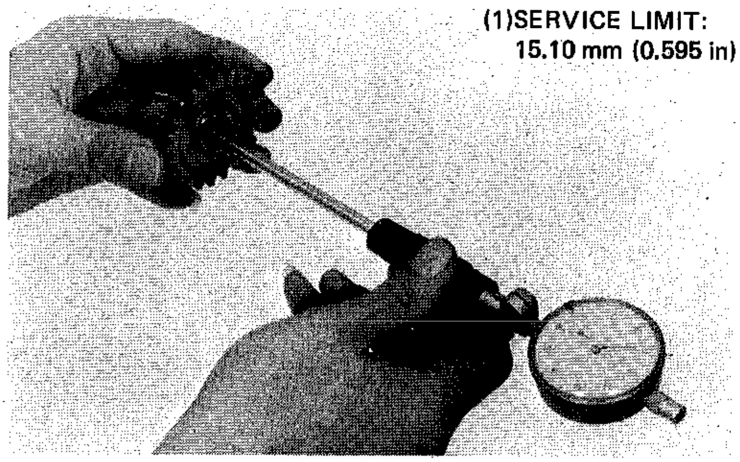
Measure the pump end clearance.

(1)SERVICE LIMIT:
0.12 mm (0.0047 in)



## • STARTER IDLER GEAR INSPECTION

Check the idler gear condition and measure the I.D.



(1)SERVICE LIMIT:
15.10 mm (0.595 in)

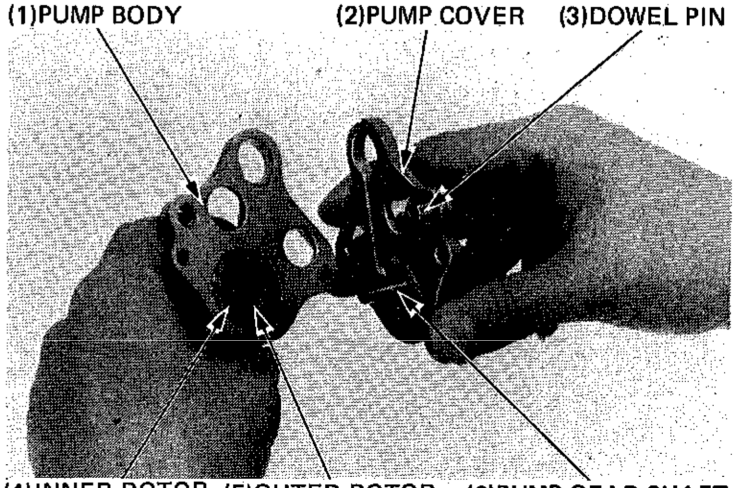
## • OIL PUMP ASSEMBLY

Install the inner and outer rotors in the pump body.
Slide the pump drive gear shaft through the pump cover and install the cover on the pump body.

NOTE

Align the flat in the shaft with the flat in the inner rotor.

Tighten the cover screws.



(1)PUMP BODY (2)PUMP COVER (3)DOWEL PIN
(4)INNER ROTOR (5)OUTER ROTOR (6)PUMP GEAR SHAFT

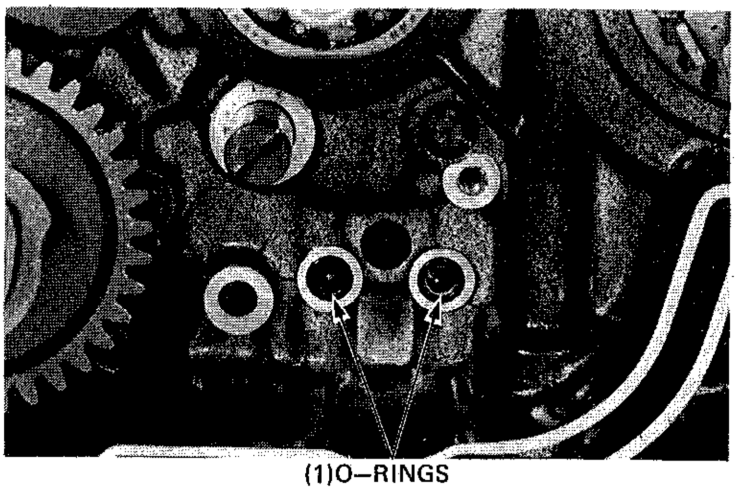
## • OIL PUMP INSTALLATION

The installation sequence is essentially the reverse of removal.

NOTE

- Make sure that the O-rings and dowel pin is in place.
- Retighten the oil pump screw after the oil pump is installed.

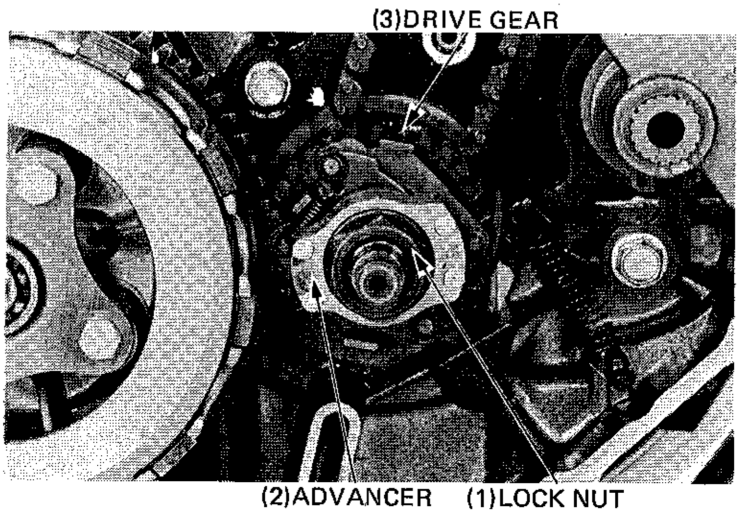
Check that the oil pump operates freely.



(1)O-RINGS

# DRIVE GEAR REMOVAL

Remove the right crankcase cover.
Remove the 14 mm lock nut.
Remove the washer, advancer rotor and drive gear.

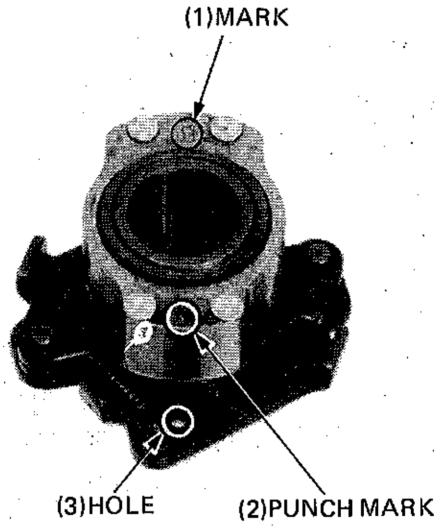



- ADVANCER ROTOR INSPECTION

Check the rotor for condition and freedom of operation.

NOTE

- Note the marking of the advancer rotor. This mark must agree with that of the pulse generator to prevent poor engine performance.
- Make sure that no foreign particles are left on the magnet.
- To assemble the rotor, align the rotor punch mark with the advancer hole.

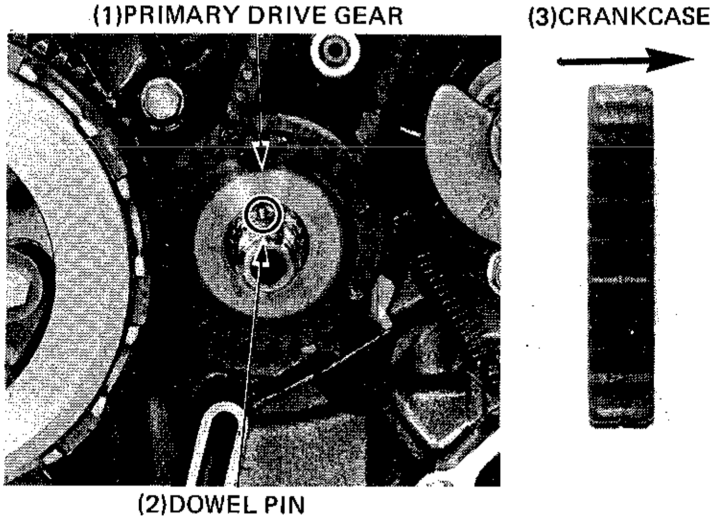



# DRIVE GEAR INSTALLATION

Install the drive gear.

NOTE

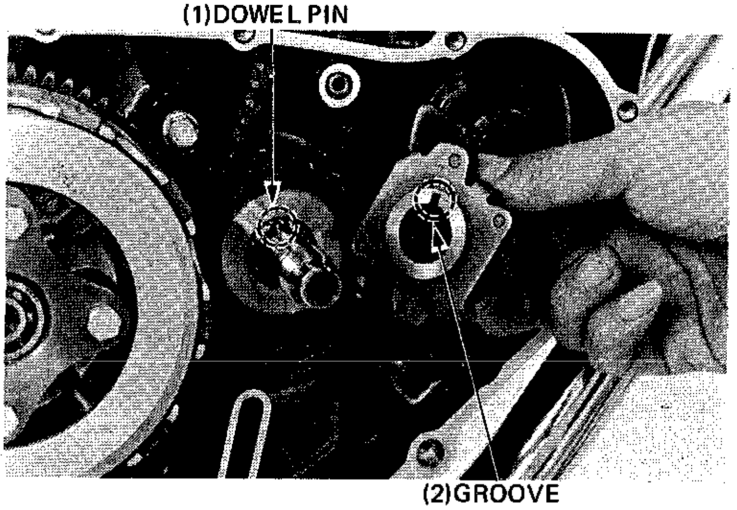
- Install the gear with the heavily chamfered teeth facing the crankcase.
- Align the dowel pin with the dowel pin hole between the splines.



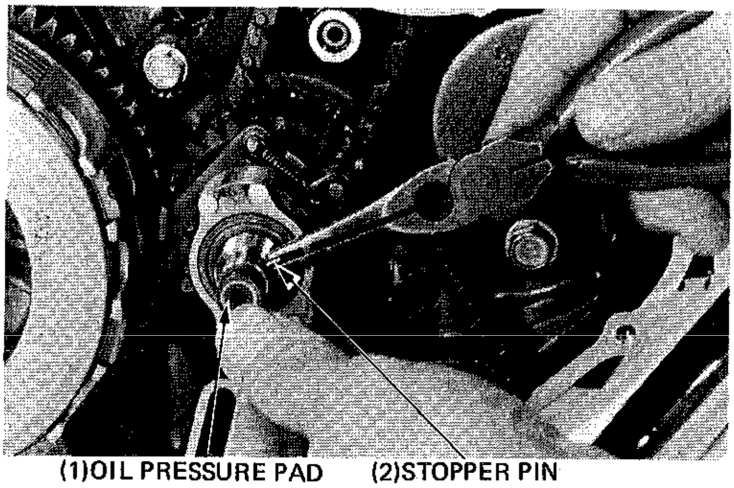
Install the advancer rotor, aligning the dowel pin and rotor cut-out.

*CAUTION*

*Make sure that the pulser generator and rotor have the same marking.*




Install the oil pressure pad, spring and stopper pin.



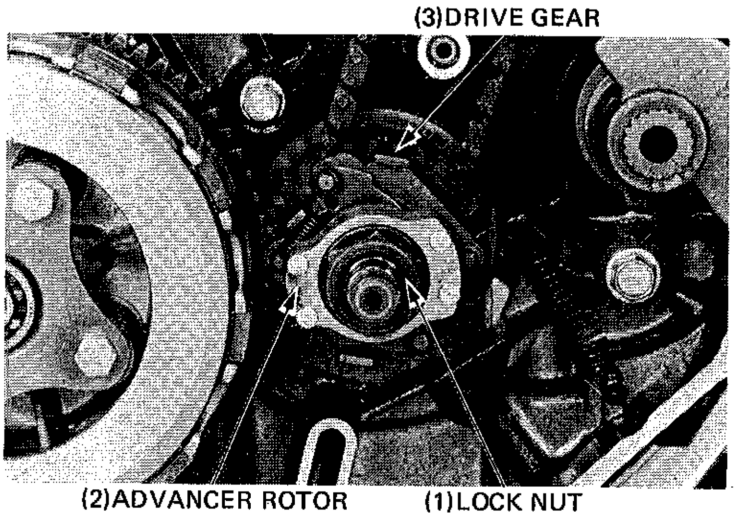

Install the washer and tighten the lock nut to the specified torque.

**TORQUE: 45–60 N·m (4.5–6.0 kg-m, 33–43 ft-lb)**

NOTE

Check the oil pressure pad for smooth movement.

Check advancer operation.

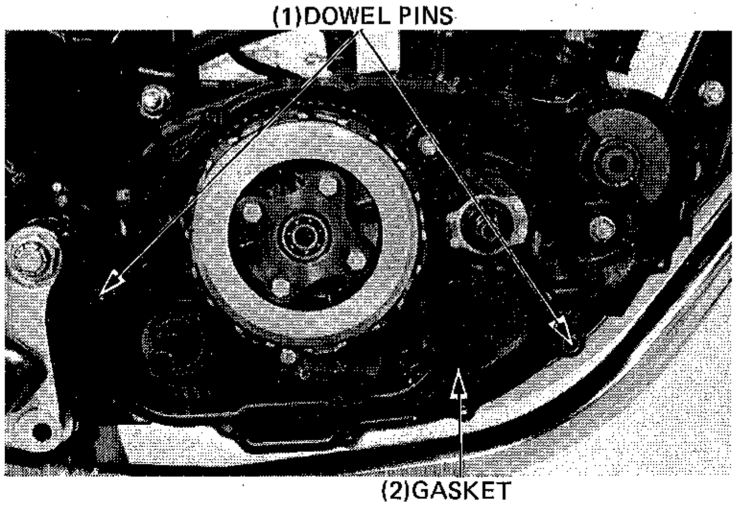


# RIGHT CRANKCASE COVER INSTALLATION

Clean the oil filter screen and install.
Install the dowel pins and gasket.

NOTE

Apply liquid sealer to the crankcase cover mating surface to hold the gasket.

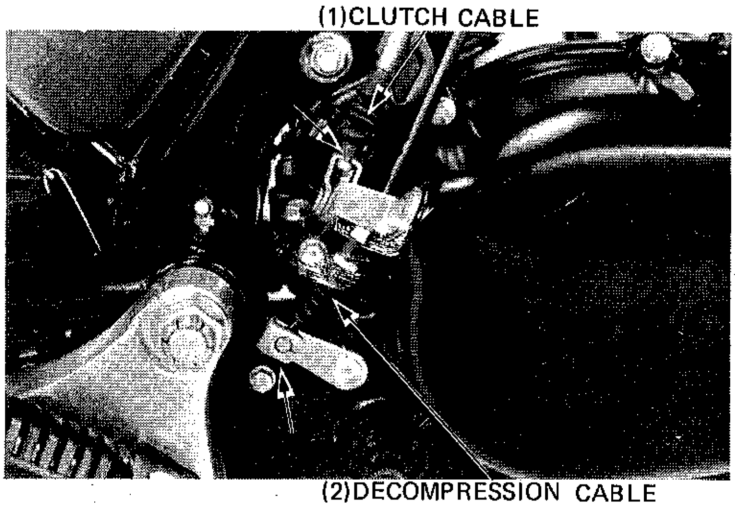



Install the right crankcase cover by rotating the cam follower and clutch lifter levers clockwise.

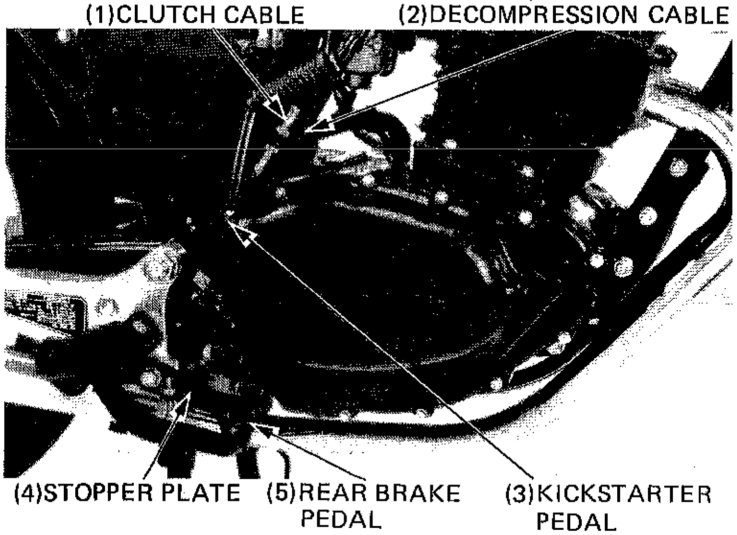
NOTE

Check operation of the decompression and clutch levers after installing the right crankcase cover.

Connect the clutch and decompression cables.



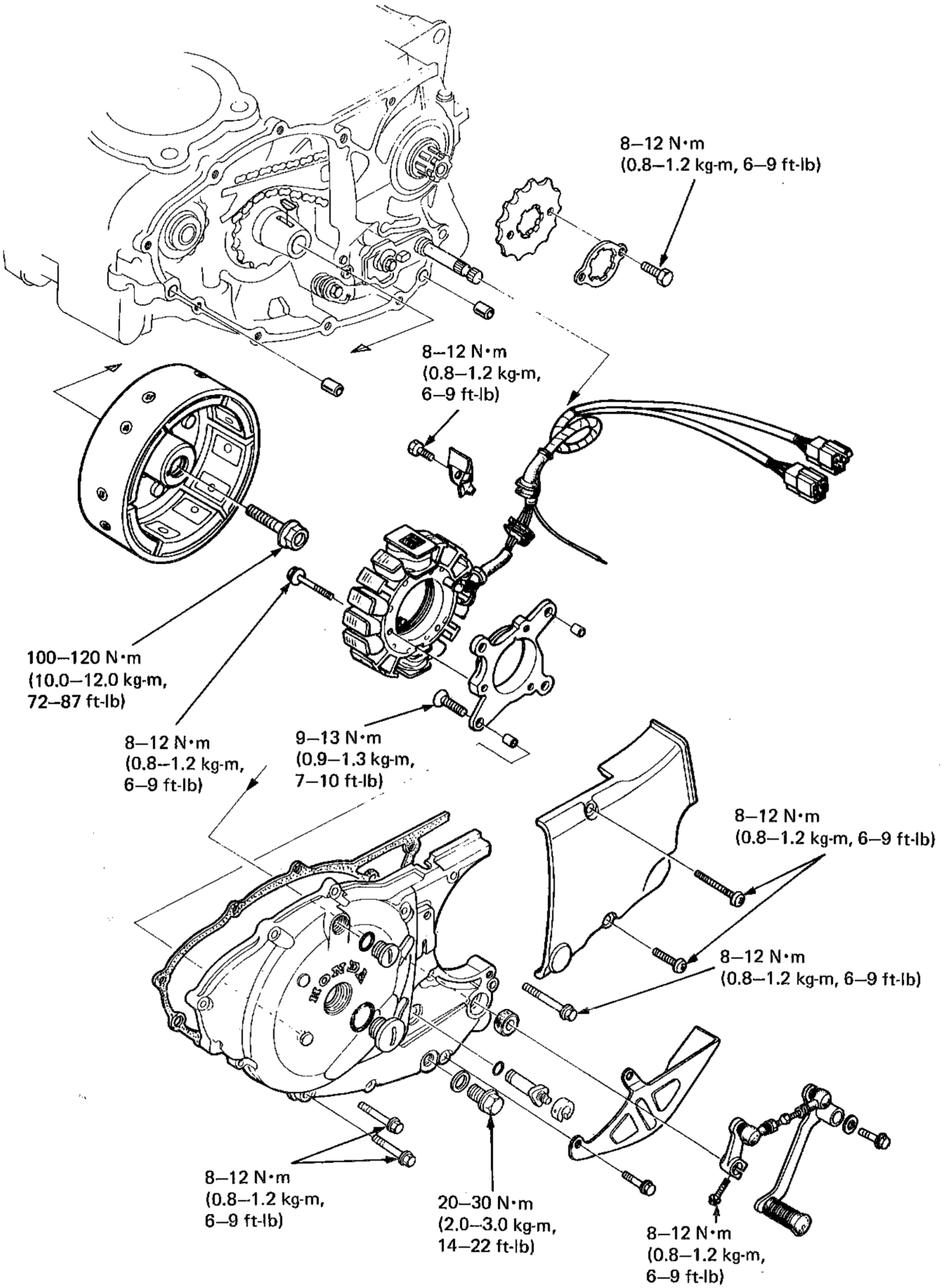

Install the kick starter pedal, stopper plate and rear brake pedal.
Connect the pulser generator wire.
Fill the crank case with recommended oil up to the proper level.
Adjust the clutch (Page 3-16) and starter decompressor (Page 3-6).



# MEMO

# 9. A.C. GENERATOR

HONDA
CB250RS



| | |
|---|---|
| SERVICE INFORMATION | 9–2 |
| LEFT CRANKCASE COVER REMOVAL | 9–3 |
| A.C. GENERATOR ROTOR REMOVAL | 9–4 |
| A.C. GENERATOR ROTOR INSTALLATION | 9–4 |
| LEFT CRANKCASE COVER ASSEMBLY | 9–4 |
| GEARSHIFT ARM INSTALLATION | 9–6 |

# SERVICE INFORMATION

## • WORKING PRACTICE

This section pertains to removal and installation of the A.C. generator. These operations can be accomplished with engine in the frame after removing the left crankcase cover. For A.C. generator inspection, refer to section 16.

## • TOOLS

Common Tools

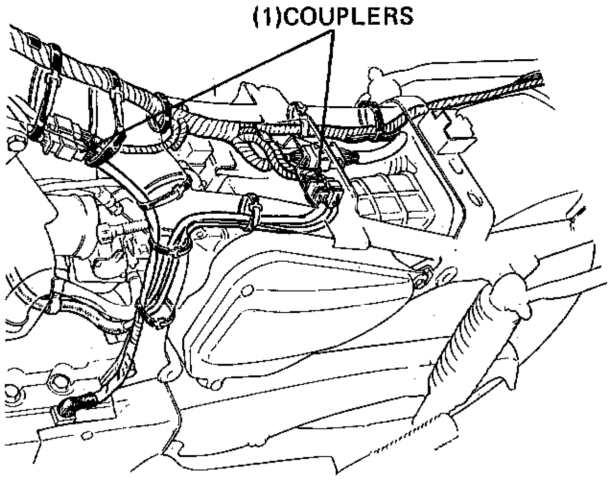
| | |
|---|---|
| Universal holder | No. 07725–0010101 |
| Rotor puller | No. 07733–0020001 |

## • TORQUE VALUES

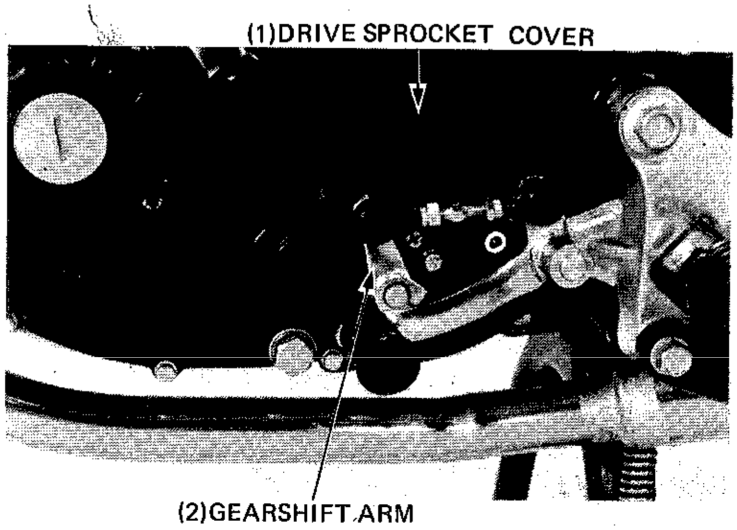
| | |
|---|---|
| A.C. Generator rotor: | 100–120 N·m (10.0–12.0 kg-m, 72–82 ft-lb) |
| Left crankcase cover: | 8–12 N·m (0.8–1.2 kg-m, 6–9 ft-lb) |
| Gearshift pedal: | 8–12 N·m (0.8–1.2 kg-m, 6–9 ft-lb) |
| Oil drain bolt: | 20–30 N·m (2.0–3.0 kg-m, 14–22 ft-lb) |
| A.C. Generator stator: | 8–12 N·m (0.8–1.2 kg-m, 6–9 ft-lb) |
| Stator spacer: | 9–13 N·m (0.9–1.3 kg-m, 7–10 ft-lb) |
| Drive sprocket cover: | 8–12 N·m (0.8–1.2 kg-m, 6–9 ft-lb) |
| Drive sprocket: | 8–12 N·m (0.8–1.2 kg-m, 6–9 ft-lb) |
| A.C. Generator cord clamp: | 8–12 N·m (0.8–1.2 kg-m, 6–9 ft-lb) |

# LEFT CRANKCASE COVER REMOVAL

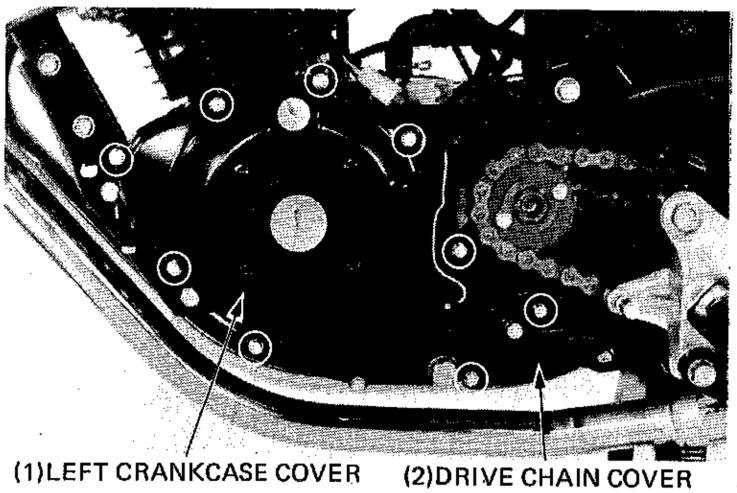
Remove the seat and fuel tank.
Remove the wire bands.
Disconnect the A.C. generator wire couplers.
Drain oil from the engine.




Remove the gearshift arm, gearshift pedal and drive sprocket cover.




Remove the left crankcase cover and drive chain cover.

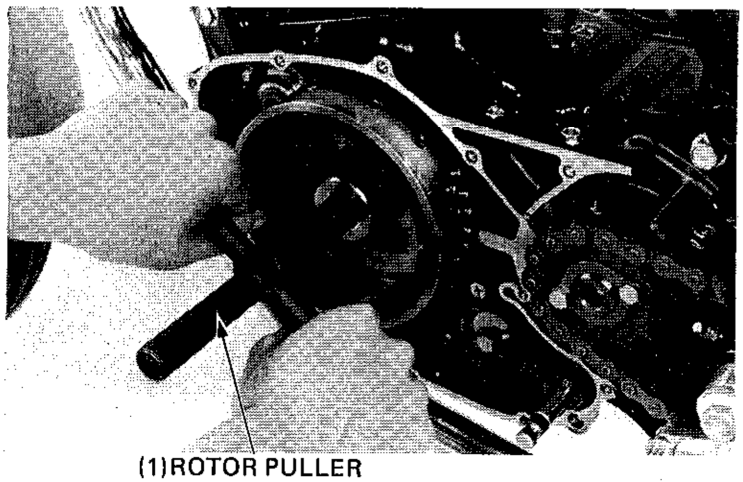


# A.C. GENERATOR ROTOR REMOVAL

Remove the rotor bolt.
Remove the rotor.

NOTE

Use the ROTOR PULLER to remove the A.C. generator rotor.



(1)ROTOR PULLER

# A.C. GENERATOR ROTOR INSTALLATION

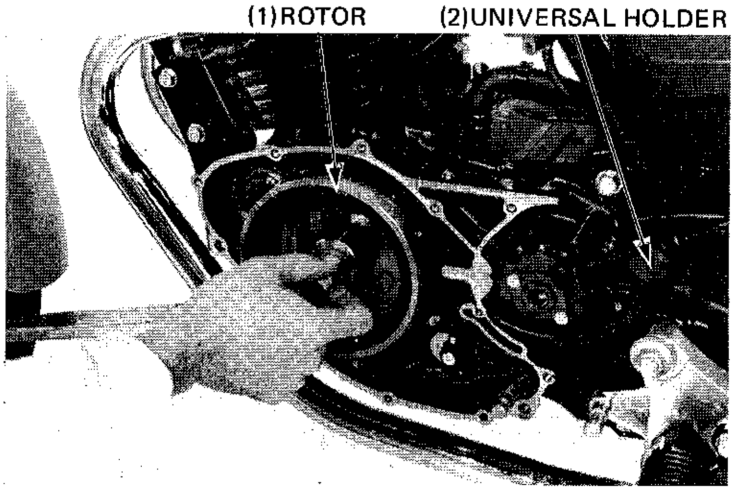
Install the rotor.

NOTE

Align the crankshaft woodruff key with the rotor keyway.

Remove the cotter pin and loosen the rear axle nut.
Remove the drive chain from the drive sprocket.
Shift the transmission into gear.
Hold the drive sprocket with universal holder.
Tighten the rotor bolt.

**TORQUE: 100–120 N·m (10.0–12.0 kg-m, 72–87 ft-lb)**



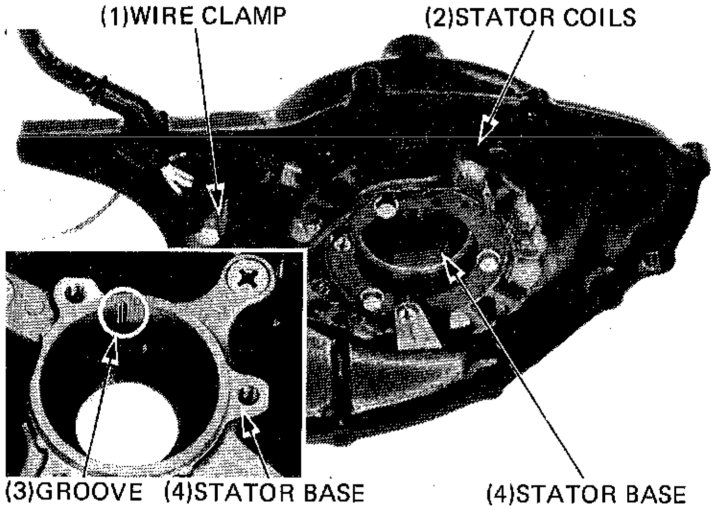
(1)ROTOR (2)UNIVERSAL HOLDER

# LEFT CRANKCASE COVER ASSEMBLY

Install the stator coil base with the groove facing up.

Install the stator coils as shown.

Tighten the wire clamp securely.



(1)WIRE CLAMP (2)STATOR COILS

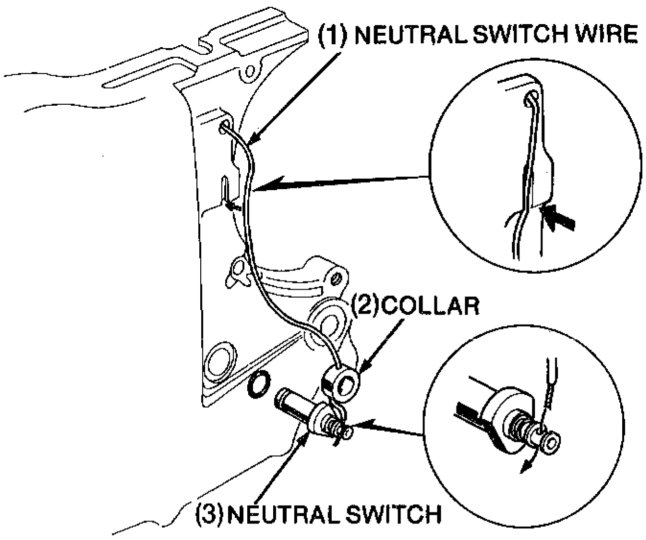
(3)GROOVE (4)STATOR BASE (4)STATOR BASE

## • NEUTRAL SWITCH INSTALLATION

Route the switch wire as shown.
Insert the wire end through the switch terminal while pressing down on the terminal.

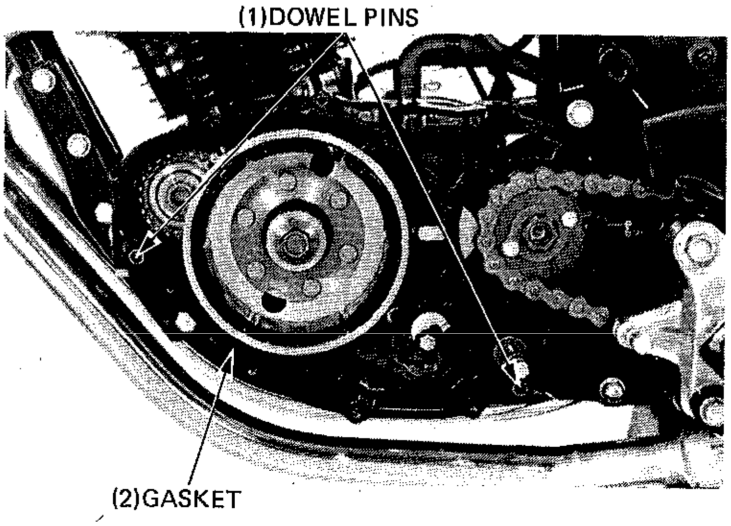
NOTE

Do not forget to install the collar.



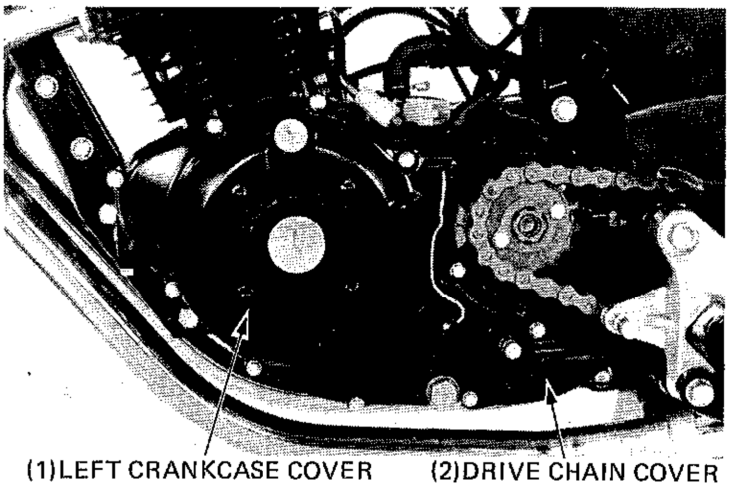

## • LEFT CRANKCASE COVER INSTALLATION

Install the dowel pins and gasket.

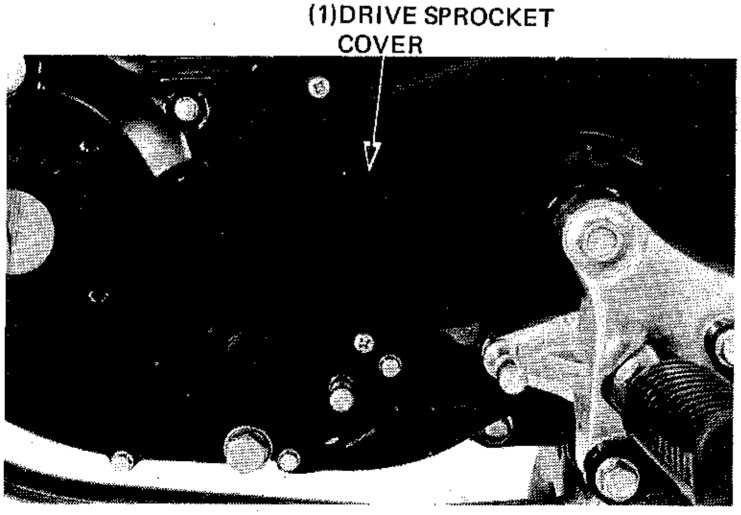



Install the left crankcase cover and the drive chain cover.
Tighten the bolts.

**TORQUE: 8–12 N·m (0.8–1.2 kg-m, 6–9 ft-lb)**



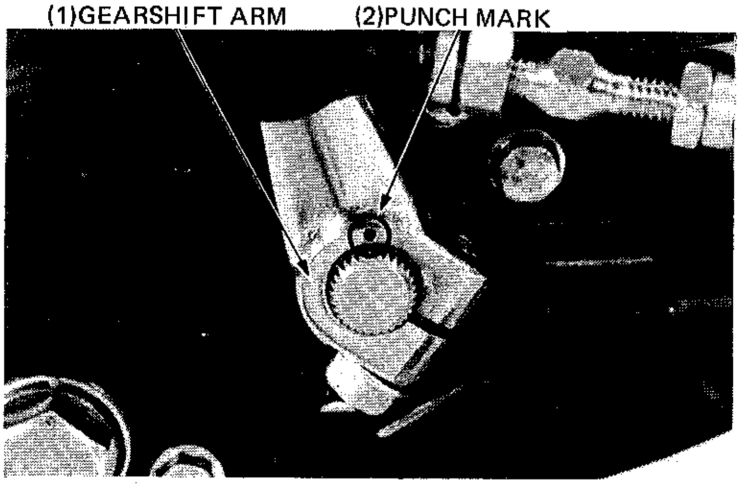
Install the drive sprocket cover with the gasket under the cover.



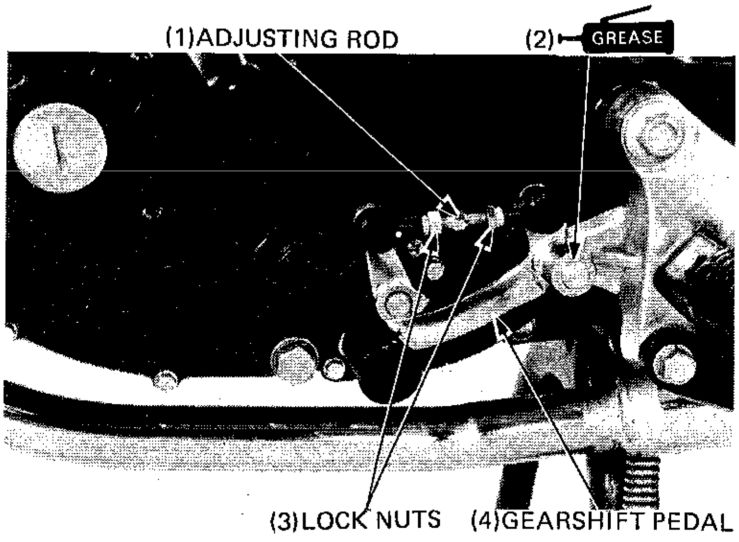

## GEARSHIFT ARM INSTALLATION

Install the gearshift arm with the punch mark facing up.

**TORQUE: 8–12 N·m (0.8–1.2 kg-m, 6–9 ft-lb)**



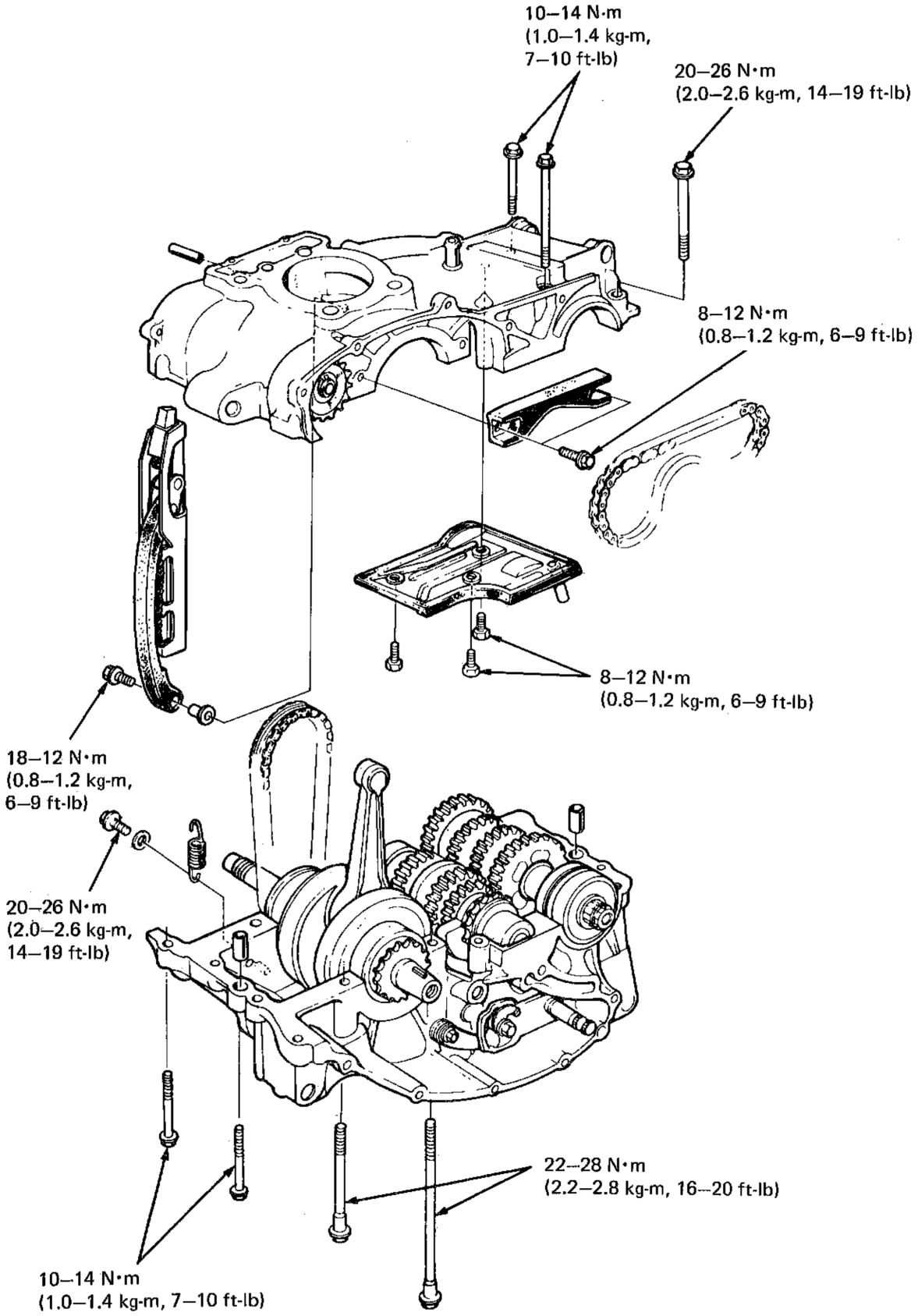

Apply to the gearshift pedal pivot shaft.
Install the gearshift pedal, washer and bolt.
Loosen the locknut and turn the adjusting rod until the lever of the gearshift pedal is vertical.
Tighten the locknut.



# MEMO

# 10. CRANKCASE

HONDA
CB250RS



| | |
|---|---|
| SERVICE INFORMATION | 10–2 |
| CRANKCASE SEPARATION | 10–3 |
| CRANKCASE ASSEMBLY | 10–5 |

# SERVICE INFORMATION

## • WORKING PRACTICE

The crankcase must be separated to repair the crankshaft, connecting rod, kickstarter, transmission and balancer.
Remove the following parts before separating the crankcase.
Be sure the oil pipe is not clogged, and is in place before installation.

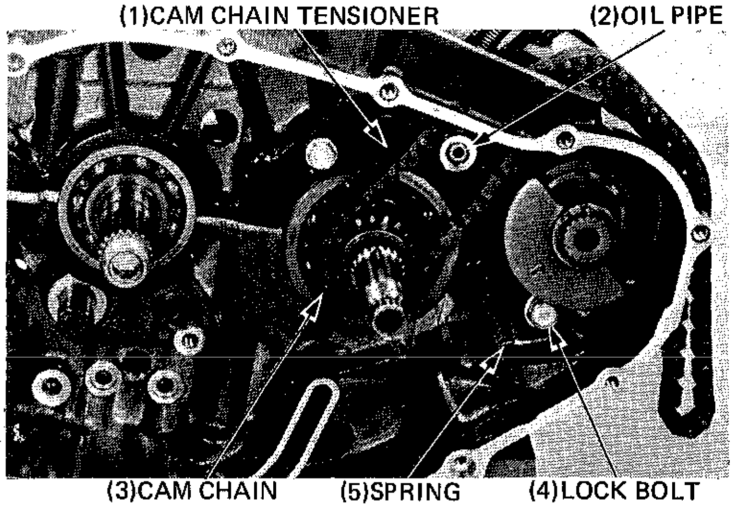
ENGINE REMOVAL ..... Section 5
CYLINDER HEAD ..... Section 6
CYLINDER/PISTON ..... Section 7
CLUTCH/OIL PUMP ..... Section 8
A.C. GENERATOR ..... Section 9

## • TORQUE VALUES

| | | |
|---|---|---|
| Upper crankcase | 6 mm bolt | 10–14 N·m (1.0–1.4 kg-m, 7–10 ft-lb) |
| | 8 mm bolt | 22–26 N·m (2.2–2.6 kg-m, 16–19 ft-lb) |
| Lower crankcase | 6 mm bolt | 10–14 N·m (1.0–1.4 kg-m, 7–10 ft-lb) |
| | 8 mm bolt | 22–28 N·m (2.2–2.8 kg-m, 16–20 ft-lb) |
| Balancer lock bolt: | | 8–12 N·m (0.8–1.2 kg-m, 6–9 ft-lb) |
| Cam chain tensioner: | | 8–12 N·m (0.8–1.2 kg-m, 6–9 ft-lb) |
| Breather plate: | | 8–12 N·m (0.8–1.2 kg-m, 6–9 ft-lb) |

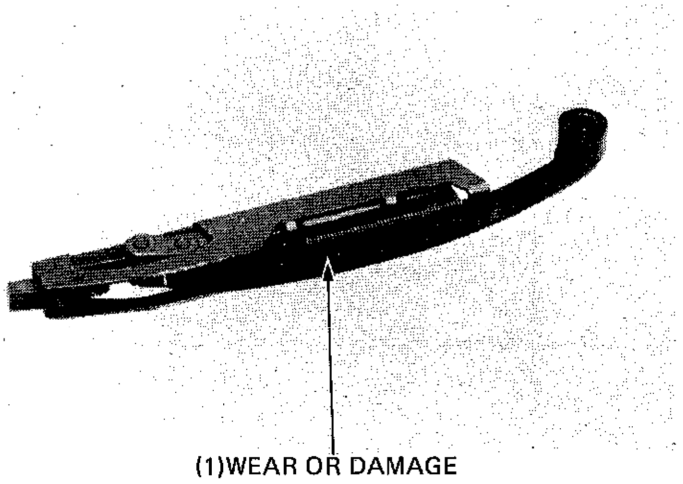
# CRANKCASE SEPARATION

Remove the balancer holder lock bolt and spring.
Remove the cam chain tensioner.
Remove the oil pipe.
Remove the cam chain.

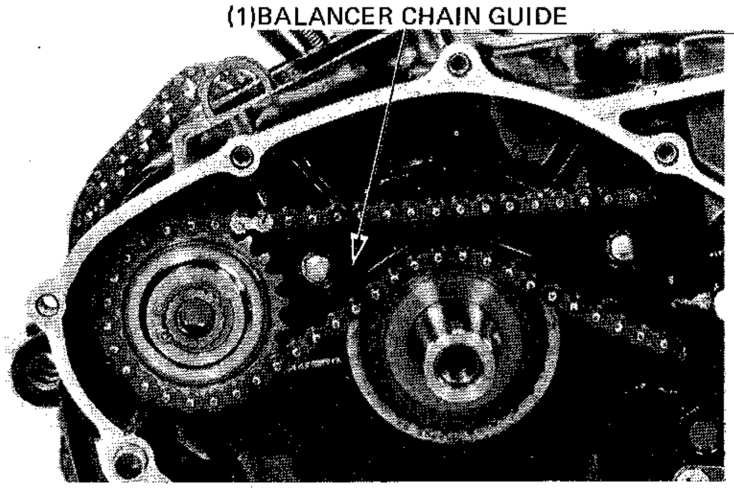



- CAM CHAIN TENSIONER INSPECTION

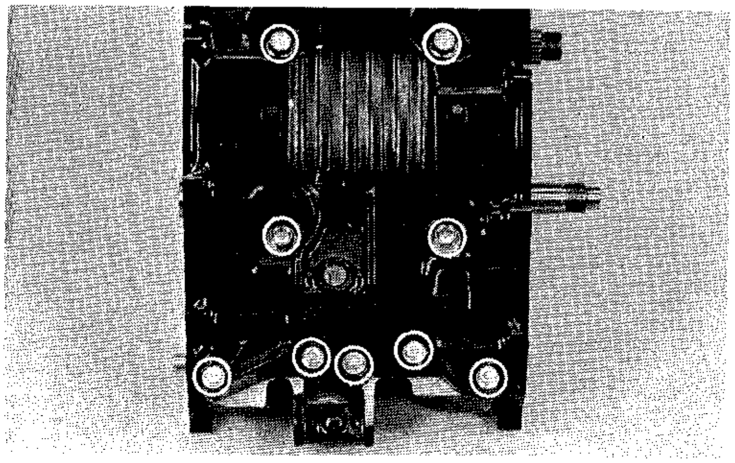
Check the cam chain tensioner for wear or damage.
Replace if necessary.



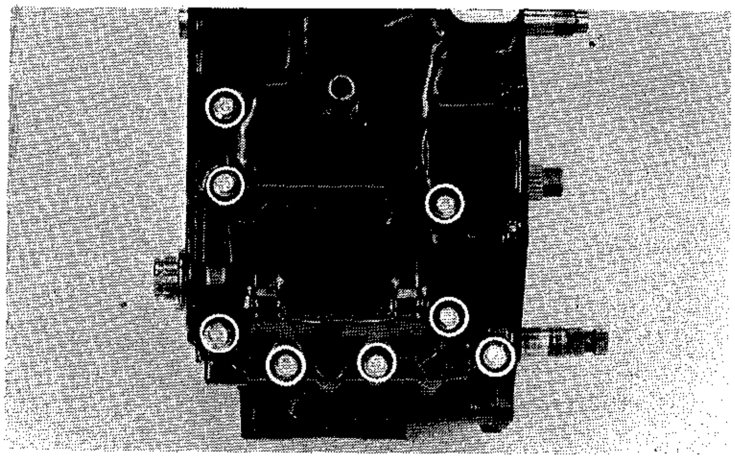

Remove the chain guide.



Turn the engine upside down and remove the bottom crankcase bolts.



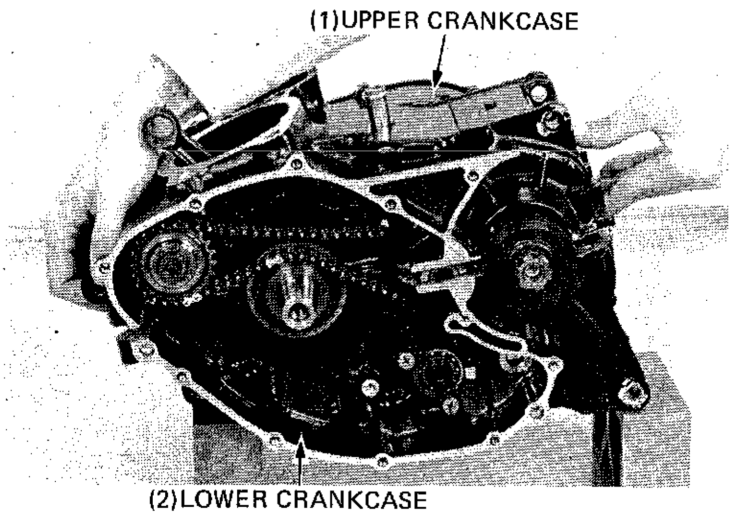
Turn the engine right side up and remove the upper crankcase bolts.



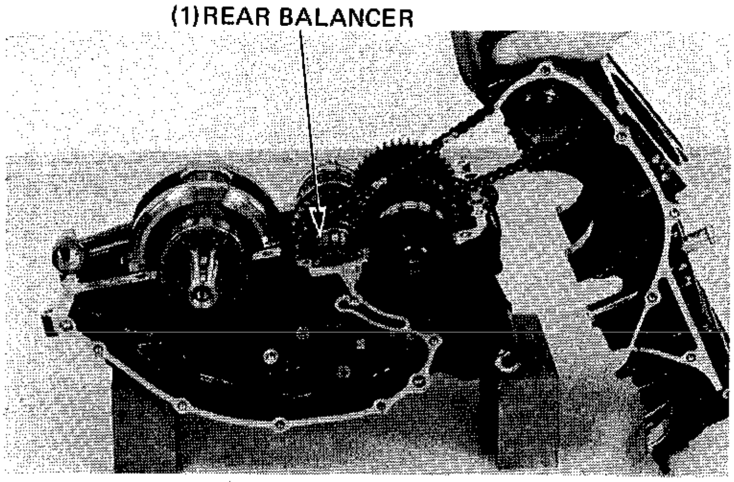
Separate the crankcase.

*CAUTION*

*Do not pry between the upper and lower cases. Lift the upper case away from the lower case, and then move it backward (toward the intake side).*

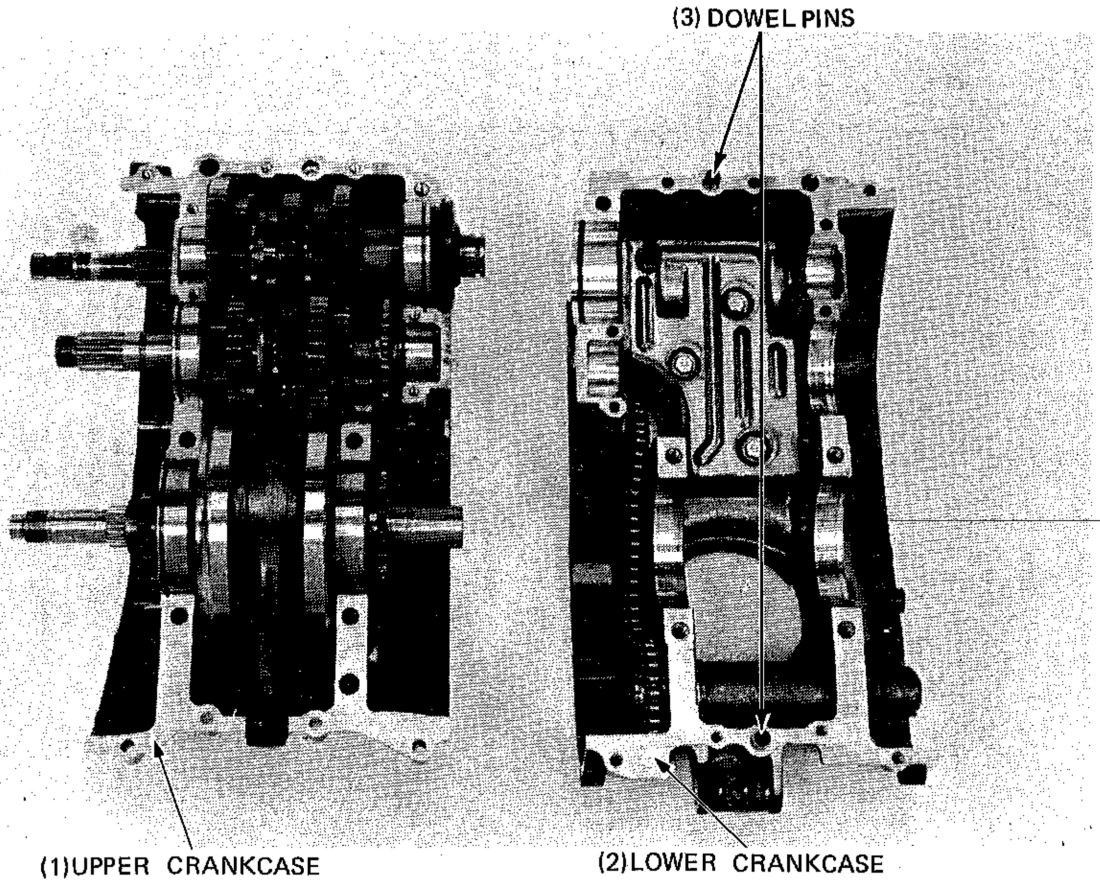


Remove the balancer chain from the rear balancer.




## CRANKCASE ASSEMBLY

Clean the case mating surfaces of any gasket material.
Apply liquid sealer to the surfaces.
Install the dowel pins.

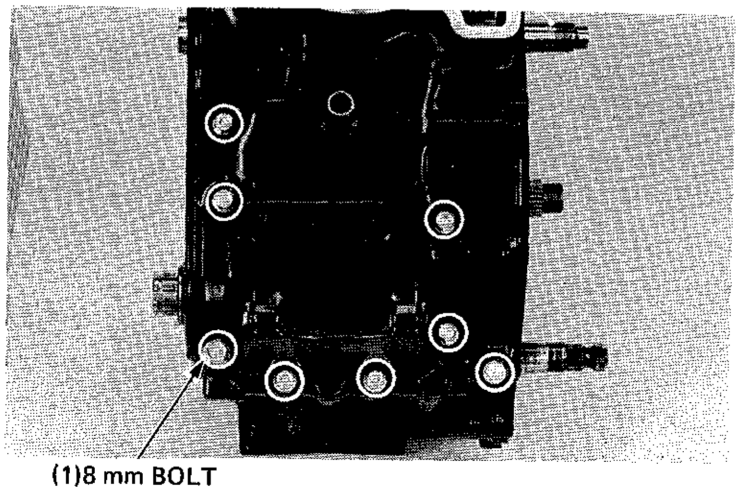


Adjust the balancer timing (Page 11-9).
Install the upper case on the lower case.
Tighten the case bolts.

**TORQUES:**
**6 mm bolt: 10–14 N·m (1.0–1.4 kg-cm, 7–10 ft-lb)**
**8 mm bolt: 20–26 N·m (2.0–2.6 kg-m, 14–19 ft-lb)**

NOTE

Tighten the bolts in 2-3 steps in the sequence shown.

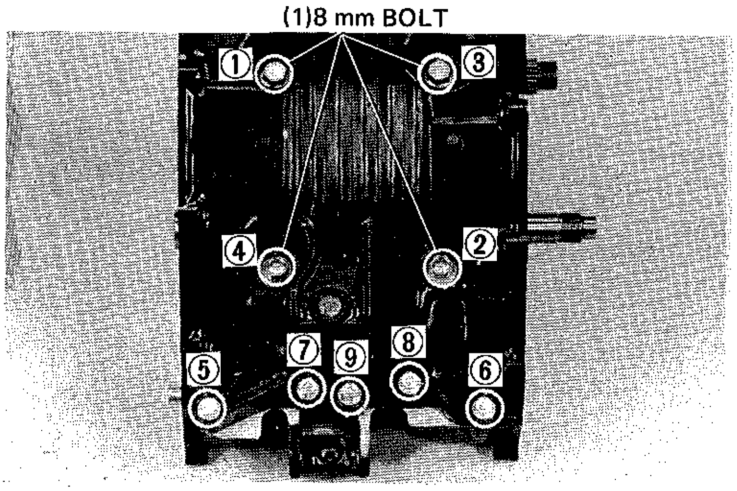

(1)8 mm BOLT

Turn the crankcase upside down and tighten the remaining case bolts.

**TORQUES:**
**6 mm bolt: 10–14 N·m (1.0–1.4 kg-m, 7–10 ft-lb)**
**8 mm bolt: 22–28 N·m (2.2–2.8 kg-m, 16–20 ft-lb)**

NOTE

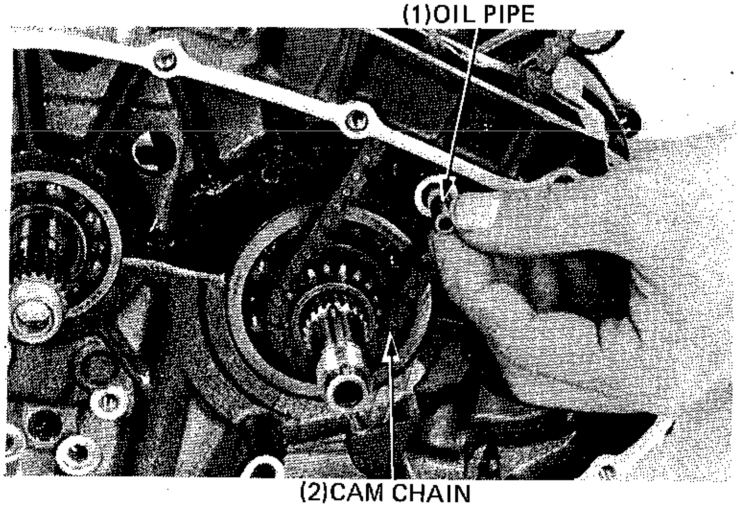
Tighten the bolts in 2-3 steps in the sequence shown.




Install the cam chain.
Install the oil pipe.

NOTE

Make sure the oil pipe is not clogged.

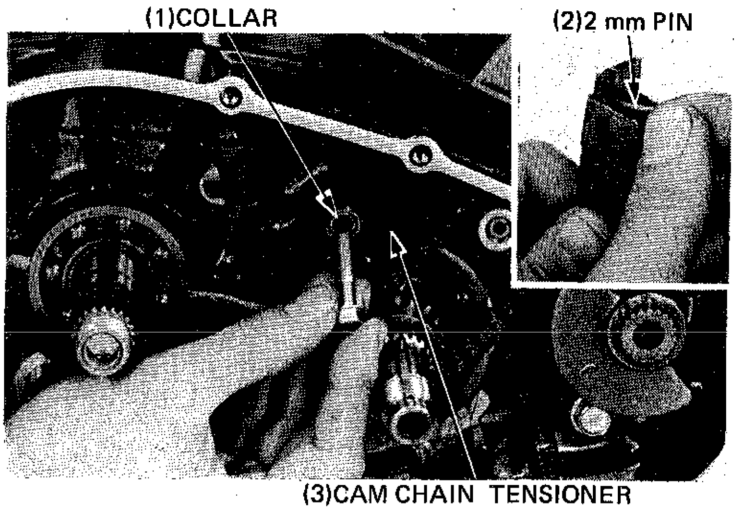


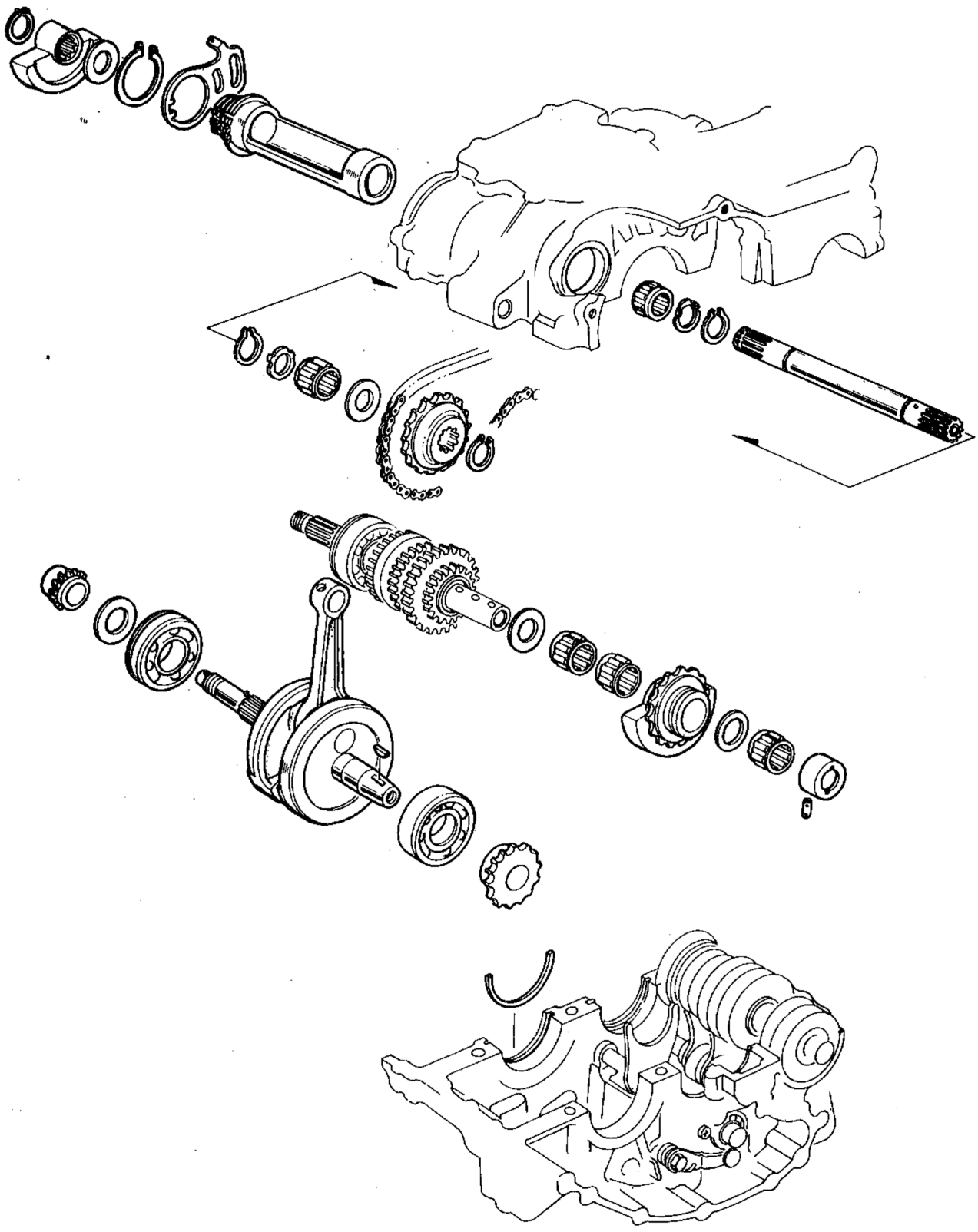
Install the cam chain tensioner.

NOTE

- Note the direction of the collar.
- When a new cam chain tensioner installed, lock the wedge A with a 2 mm pin by holding the wedge B and pulling wedge A.

Install the balancer spring and lock bolt.
Install the balancer chain guide.





| | |
|---|---|
| SERVICE INFORMATION | 11–2 |
| TROUBLESHOOTING | 11–2 |
| FRONT BALANCER REMOVAL | 11–3 |
| REAR BALANCER REMOVAL | 11–4 |
| CRANKSHAFT REMOVAL | 11–4 |
| CAMSHAFT TIMING SPROCKET REPLACEMENT | 11–6 |
| BALANCER TIMING SPROCKET REPLACEMENT | 11–7 |
| CRANKSHAFT INSTALLATION | 11–7 |
| REAR BALANCER INSTALLATION | 11–7 |
| FRONT BALANCER INSTALLATION | 11–8 |
| BALANCER TIMING | 11–9 |
| BALANCER TIMING INSPECTION | 11–11 |

# SERVICE INFORMATION

• WORKING PRACTICE

To service the crankshaft and balancer, it is necessary to separate the crankcase halves. After installing the balancer, check balancer timing and adjust chain tension.

• SPECIFICATIONS

| ITEM | | STANDARD | SERVICE LIMIT |
|---|---|---|---|
| Crankshaft | Connecting rod big end side clearance | 0.05–0.45 mm (0.0020–0.017 in) | 0.6 mm (0.024 in) |
| | Connecting rod big end radial clearance | 0.006–0.018 mm (0.0002–0.0007 in) | 0.05 mm (0.002 in) |
| | Connecting rod small end I.D. | 19.020–19.041 mm (0.7488–0.7496 in) | 19.07 mm (0.751 in) |
| | Crankshaft runout | ——— | 0.1 mm (0.004 in) |
| Balancer | Shaft holder O.D. | 39.964–39.980 mm (1.5734–1.5740 in) | 39.91 mm (1.571 in) |
| | Shaft holder I.D. | 26.007–26.020 mm (1.0239–1.0244 in) | 26.05 mm (1.026 in) |
| | Rear balancer I.D. | 26.007–26.020 mm (1.0239–1.0244 in) | 26.05 mm (1.026 in) |

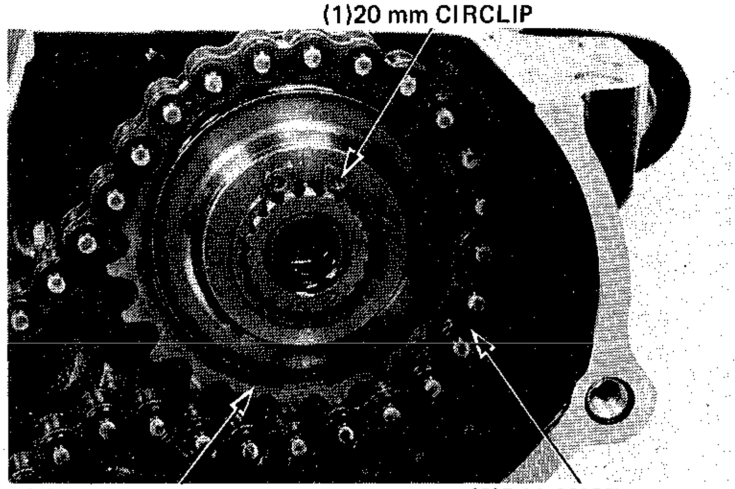
# TROUBLESHOOTING

**Excessive Noise**

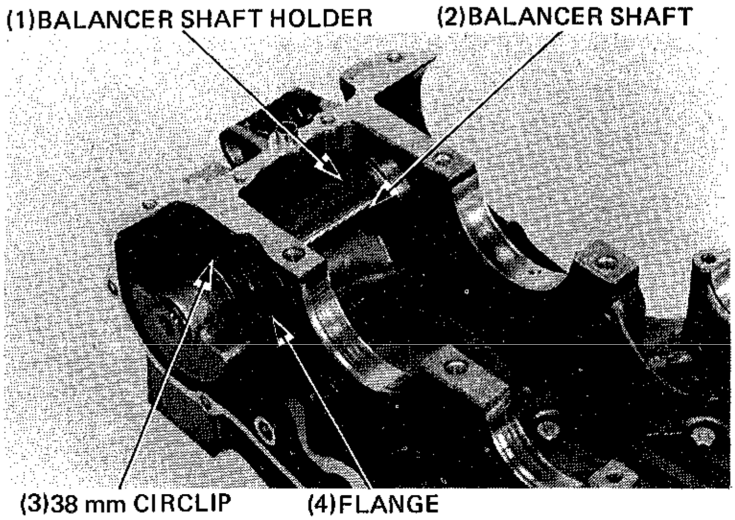
1. Crankshaft
   –Worn connecting rod small and big end bearings.
   –Bent connecting rod
   –Worn crankshaft bearing.
2. Balancer
   –Improper timing adjustment.
   –Improper chain adjustment.
   –Damaged chain.

# FRONT BALANCER REMOVAL

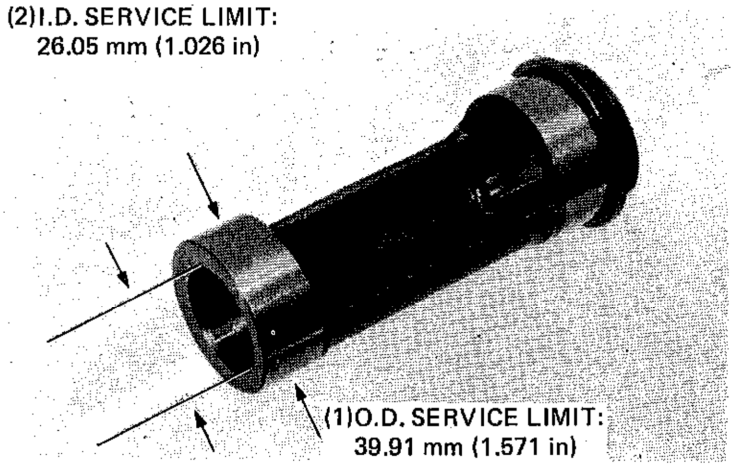
Separate the crankcase.
Remove the 20 mm circlip.
Remove the balancer sprocket.
Remove the balancer chain from the rear balancer.




Remove the balancer shaft and shaft holder.
Remove the circlip.
Remove the shaft holder from the shaft.

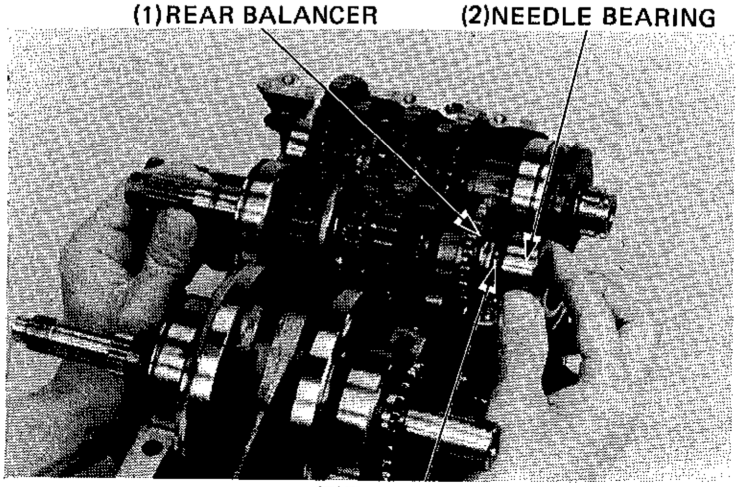



Measure the shaft hole I.D.
Measure the shaft O.D.

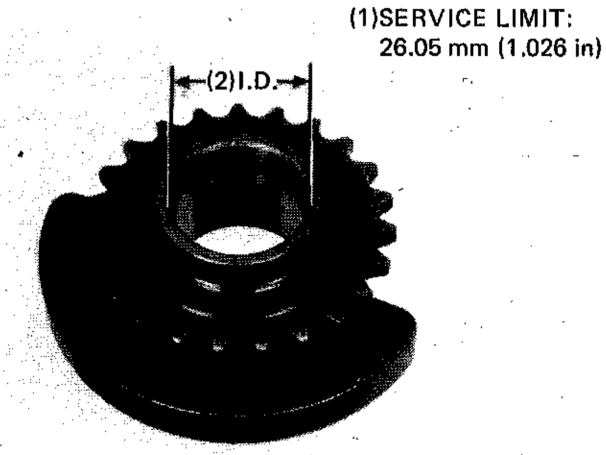


# REAR BALANCER REMOVAL

Remove the needle bearing and thrust washer from the main shaft.
Remove the rear balancer, thrust washer and needle bearing.

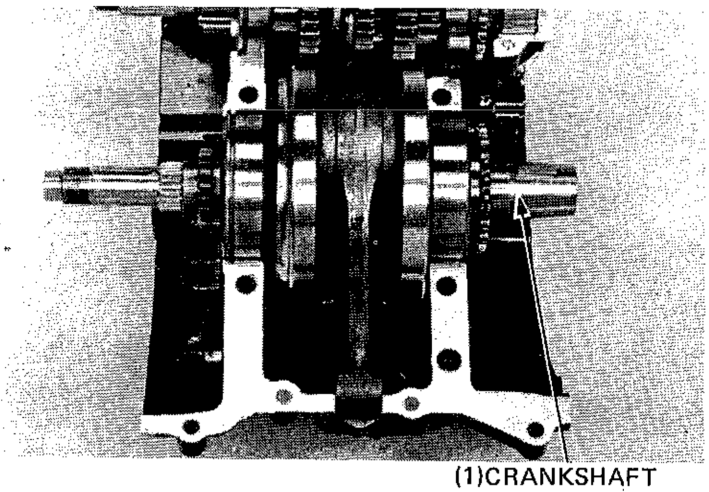



Measure the balancer I.D.




# CRANKSHAFT REMOVAL

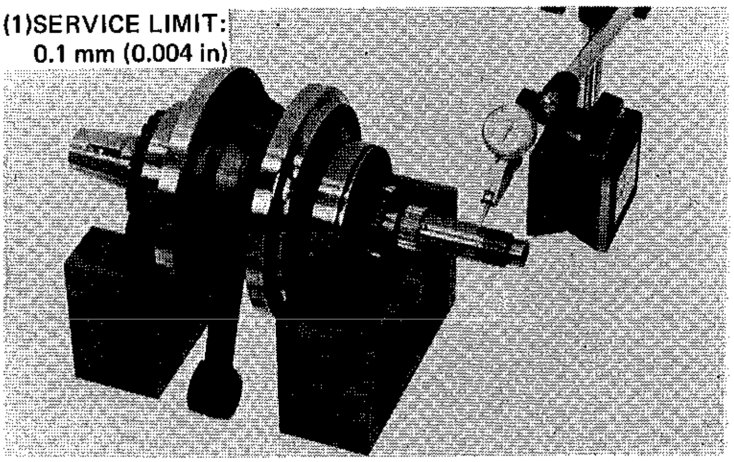
Separate the crankcase.
Remove the crankshaft.



## • CRANKSHAFT INSPECTION

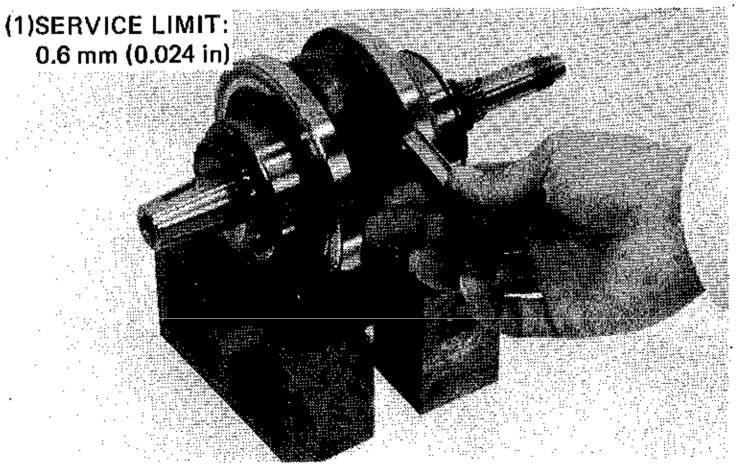
Set the crankshaft on a stand or V blocks and read runout using a dial gauge.

(1)SERVICE LIMIT:
0.1 mm (0.004 in)



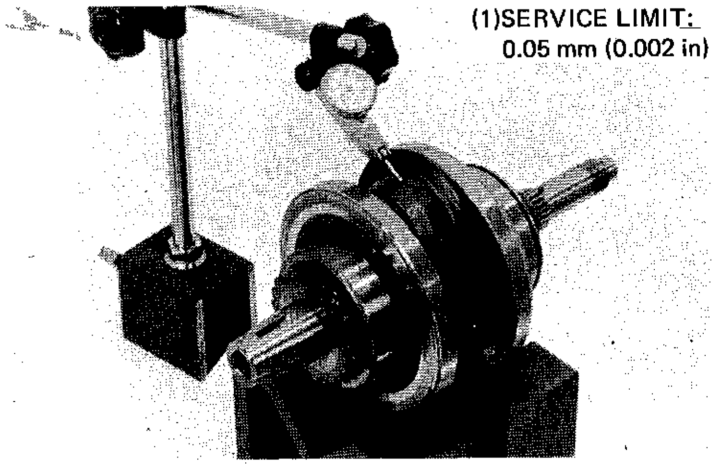
Measure the connecting rod big end side clearance with a feeler gauge.

(1)SERVICE LIMIT:
0.6 mm (0.024 in)

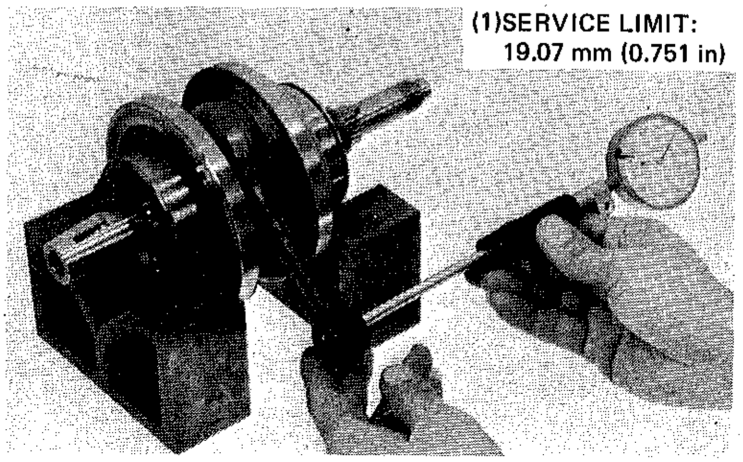


Measure the connecting rod big end radial clearance.

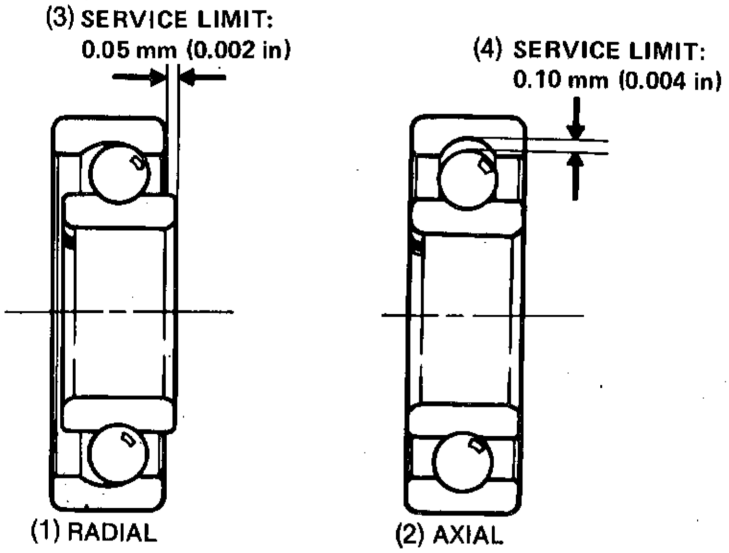
(1)SERVICE LIMIT:
0.05 mm (0.002 in)



Measure the connecting rod small end I.D.

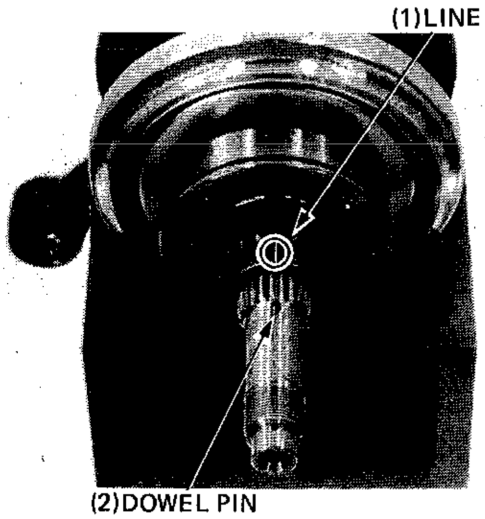



Spin the crankshaft bearing by hand and check for play.
The bearing must be replaced if it is noisy or has excessive play.



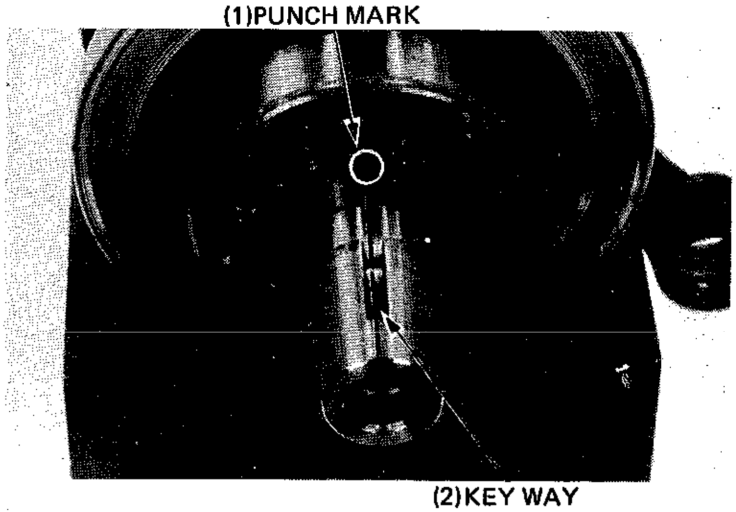

## CAMSHAFT TIMING SPROCKET REPLACEMENT

Before installing a new sprocket, scribe a line from any tooth center over the gear boss in the axial direction.
Install the sprocket, aligning the line with the dowel pin hole in the sprocket shaft.



## BALANCER TIMING SPROCKET REPLACEMENT

Remove the balancer timing sprocket from the shaft.
Install a new sprocket on the shaft with the punch mark aligned with the shaft keyway.

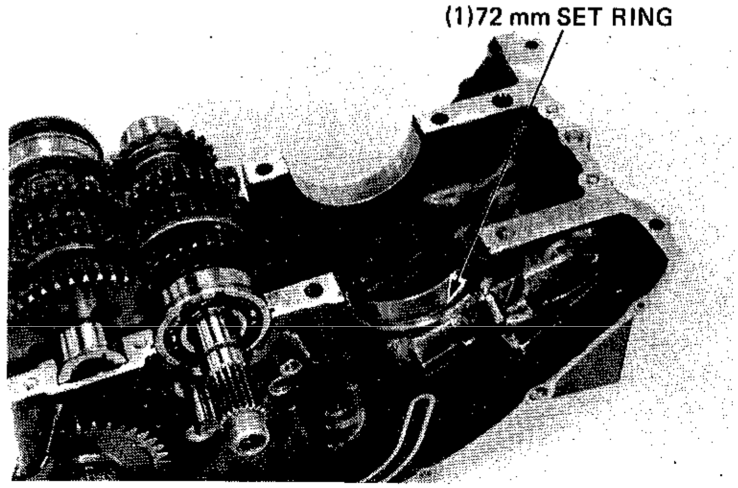



## CRANKSHAFT INSTALLATION

Place the 72 mm set ring in the lower crankcase.
Install the crankshaft in the lower crankcase.

NOTE

Be sure the set ring fits in the main bearing outer race.



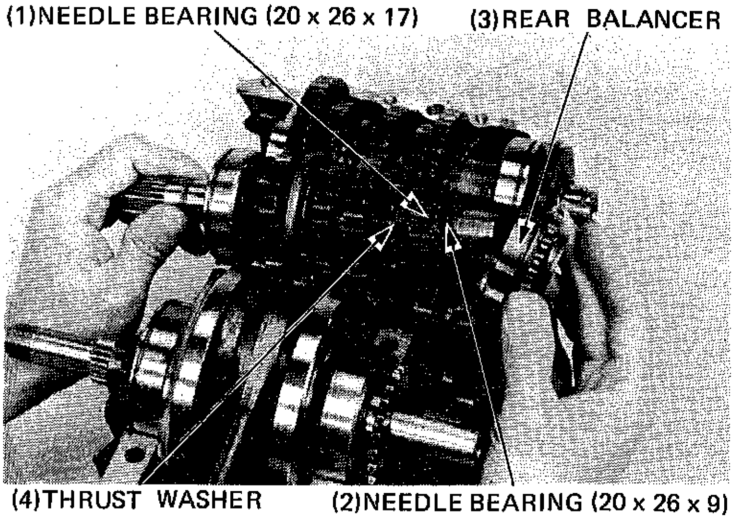

## REAR BALANCER INSTALLATION

Install the rear balancer, thrust washer and needle bearing.

NOTE

Note the needle bearing location.

Install the thrust washer and needle bearing.



# FRONT BALANCER INSTALLATION

Set the circlips in the balancer shaft.

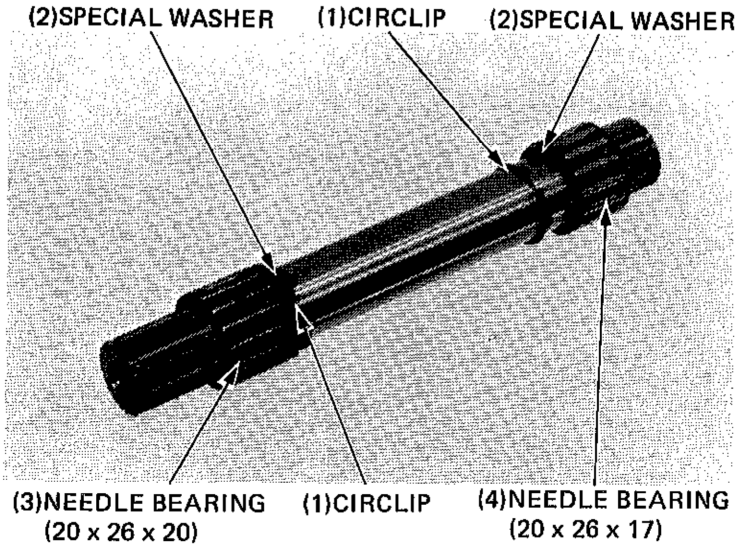
Note

Install the circlips with the sharp edge end on the outside.

Install the special washers and needle bearings.

NOTE

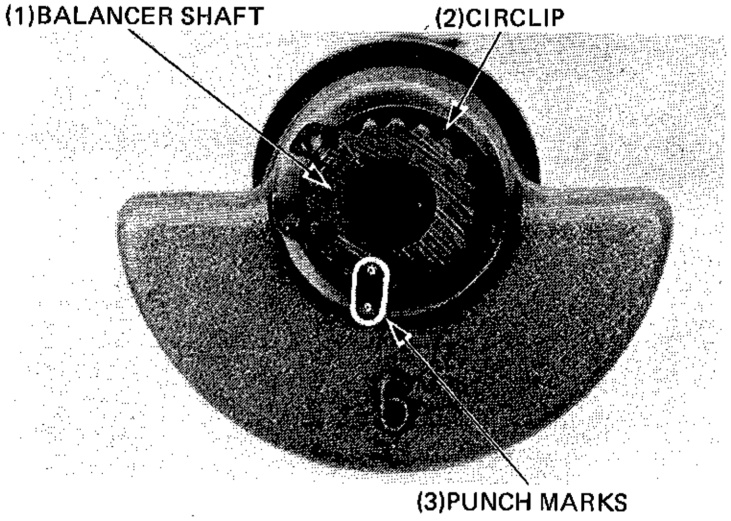
- Align the tab of the special washer.
- Apply grease to the inside of the special washer to hold.




Install the balancer weight.

NOTE

Align the punch mark on the balancer shaft with the punch mark on the balancer weight.




Install the circlip.

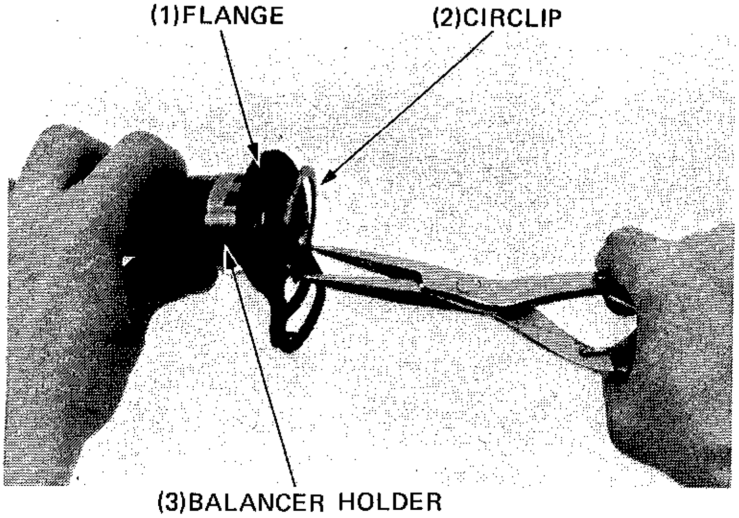
NOTE

Install the circlip with the sharp edge on the outside.

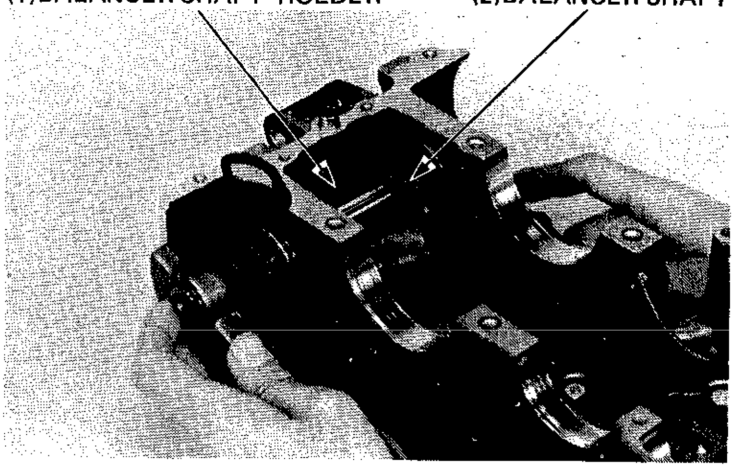
Install the holder flange on the balancer shaft holder and secure with the circlip.

NOTE

- Note the holder flange direction.
- Install the circlip with the sharp edge on the outside.

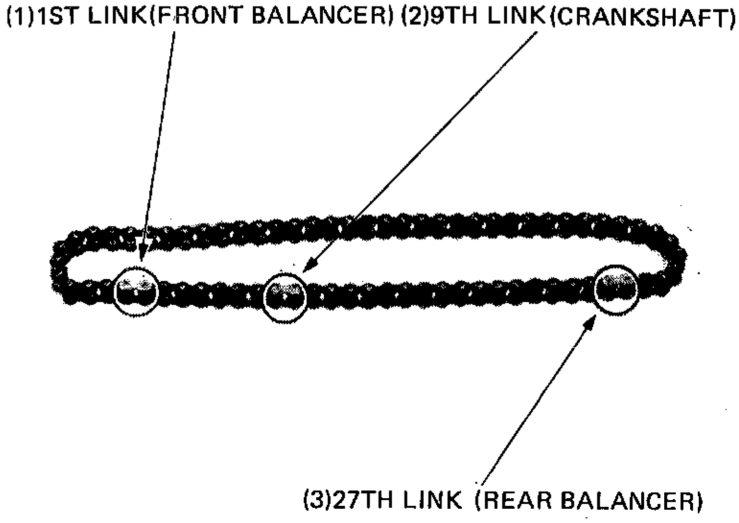


Install the balancer shaft holder in the crankcase.
Install the balancer shaft.




## BALANCER TIMING

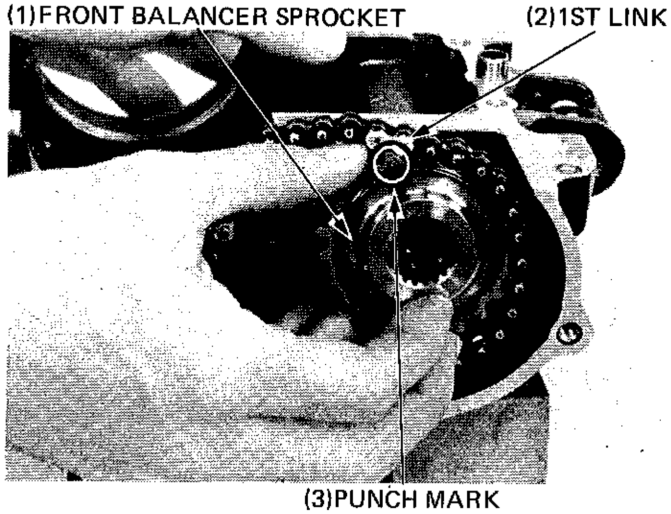
Mark the balancer chain at three points, 1st, 9th and 27th links, starting at any link toward the right along the lower length of the chain as shown.




Place the balancer chain over the front balancer sprocket.

NOTE

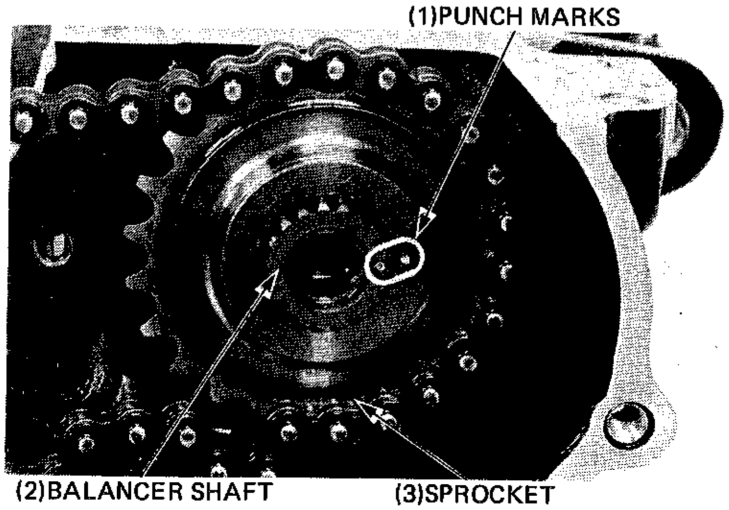
Align the 1st link with the punch mark on the sprocket.



Install the thrust washer and balancer sprocket on the balancer shaft and secure with the circlip.

NOTE

Align the punch mark on the sprocket with the punch mark on the balancer shaft.

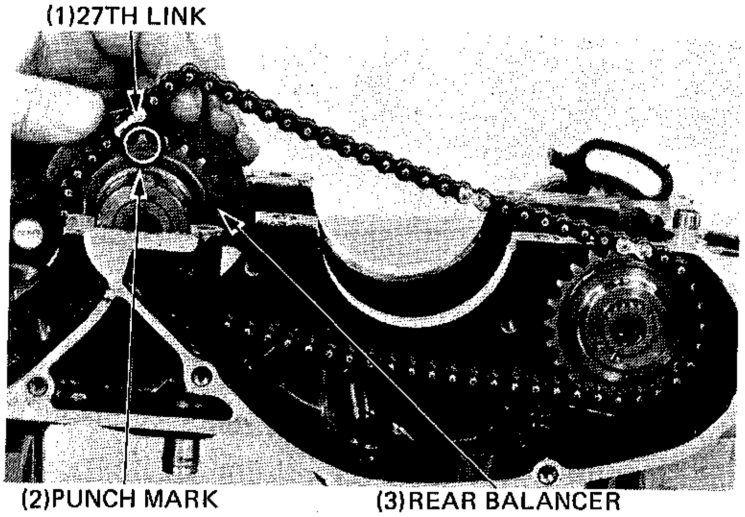



Install the mainshaft in the upper case.

Place the balancer chain on the rear balancer sprocket.

NOTE

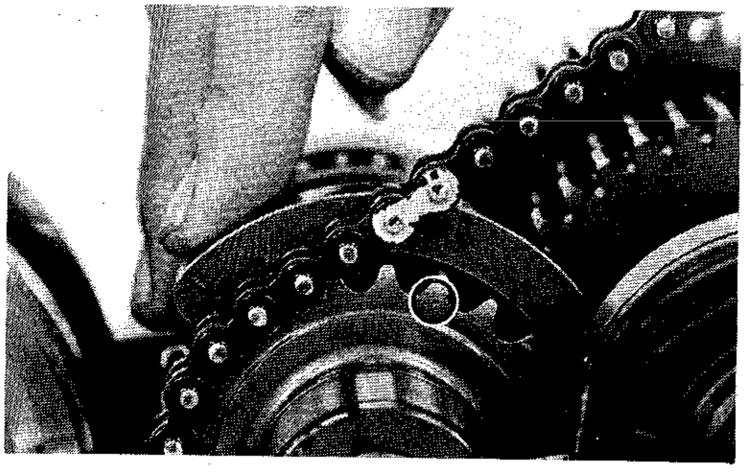
- Align the 27th link with the punch mark on the rear balancer sprocket.
- Check that the 1st link is aligned with the punch mark on the front balancer sprocket.




Install the mainshaft in the lower case.

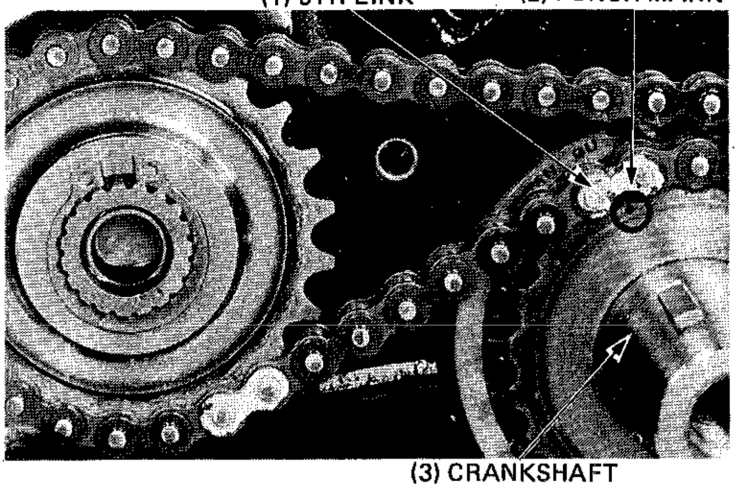
NOTE

Keep the balancer chain in engagement with the sprocket mark.



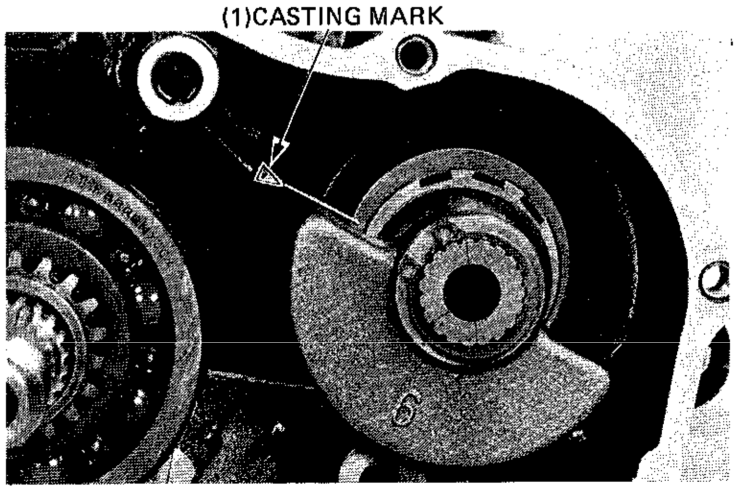
Ensure that the 9th link is in line with the punch mark on the crankshaft balancer sprocket.
Tighten the upper and lower case bolts.

Install the balancer chain guide.
Install the balancer spring.
Move the balancer flange to the left one graduation from where it rests, and tighten the lock nut.

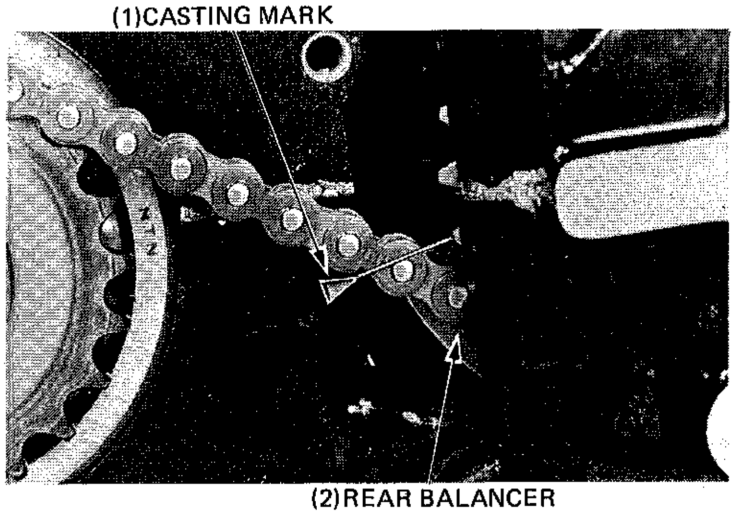



## BALANCER TIMING INSPECTION

Rotate the crankshaft until the piston is at T.D.C.
Timing is correct if the edge of the front balancer is aligned with the mark on the crankcase.

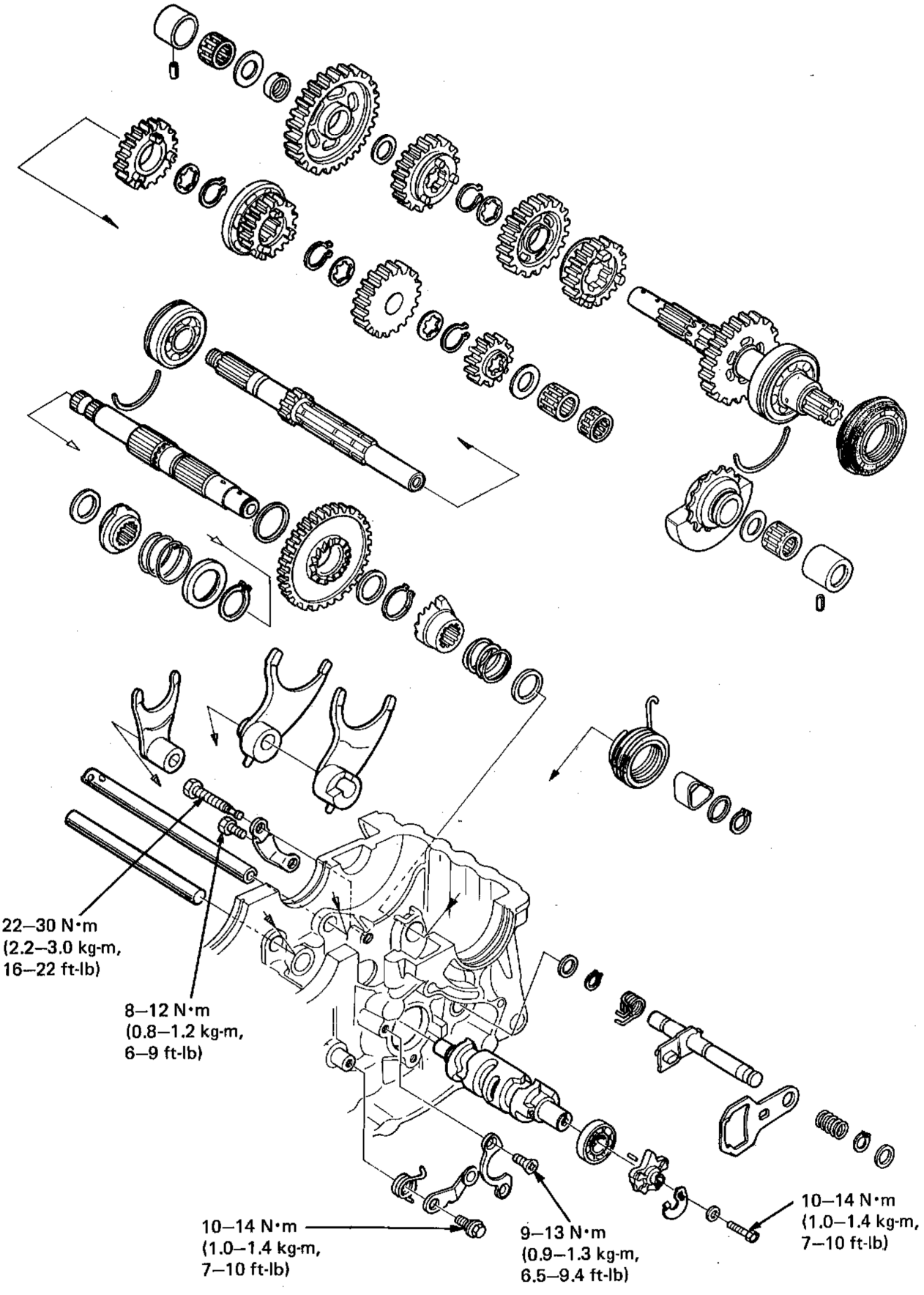



Ensure that the edge of the rear balancer is also in alignment with the crankcase casting mark.



# 12. TRANSMISSION

HONDA
CB250RS



| | |
|---|---|
| SERVICE INFORMATION | 12–2 |
| TROUBLESHOOTING | 12–2 |
| GEARSHIFT LINKAGE DISASSEMBLY | 12–3 |
| TRANSMISSION DISASSEMBLY | 12–3 |
| KICKSTARTER DISASSEMBLY | 12–8 |
| KICKSTARTER ASSEMBLY | 12–10 |
| TRANSMISSION ASSEMBLY | 12–12 |

# SERVICE INFORMATION

## • WORKING PRACTICE

The crankcase must be separated to service the transmission and kickstarter.
The gearshift linkage can be serviced with the engine installed in the frame.

## • SPECIFICATIONS

| ITEM | | STANDARD | SERVICE LIMIT |
|---|---|---|---|
| Transmission | Backlash | ——— | 0.2 mm (0.008 in) |
| | Gear dog minimum clearance | ——— | 0.3 mm (0.012 in) |
| | Gear I.D. $C_1$, $C_3$, $M_4$, $M_5$ gears | 25.020–25.041 mm (0.9850–0.9859 in) | 25.10 mm (0.988 in) |
| | Bushing I.D. | 20.020–20.041 mm (0.7866–0.7890 in) | 20.10 mm (0.791 in) |
| | O.D. | 25.005–25.016 mm (0.9844–0.9849 in) | 24.95 mm (0.982 in) |
| | Gear to bushing clearance | 0.004–0.036 mm (0.0002–0.0014 in) | 0.15 mm (0.006 in) |
| | Mainshaft O.D. | 24.959–24.980 mm (0.9826–0.9835 in) | 24.91 mm (0.981 in) |
| | Gear to shaft clearance | 0.040–0.082 mm (0.0016–0.0032 in) | 0.15 mm (0.006 in) |
| | Shaft to bushing clearance | 0.020–0.054 mm (0.0008–0.0021 in) | 0.15 mm (0.006 in) |
| | Countershaft O.D. $C_3$ | 24.959–24.980 mm (0.9826–0.9835 in) | 24.91 mm (0.981 in) |
| | $C_1$ | 19.987–20.000 mm (0.7869–0.7874 in) | 19.95 mm (0.785 in) |
| Shift fork | Shift fork I.D. Center fork | 12.000–12.021 mm (0.4724–0.4733 in) | 12.05 mm (0.474 in) |
| | R/L forks | 15.000–15.021 mm (0.5906–0.5914 in) | 15.05 mm (0.593 in) |
| | Fork claw thickness | 4.93–5.00 mm (0.194–0.197 in) | 4.5 mm (0.18 in) |
| | Guide shaft O.D. Center shaft | 11.966–11.984 mm (0.4711–0.4718 in) | 11.91 mm (0.469 in) |
| | R/L shafts | 14.966–14.984 mm (0.5892–0.5899 in) | 14.91 mm (0.587 in) |
| Shift drum | Drum O.D. | 11.966–11.984 mm (0.4711–0.4718 in) | 11.91 mm (0.469 in) |
| Lower case | Case I.D. | 12.000–12.027 mm (0.4724–0.4735 in) | 12.10 mm (0.476 in) |
| Kickstarter | Starter pinion I.D. | 22.000–22.021 mm (0.8661–0.8670 in) | 22.10 mm (0.870 in) |
| | Starter spindle O.D. | 21.959–21.980 mm (0.8645–0.8654 in) | 21.91 mm (0.863 in) |

## • TORQUE VALUES

| | |
|---|---|
| Kickstarter stopper plate: | 8–12 N·m (0.8–1.2 kg-m, 6–9 ft-lb) |
| Return spring hook pin: | 22–30 N·m (2.2–3.0 kg-m, 16–22 ft-lb) |
| Gearshift drum stopper plate: | 10–14 N·m (1.0–1.4 kg-m, 7–10 ft-lb) |
| Gearshift drum stopper arm: | 10–14 N·m (1.0–1.4 kg-m, 7–10 ft-lb) |
| Gearshift drum bearing set plate: | 9–13 N·m (0.9–1.3 kg-m, 6.5–9.4 ft-lb) |

# TROUBLESHOOTING

**Hard to Shift**
1. Improper clutch adjustment; too much free play
2. Shift forks bent
3. Shift shaft bent
4. Shift fork claw bent
5. Shift drum cam groove damaged

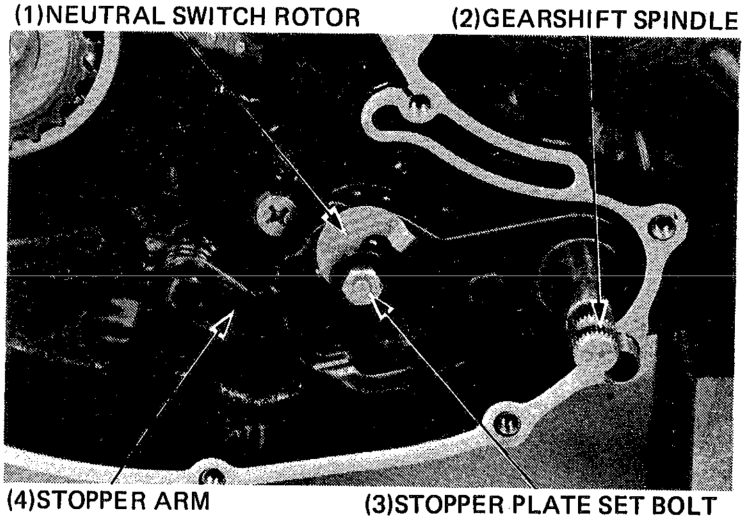
**Transmission Jumps Out Of Gear**
1. Gear dogs worn
2. Shift shaft bent
3. Shift drum stopper broken
4. Shift forks bent

# GEARSHIFT LINKAGE DISASSEMBLY

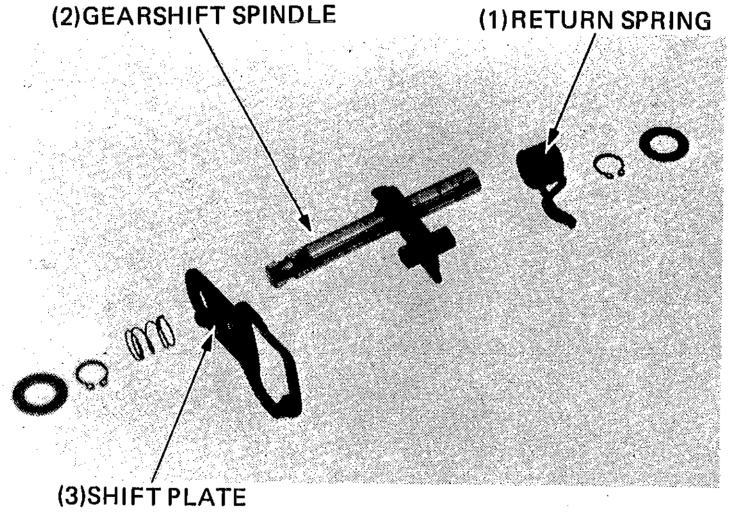
Remove the left crankcase cover (Page 9-3).
Remove the A.C. generator rotor (Page 9-4).
Loosen the stopper plate bolt.
Remove the gearshift spindle.
Remove the shift stopper arm and spring.

NOTE

Do not distort the neutral switch rotor during disassembly.

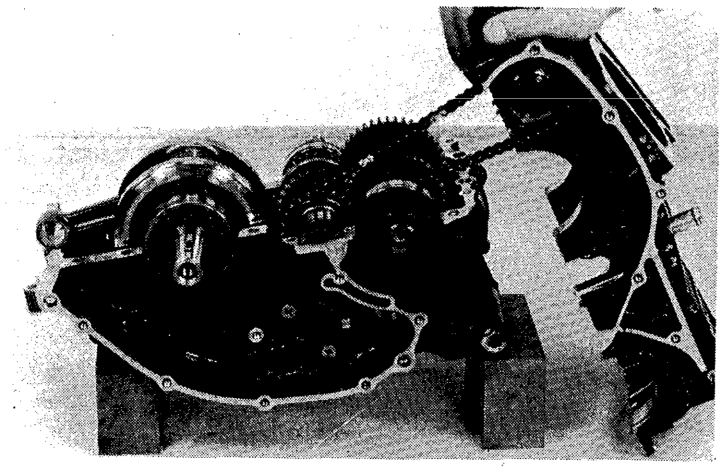



Remove the circlip, spring and shift plate.
Remove the thrust washer, circlip and return spring.




# TRANSMISSION DISASSEMBLY

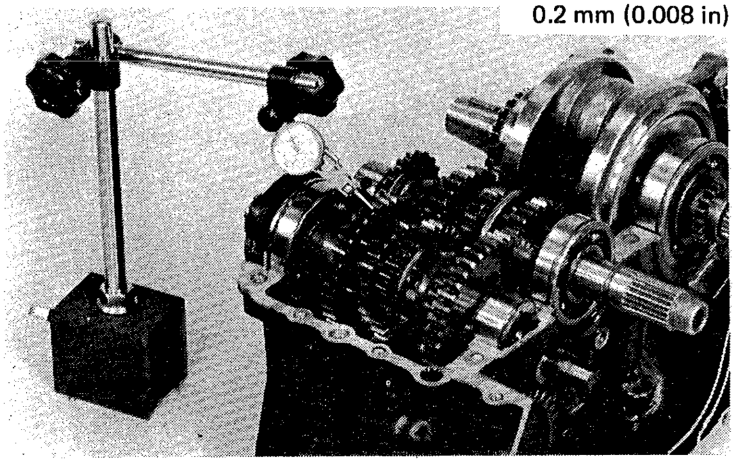
Separate the crankcase (Section 10).
Remove the balancer chain from the main-shaft balancer.



## • TRANSMISSION GEAR INSPECTION

Inspect each gear for backlash.

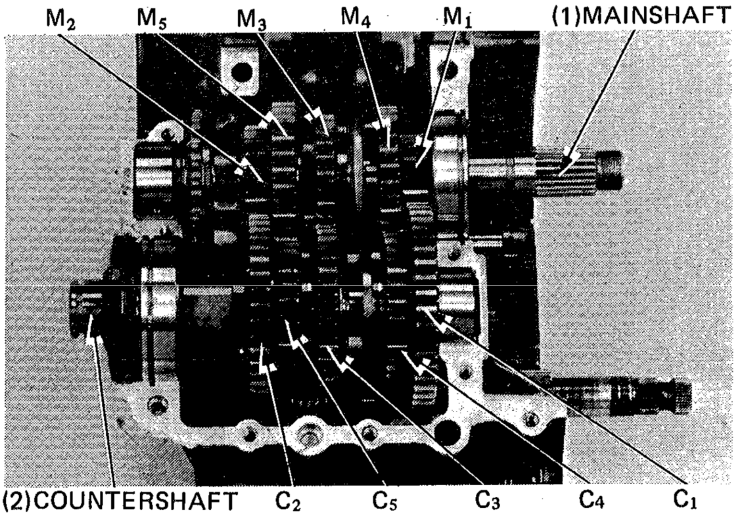
(1)SERVICE LIMIT:
0.2 mm (0.008 in)



Place gears into neutral, and check each gear dog for minimum clearance at end.

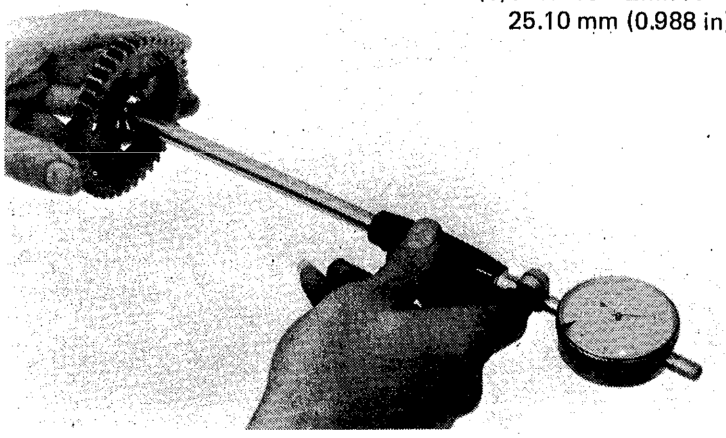
**SERVICE LIMIT: 0.3 mm (0.012 in)**

If the clearance exceeds the service limit, inspect the thrust washers, gears, shift forks and shift drums, replacing those which show excessive wear.




Remove the mainshaft and countershaft.
Check each gear dog for excessive or abnormal wear.
Inspect the I.D. of each gear.

(1)SERVICE LIMIT:
25.10 mm (0.988 in)

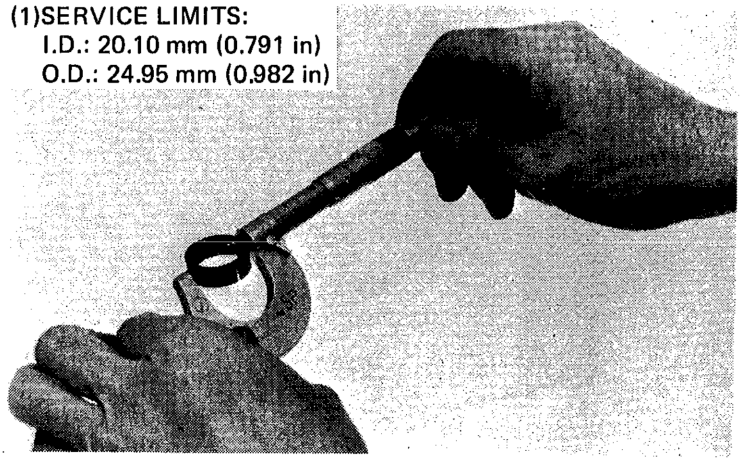


Measure the I.D. and O.D. of the countershaft low gear bushing.

Calculate the clearance between the gear and bushing.

**SERVICE LIMIT: 0.15 mm (0.006 in)**

(1)SERVICE LIMITS:
I.D.: 20.10 mm (0.791 in)
O.D.: 24.95 mm (0.982 in)

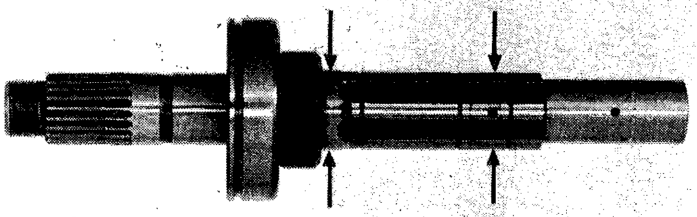


Measure the mainshaft O.D.

Calculate the clearance between the mainshaft and gear.

**SERVICE LIMIT: 0.15 mm (0.006 in)**

(1)SERVICE LIMIT:
24.91 mm (0.981 in)

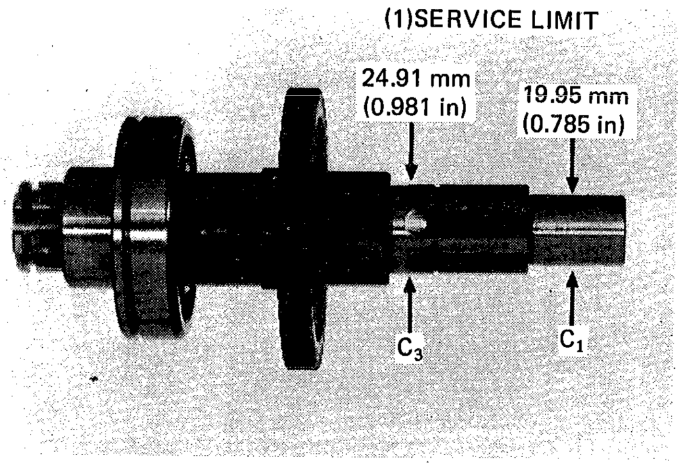


Measure the countershaft O.D.

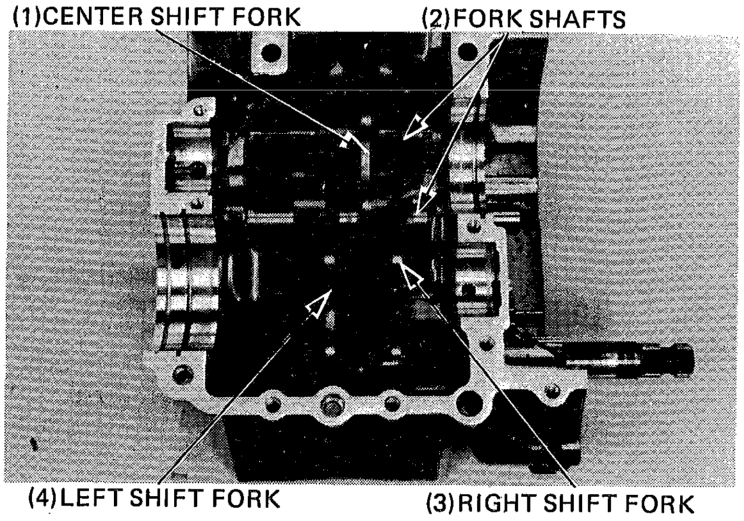
Calculate the clearance between the gear and countershaft.

**SERVICE LIMIT: 0.15 mm (0.006 in)**

(1)SERVICE LIMIT

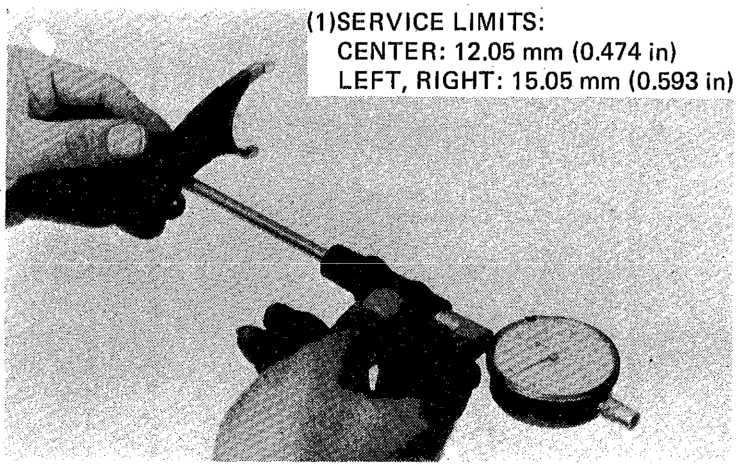


Remove the shift fork shafts and shift forks.
Mark the forks to ensure original assembly.

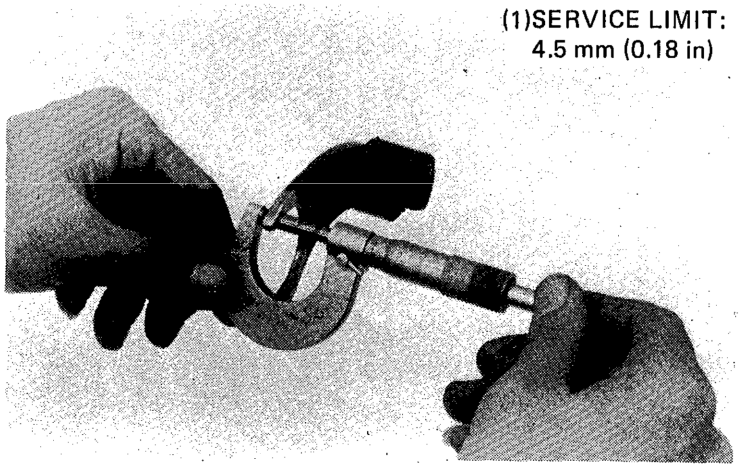



- SHIFT FORK/GUIDE SHAFT INSPECTION

Measure the shift fork I.D.

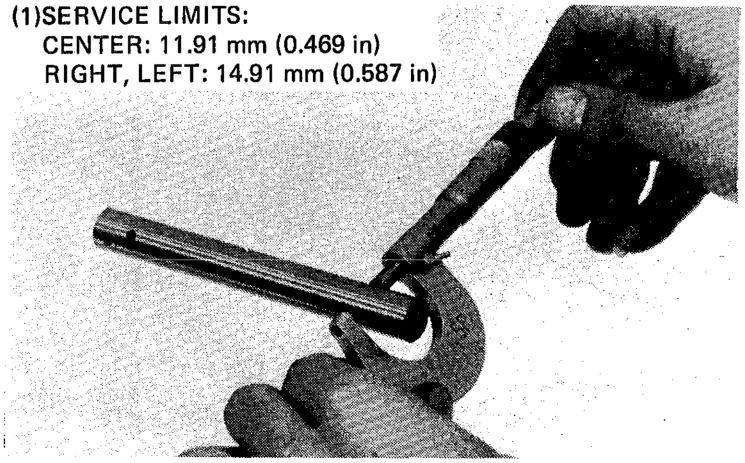



Measure the shift fork claw thickness.



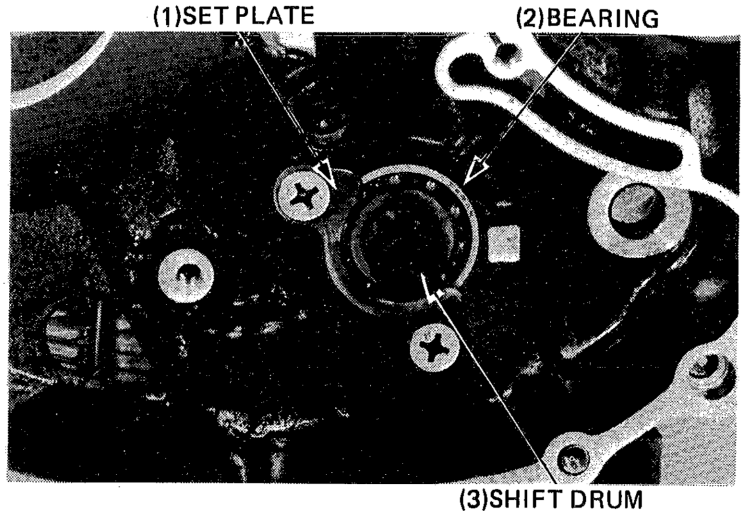
Measure the guide shaft O.D.

(1)SERVICE LIMITS:
CENTER: 11.91 mm (0.469 in)
RIGHT, LEFT: 14.91 mm (0.587 in)

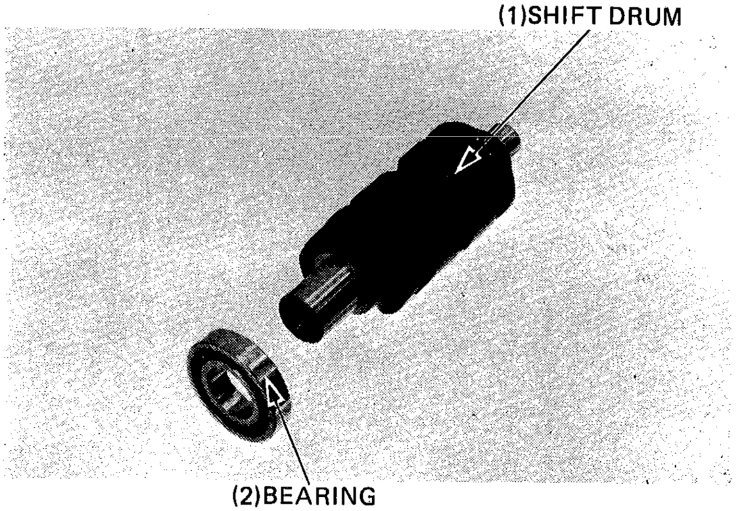


## • SHIFT DRUM DISASSEMBLY

Remove the bearing set plate.
Remove the shift drum.

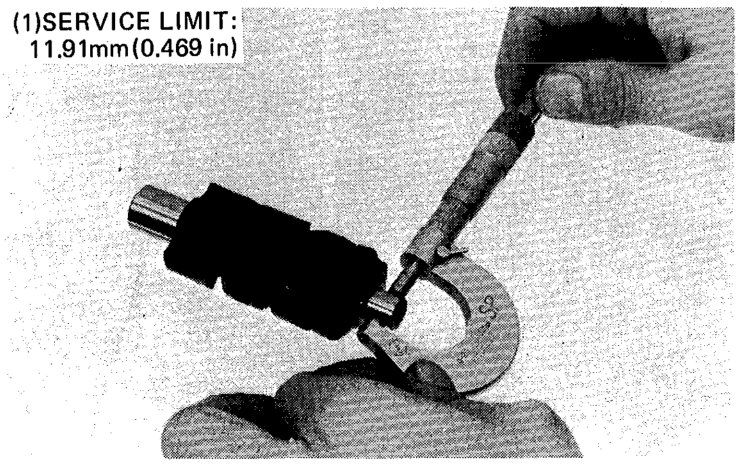



Check each part for wear or damage and replace if necessary.
The bearing should be replaced with a new one if it is noisy or has excessive play.



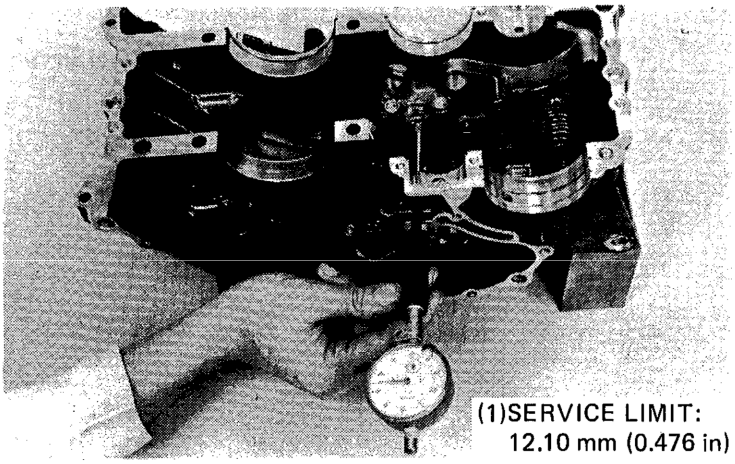
- GEARSHIFT DRUM INSPECTION

Measure the shift drum O.D.
Inspect the drum grooves and replace the drum if they are damaged or show excessive wear.



(1)SERVICE LIMIT: 11.91mm(0.469 in)

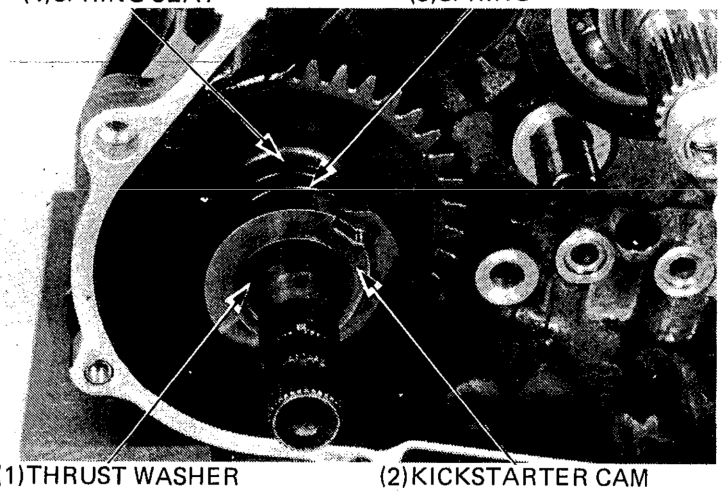
Measure the lower case I.D.



(1)SERVICE LIMIT: 12.10 mm (0.476 in)

## KICKSTARTER DISASSEMBLY

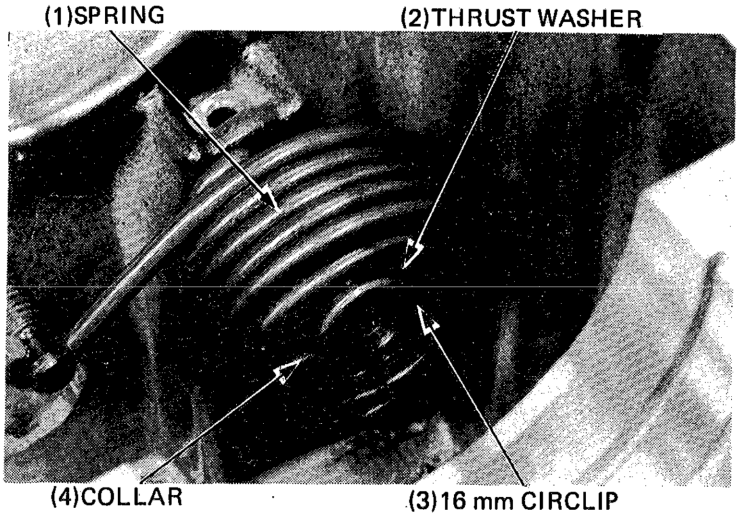
Remove the thrust washer, kick starter cam, spring and spring seat.



(4)SPRING SEAT (3)SPRING

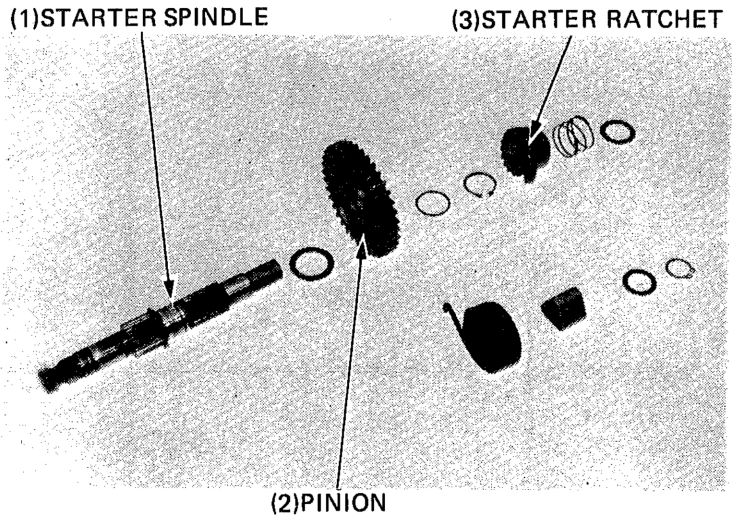
(1)THRUST WASHER (2)KICKSTARTER CAM

Remove the 16 mm circlip, thrust washer and collar.
Remove the kickstarter spring.
Remove the kickstarter spindle.



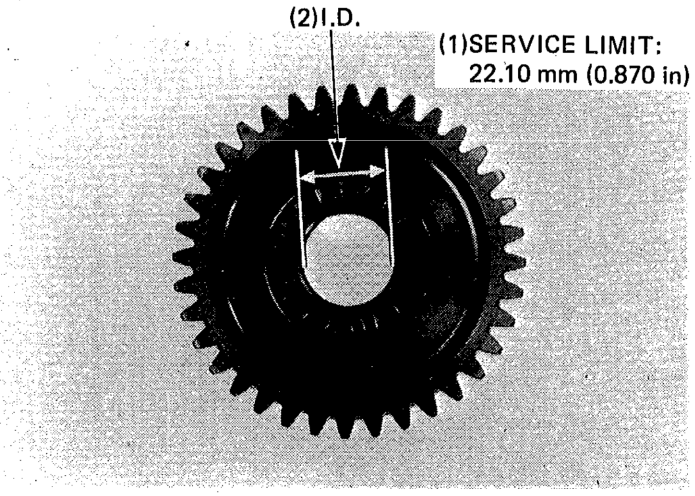

## • KICKSTARTER SPINDLE DISASSEMBLY

Remove the thrust washer, ratchet spring and starter ratchet from the spindle.
Remove the 22 mm circlip, thrust washer and kickstarter pinion from the other end.



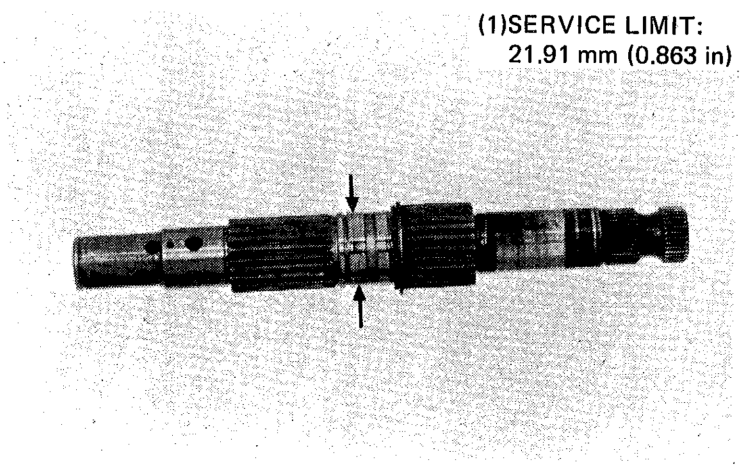

## • KICKSTARTER INSPECTION

Measure the kickstarter pinion I.D.



Measure the kickstarter spindle O.D.
Remove the kickstarter stopper plate and spring hook pin.

(1)SERVICE LIMIT:
21.91 mm (0.863 in)



## KICKSTARTER ASSEMBLY

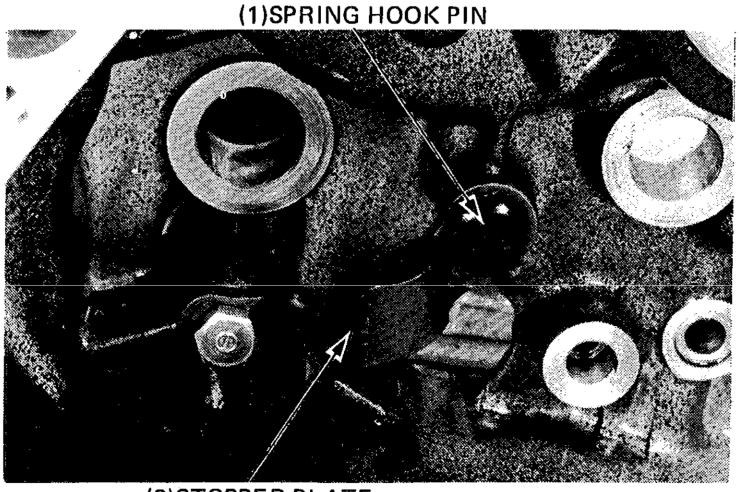
Install the kickstarter stopper plate and tighten the bolt.

**TORQUE: 8–12 N·m**
**(0.8–1.2 kg-m, 6–9 ft-lb)**

Tighten the spring hook pin.

**TORQUE: 22–30 N·m**
**(2.2–3.0 kg-m, 16–22 ft-lb)**

(1)SPRING HOOK PIN



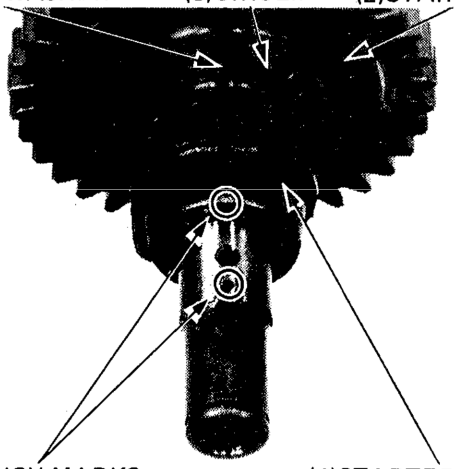
(2)STOPPER PLATE

Install the 24 mm circlip, thrust washer, starter pinion, thrust washer and 22 mm circlip.
Install the starter ratchet, ratchet spring and thrust washer.

NOTE

Align the ratchet punch mark with the spindle punch mark.

(1)THRUST WASHER (3)CIRCLIP (2)STARTER PINION



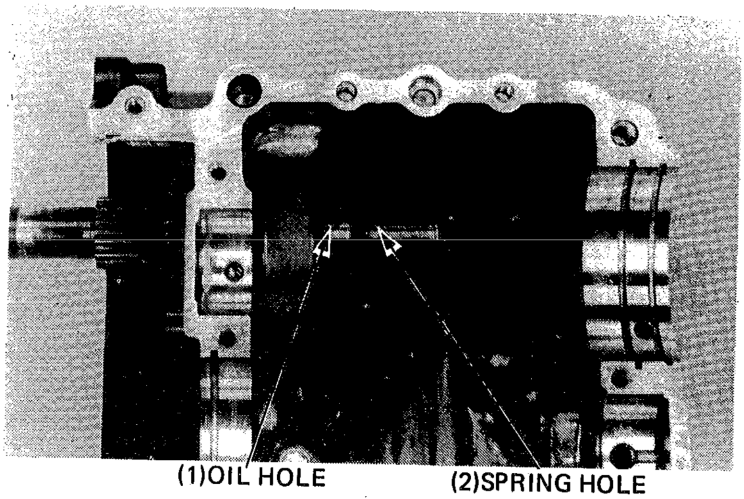
(5)PUNCH MARKS (4)STARTER RATCHET

Install the starter spindle in the crankcase.

NOTE

Install the spindle with the spring hole facing up.

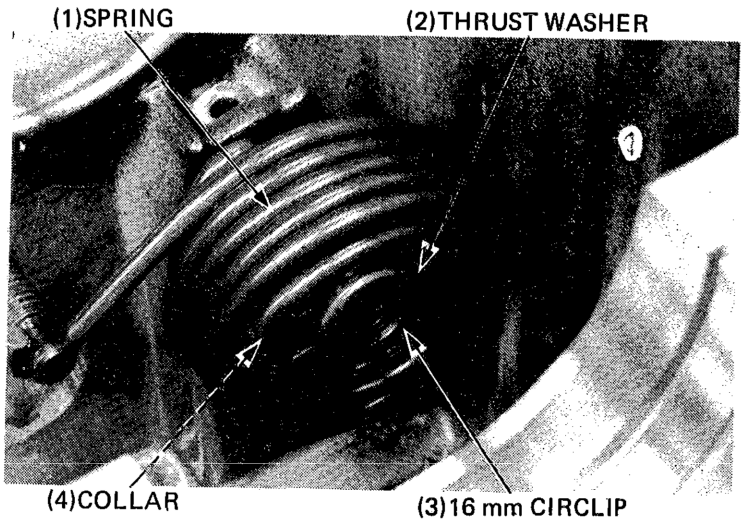
Pour engine oil into the oil hole.
Install the starter spring and collar.




Hook the spring on the spring hook pin.
Install the thrust washer and 16 mm circlip.

NOTE

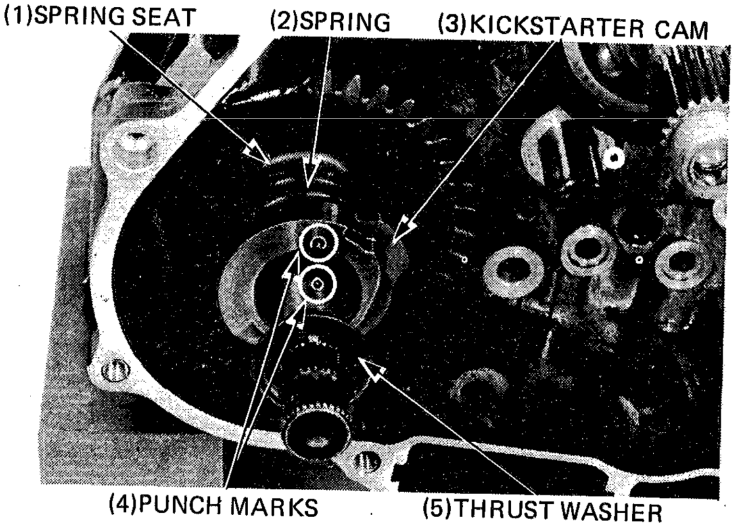
- Install the circlip with the chamfered edge on the outside.
- Make sure the 16 mm circlip fits in the spindle.




Install the spring seat, spring, kickstarter cam and thrust washer.

NOTE

Align the cam punch mark with the spindle punch mark.

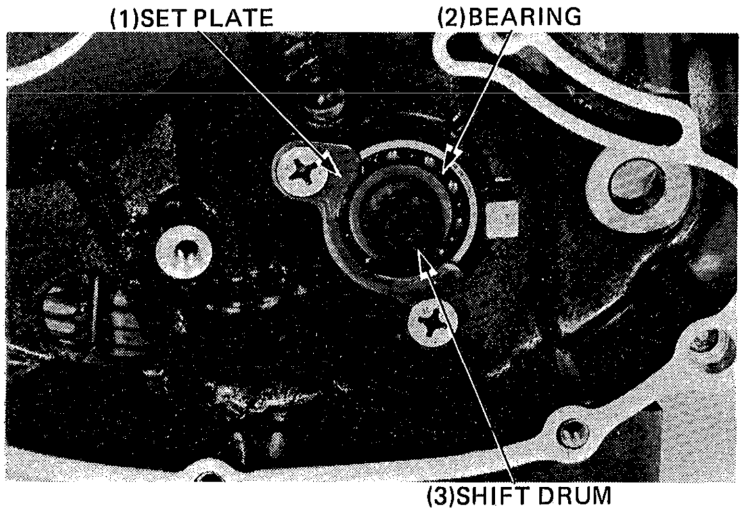


# TRANSMISSION ASSEMBLY

Install the shift drum, bearing and bearing set plate.

NOTE

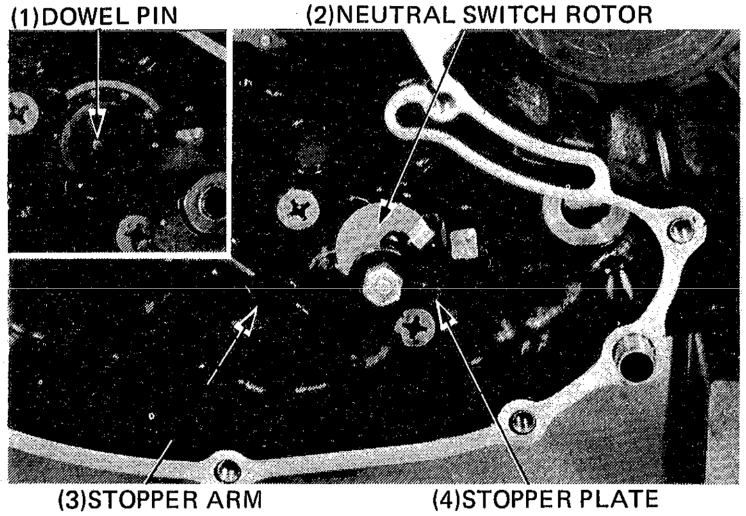
Note the set plate direction.



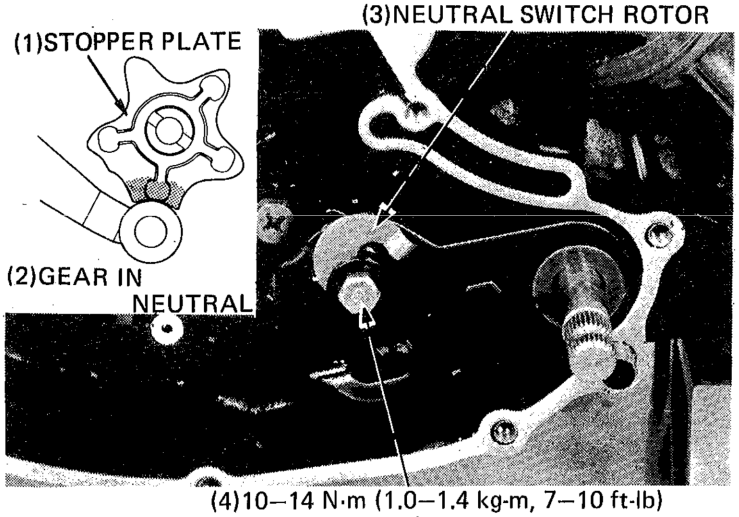

Install the dowel pin, stopper plate and neutral switch rotor.
Install the plain washer and tighten the bolt temporarily.
Install the stopper arm and spring.

NOTE

Check shift drum operation.



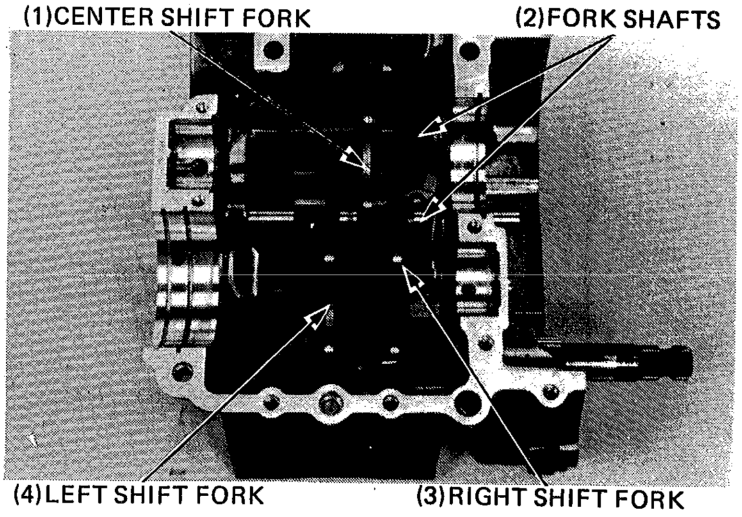

Install the gearshift spindle shift the transmission into neutral and place the neutral switch rotor as shown and tighten the bolt.



Install the right and left shift forks.

NOTE

Do not interchange the right and left shift forks.




Install the center shift fork.

NOTE

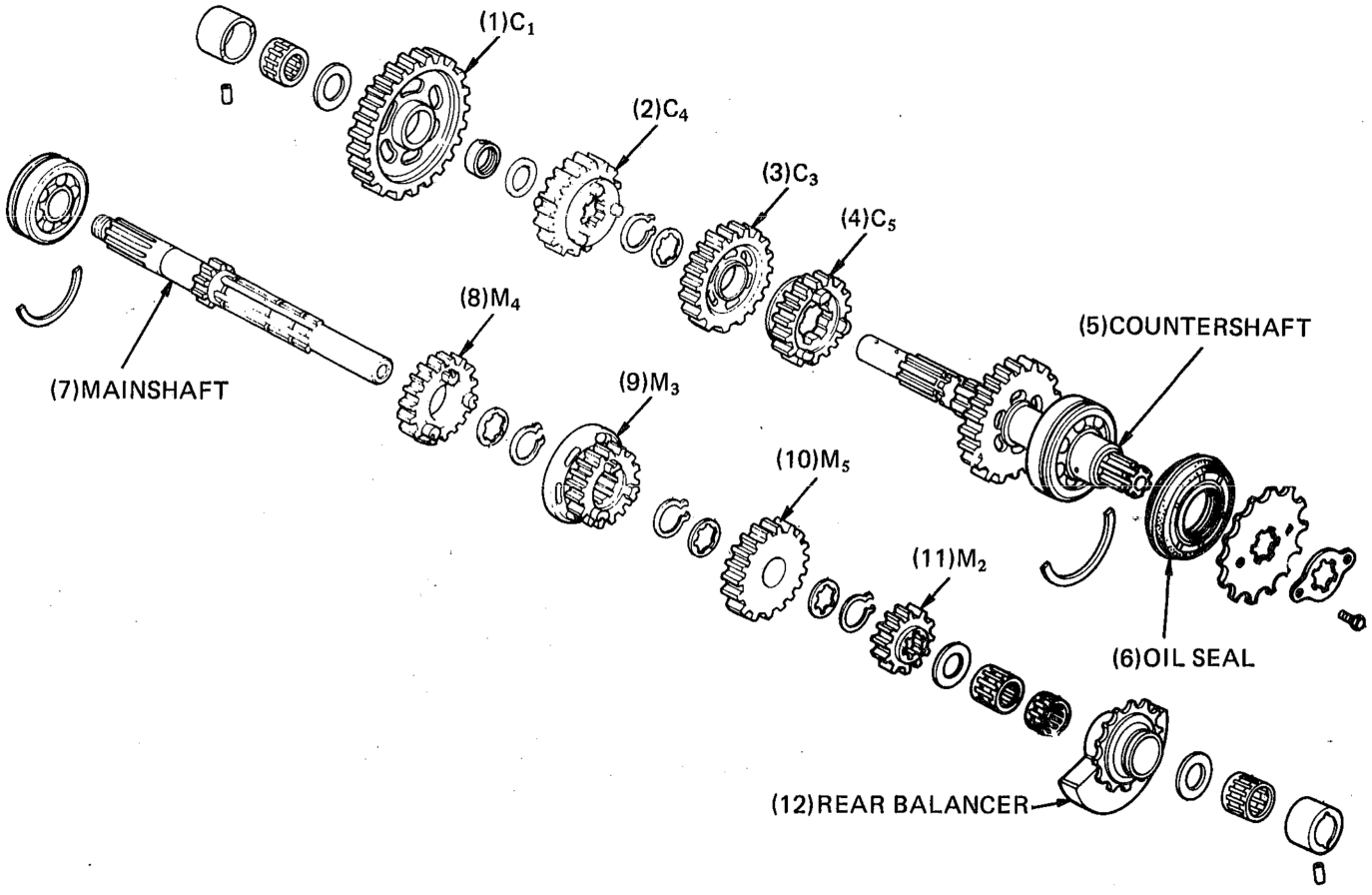
After installing, check for smooth operation.

- TRANSMISSION GEAR ASSEMBLY

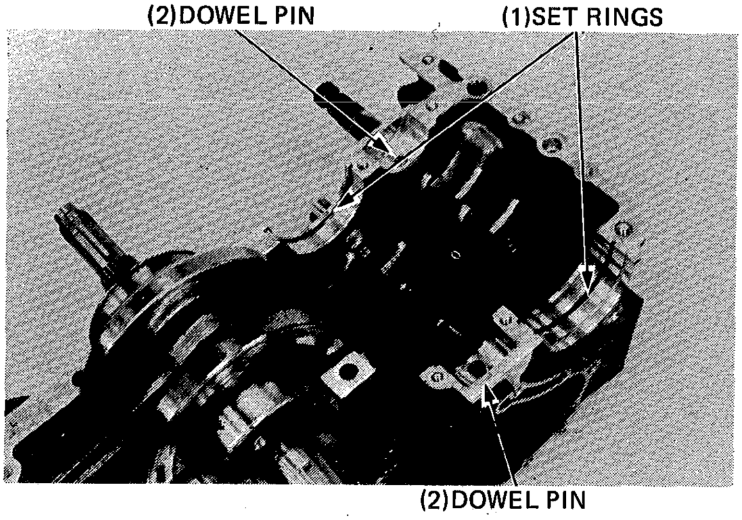
Install each transmission gear.

NOTE

Coat each gear with engine oil before assembling.



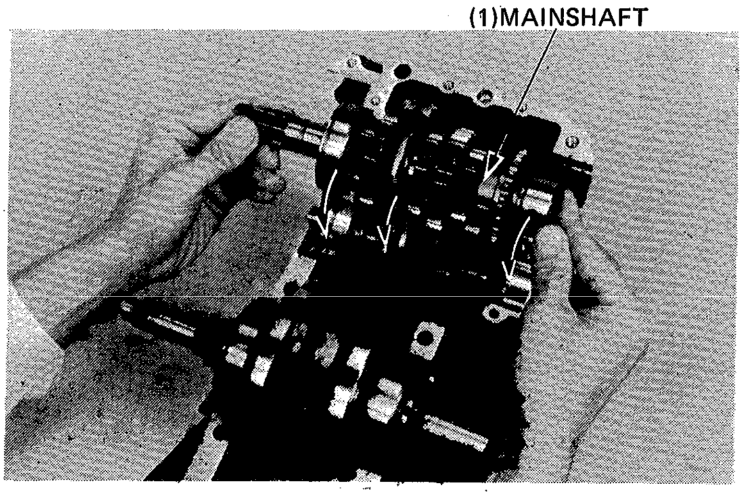
Install the bearing dowel pins and set rings in the lower case.




Install the mainshaft.

NOTE

- Align the dowel pin with the needle bearing outer race.
- Be sure the set ring fits in the bearing outer race.

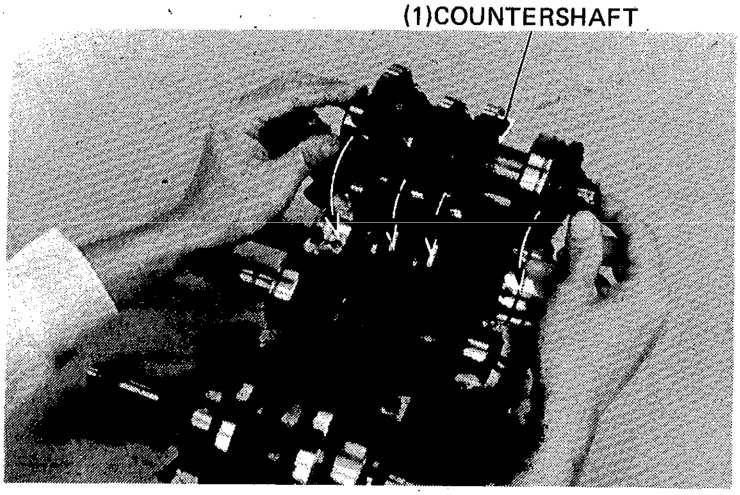



Install the countershaft assembly in the lower case.

NOTE

- Align the dowel pin with the needle bearing outer race.
- Fit the set ring in the ball bearing outer race.
- Make sure the oil seal is seated in the crankcase.

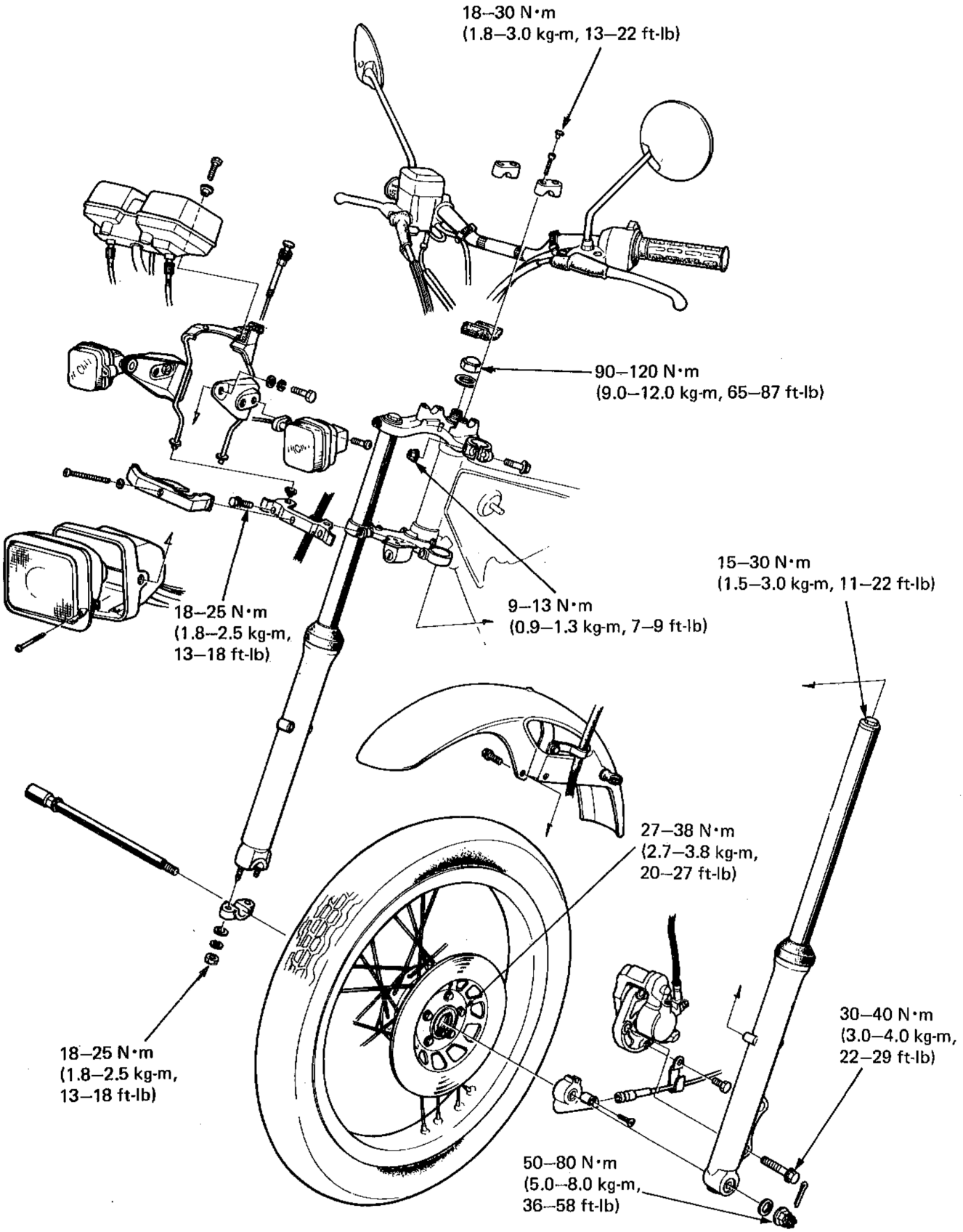
Assemble the crankcase.



# MEMO

# 13. FRONT WHEEL/ STEERING/SUSPENSION

HONDA CB250RS



| | |
|---|---|
| SERVICE INFORMATION | 13–2 |
| TROUBLESHOOTING | 13–3 |
| HEADLIGHT | 13–4 |
| INSTRUMENTS | 13–5 |
| HANDLEBAR | 13–6 |
| FRONT WHEEL | 13–7 |
| FRONT FORK | 13–12 |
| STEERING STEM | 13–18 |

# SERVICE INFORMATION

## • WORKING PRACTICE

A jack or other support is required to support the motorcycle.

## • SPECIAL TOOLS

| | |
|---|---|
| 6 mm Hollow set wrench | No. 07917–3230000 |
| Ball race driver | No. 07946–3290000 |
| Ball race remover | No. 07953–3330000 |

## • COMMON TOOLS

| | |
|---|---|
| Hook spanner | No. 07702–0010000 |
| Box wrench 30 x 32 mm | No. 07716–0020400 |
| Extension bar | No. 07716–0020500 |
| Bearing driver handle outer A | No. 07749–0010000 |
| Bearing driver outer 42 x 47 mm | No. 07746–0010200 |
| Driver pilot 15 mm | No. 07746–0040300 |
| Fork seal driver body | No. 07747–0010100 |
| Fork seal driver attachment D | No. 07747–0010500 |

## • SPECIFICATIONS

| ITEM | | STANDARD | SERVICE LIMIT |
|---|---|---|---|
| Axle shaft runout | | — | 0.2 mm (0.008 in) |
| Front wheel rim runout | Radial | — | 2.0 mm (0.08 in) |
| | Axial | — | 2.0 mm (0.08 in) |
| Front fork spring free length | | 495.2 mm (19.5 in) | 477 mm (18.8 in) |
| Front fork slider I.D. | | — | 0.2 mm (0.008 in) |
| Front fork tube bend | | 44.2 mm (1.74 in) | 39.0 mm (1.54 in) |

Front fork oil: ATF
Front fork oil capacity: 158 ± 2.5 $cm^3$ (158 ± 2.5 cc)

## • TORQUE VALUES

| | |
|---|---|
| Handlebar upper holder | 18–30 N·m (1.8–3.0 kg-m, 13–22 ft-lb) |
| Front spoke | 2.5–5.0 N·m (0.25–0.50 kg-m, 18–36 ft-lb) |
| Front brake disc | 27–38 N·m (2.7–3.8 kg-m, 20–27 ft-lb) |
| Front axle nut | 50–80 N·m (5.0–8.0 kg-m, 36–58 ft-lb) |
| Front axle holder nut | 18–25 N·m (1.8–2.5 kg-m, 13–18 ft-lb) |
| Fork bolt | 15–30 N·m (1.5–3.0 kg-m, 11–22 ft-lb) |
| Fork top bridge | 9–13 N·m (0.9–1.3 kg-m, 7–9 ft-lb) |
| Fork bottom bridge | 18–25 N·m (1.8–2.5 kg-m, 13–18 ft-lb) |
| Steering stem nut | 90–120 N·m (9.0–12.0 kg-m, 65–87 ft-lb) |
| Front caliper | 30–40 N·m (3.0–4.0 kg-m, 22–29 ft-lb) |

# TROUBLESHOOTING

**Hard Steering**
1. Steering stem nut too tight
2. Faulty steering stem bearings
3. Damaged steering stem ball race and/or cone race
4. Insufficient tire pressure

**Steers to One Side or Does Not Track Straight**
1. Misadjusted shock absorbers
2. Bent front forks
3. Bent front axle, wheel installed incorrectly

**Front Wheel Wobbling**
1. Distorted rim
2. Worn front wheel bearing
3. Distorted spokes
4. Faulty tire
5. Axle not tightened properly

**Soft Suspension**
1. Weak fork spring
2. Insufficient fluid in front forks

**Hard Suspension**
1. Incorrect fluid weight in front forks

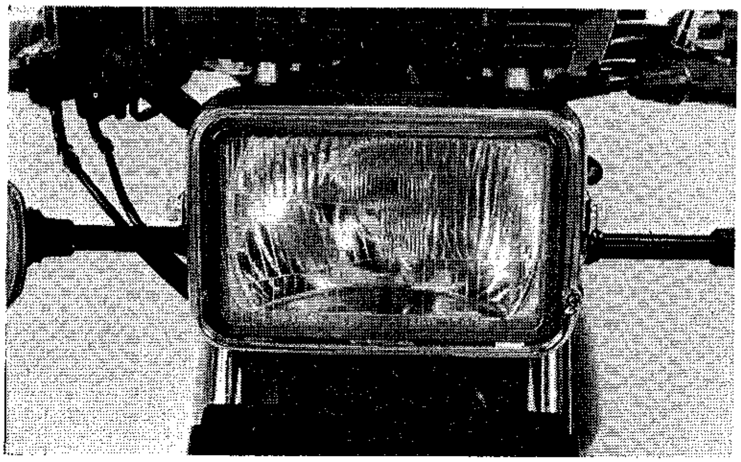
**Front Suspension Noise**
1. Slider binding
2. Insufficient fluid in forks
3. Loose front fork fasteners

# HEADLIGHT

## • HEADLIGHT CASE REMOVAL

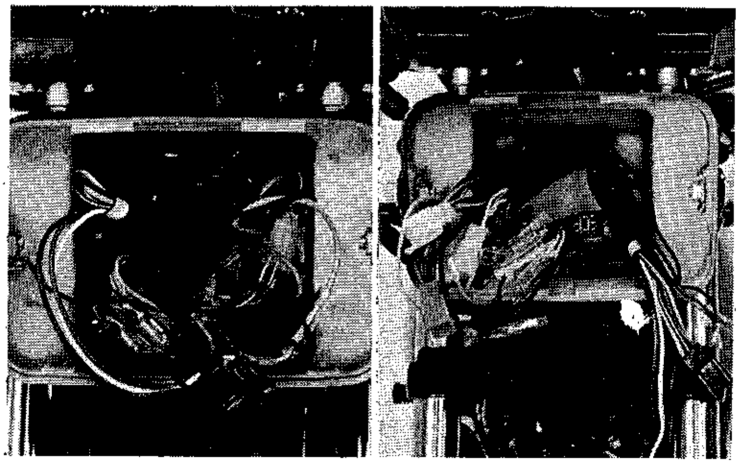
Remove the headlight and disconnect all wires at their couplers and connectors.

Unscrew the headlight case mounting bolts and remove the headlight case.



## • WIRING CONNECTION IN HEADLIGHT CASE

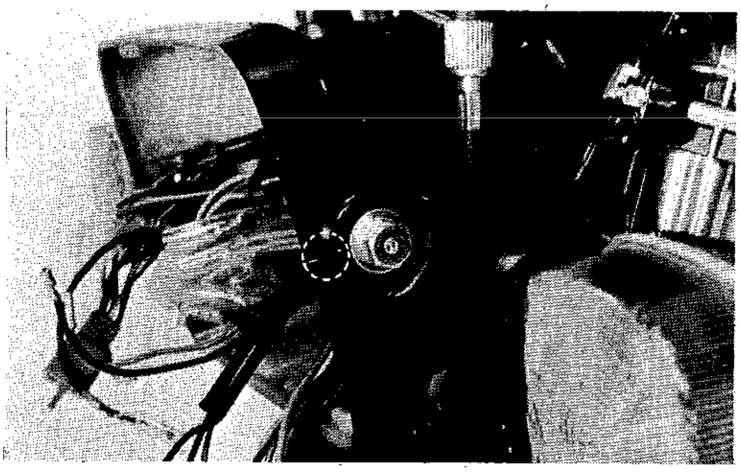
Route the switch and meter light wires into the headlight case through the upper hole.
Route the wire harness into the headlight case through the lower hole.
Connect the color coded wires and the couplers.
For wiring routing, see page 1-15.



## • HEADLIGHT CASE INSTALLATION

Align the punch marks on the headlight case with the punch marks on the headlight case brackets.

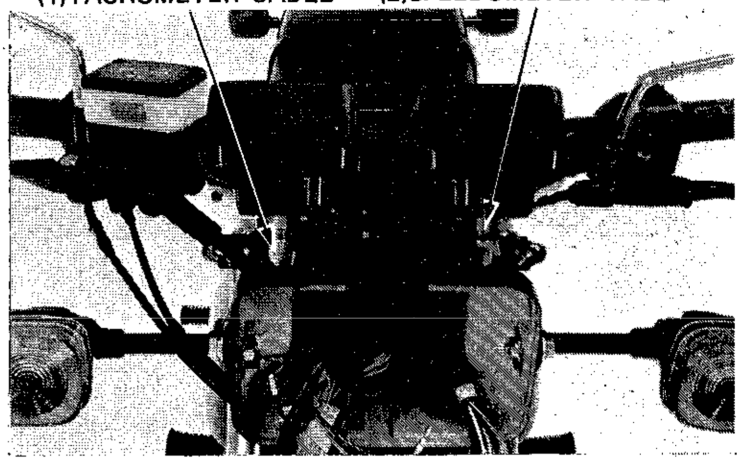
Check all electrical equipment.



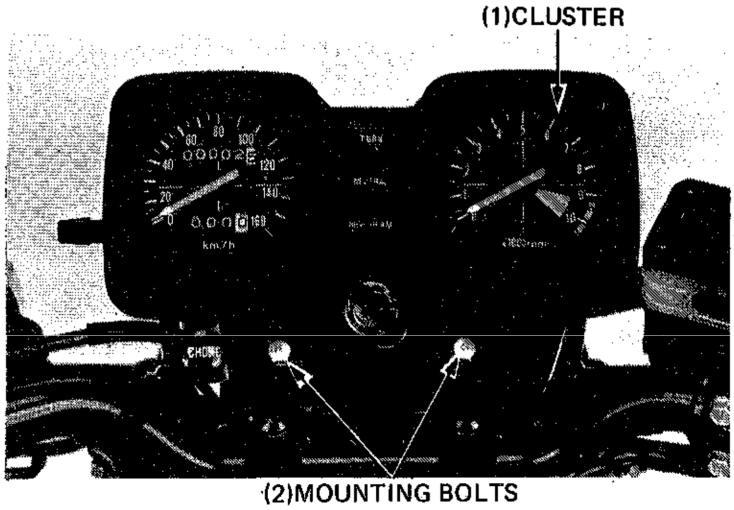
# INSTRUMENTS

## • CLUSTER REMOVAL

Remove the headlight.
Disconnect the wires at the couplers and connectors.
Disconnect the speedometer and tachometer cables.




Remove the mounting bolts.
Remove the cluster.

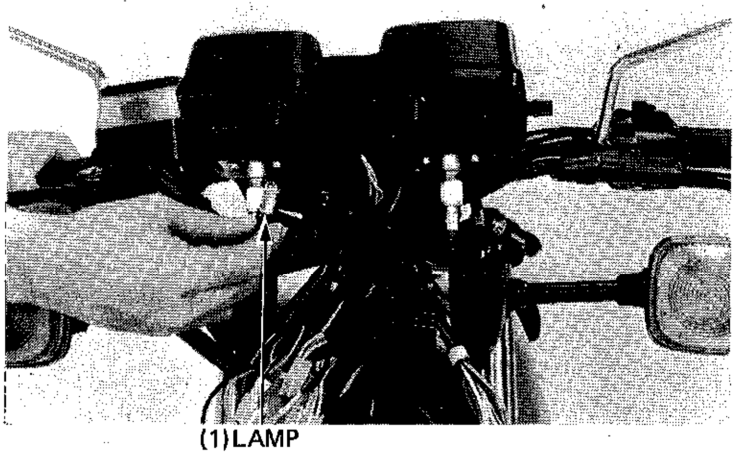



## • INDICATOR/METER LAMP REPLACEMENT

Remove the headlight case.
Replace the indicator or meter bulb.

NOTE

Check the meter wires if a new bulb will not come on.



# HANDLEBAR

## • HANDLEBAR REMOVAL

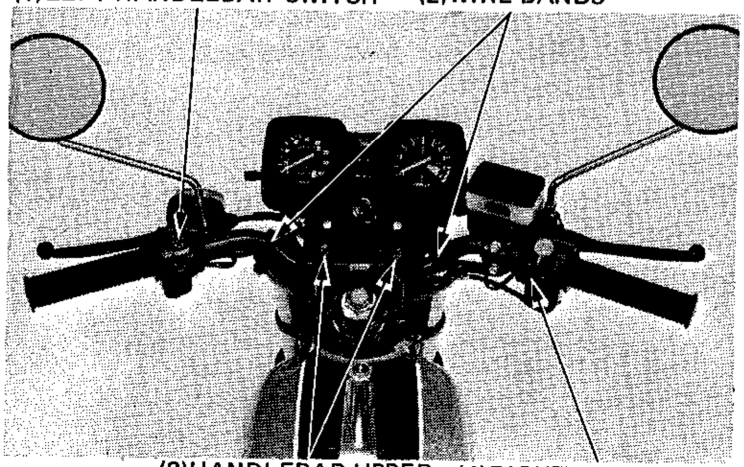
Remove the wire bands.
Disconnect the front stoplight switch wire.
Remove the master cylinder.

NOTE

Do not loosen the brake hose unless this operation will require it.

Remove the right handlebar switch housing and throttle grip together.
Remove the left handlebar switch housing and clutch lever.
Remove the handlebar upper holders.
Remove the handlebar.

(1)LEFT HANDLEBAR SWITCH (2)WIRE BANDS



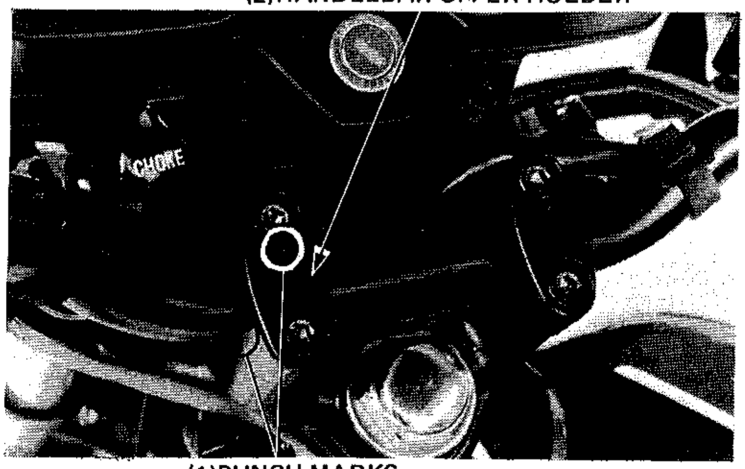
(3)HANDLEBAR UPPER HOLDER (4)RIGHT HANDLEBAR SWITCH

## • HANDLEBAR INSTALLATION

Install the handlebar on the lower handlebar holder by aligning the punch mark with the top of the lower holder.
Place the upper holders on the handlebar with the punch marks facing the front.
Tighten the forward bolts first, then tighten the rear bolts.

**TORQUE: 18–30 N·m**
**(1.8–3.0 kg-m, 13–22 ft-lb)**

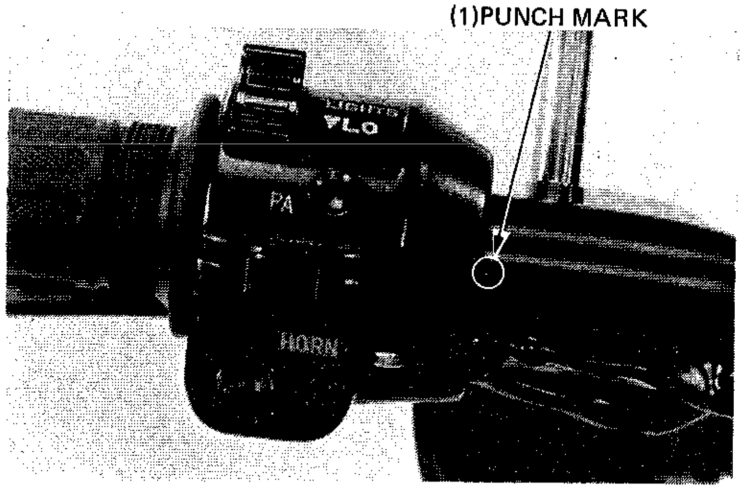
(2)HANDLEBAR UPPER HOLDER



(1)PUNCH MARKS

Install the left handlebar switch by aligning the split of the switch housing with the punch mark on the handlebar.
Tighten the forward screw first then tighten the rear screw.

(1)PUNCH MARK



Apply grease to the sliding surface of the throttle grip.
Install the right handlebar switch with the throttle grip by aligning the split of the switch housing with punch mark on the handlebar.
Tighten the forward screw first the tighten the rear screw.

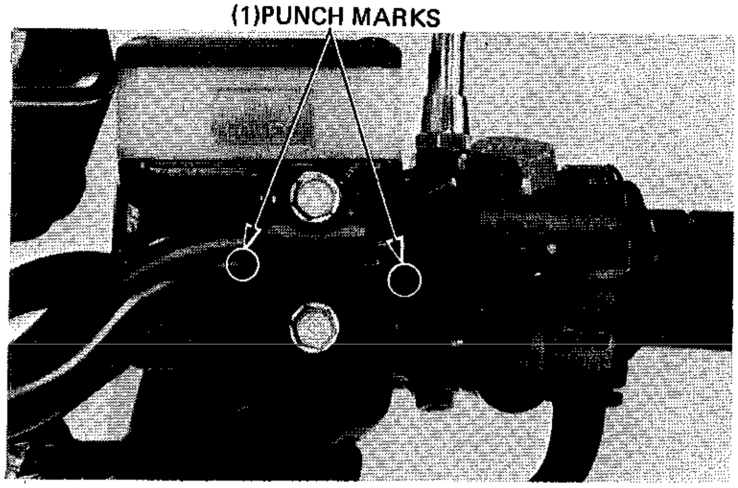
Install the master cylinder by aligning the boss of the master cylinder holder with the punch mark of the handlebar.

NOTE

Install the master cylinder holder by facing the cutout to bottom.

Connect the front brakelight switch wire.

(1)PUNCH MARKS

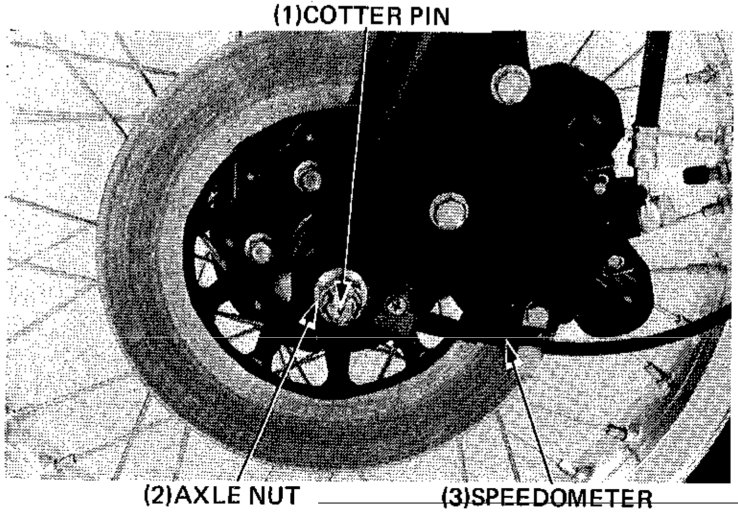


# FRONT WHEEL

## • FRONT WHEEL REMOVAL

Raise the front wheel off the ground by placing a padded block or safety stand under the engine.
Disconnect the speedometer cable from the speedometer gearbox.
Pry off the cotter pin and remove the axle nut.

(1)COTTER PIN



(2)AXLE NUT

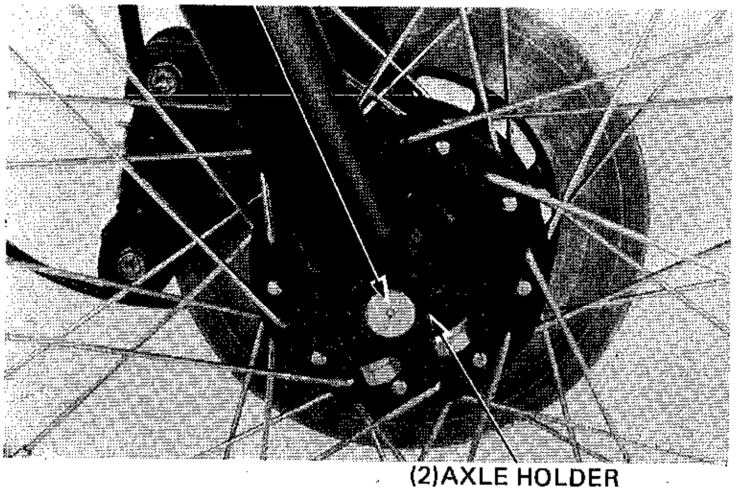
(3)SPEEDOMETER CABLE

Remove the axle holder from the fork end.
Withdraw the axle and remove the wheel.

NOTE

Do not operate the front brake lever after removing the front wheel. Failure to do so will cause difficulty to fit the brake disc between the brake pads.

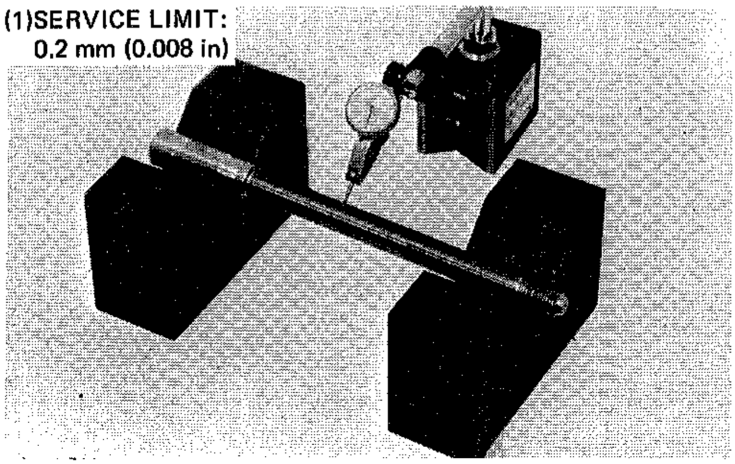
(1)FRONT AXLE



(2)AXLE HOLDER

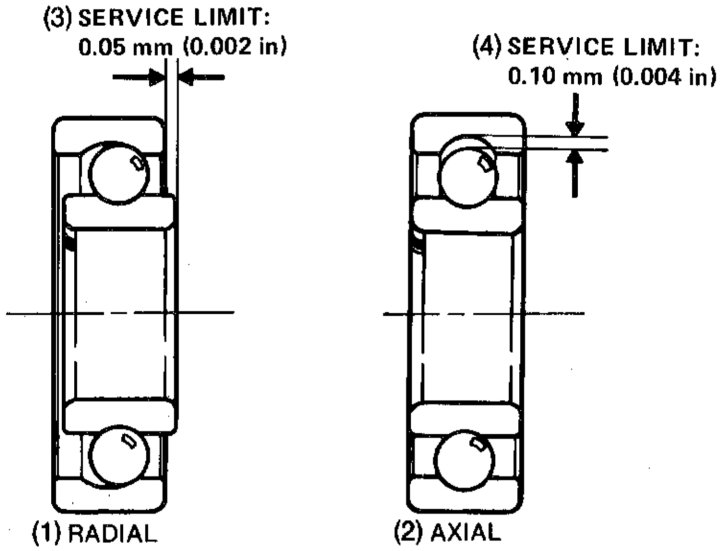
## • AXLE INSPECTION

Set the axle in V blocks and measure the runout.
The actual runout is 1/2 of TIR (Total Indicator Reading).




## • WHEEL BEARING INSPECTION

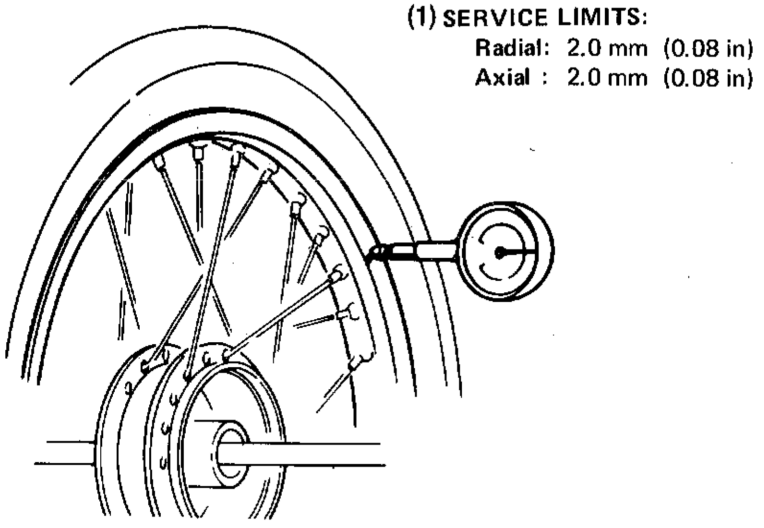
Check the wheel bearing play by placing the wheel in a truing stand and spinning the wheel by hand.
Replace the bearings with new ones if they are noisy or have excessive play.



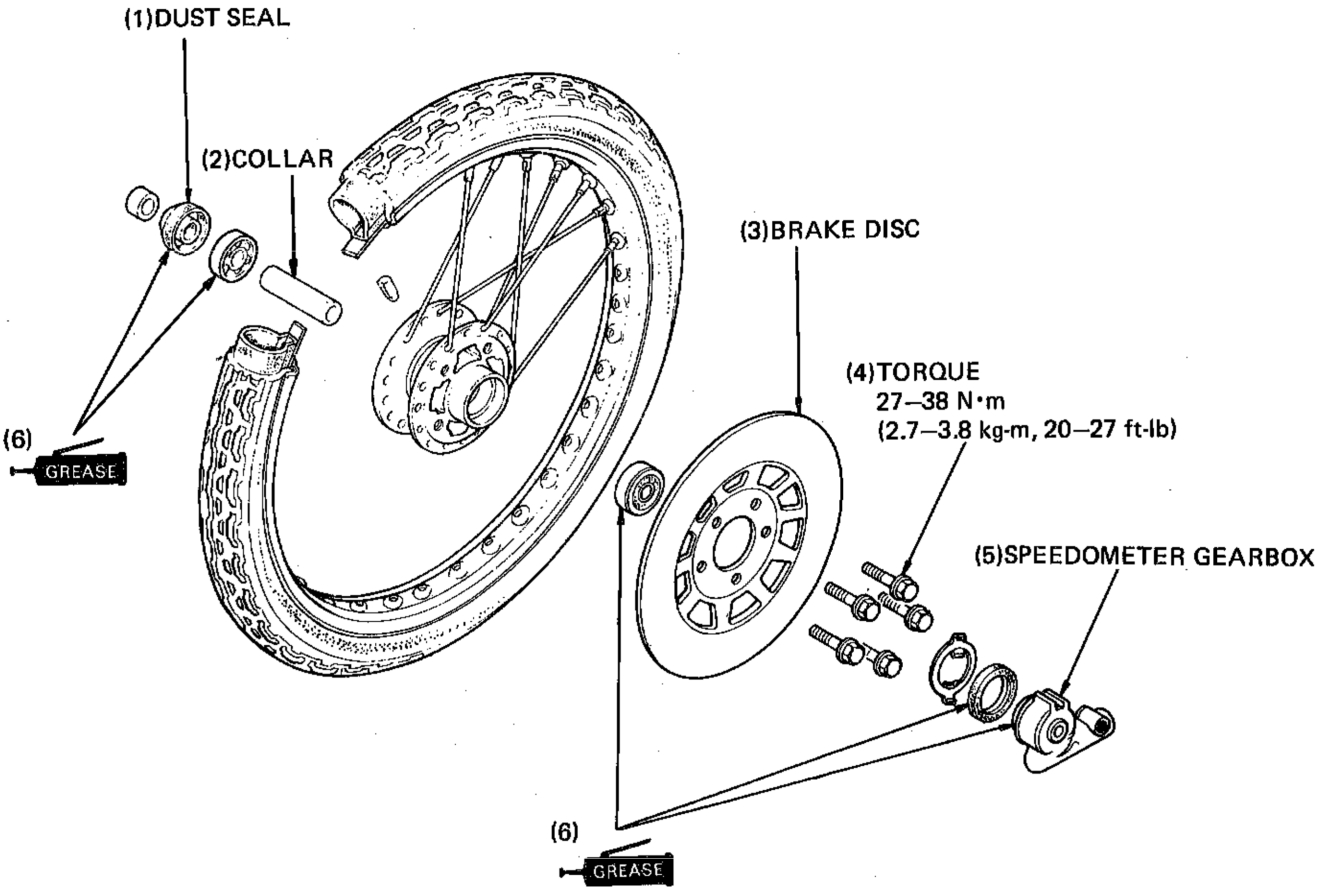

## • WHEEL INSPECTION

Check the rim runout by placing the wheel in a truing stand. Then spin the wheel by hand, and read the runout using a dial indicator gauge.
Check for loose spokes.

**TORQUE: 2.5–5.0 N·m (25–50 kg-cm)**



## • FRONT WHEEL DISASSEMBLY




## • FRONT WHEEL ASSEMBLY

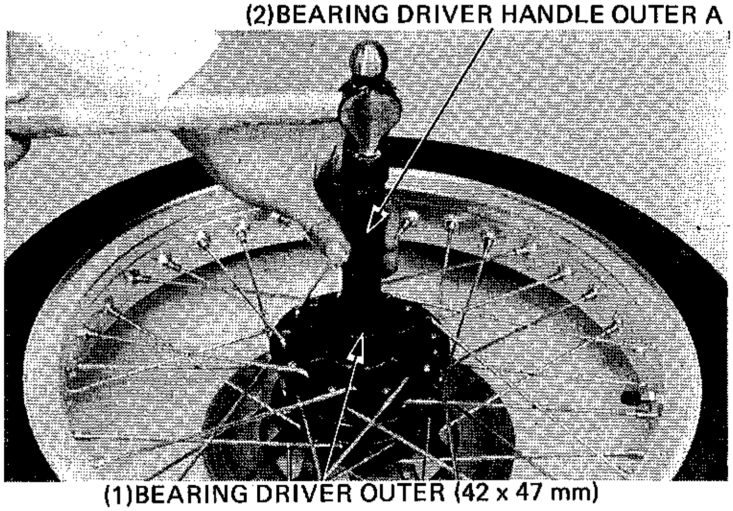
Pack all bearing cavities with grease.
Drive in the right bearing.
Install the distance collar.
Drive in the left bearing.

NOTE

Install the bearings with the sealed end toward the outside. Be sure to drive the bearing squarely.

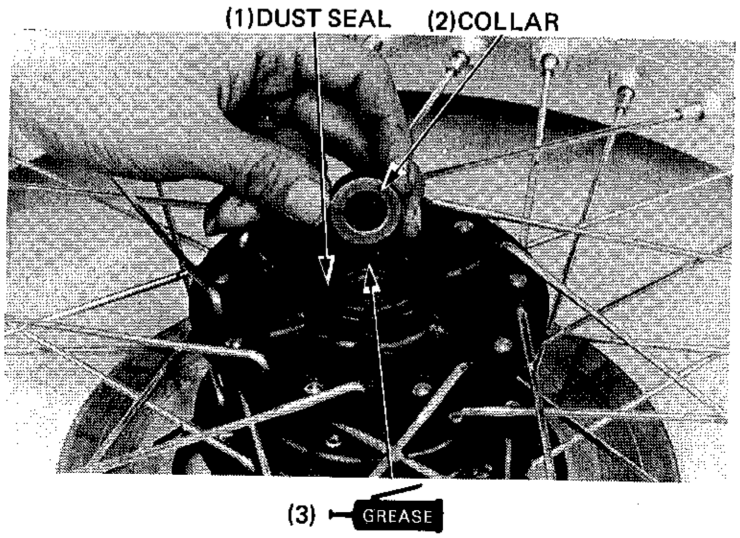
*WARNING*

- ***Keep grease off the brake disc.***
- ***Contaminated brake pads reduce stopping power.***

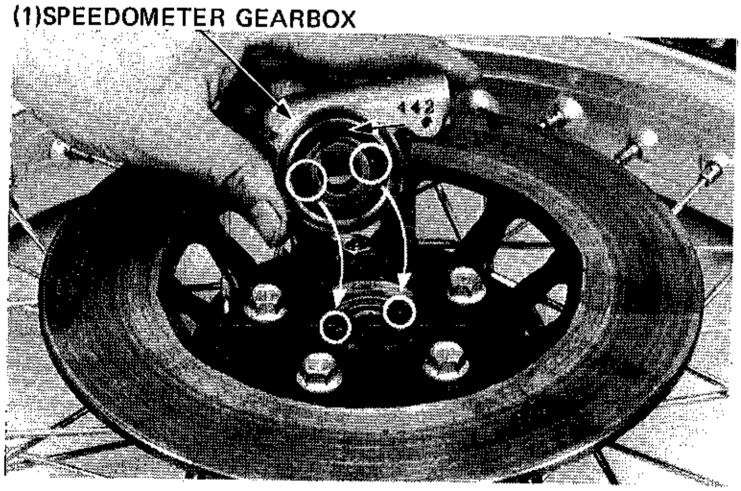



(1)BEARING DRIVER OUTER (42 x 47 mm)
(3)DRIVER PILOT 15 mm

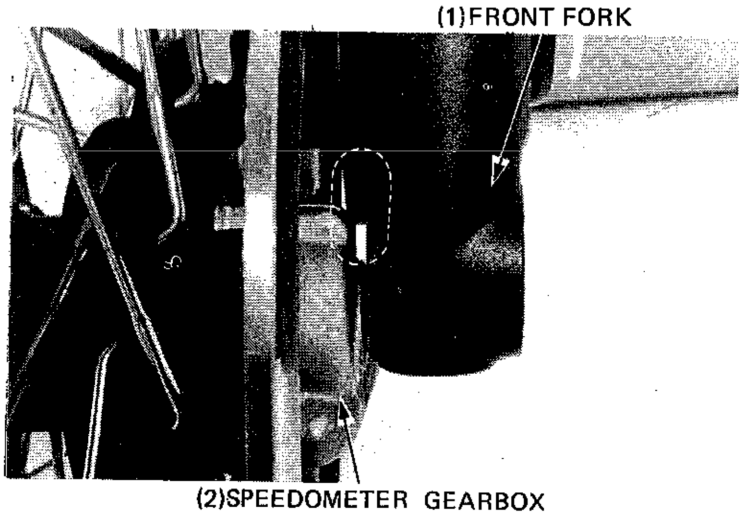
Apply grease to the inside of the dust seal.
Install the dust seal and collar.




Install the speedometer gear retainer in the hub from the left side.
Lubricate the inside of the oil seal and install.
Disassemble the speedometer gearbox and lubricate the gears and sliding faces.
Install the speedometer gear in the wheel hub, aligning the speedometer gearbox tangs with the notches in the retainer.

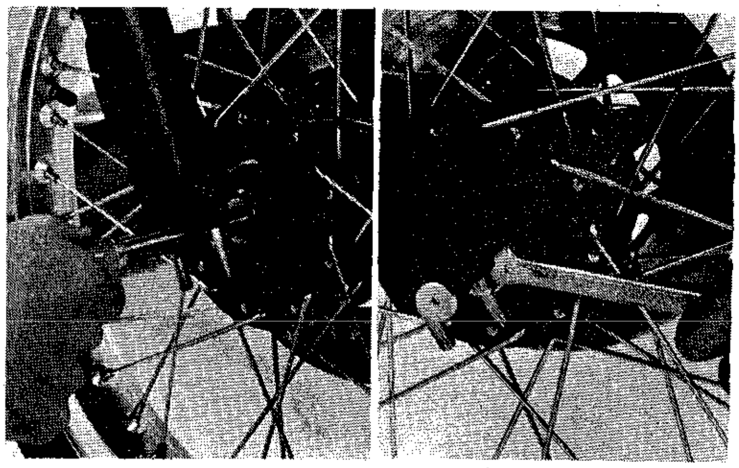



Install the front wheel.
Align the groove of the speedometer with the boss of the left front fork bottom case.



Insert the front axle through the wheel hub from the right side.
Install the plain washer.
Tighten the axle nut.

**TORQUE: 50–80 N·m**
**(5.0–8.0 kg-m, 36–58 ft-lb)**

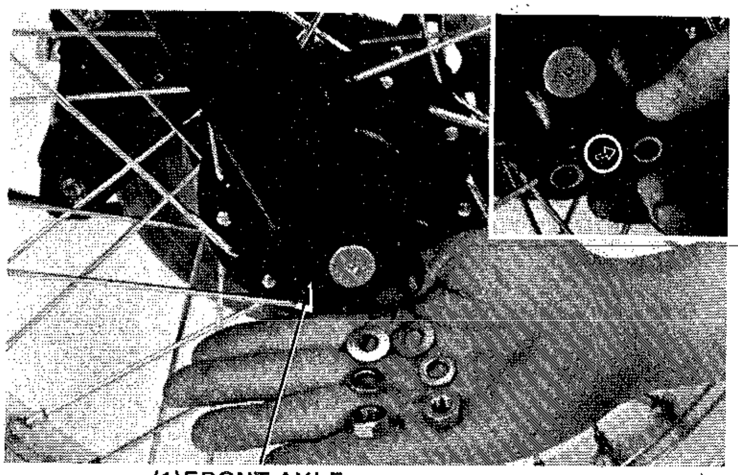


Position the axle holder on the fork end with the arrow mark facing the front.
Tighten the forward nut to the specified torque first, then tighten the rear nut to the same torque.

**TORQUE: 18–25 N·m**
**(1.8–2.5 kg-m, 13–18 ft-lb)**

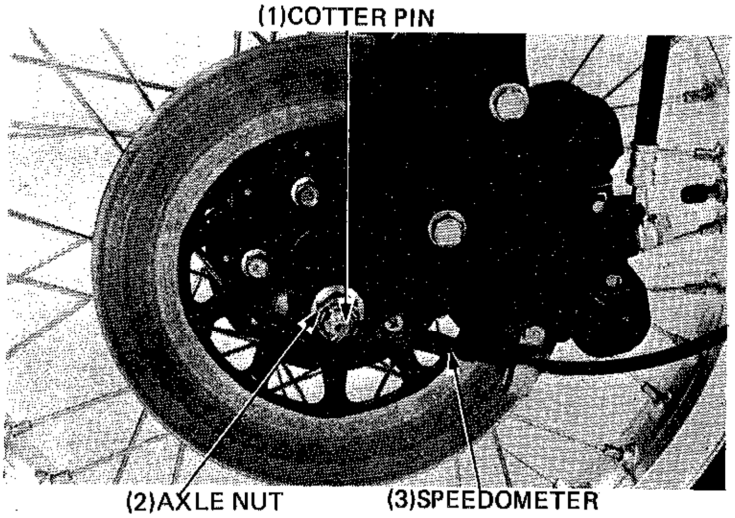
NOTE

Place a stand under the engine to remove load from the front fork. Keep the handlebar straight forward.



(1)FRONT AXLE HOLDER

Connect the speedometer cable to the speedometer gearbox while rotating the wheel by hand.
With the front brake applied, pump the front fork up and down several times to check for proper operation.
Recheck the installation of the axle holder and adjust, if necessary.



(1)COTTER PIN
(2)AXLE NUT
(3)SPEEDOMETER CABLE

# FRONT FORK

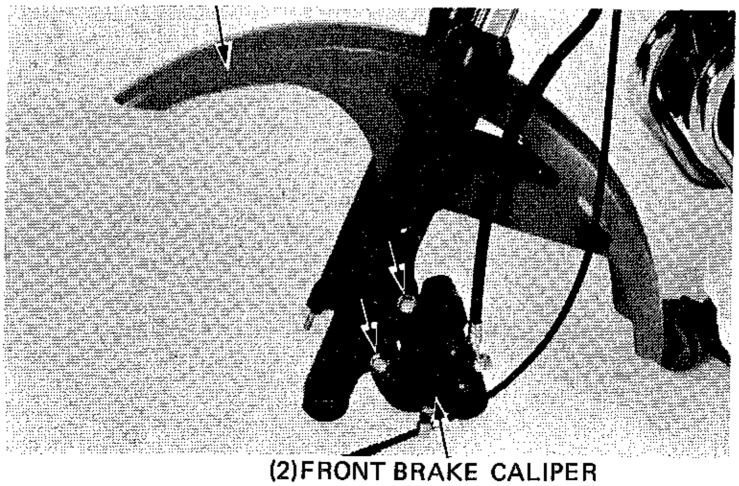
## • FRONT FORK REMOVAL

Remove the front wheel.
Remove the brake caliper by unscrewing the attaching bolts.

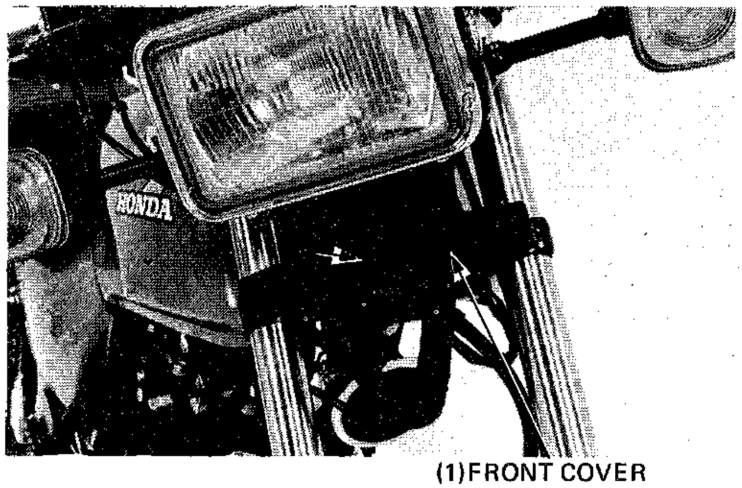
NOTE

Do not loosen the brake hose unless operation requires it.

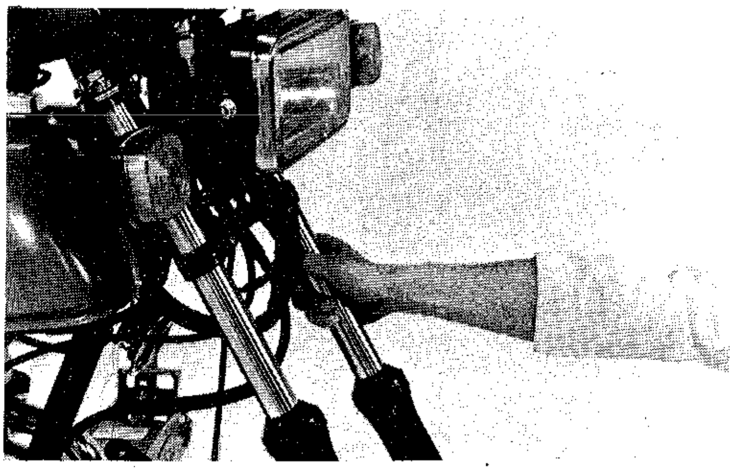
Remove the front fender.




Remove the front cover.




Loosen the top and bottom fork pinch bolts.
Remove the front fork by rotating the fork pipe.



## • FORK DISASSEMBLY

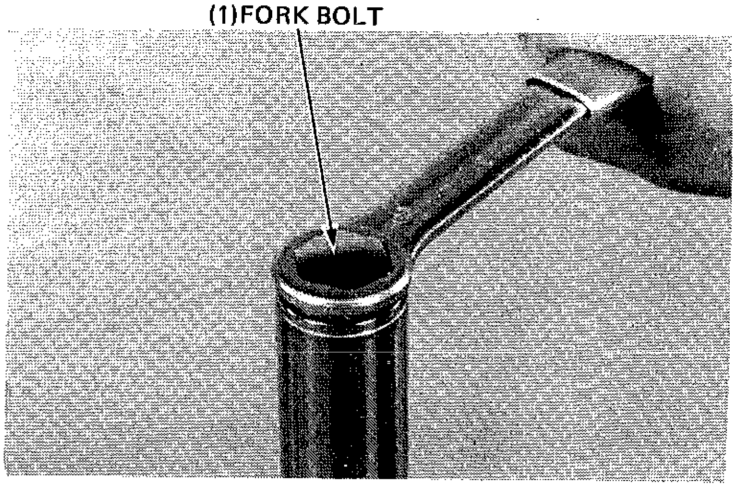
Hold the fork tube in a vice.
Loosen the fork spring bolt.

*CAUTION*
*Hold the fork tube in a vice, avoiding the sliding surface.*

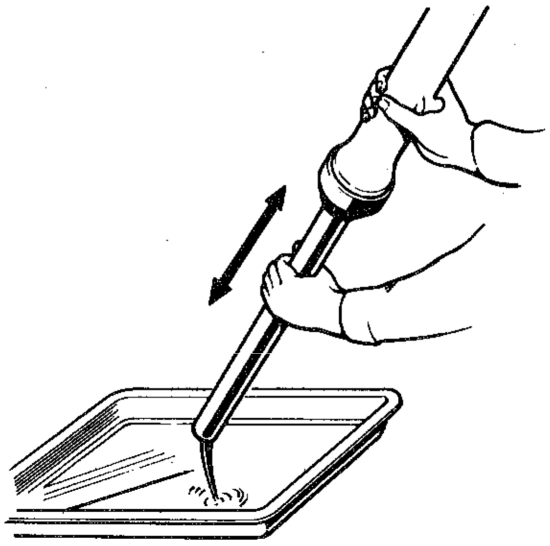
*WARNING*
***Use extra care when loosening the bolt since the spring will pop out.***

Remove the fork spring.

(1)FORK BOLT

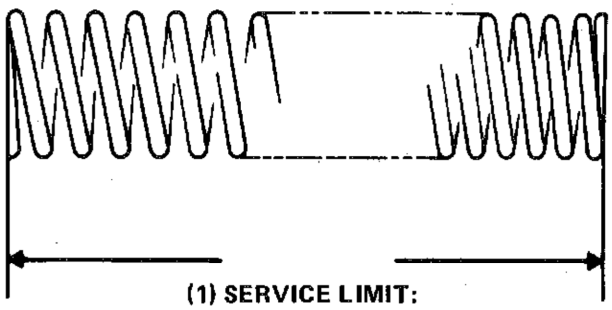


Pour out any remaining fork fluid by pumping the fork up and down several times.



## • FORK SPRING INSPECTION

Measure the fork spring free length.

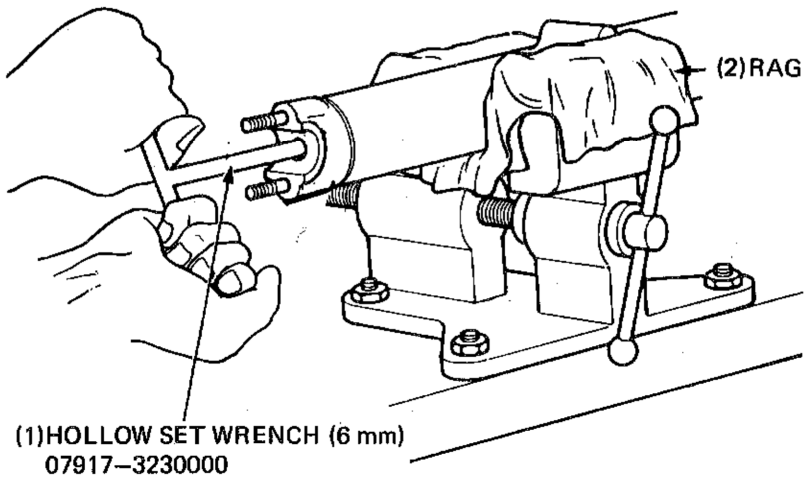


**(1) SERVICE LIMIT:**
**477 mm (18.8 in)**

Hold the fork slider in a vice.
Remove the socket bolt.
Remove the fork tubes and piston.

NOTE

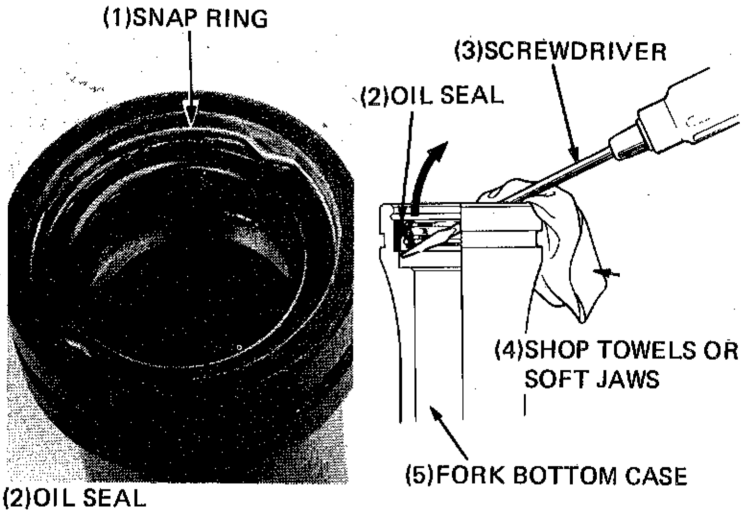
Do not distort the fork slider.
Temporarily install the spring and fork bolt should difficulty be encountered in removing the bolt.




Remove the dust seal.
Remove the set ring.
Carefully lift out the oil seal with a screwdriver.

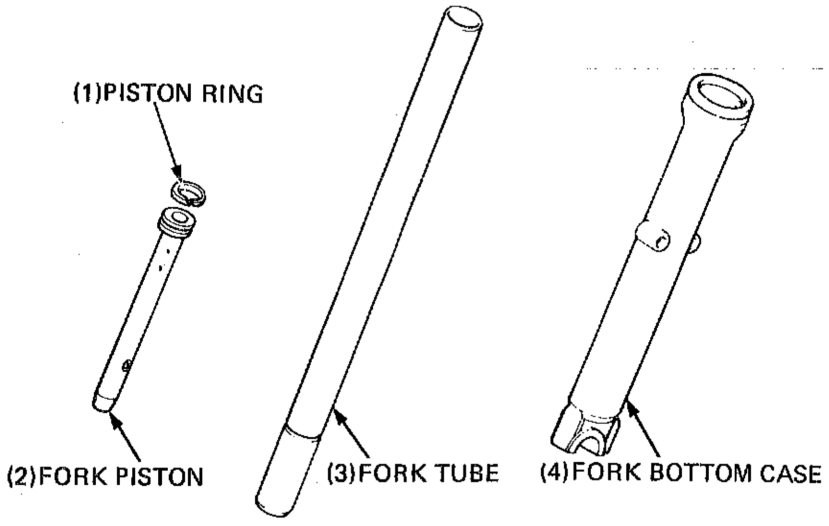
NOTE

Avoid damaging the inner and outer surfaces of the slider when removing the seals and set ring.



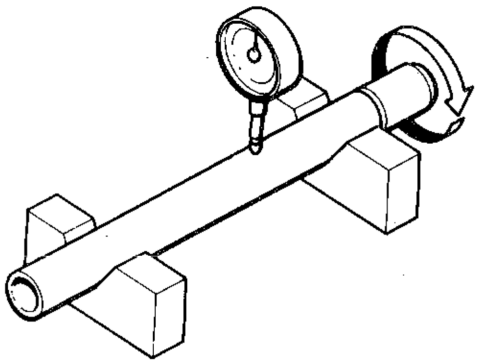

## • FORK TUBE/FORK PISTON INSPECTION

Check the fork tubes, bottom pipes and oil lock pieces for score marks, scratches, or abnormal wear, replacing* those which are worn or damaged.



Set the fork tube in V blocks and read the runout.
Take 1/2 of TIR (Total Indicator Reading) to determine the actual runout.

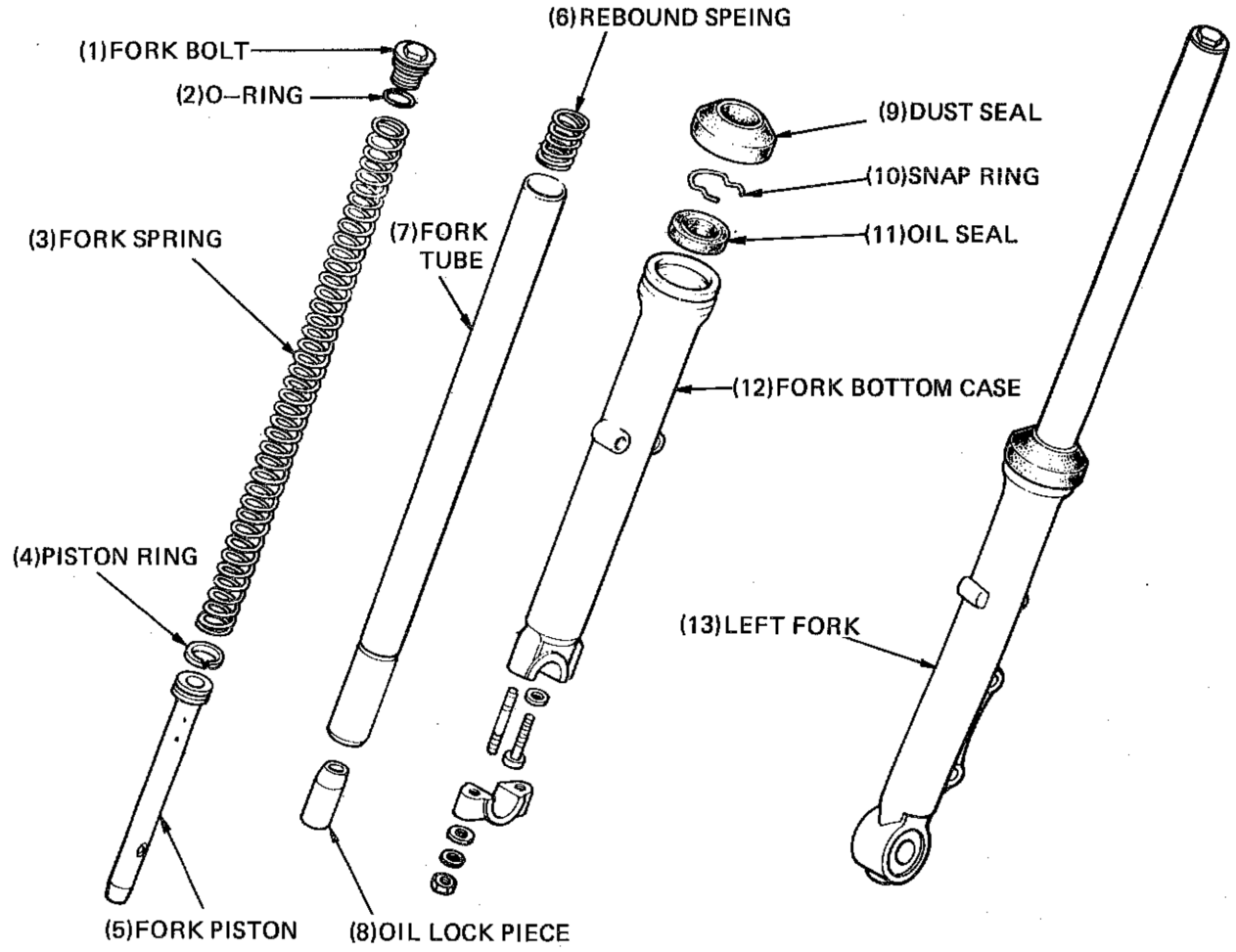
(1) SERVICE LIMIT: 0.2 mm (0.008 in)



- FRONT FORK ASSEMBLY

NOTE

Clean all removed parts in/with solvent and wipe off excess solvent.



NOTE

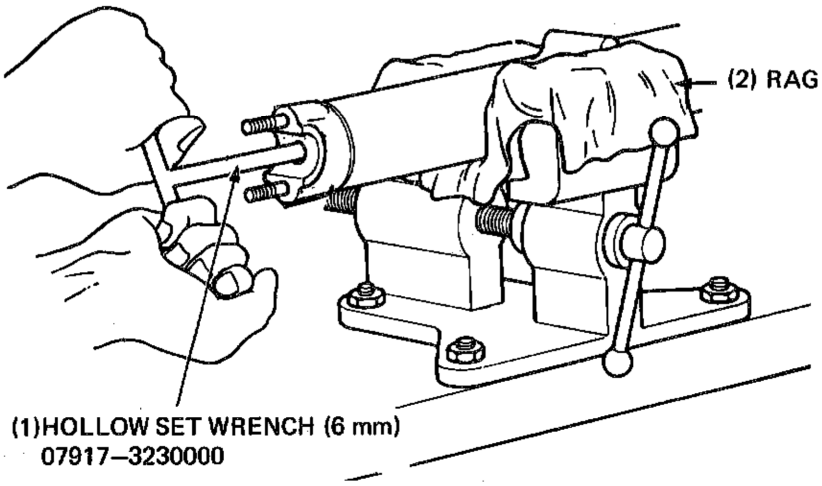
Clean all parts with solvent.

Install the piston, oil lock piece and fork tube. Apply a locking agent to the bolt threads and underside of the bolt, then tighten the bolt.

**TORQUE: 15–25 N·m (1.5–2.5 kg-m, 11–18 ft-lb)**

NOTE

Do not tighten the fork slider excessively in a vise.

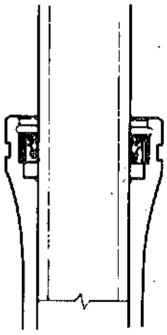



Install the oil seal.

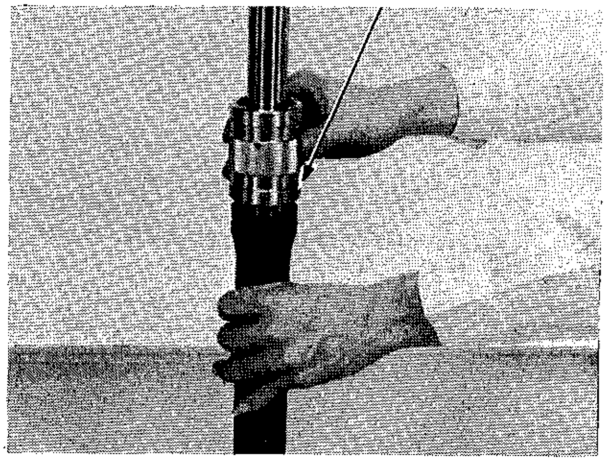
NOTE

Coat the oil seal with ATF (Automatic Transmission Fluid), then drive it in until the snap ring groove appears.

Install the snap ring and dust seal.



(1)FORK SEAL DRIVER BODY
(2)FORK SEAL DRIVER ATTACHMENT D

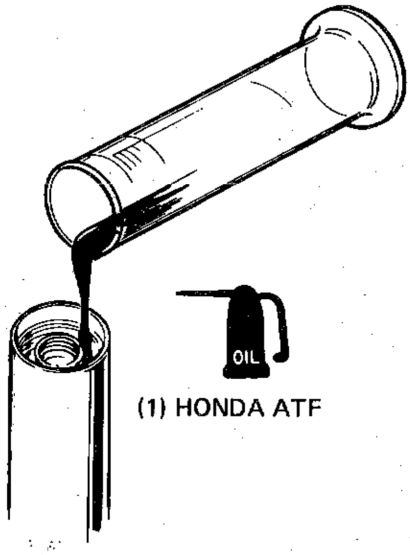


Pour in the specified amount of ATF.

**SPECIFIED FLUID: HONDA ATF**
**CAPACITY: 155.5–160.5 cm³ (5.3–5.4 ozs) at assembly**

NOTE

Do not overfill.

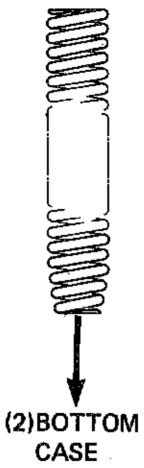


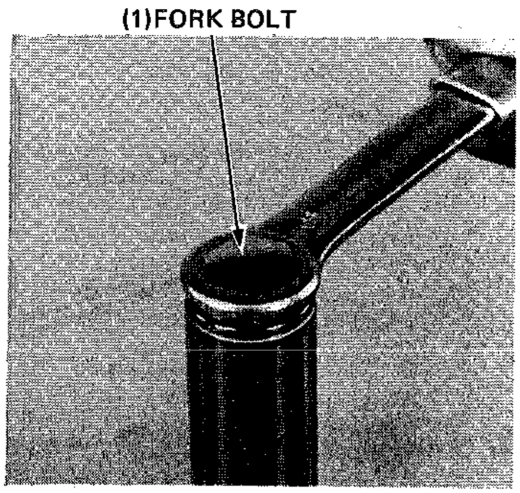

(1) HONDA ATF

Inspect the O-ring and replace if worn or damaged.
Install the fork springs and washer and tighten with the fork bolt.

**TORQUE: 15–30 N·m**
**(1.5–3.0 kg-m, 11–22 ft-lb)**

Install the cap on each fork bolt.

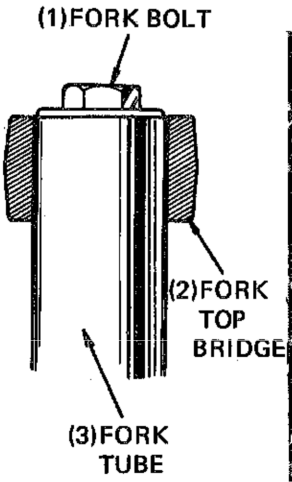


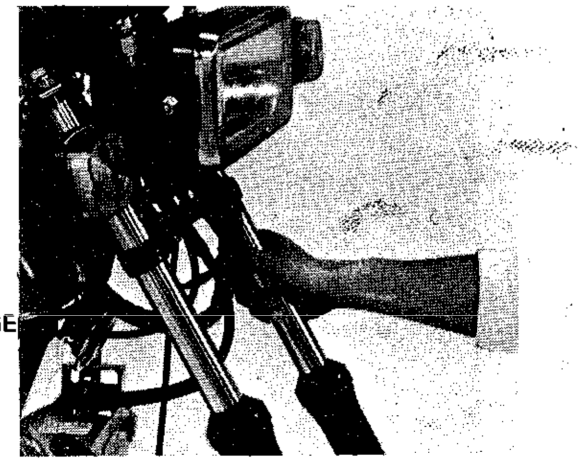




Install the fork tubes in the fork top and bottom bridges while rotating them by hand.

NOTE

Ensure that the top of each tube is in line with the top of the fork top bridge.

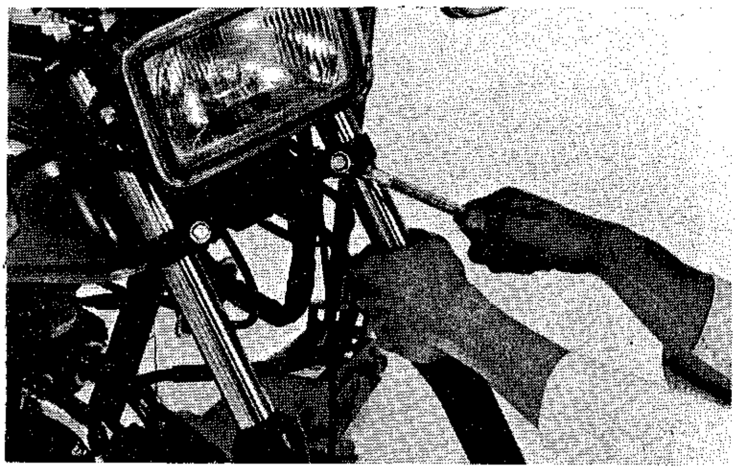


Tighten the fork top and bottom bridge pinch bolts.

**TORQUES:**
**Fork top bridge:**
**9–13 N·m (0.9–1.3 kg-m, 7–9 ft-lb)**
**Fork bottom bridge:**
**18–25 N·m (1.8–2.5 kg-m, 13–18 ft-lb)**

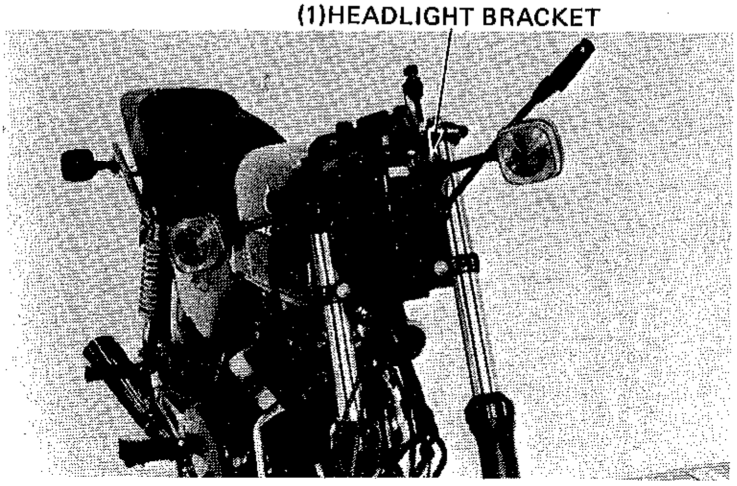
Install the front fender.
Install the front brake caliper.
Install the front wheel (Page 13-12).



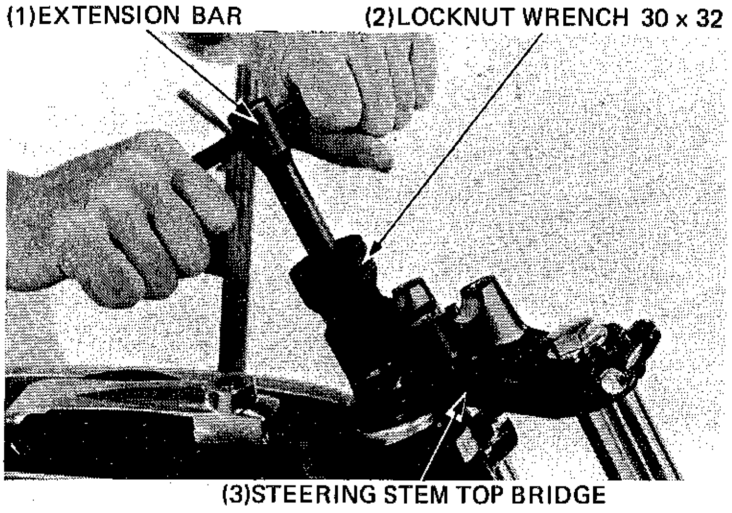
# STEERING STEM

## • FORK TOP BRIDGE REMOVAL

Remove the headlight.
Remove the instruments.
Remove the handlebars.
Remove the headlight bracket with the turn signal light.

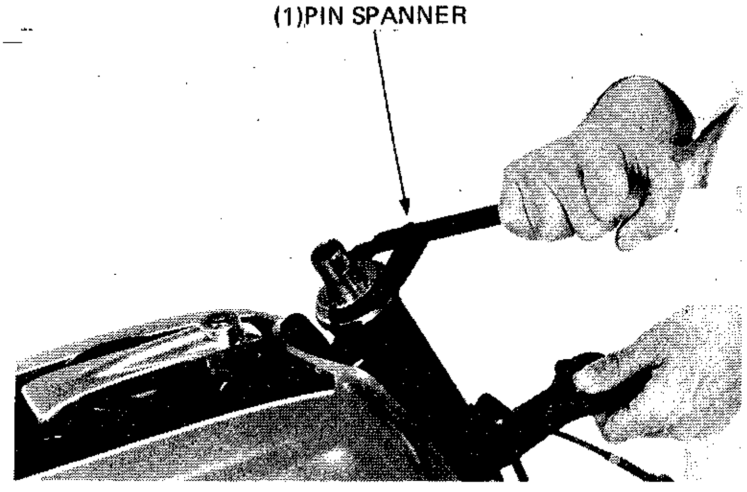



Remove the steering stem nut.
Loosen the top bridge pinch bolts.
Remove the steering stem top bridge.




## • STEERING STEM REMOVAL

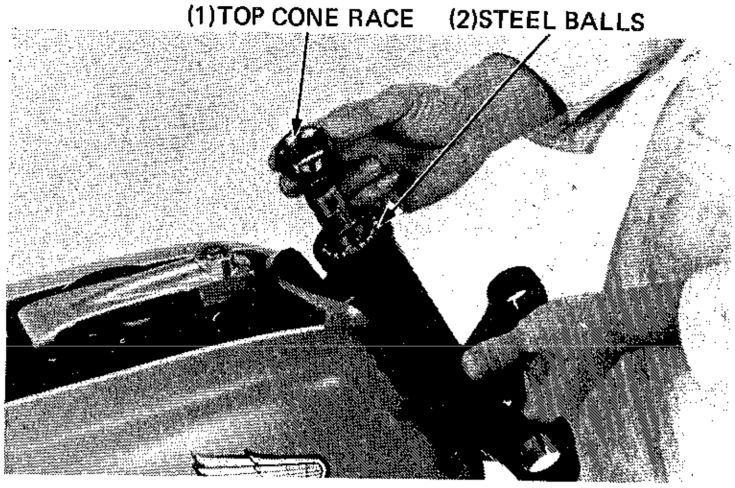
Remove the front forks.
Remove the steering stem top thread.



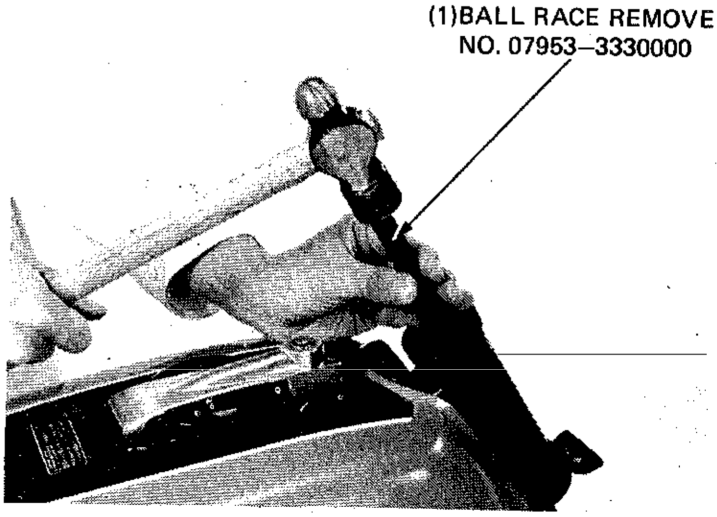
Remove the cone race, steel balls and steering stem.

NOTE

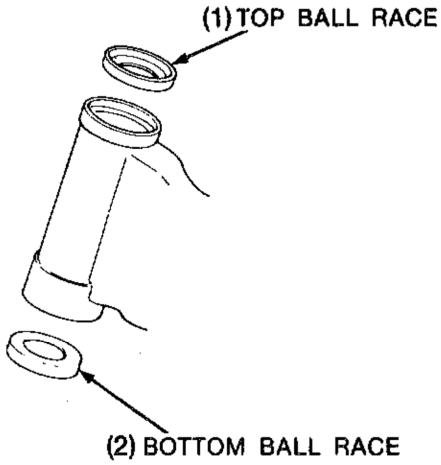
Use caution to prevent the steel balls from falling.




Remove the ball race.

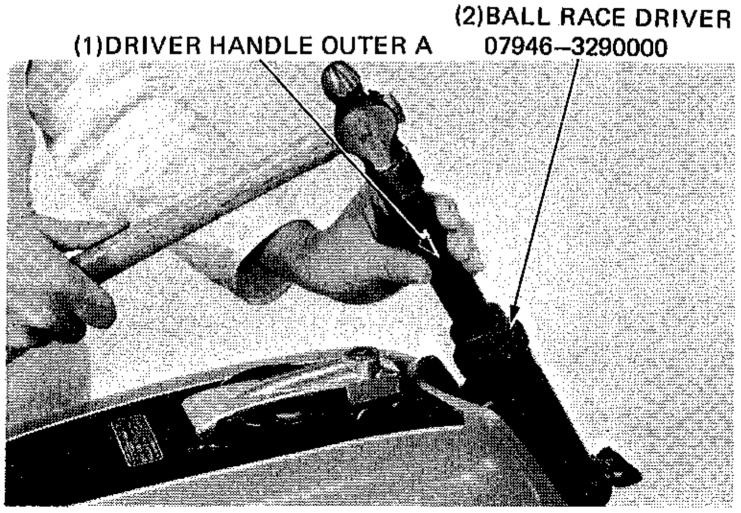



Check the ball race for damage or wear.
Replace if necessary.

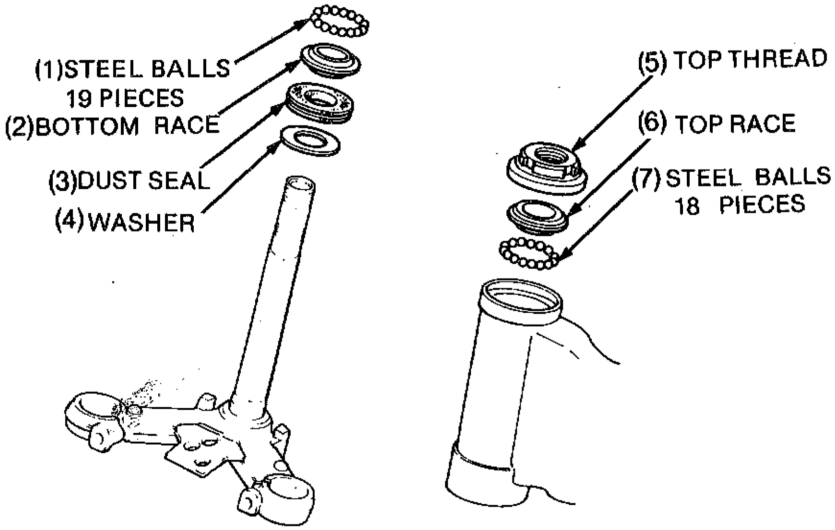


## • STEERING STEM INSTALLATION

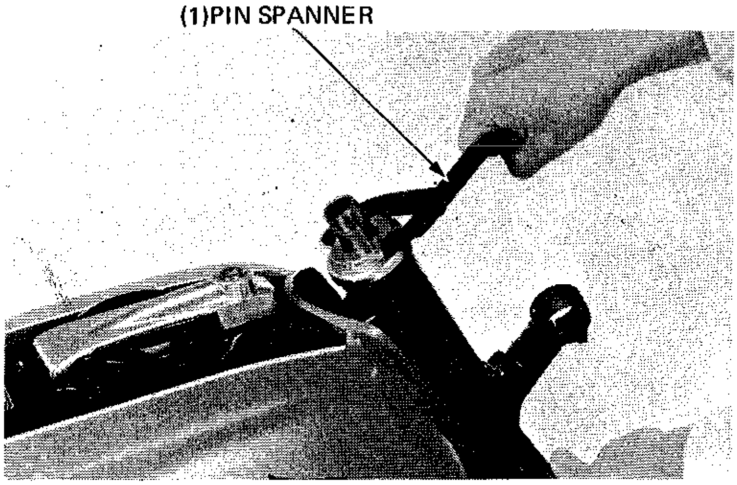
Drive in the ball races.




Install the washer, dust seal and bottom race in the steering head.
Grease the upper and bottom races and install the steel balls on the races.
Slide the steering stem through the steering head from the bottom.




Install the adjuster in the steering head and tighten it until snug against the upper cone race. Then, back it out 1/8 turn.
Make sure that there is no vertical movement and the stem rotates freely.



Install the steering top bridge, front forks.
Tighten the stem nut.

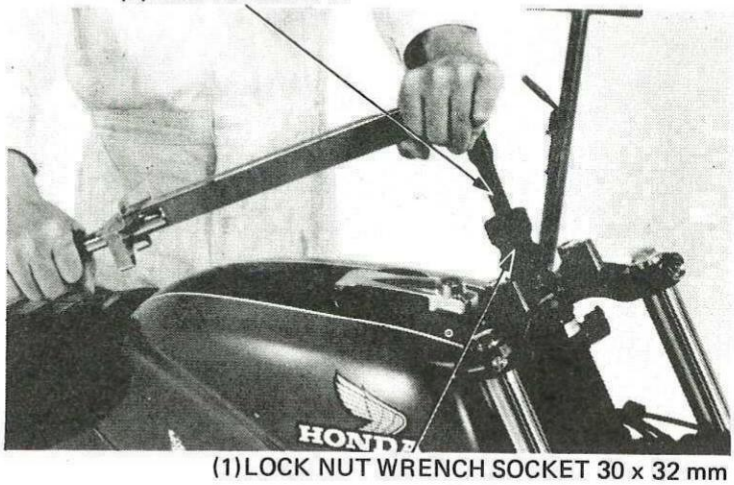
**TORQUE: 90–120 N·m**
**(9.0–12.0 kg-m, 65–87 ft-lb)**

Align the top of the fork pipe with the top of the top bridge.
Tighten the fork pinch bolts.

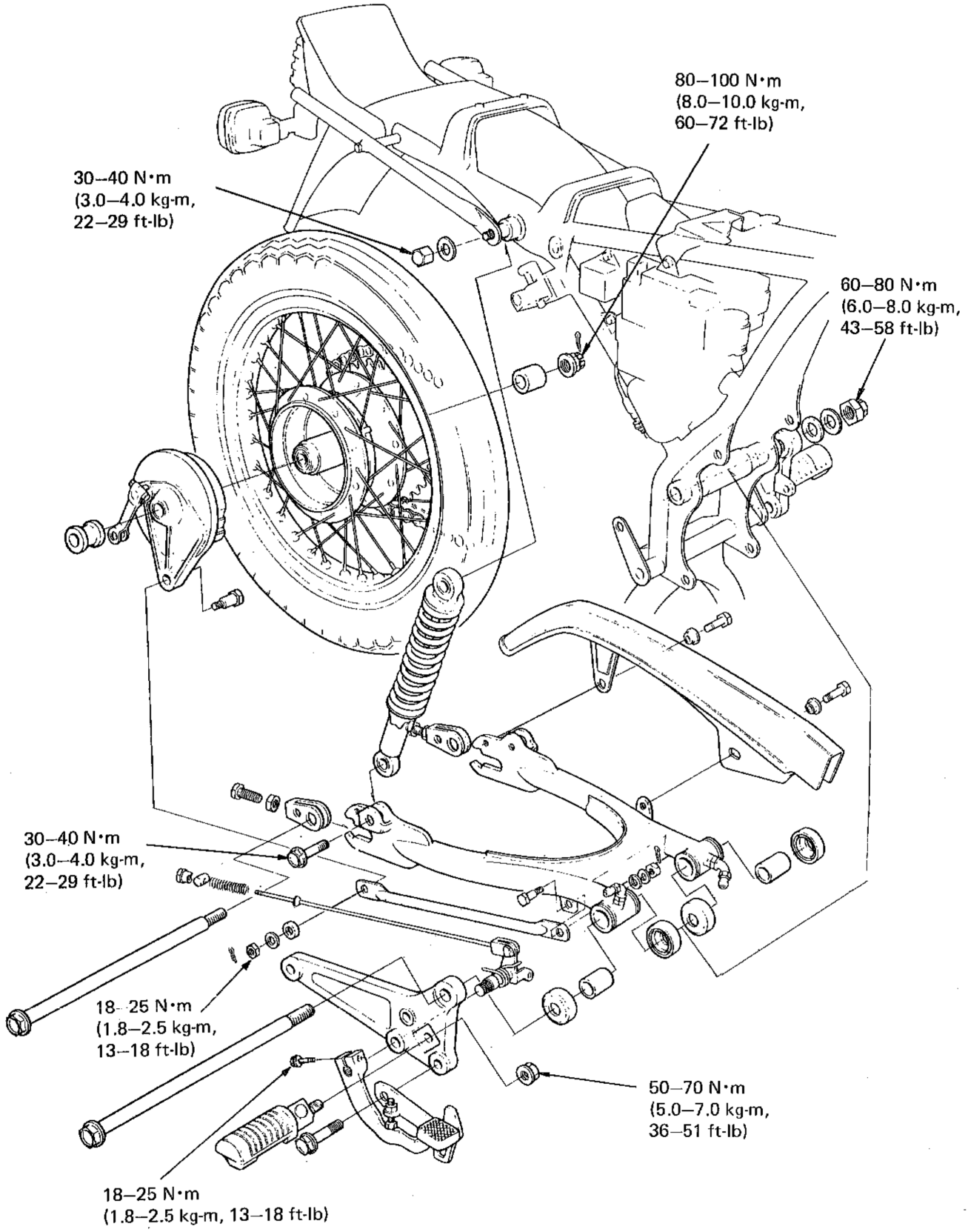
**TORQUE:**
**TOP BRIDGE: 9–13 N·m**
**(0.9–1.3 kg-m, 7–9 ft-lb)**
**BOTTOM BRIDGE:**
**18–25 N·m**
**(1.8–2.5 kg-m, 13–18 ft-lb)**

Install the front wheel, front fork, headlight, cluster and handlebar.

(2)EXTENSION BAR



(1)LOCK NUT WRENCH SOCKET 30 x 32 mm


80–100 N·m
(8.0–10.0 kg-m,
60–72 ft-lb)
30–40 N·m
(3.0–4.0 kg-m,
22–29 ft-lb)
60–80 N·m
(6.0–8.0 kg-m,
43–58 ft-lb)
30–40 N·m
(3.0–4.0 kg-m,
22–29 ft-lb)
18–25 N·m
(1.8–2.5 kg-m,
13–18 ft-lb)
50–70 N·m
(5.0–7.0 kg-m,
36–51 ft-lb)
18–25 N·m
(1.8–2.5 kg-m, 13–18 ft-lb)

| | |
|---|---|
| SERVICE INFORMATION | 14–2 |
| TROUBLESHOOTING | 14–3 |
| REAR WHEEL | 14–4 |
| SHOCK ABSORBERS | 14–11 |
| SWINGARM | 14–13 |
| REAR BRAKE PEDAL | 14–15 |

# SERVICE INFORMATION

## • TOOLS

| | |
|---|---|
| Bearing driver outer 42 x 47 mm | No. 07746–0010300 |
| Bearing driver outer 52 x 55 mm | No. 07746–0010400 |
| Bearing driver handle outer A | No. 07749–0010000 |
| Driver pilot 17 | No. 07746–0040400 |
| Shock absorber compressor | No. 07959–3290001 |

## • TORQUE VALUES

| | |
|---|---|
| Step holder: | 50–70 N·m (5.0–7.0 kg-m, 36–51 ft-lb) |
| Rear shock absorber: | 30–40 N·m (3.0–4.0 kg-m, 22–29 ft-lb) |
| Rear spoke: | 2.5–5.0 N·m (25–50 kg-cm, 22–43 in-lb) |
| Final driven sprocket: | 60–70 N·m (6.0–7.0 kg-m, 43–51 ft-lb) |
| Rear axle nut: | 80–100 N·m (8.0–10.0 kg-m, 58–72 ft-lb) |
| Rear fork bolt: | 60–80 N·m (6.0–8.0 kg-m, 43–58 ft-lb) |
| Rear brake torque link: | 18–25 N·m (1.8–2.5 kg-m, 13–18 ft-lb) |
| Rear brake pedal: | 18–25 N·m (1.8–2.5 kg-m, 13–18 ft-lb) |

## • SPECIFICATIONS

| ITEM | | STANDARD | SERVICE LIMIT |
|---|---|---|---|
| Rear shock absorber spring free length | | 199.5 mm (7.85 in) | 193.5 mm (7.62 in) |
| Rear wheel runout | Radial | — | 2.0 mm (0.08 in) |
| | Axial | — | 2.0 mm (0.08 in) |
| Rear axle shaft bend | | — | 0.2 mm (0.008 in) |
| Rear brake drum I.D. | | 140 mm (5.51 in) | 141 mm (5.55 in) |
| Rear brake | | 4 mm (0.16 in) | 2 mm (0.08 in) |
| Swing arm bushing I.D. and collar O.D. | | 0.2–0.3 mm (0.008–0.012 in) | 0.8 mm (0.032 in) |

# TROUBLESHOOTING

**Wobble or Vibration in Motorcycle**
1. Distorted rim
2. Loose Wheel bearing
3. Loose or distorted spokes
4. Faulty tire
5. Tire pressure incorrect
6. Loose axle
7. Swing arm bushing worn

**Soft Suspension**
1. Weak spring
2. Shock absorbers improperly adjusted
3. Wear rear damper

**Hard Suspension**
1. Shock absorbers improperly adjusted
2. Bent shock absorber.

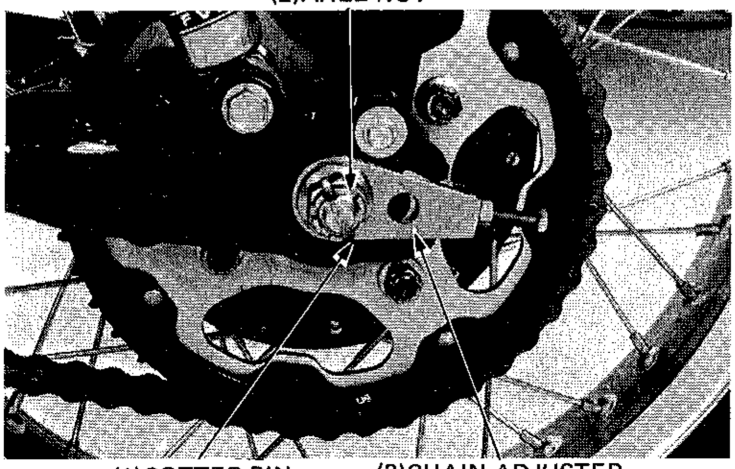
**Suspension Noise**
1. Shock case binding
2. Loose fasteners

**Poor Brake Performance**
1. Improper brake adjustments
2. Contaminated brake linings
3. Worn brake shoes
4. Worn brake shoe cam faces
5. Worn brake shoe cam
6. Worn brake drum
7. Brake arm serrations improperly engaged

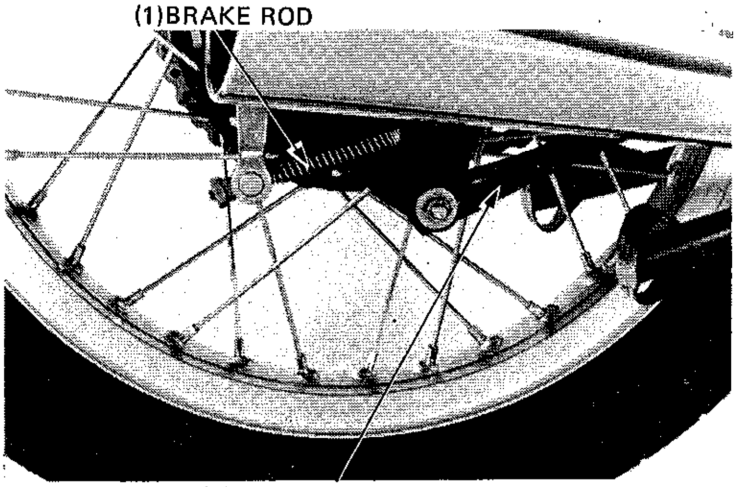
# REAR WHEEL

## • REAR WHEEL REMOVAL

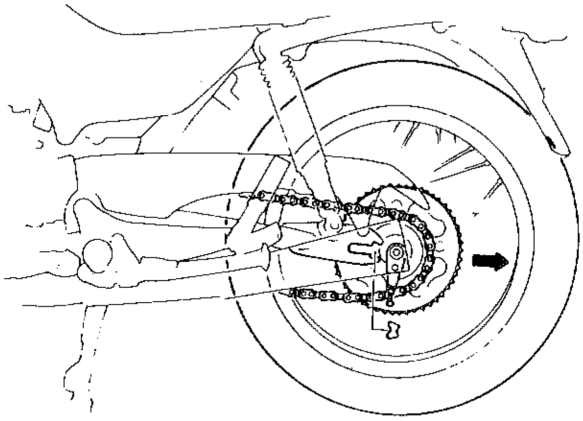
Support the motor-cycle on its center stand.
Pry of the cotter pin and remove the rear axle nut.
Loosen the drive chain adjuster.




Disconnect the brake rod.
Pry off the cotter pin and separate the brake torque link.

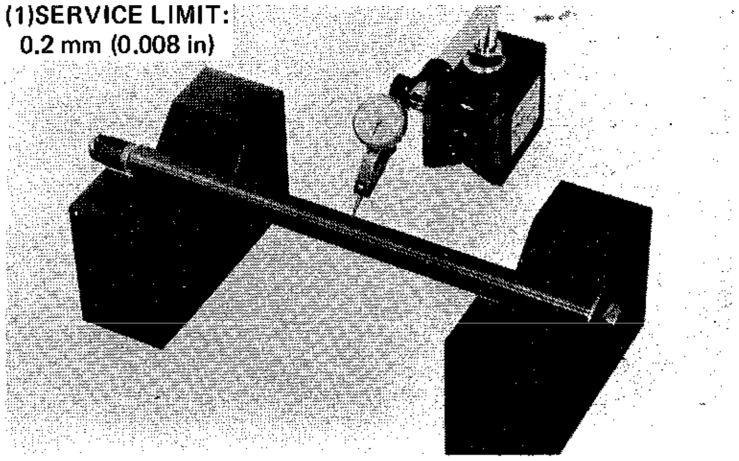



Move the rear wheel forward.
Disengage and place the drive chain outside of the drive sprocket.
Slide the drive chain adjuster down and pull the rear wheel back.
Remove the rear wheel.
Remove the rear axle and chain adjusters.



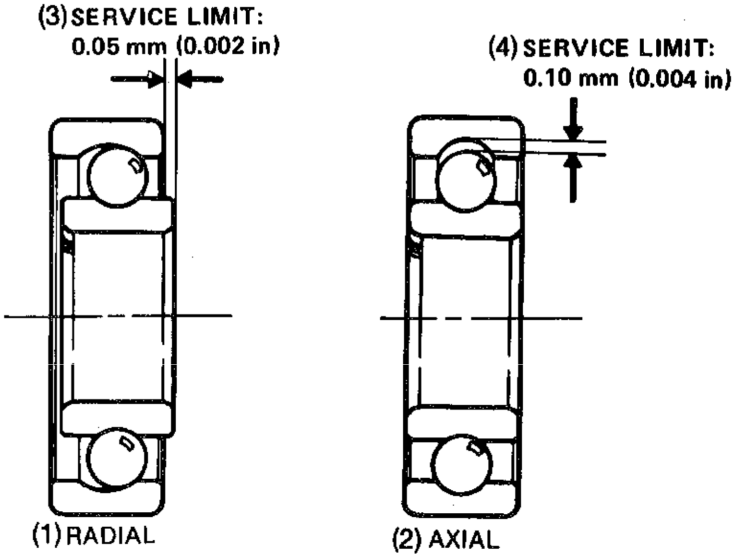
## • AXLE SHAFT INSPECTION

Set the axle in V blocks and measure the runout. The actual runout is 1/2 of TIR (Total Indicator Reading).




## • REAR WHEEL BEARING PLAY INSPECTION

Check the wheel bearing play by placing the wheel in a truing stand and spinning the wheel by hand. Replace the bearings with new ones if they are noisy or have excessive play.

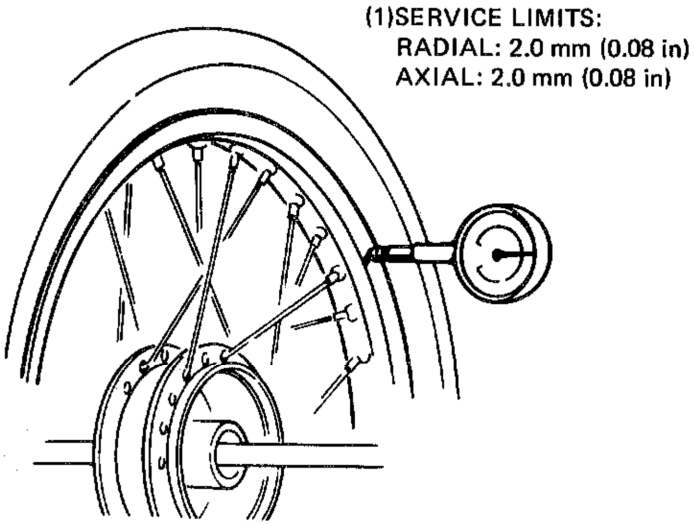



## • REAR WHEEL RIM RUNOUT INSPECTION

Check the rim runout by placing the wheel in a truing stand. Turn the wheel by hand and read the runout using a dial indicator gauge.

Check the spokes for looseness.

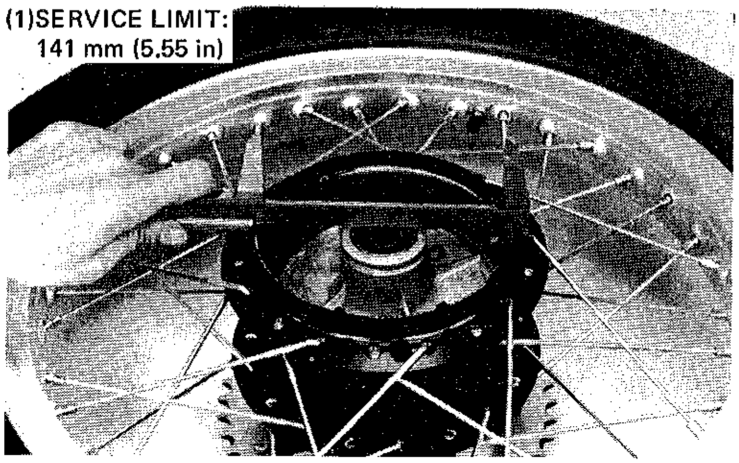
**TORQUE: 2.5–5.0 N·m**
**(25–50 kg-cm, 22–43 in-lb)**



## • REAR BRAKE DRUM I.D.

Measure the rear brake drum I.D.

(1)SERVICE LIMIT:
141 mm (5.55 in)

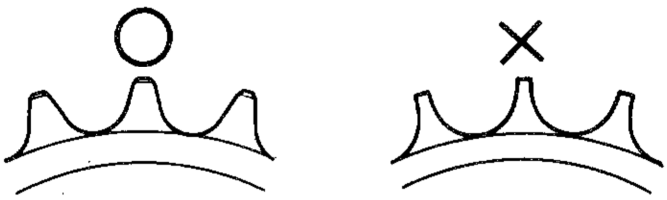


## • FINAL DRIVEN SPROCKET INSPECTION

Check the condition of the final driven sprocket teeth.
Replace the sprocket if worn or damaged.

NOTE

The drive chain and drive sprocket must also be inspected if the driven sprocket is worn or damaged.



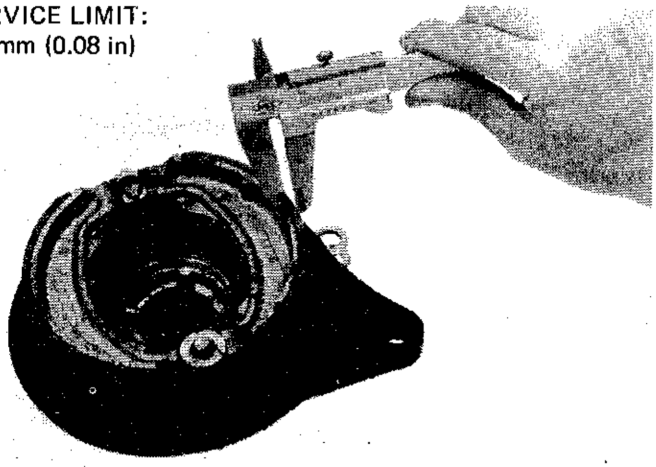
(1) GOOD

(2)REPLACE

## • BRAKE LINING INSPECTION

Measure the rear brake lining thickness.

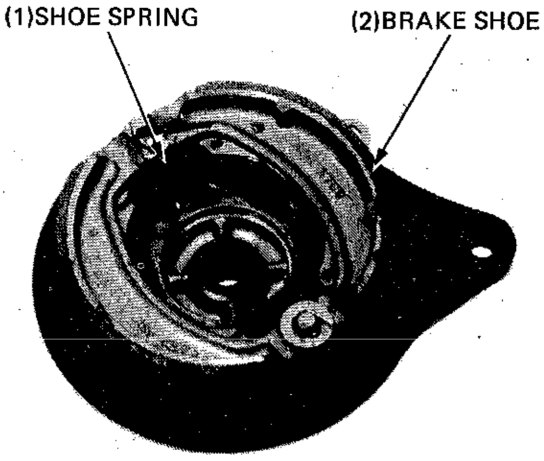
(1)SERVICE LIMIT:
2.0 mm (0.08 in)



## • REAR BRAKE SHOE REPLACEMENT

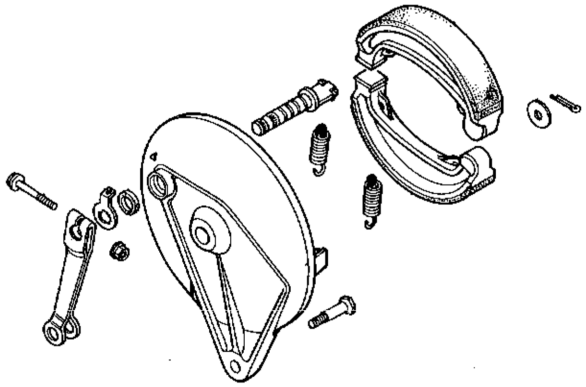
Remove the brake arm.
Remove the brake shoes.

Apply grease to the face of the brake cam and anchor pin.
Install the brake cam.
Install new brake shoes.
Install the springs.




***WARNING***

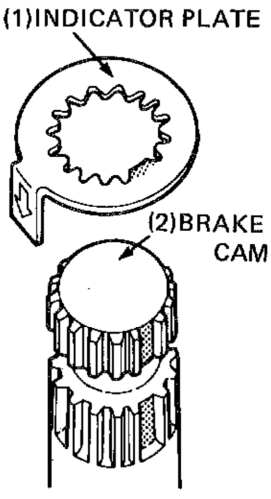
***Contaminated brake lining reduce stopping power.***
***Keep the grease off the linings. Wipe the excess grease off the cam.***



Install the wear indicator.

NOTE

Align the indicator tab with the cutout in the brake camshaft.

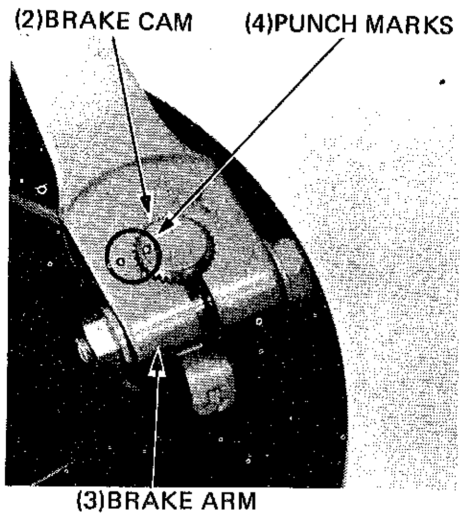



Install the brake arm.

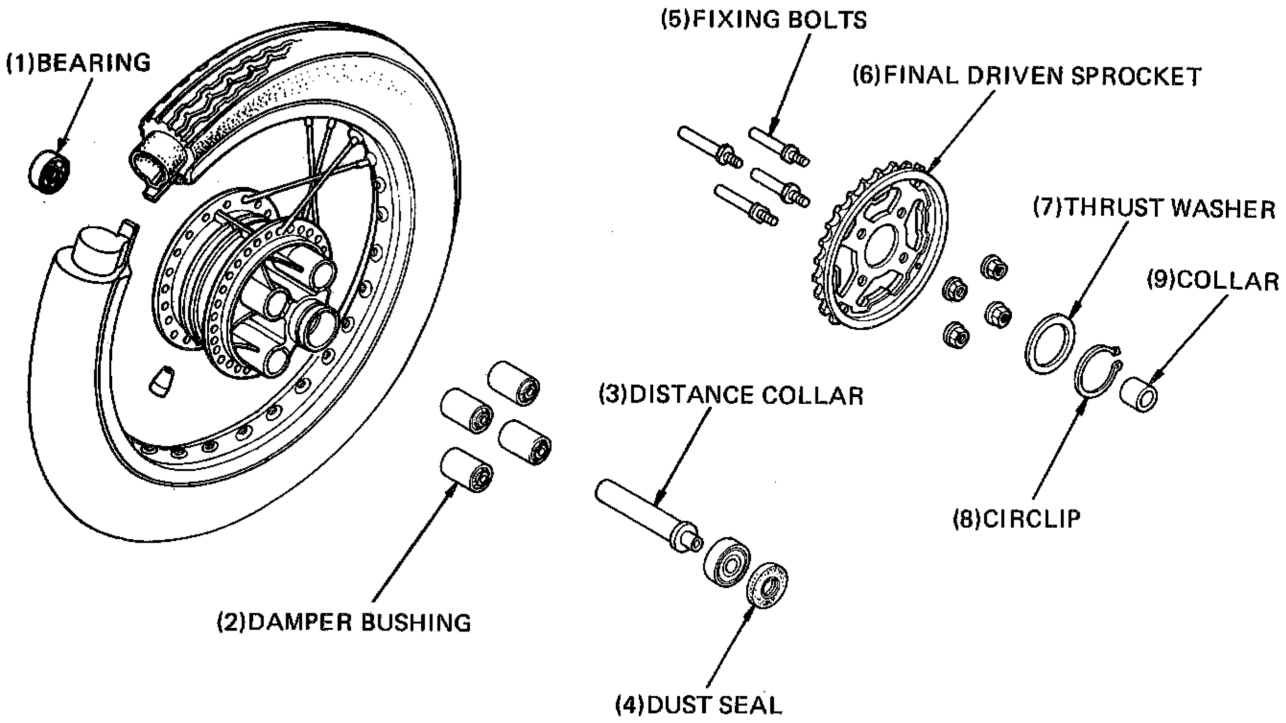
NOTE

Align the punch mark on the brake arm with the punch mark on the brake cam.

**TORQUE: 8–12 N·m**
**(0.8–1.2 kg-m, 6–9 ft-lb)**

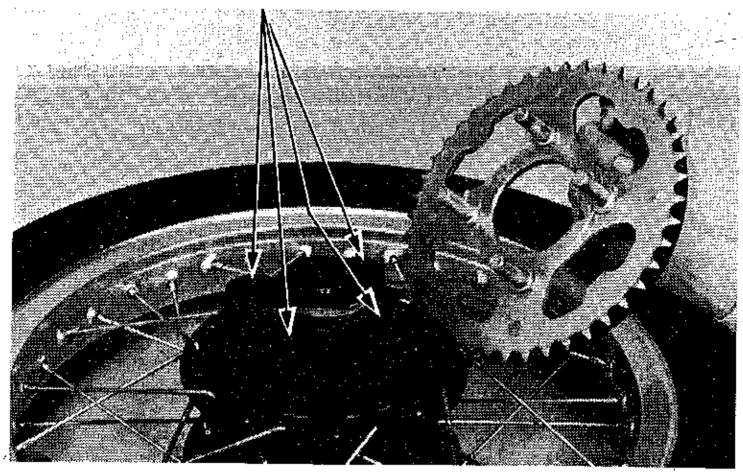


- REAR WHEEL DISASSEMBLY




Remove the 69 mm circlip.
Remove the final driven sprocket.
Replace the damper bushings if they are damaged or deteriorated.

(1)DUMPER BUSHINGS



## • REAR WHEEL ASSEMBLY

Pack all bearing cavities with grease.
Install the right and left wheel bearings in the wheel hub.

NOTE

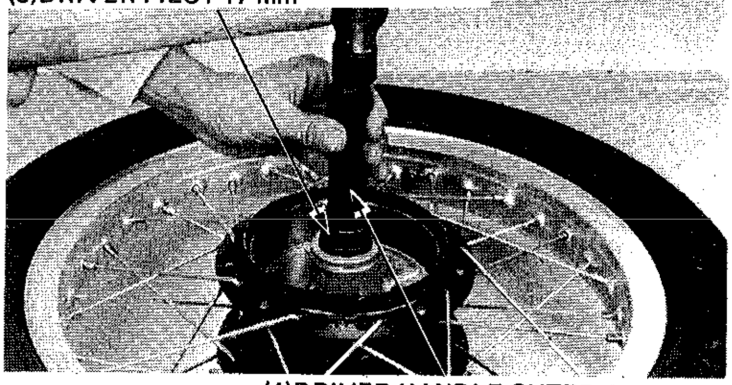
Install the bearings with the sealed end on the outside.

*WARNING*

***Contaminated brake linings reduce stopping power. Keep grease off the linings.***

Install the dust seal.

(1)BEARING DRIVER OUTER 37 x 40 mm
(2)BEARING DRIVER OUTER 52 x 55 mm
(3)DRIVER PILOT 17 mm



(4)DRIVER HANDLE OUTER A

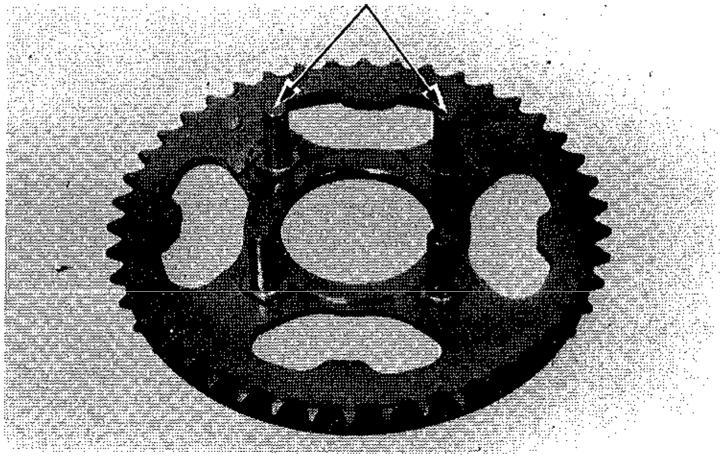
Install the fixing bolts.

NOTE

Make certain that the fixing bolts are seated on the sprocket snugly.

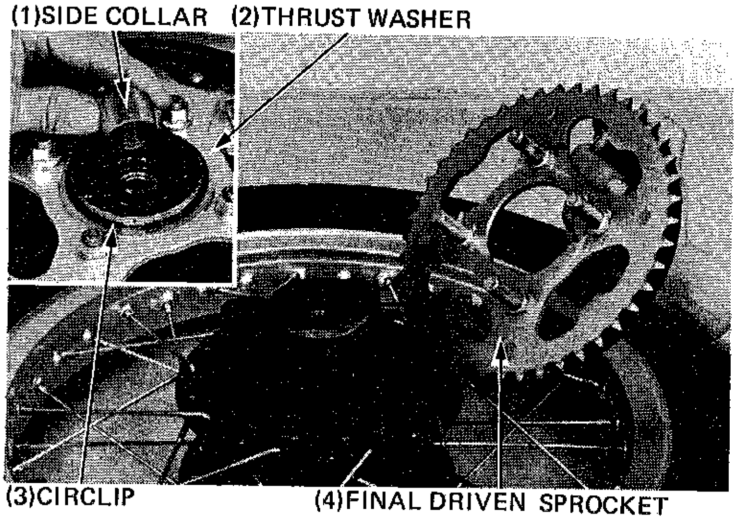
**TORQUE: 60–70 N·m (6.0–7.0 kg-m, 43–51 ft-lb)**

(1)FIXING BOLTS



Apply grease to the fixing bolts and rear wheel hub as shown.
Install the final driven sprocket.
Install the thrust washer and circlip.
Install the side collar.

(1)SIDE COLLAR (2)THRUST WASHER

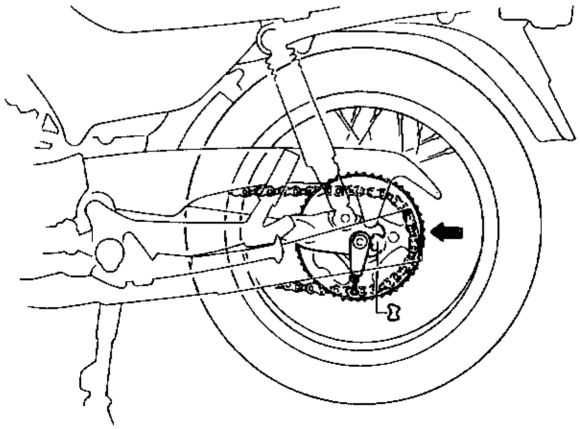


(3)CIRCLIP (4)FINAL DRIVEN SPROCKET

## • REAR WHEEL INSTALLATION

Install the rear axle and drive chain adjuster.
Install the drive chain inside of the driven sprocket.

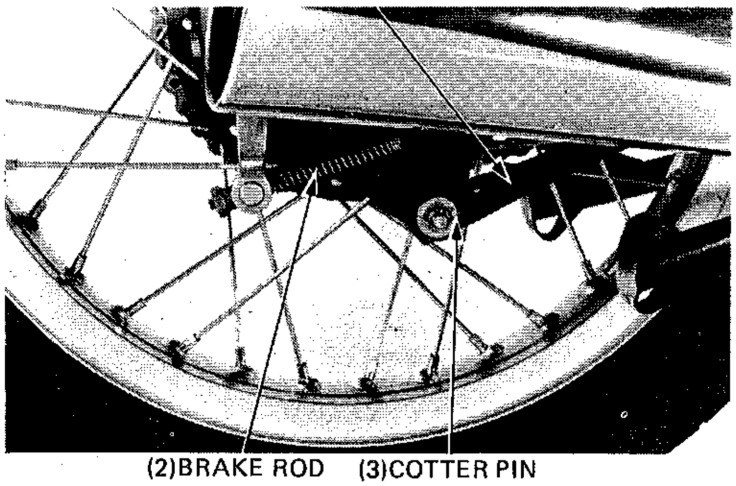
Install the rear axle onto the swing arm.



Engage the drive chain onto the driven sprocket.
Connect the brake torque link and brake rod.

**TORQUE: 18–25 N·m**
**(1.8–2.5 kg-m, 13–18 ft-lb)**

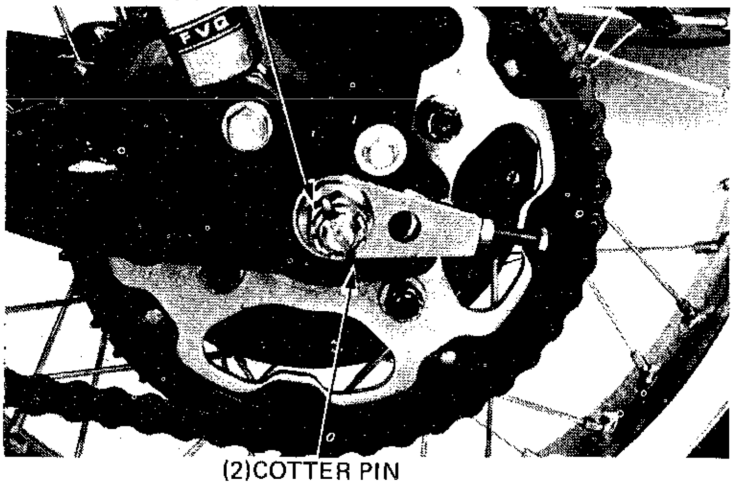
Install the cotter pin and spread the end as shown.
Adjust the drive chain and rear brake.




Tighten the rear axle nut.

**TORQUE: 80–100 N·m**
**(8.0–10.0 kg-m, 80–72 ft-lb)**

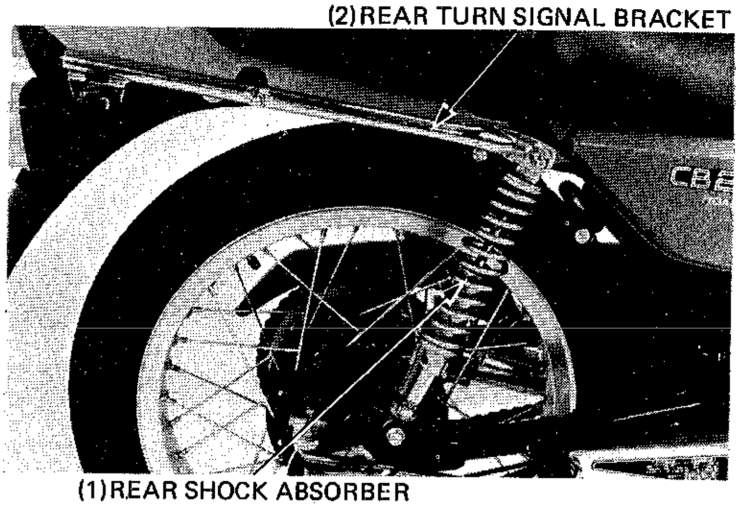
Install the cotter pin and spread the end as shown.



# SHOCK ABSORBERS

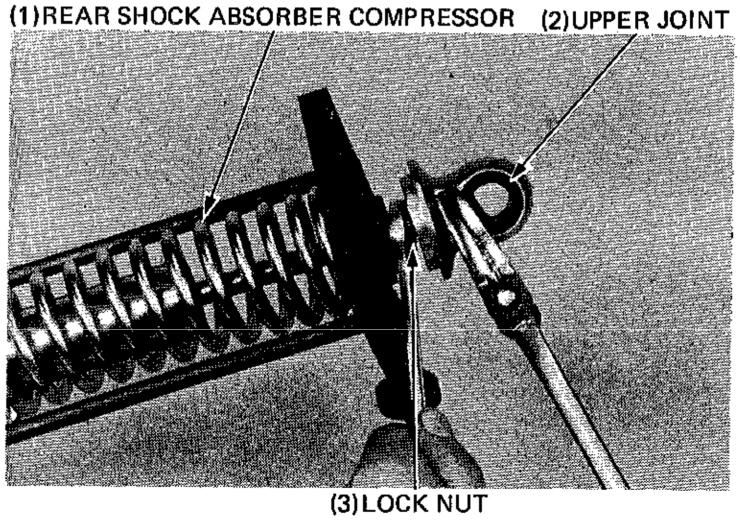
## • SHOCK ABSORBER REMOVAL

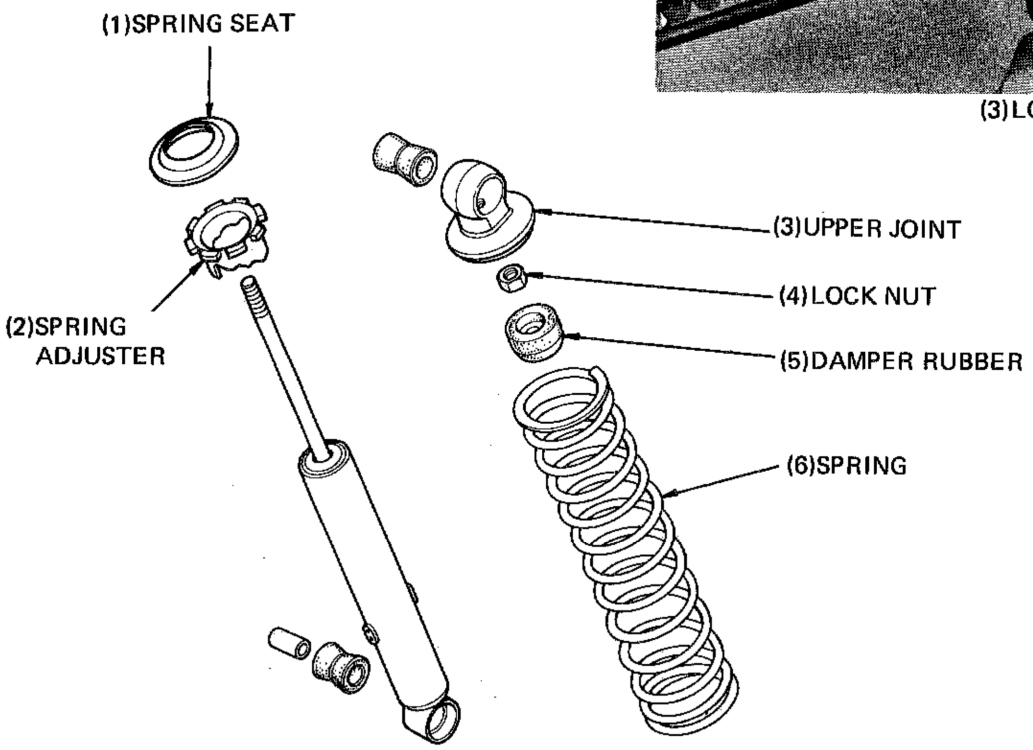
Remove the rear turn signal bracket.
Remove the rear shock absorber.




## • SHOCK ABSORBER DISASSEMBLY

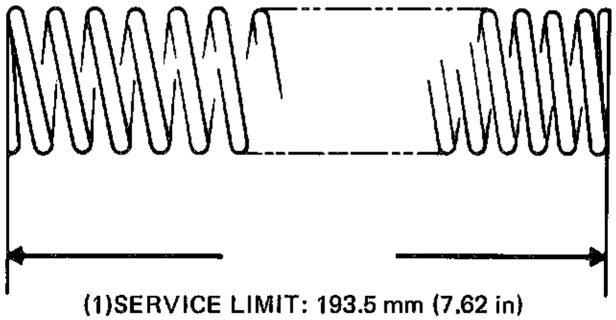
Set the rear shock absorber in the compressor as shown.
Loosen the lock nut and remove the upper joint.
Disassemble the shock absorber.



## • SHOCK ABSORBER SPRING INSPECTION

Measure the spring free length.



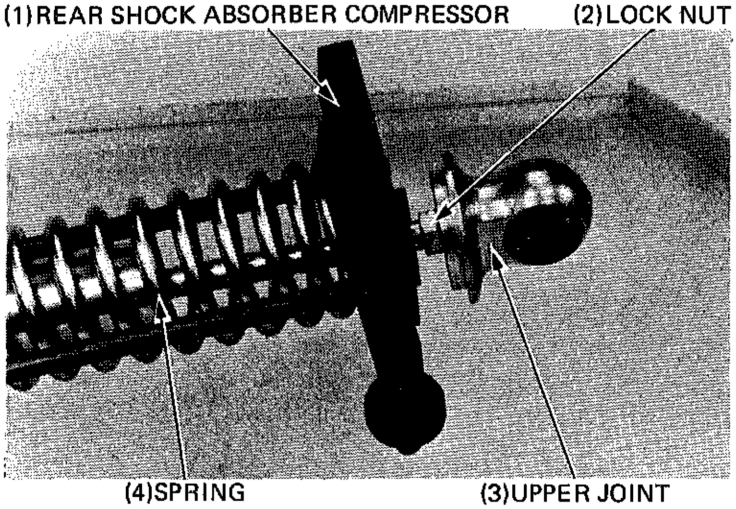
(1)SERVICE LIMIT: 193.5 mm (7.62 in)

## • SHOCK ABSORBER ASSEMBLY

Install the spring adjuster, spring seat, spring, damper rubber and shock absorber.
Compress the spring.
Install the lock nut.
Apply locking agent to the thread of the shock absorber.
Screw in the upper joint and tighten the lock nut.

**TORQUE: 30–45 N·m (3.0–4.5 kg-m, 22–33 ft-lb)**

(1)REAR SHOCK ABSORBER COMPRESSOR (2)LOCK NUT



(4)SPRING (3)UPPER JOINT

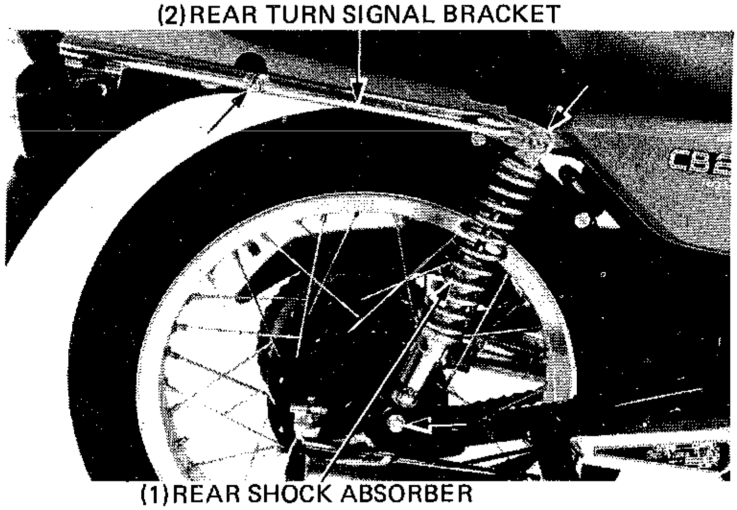
## • SHOCK ABSORBER INSTALLATION

Install the rear shock absorber.

**TORQUE: 30–40 N·m (3.0–4.0 kg-m, 22–29 ft-lb)**

Install the rear turn signal bracket.

(2)REAR TURN SIGNAL BRACKET

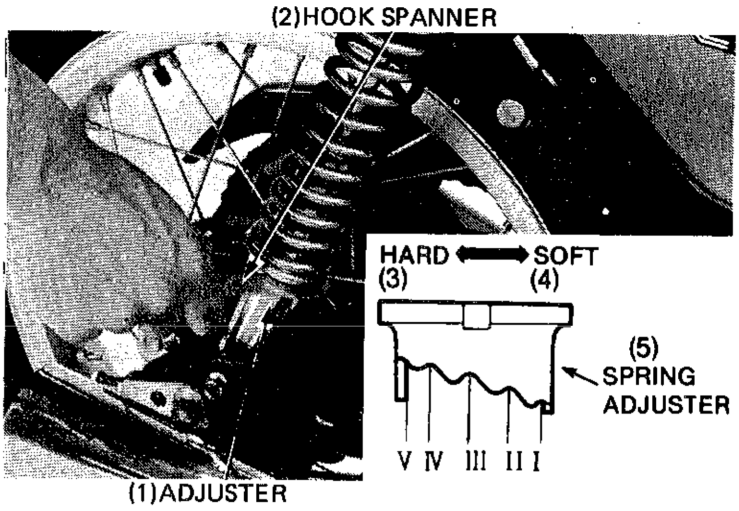


(1)REAR SHOCK ABSORBER

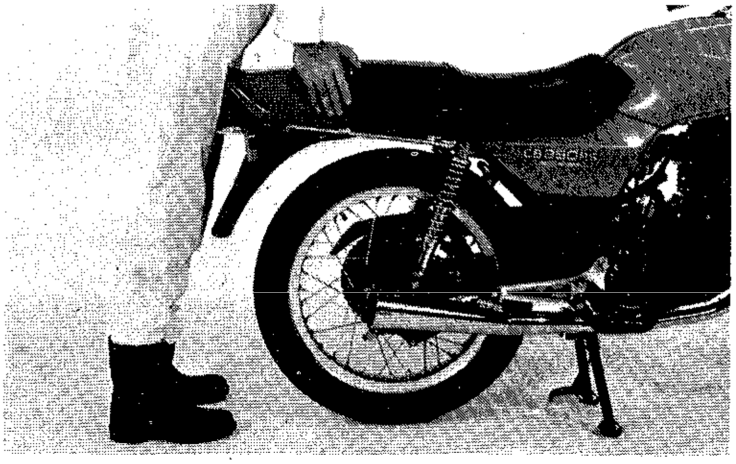
- SHOCK ABSORBER ADJUSTMENT

NOTE

Turn the spring adjusters to the same position.



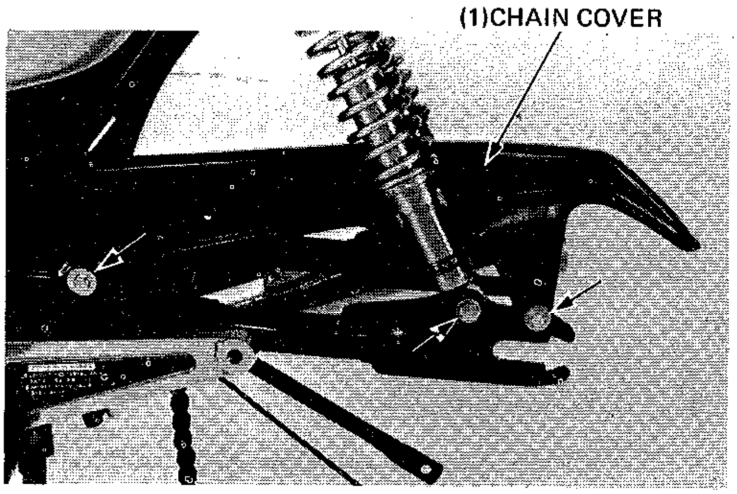

Check the operation of the rear suspension.



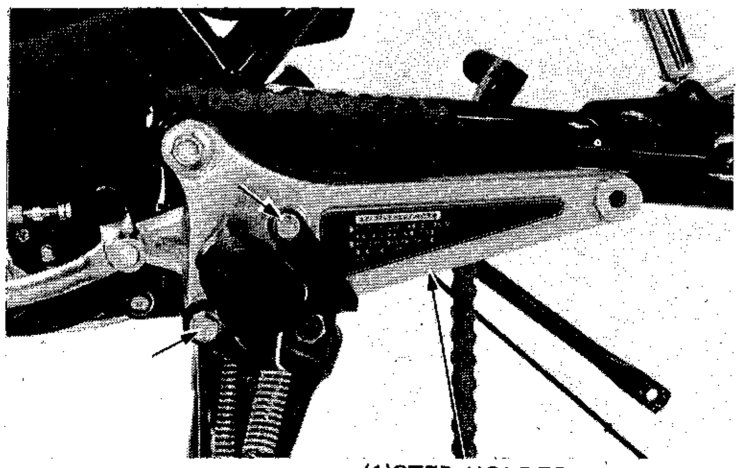
# SWINGARM

- SWINGARM REMOVAL

Remove the rear wheel (page 14-4).
Remove the rear shock absorbers (Page 14-11).
Remove the chain cover.



Loosen the step holder mounting bolts.
Remove the swingarm pivot bolt and swingarm.

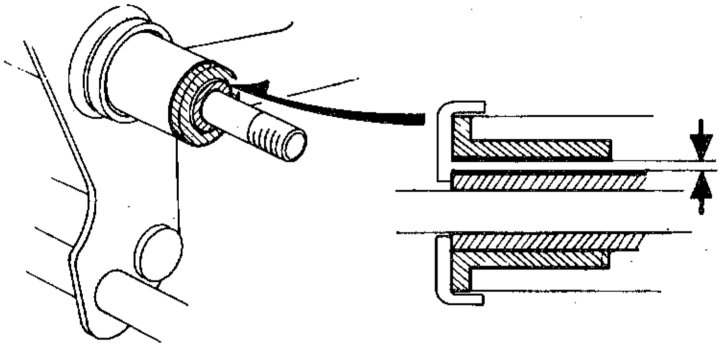


(1)STEP HOLDER

## • SWINGARM INSPECTION

Measure each bushing I.D. and pivot collar O.D.

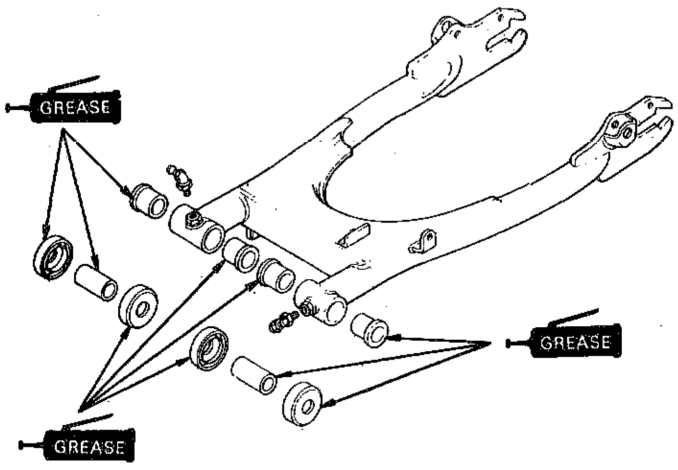
**(1) SERVICE LIMIT: 0.8 mm (0.031 in)**



## • SWINGARM DISASSEMBLY/ASSEMBLY

NOTE

Drive the bushings into place with a wood block, making sure that they are not damaged.
Lubricate with grease after installation.



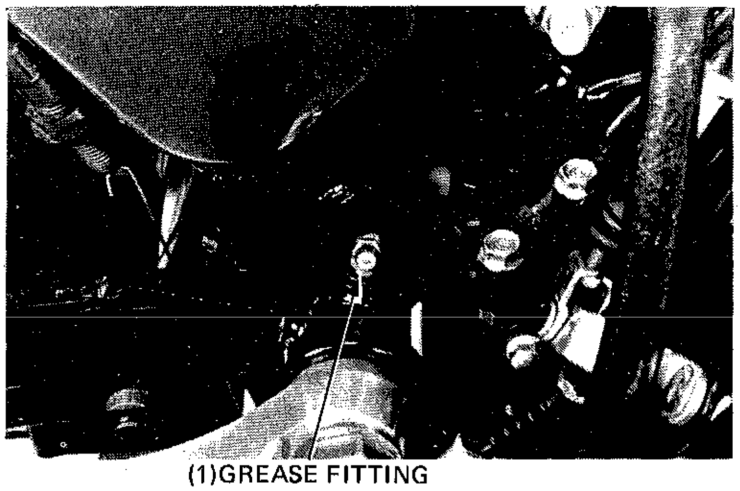
• SWINGARM INSTALLATION

Install the swingarm.
Tighten the pivot bolt.

**TORQUE: 60–80 N·m**
**(6.0–8.0 kg-m, 43–58 ft-lb)**

Install the chain cover.
Install the rear shock absorbers and rear wheel.

After installation, grease the swingarm pivot bushing through the grease fitting on the swingarm.

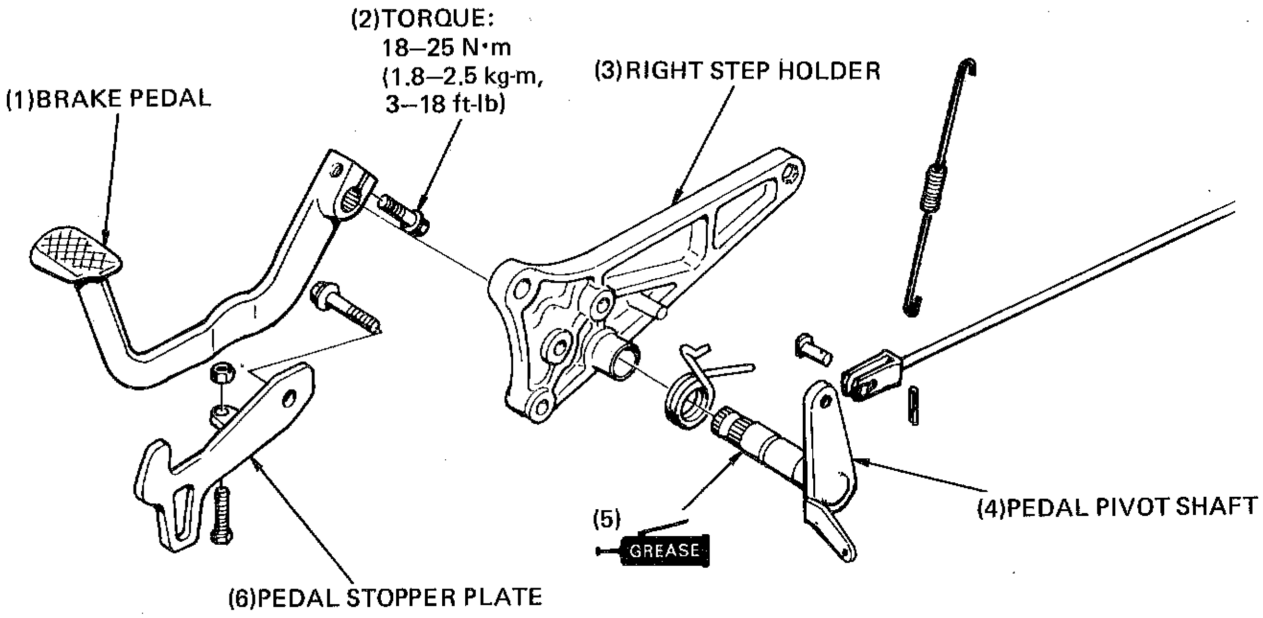


(1)GREASE FITTING

# REAR BRAKE PEDAL

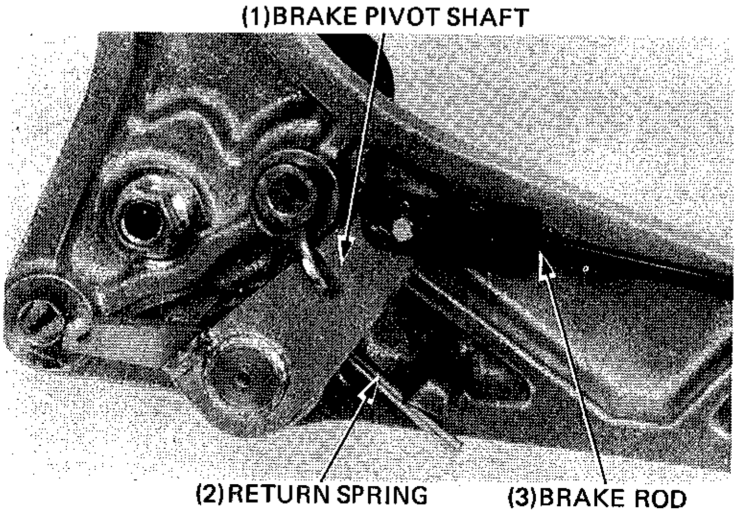
• REAR BRAKE PEDAL REMOVAL

Remove the pedal stopper plate.
Remove the brake pedal.
Disconnect the brake rod.
Remove the brake pedal pivot shaft and return spring.



- REAR BRAKE PEDAL INSTALLATION

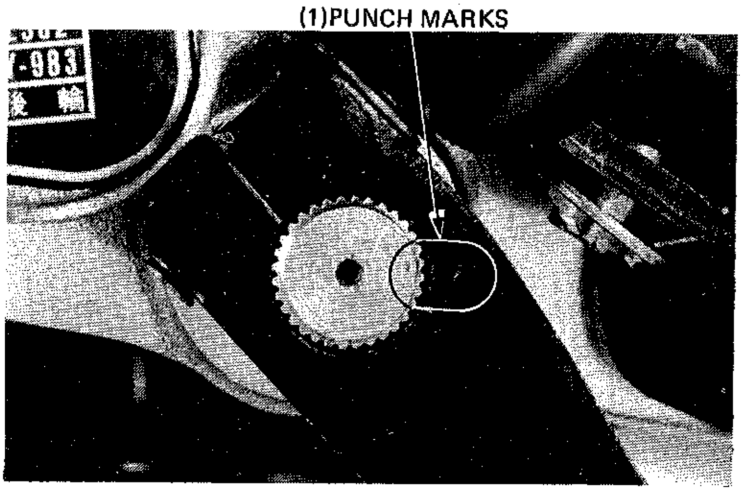
Apply grease to the brake pedal pivot shaft.
Install the return spring and pedal pivot shaft as shown.
Connect the brake rod.



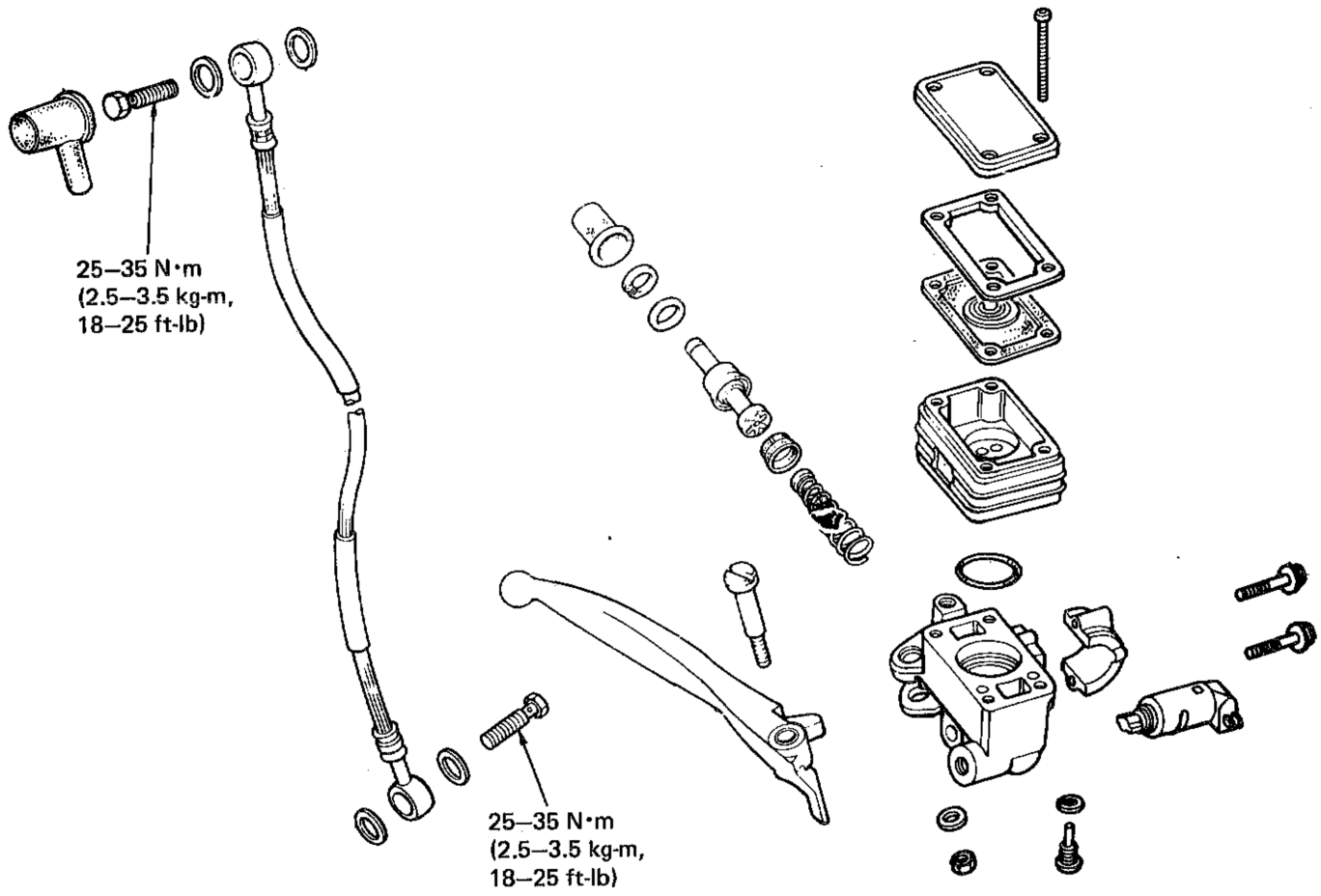

Install the brake pedal by aligning the punch marks.
Tighten the brake pedal bolt.

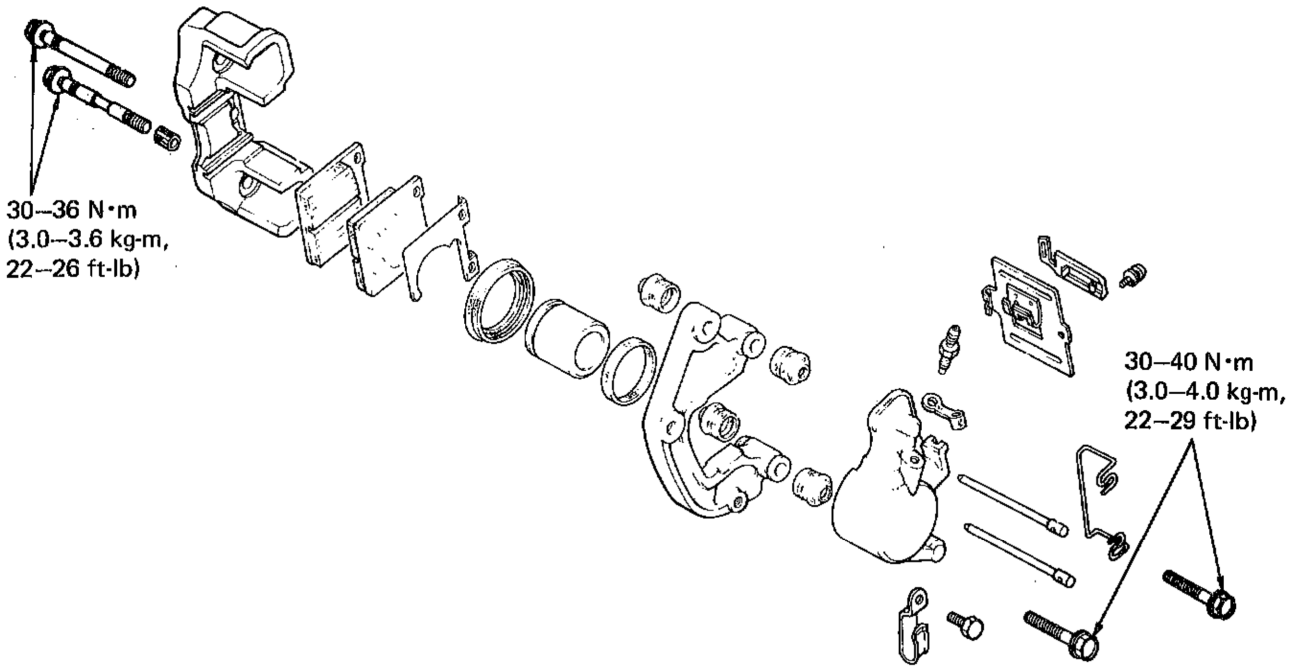
**TORQUE: 18–25 N·m (1.8–2.5 kg-m, 13–18 ft-lb)**

Install the stopper plate.



# 15. HYDRAULIC DISC BRAKE (FRONT)



# MEMO

| | |
|---|---|
| SERVICE INFORMATION | 15–2 |
| TROUBLESHOOTING | 15–2 |
| BRAKE FLUID REPLACEMENT/ AIR BLEEDING | 15–3 |
| BRAKE PADS/BRAKE DISC | 15–4 |
| FRONT BRAKE MASTER CYLINDER | 15–7 |
| FRONT BRAKE CALIPER | 15–9 |

# SERVICE INFORMATION

- SPECIAL TOOL

SNAP RING PLIERS 07914–3230001

- SPECIFICATIONS

| | STANDARD | SERVICE LIMIT |
|---|---|---|
| Disc thickness | 4.9–5.1 mm (0.19–0.20 in) | 4.0 mm (0.16 in) |
| Disc runout | 0–0.1 mm (0–0.004 in) | 0.3 mm (0.012 in) |
| Master cylinder I.D. | 14.000–14.043 mm (0.5512–0.5529 in) | 14.055 mm (0.5533 in) |
| Master piston O.D. | 13.957–13.984 mm (0.5495–0.5506 in) | 13.940 mm (0.5488 in) |
| Caliper piston O.D. | 42.772–42.882 mm (1.684–1.688 in) | 42.865 mm (1.687 in) |
| Caliper cylinder I.D. | 42.850–42.950 mm (1.687–1.691 in) | 42.915 mm (1.689 in) |

- TORQUE VALUES

Wheel hose bolt: 25–35 N·m (2.5–3.5 kg-m, 18–25 ft-lb)
Caliper pin: 30–36 N·m (3.0–3.6 kg-m, 22–26 ft-lb)
Caliper bracket: 30–40 N·m (3.0–4.0 kg-m, 22–29 ft-lb)

# TROUBLESHOOTING

Poor Brake Performance
- Air bubbles in hydraulic system
- Worn brake pads
- Pads fouled or glazed
- Hydraulic system leaking

# BRAKE FLUID REPLACEMENT/AIR BLEEDING

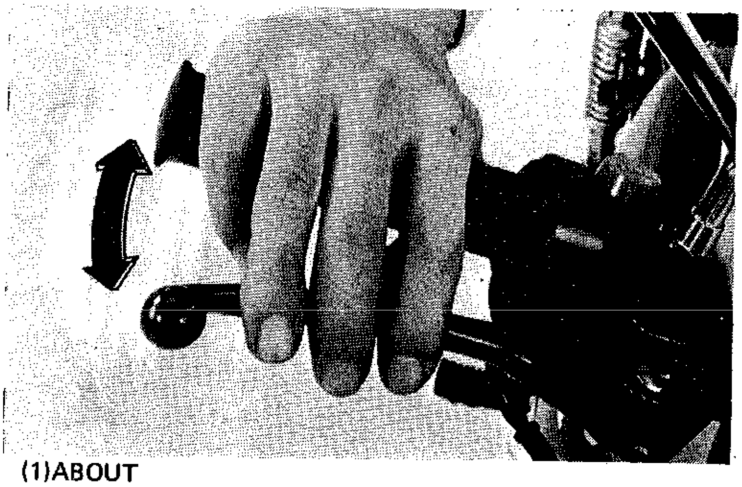
Check the fluid level with the fluid reservoir parallel with the ground.

*CAUTION*

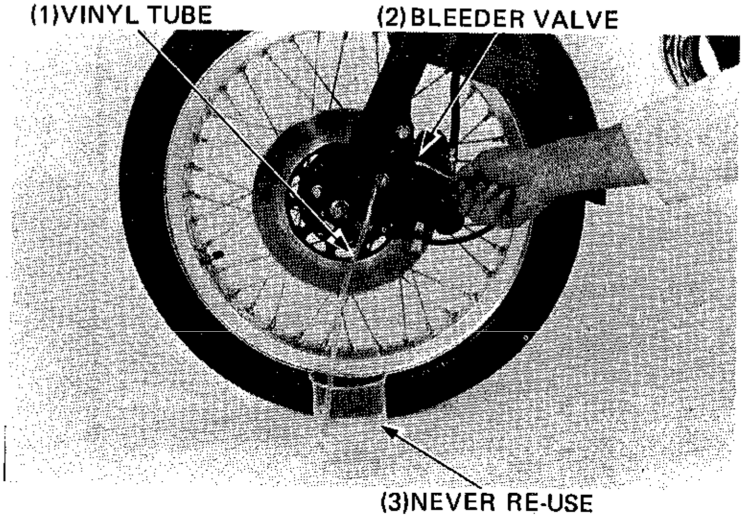
- *Be sure to install the diaphragm on the reservoir when operating the brake lever. Failure to do so will force the fluid out of the reservoir by the system pressure pumped up by the operation of the brake lever.*
- *Avoid spilling fluid on painted surfaces. Place a rag over the fuel tank whenever the system is serviced.*

## • BRAKE FLUID DRAINING

Loosen the caliper bleeder valve and pump up the system pressure by operating the brake lever.
Stop operating the lever when no fluid is flowing out of the bleeder valve.



(1)ABOUT
20 mm




## • BRAKE FLUID FILLING

*CAUTION*

- *Check the fluid level often while bleeding the brake, to prevent air from being pumped into the system.*
- *Do not mix different brands of fluid since they are not compatible. Stay with one fluid as specified in this manual.*

Close the bleeder valve, top up the reservoir, and install the diaphragm.
To prevent piston overtravel and brake fluid seepage, keep a 20 mm space to the handlebar grip when bleeding the front brake system. Pump up the system pressure with the lever until there are no air bubbles in the fluid flowing out of the reservoir small hole (until the lever becomes hard).

## • AIR BLEEDING

Pull the brake lever all the way back to the handlebar grip. Screw out the bleeder valve about 1/2 turn, and retighten.

NOTE

Do not release the lever until the bleeder valve has been closed.

Release the lever gradually and wait for several seconds after it reaches the end of its travel.
Repeat the above steps until there is no air bubble in the fluid flowing out of the bleeder valve.
Fill the reservoir up to the UPPER FLUID LEVEL.
Check the entire system for leaks by operating the lever.

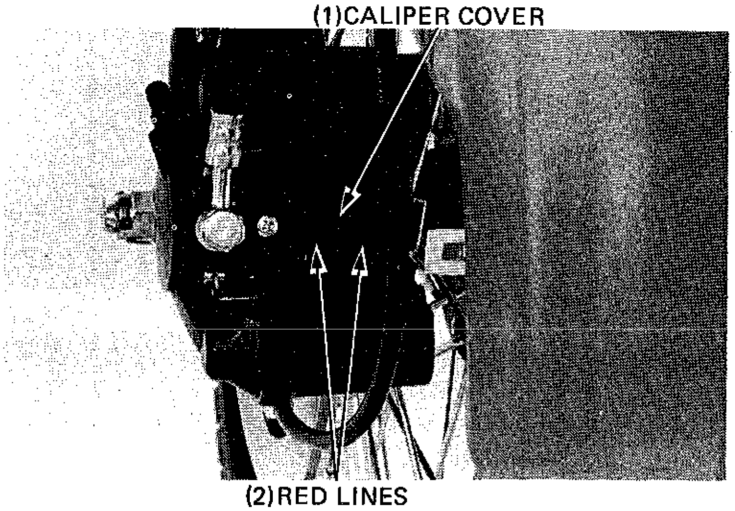
*WARNING*

*Wipe clean the brake disc.*

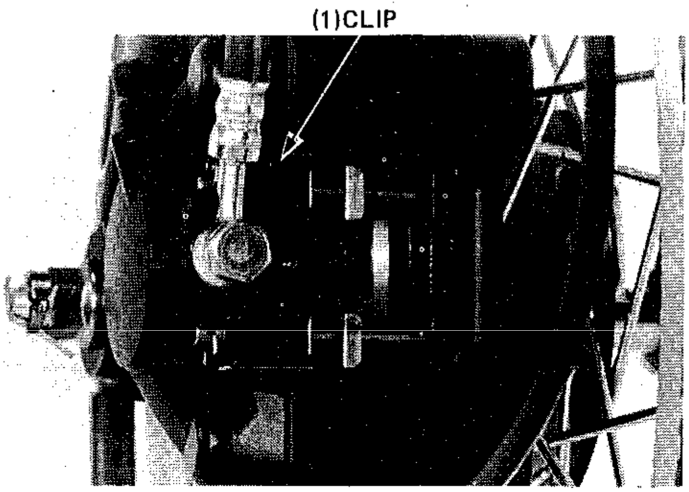
# BRAKE PADS/BRAKE DISC

## • BRAKE PAD REPLACEMENT

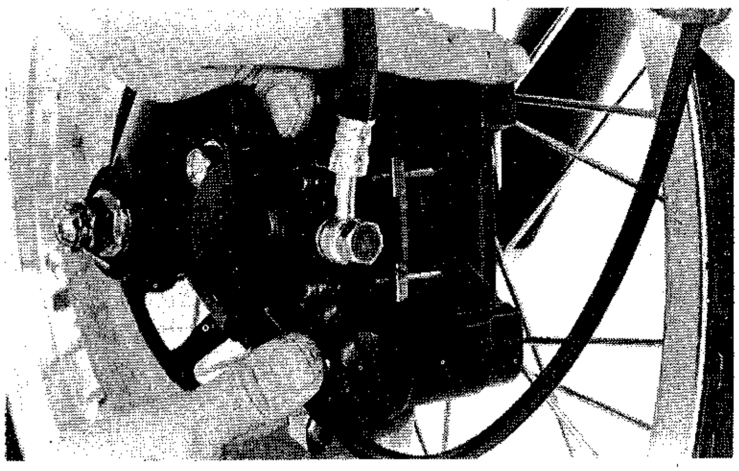
The front brake pads require replacement if the red line on the top of the pads reaches the edges of the brake disc.
Remove the caliper cover.



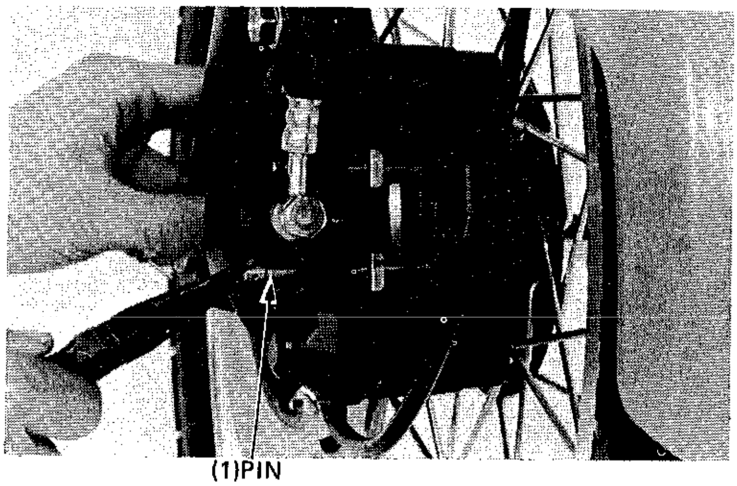

Pull off the clip.




Push the caliper toward the right and push in the piston all the way to allow installation of new brake pads.



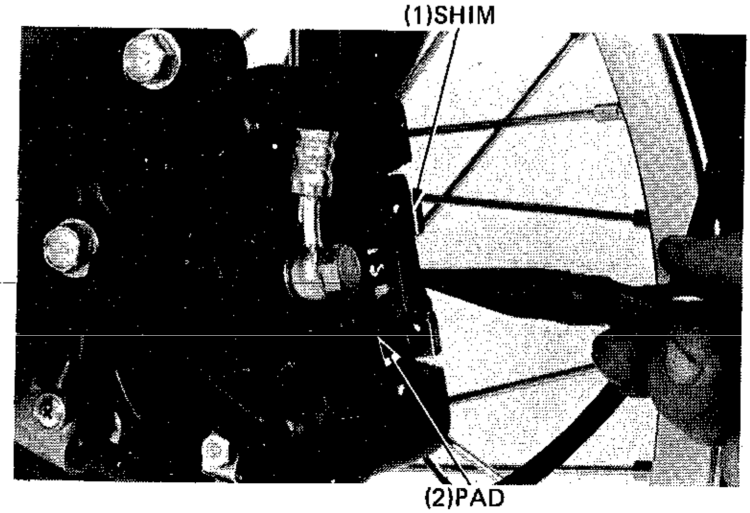
Remove the pins with help of a pair of pliers.


(1)PIN

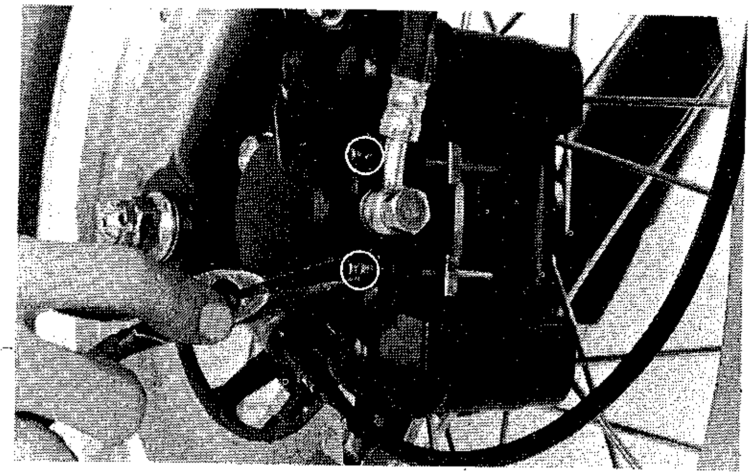
Install the new brake pads and the shim on the piston side pad.

*CAUTION*

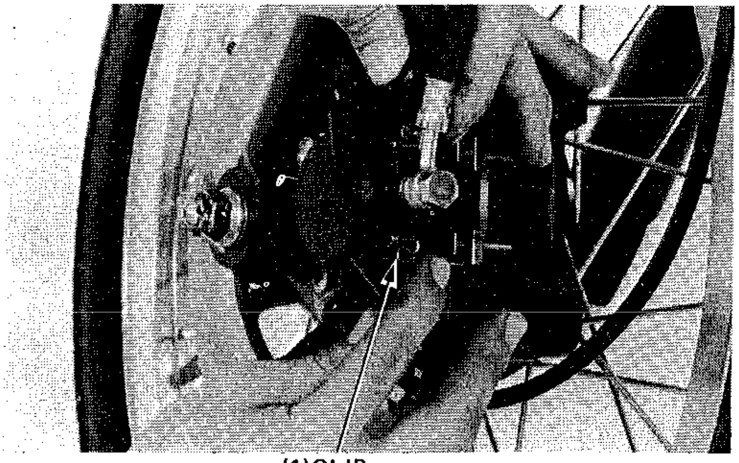
*Apply silicon grease to the outside of each pad.*


(1)SHIM
(2)PAD

Insert the pins with the pin hole facing out as shown.



Insert the clip into place in the pin holes.
Install the caliper cover.

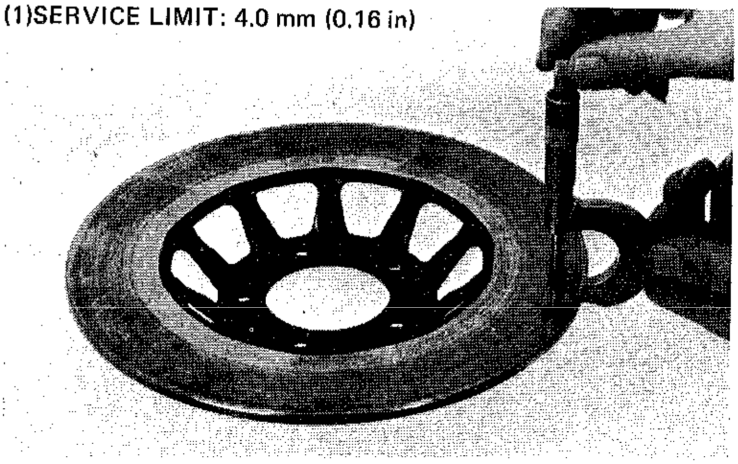


(1)CLIP

- DISC THICKNESS

Measure the disc thickness.
Brake disc removal/installation (Page 14-9).

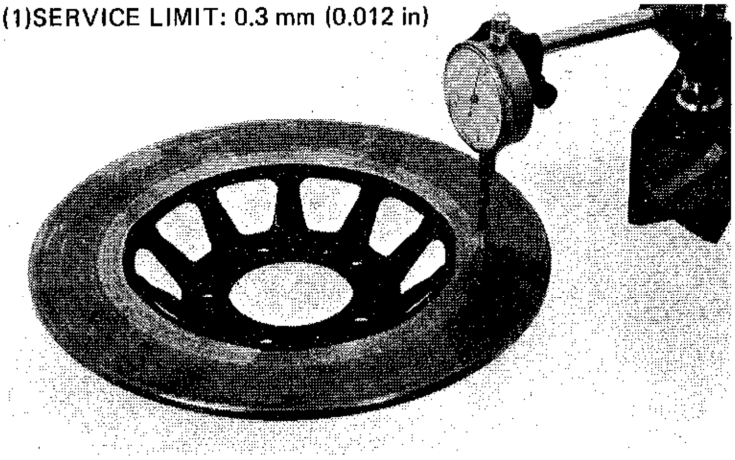
(1)SERVICE LIMIT: 4.0 mm (0.16 in)



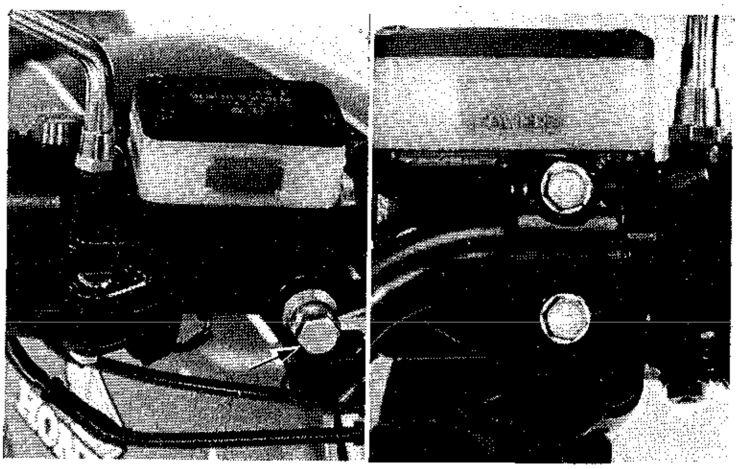
- BRAKE DISC WARPAGE

Measure the brake disc warpage.

(1)SERVICE LIMIT: 0.3 mm (0.012 in)



# FRONT BRAKE MASTER CYLINDER



- MASTER CYLINDER DISASSEMBLY

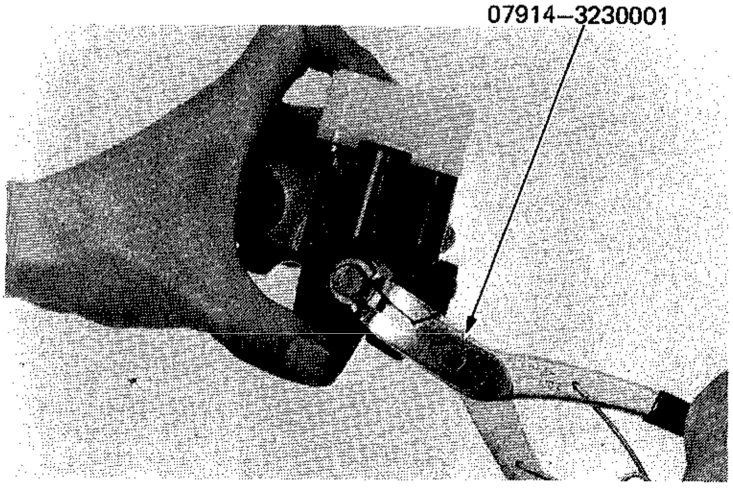
Drain brake fluid from the hydraulic system.
Free the brake lever from the master cylinder.
Disconnect the brake hose.

*CAUTION*

*Avoid spilling brake fluid on painted surfaces.*
*Place a rag over the fuel tank whenever the brake system is serviced.*

Remove the master cylinder.
Remove the snap ring.

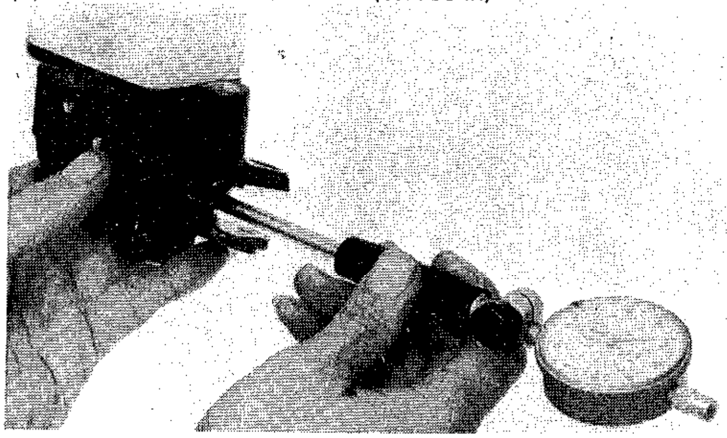
(1)SNAP RING PLIERS
07914–3230001



- MASTER CYLINDER I.D. INSPECTION

Measure the master cylinder I.D.
Check the master cylinder for scores, scratches, nicks or other defects.

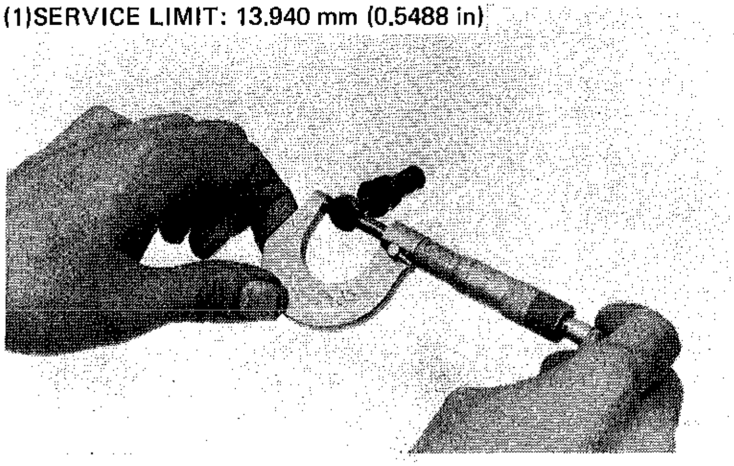
(1)SERVICE LIMIT: 14.055 mm (0.5533 in)



- MASTER PISTON O.D. INSPECTION

Measure the master piston O.D.

(1)SERVICE LIMIT: 13.940 mm (0.5488 in)

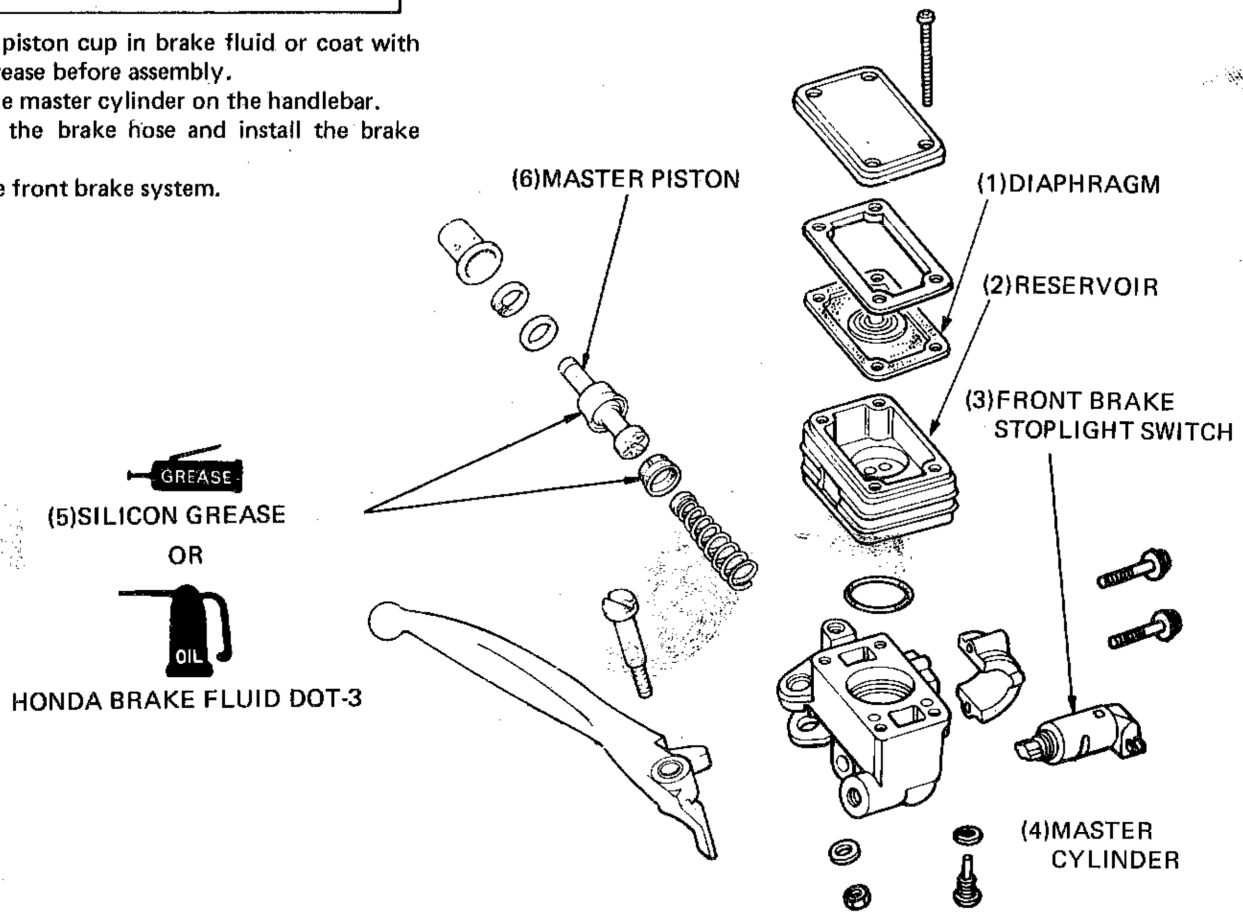


- MASTER CYLINDER ASSEMBLY

*CAUTION*

*Handle the master cylinder piston, cylinder and spring as a set.*

Dip the piston cup in brake fluid or coat with silicon grease before assembly.
Install the master cylinder on the handlebar.
Connect the brake hose and install the brake lever.
Bleed the front brake system.



# FRONT BRAKE CALIPER

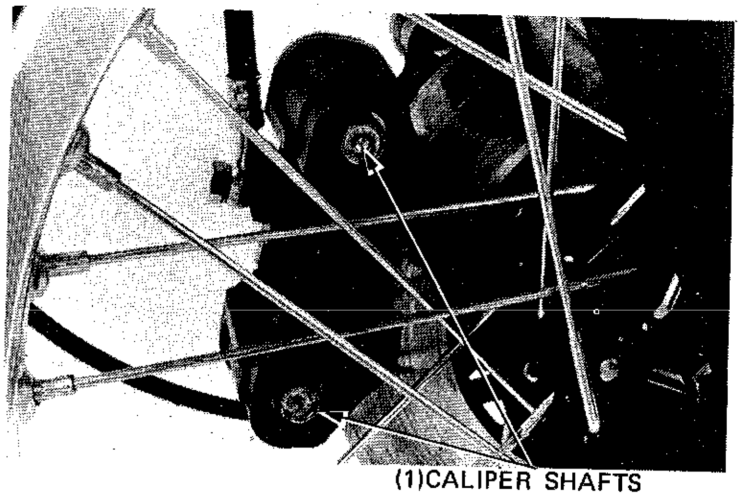
## • CALIPER A REMOVAL

Remove caliper cover.
Remove the clip and the caliper pin.
Remove the brake pads.
Drain the brake hydraulic system.
Disconnect the brake hose.

NOTE

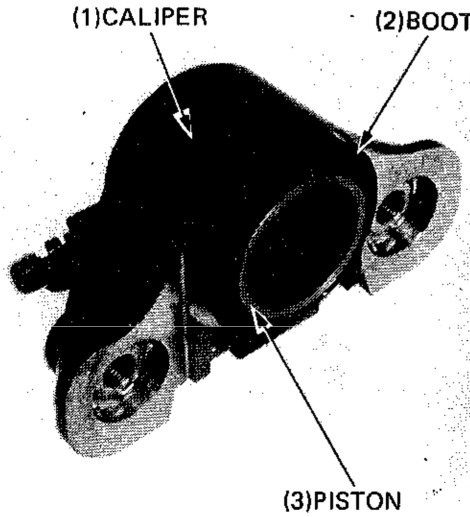
Avoid spilling brake fluid on painted surfaces.

To remove the caliper A, loosen the two caliper shafts gradually in several steps while pressing them against the caliper.


(1)CALIPER SHAFTS

## • BRAKE CALIPER A DISASSEMBLY

Remove the caliper boot.



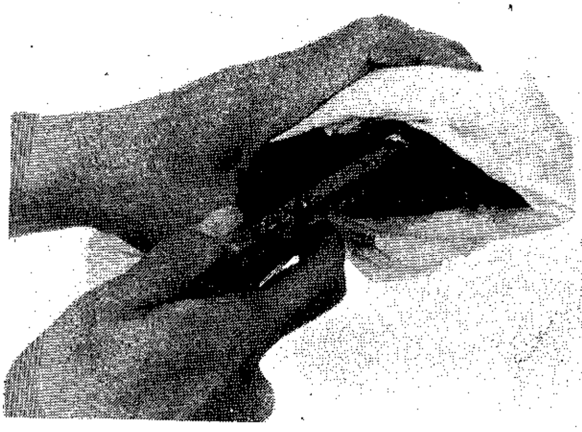

Place a shop towel or rag over the piston to prevent the piston from coming out, and position the caliper with the piston down.

***WARNING***

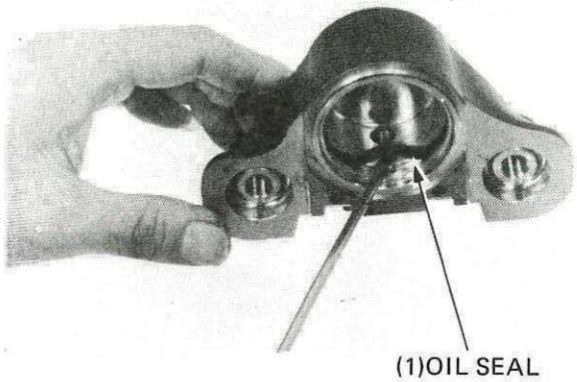
***Do not use high pressure air or bring the nozzle very close to the inlet.***

NOTE

Replace the piston and cylinder for any evidences of scores, scratches or other defects and replace if necessary.



Lift out the oil seal by first pushing it into the cylinder as shown.
Clean the caliper grooves with brake fluid.

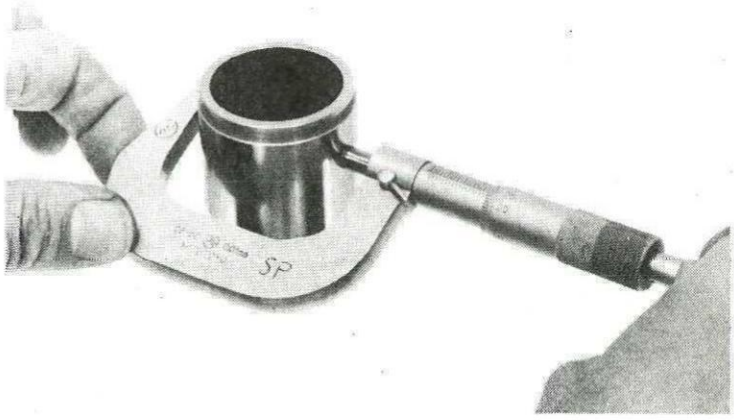


(1)OIL SEAL

- CALIPER PISTON O.D.

Check the piston for signs of scores, scratches or other defects. Measure the piston diameter using a micrometer.

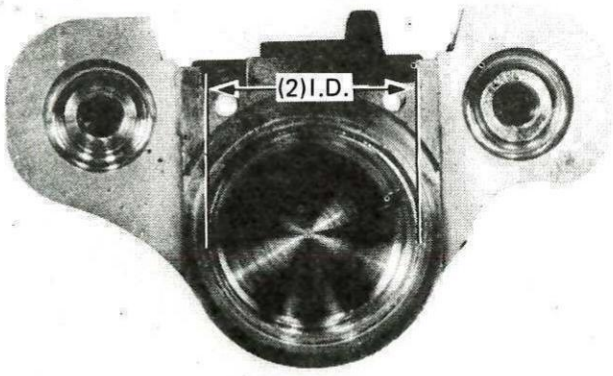
(1)SERVICE LIMIT: 42.865 mm



- CALIPER CYLINDER I.D.

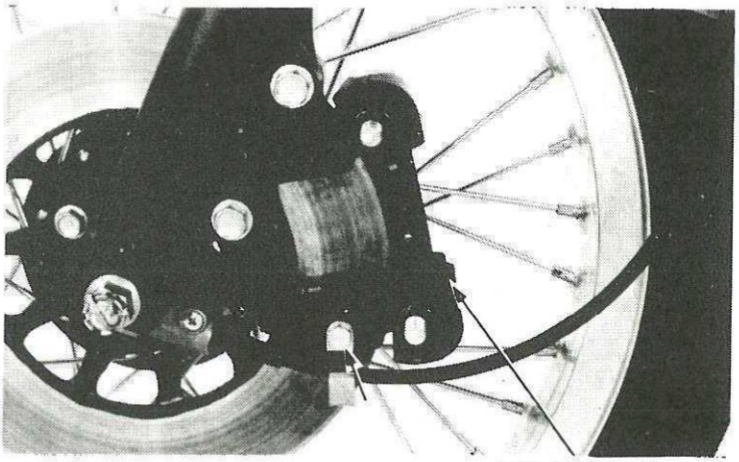
Check the caliper cylinder for scores, scratches or other defects. Measure the inside diameter of the caliper cylinder bore.

(1)SERVICE LIMIT: 42.915 mm

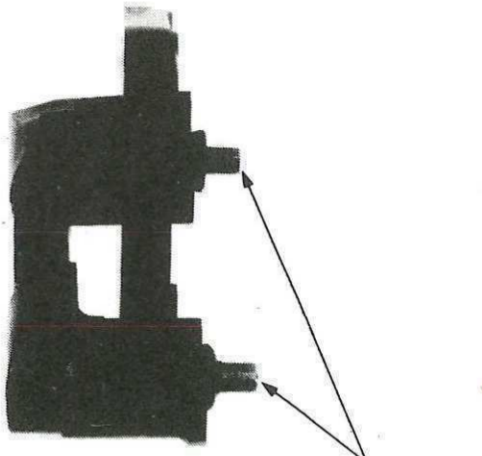


- CALIPER CARRIER/CARRIER B DISASSEMBLY

Remove the speedometer cable calmp.
Remove the caliper carrier bolt.
Remove the carrier complete with the caliper B.

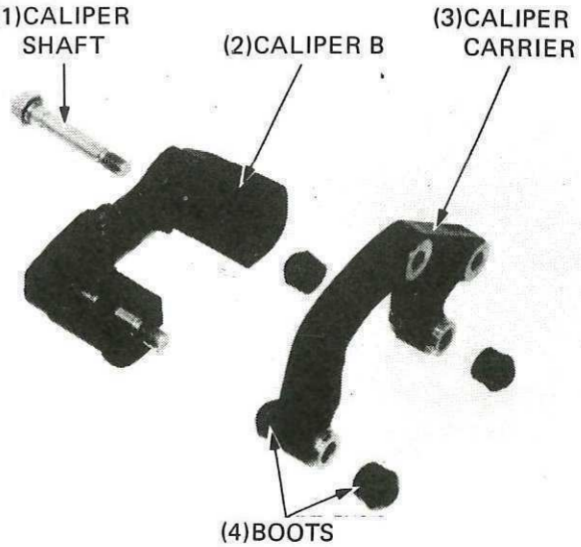

(1)CALIPER B

Remove the caliper shafts off the carrier and caliper B while rotating them by hand. Avoid damaging the boots.


(1)CALIPER SHAFTS

- CALIPER CARRIER/CALIPER B ASSEMBLY

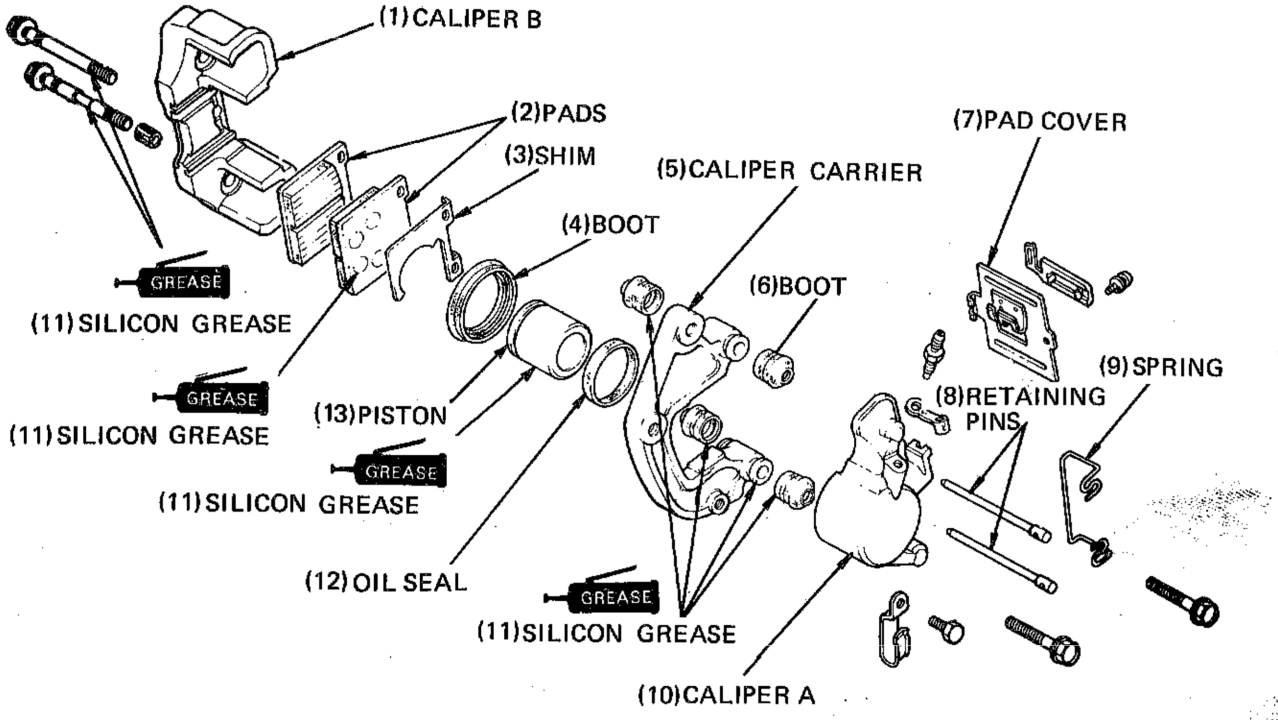
Wash clean all the removed parts.
Coat the caliper shafts with silicon grease.



Replace the boots with new ones if damaged.
Coat the boot inside with silicon grease.
Install the boot on the caliper carrier.
Assemble the caliper B and caliper carrier together while rotating them by hand.

NOTE

Make sure the boots are seated in the caliper shaft grooves properly.



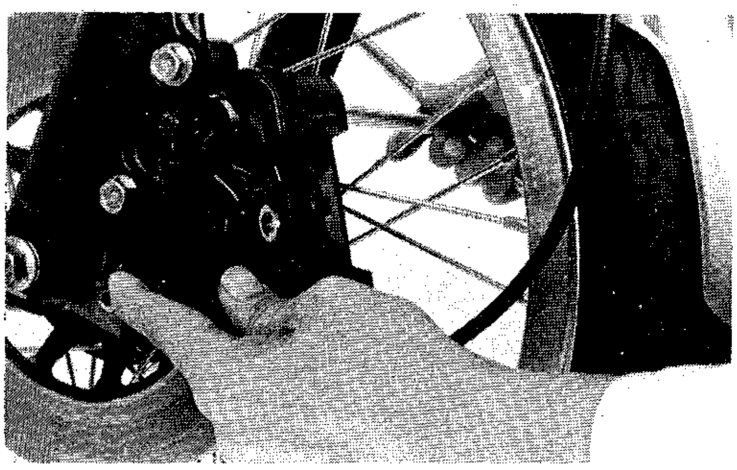

## • CALIPER A INSTALLATION

Tighten the caliper shafts evenly while pushing them against the caliper B.

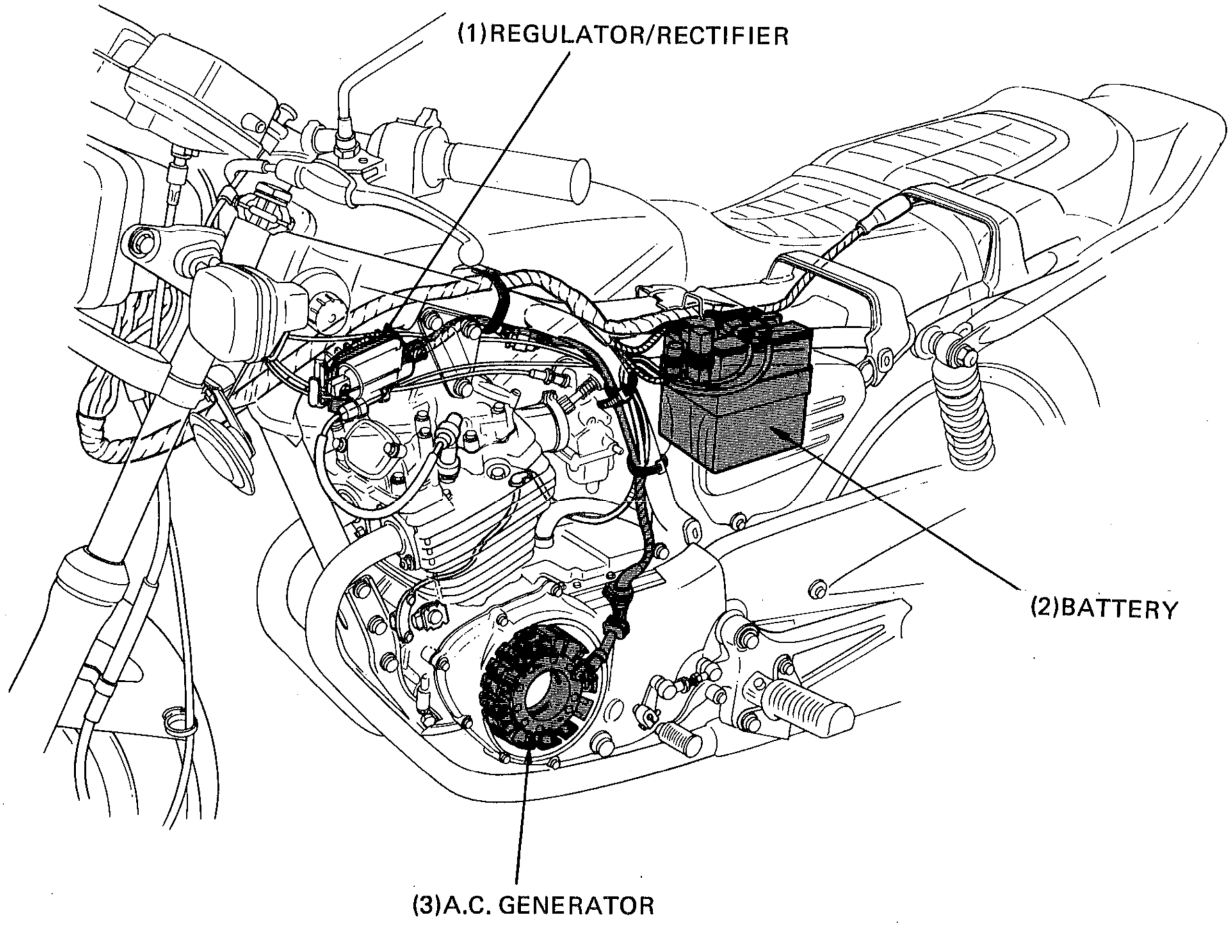
NOTE

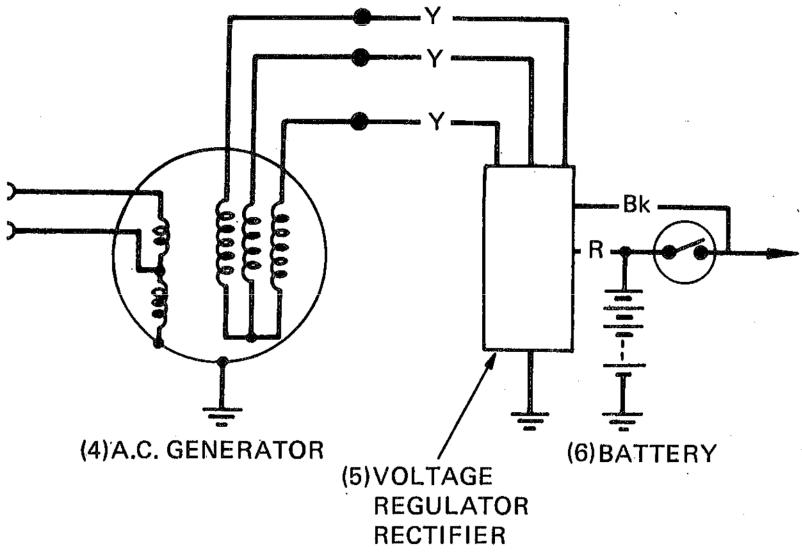
Tighten the shafts carefully, noting the mating faces of the calipers A and B.

Connect the brake hose.
Bleed the brake system.



# MEMO


(1)REGULATOR/RECTIFIER
(2)BATTERY
(3)A.C. GENERATOR


Y
Y
Y
Bk
R
(4)A.C. GENERATOR
(5)VOLTAGE REGULATOR RECTIFIER
(6)BATTERY

| | |
|---|---|
| SERVICE INFORMATION | 16–2 |
| TROUBLESHOOTING | 16–2 |
| BATTERY | 16–3 |
| CHARGING SYSTEM | 16–4 |
| A.C. GENERATOR | 16–5 |
| VOLTAGE REGULATOR/RECTIFIER | 16–5 |
| A.C. GENERATOR REMOVAL/ INSTALLATION | 16–6 |

# SERVICE INFORMATION

## • WORKING PRACTICE

Battery acid level should be checked regularly and filled with distilled water when necessary.
When charging the battery, quick-charging should only be done in an emergency; slow-charging is preferred.
Remove the battery from the motorcycle for charging whenever possible. If battery must be charged on the motorcycle, keep flames or sparks away from a charging battery because it produces hydrogen.
All charging system components can be tested on the motorcycle.

## • SPECIFICATIONS

| | |
|---|---|
| AC generator | |
| Charging rpm | 1,500 rpm min. |
| Charging output | 9.5 A min./5,000 rpm<br>15 A max./8,000 rpm |
| Lighting output | 7.0 V min./2,500 rpm<br>9.0 V max./8,000 rpm |
| Battery | |
| Capacity | 12 V, 9 ampere-hour |
| Fuse | |
| Rating | 15 A x 1, 7 A x 2 |
| Voltage regulator | |
| Type | Transistorized non-adjustable regulator |

# TROUBLESHOOTING

**No Power – Key Turned On:**
1. Dead battery
   - –Battery not charged
   - –Battery electrolyte evaporated
   - –Charging system failure
2. Disconnected battery cable
3. Main fuse burned out
4. Faulty ignition switch

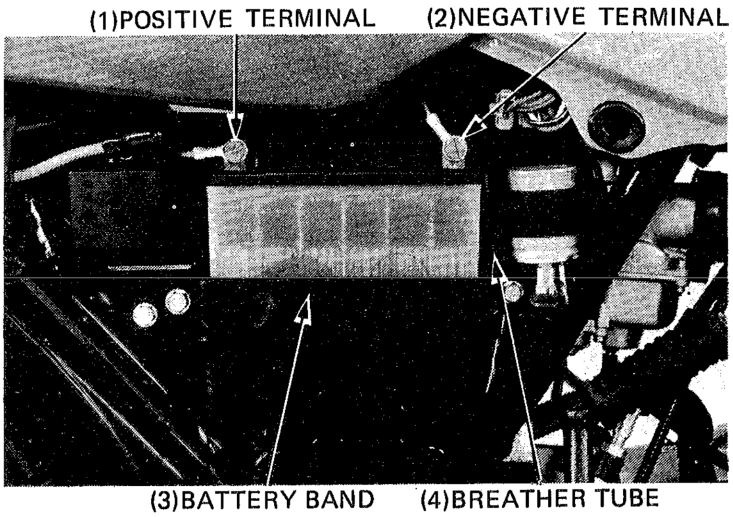
**Low Power – Key Turned On:**
1. Weak battery
   - –Low battery electrolyte level
   - –Battery run down
   - –Charging system failure
2. Loose battery connection

**Low Power – Engine Running:**
1. Battery undercharged
   - –Low battery electrolyte level
   - –One or more dead cells
2. Charging system failure

**Intermittent Power:**
1. Loose battery connection
2. Loose charging system connection
3. Loose starting system connection
4. Loose connection or short circuit in ignition system
5. Loose connection or short circuit in lighting system

**Charging System Failure:**
1. Loose, broken, or shorted wire or connection
2. Faulty voltage regulator
3. Faulty rectifier
4. Faulty AC generator

# BATTERY




## • REMOVAL

Remove the right side cover.
Remove the battery band.
Disconnect the negative cable.
Disconnect the positive cable.
Take out the battery with the breather tube attached from the battery compartment.

## • SPECIFIC GRAVITY TEST

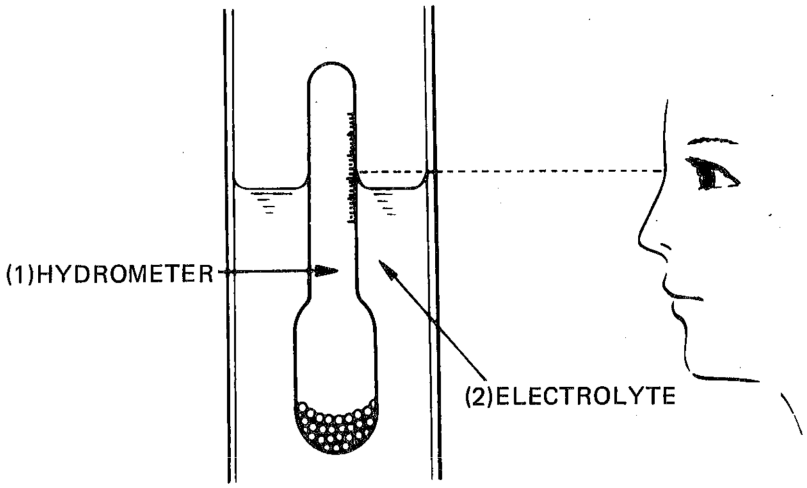
Test each cell by drawing electrolyte into a hydrometer.

**SPECIFIC GRAVITY (20°C/68°F)**

| | |
|---|---|
| **1.270–1.290** | **Fully charged** |
| **1.260 or below** | **Undercharged** |

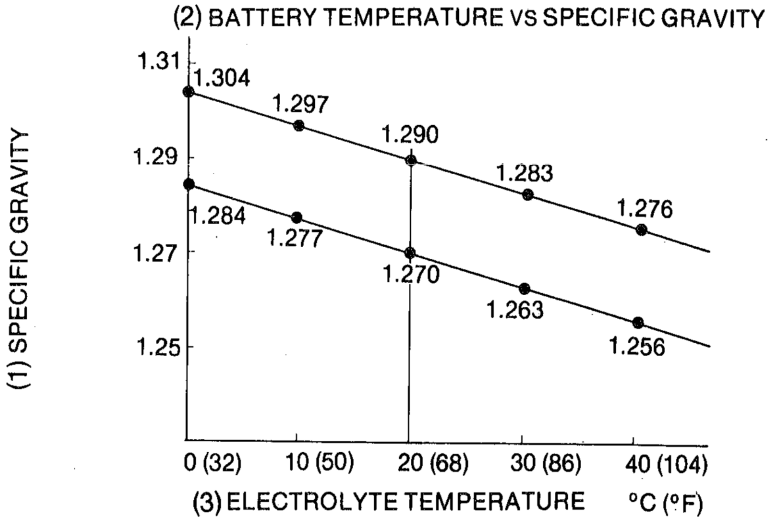
NOTE

- The battery must be recharged if the specific gravity is below 1.230.
- The specific gravity varies with the temperature as shown.
- Replace the battery if sulfation is evident.
- The battery must be replaced if there is paste on the bottom of the cell.



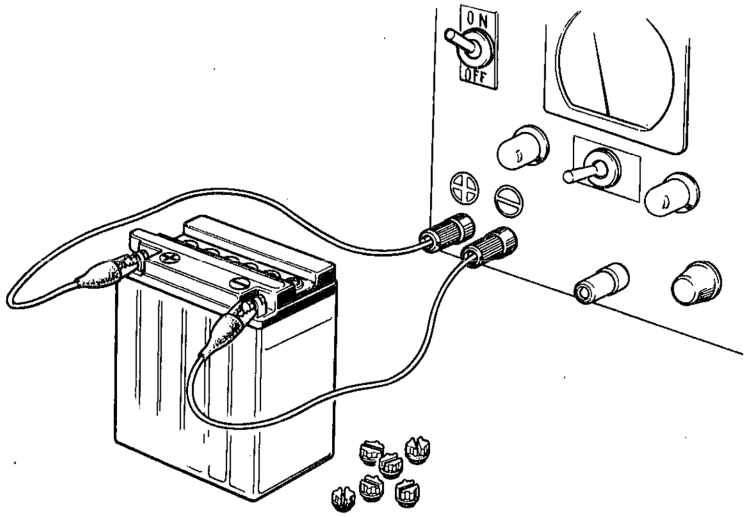

***WARNING***

*The battery contains sulfuric acid. Avoid contact with skin, eyes, or clothing. Antidote: Flush with water and get prompt medical attention.*



## • BATTERY CHARGING

Hook up Instruction.
Connect the charge positive (+) cable to the battery positive (+) terminal.
Connect the charger negative (–) cable to the battery negative (–) terminal.




Charging current:
1.2 amperes maximum
Charging:
Charge the battery until specific gravity is 1.270–1.290 at 20°C (68°F)

***WARNING***

- ***Before charging a battery, remove the cap from each cell.***
- ***Keep flames and sparks away from a charging battery.***
- ***Turn power ON/OFF at the charger, not at the battery terminals.***
- ***Discontinue charging if the electrolyte temperature exceeds 45°C (117°F).***

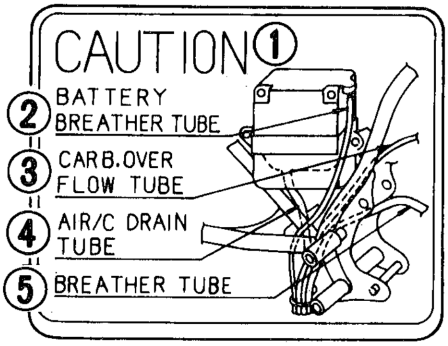
NOTE

Quick-charging should only be done in an emergency, slow-charging is preferred.

After installing the battery, coat the terminals with clean grease.

*CAUTION*

*Route the breather tube as shown on the battery caution label.*

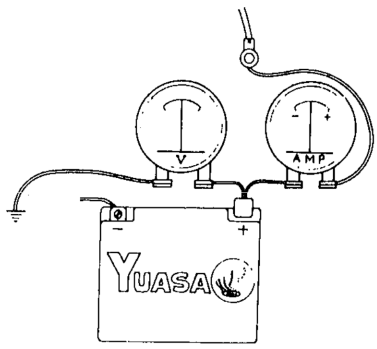



# CHARGING SYSTEM

Warm up the engine before taking readings.
Disconnect the regulator/rectifier wire.
Connect a voltmeter and an ammeter to check charging system output.

NOTE

Use a fully charged battery to check the charging system output.




## • TECHNICAL DATA

| MAIN SWITCH | LIGHTING SWITCH | INITIAL CHARGING | AT 5,000 $min^{-1}$ (rpm) |
|---|---|---|---|
| ON | ON (HIGH BEAM) | 1,500 $min^{-1}$ (rpm) max. | 9A minimum |

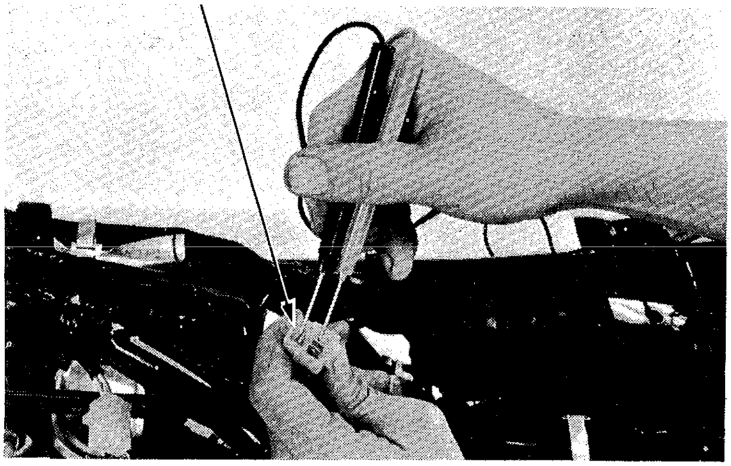
# A.C. GENERATOR

- STATOR COIL CONTINUITY TEST

NOTE

It is not necessary to remove the stator coil to make this test.

Remove the seat and fuel tank.
Disconnect the A.C. generator coupler over the carburetor.
Check the yellow leads to the A.C. generator stator for continuity with each other. Replace the stator if any yellow lead is not continuous with the others, or if any lead has continuity to ground.



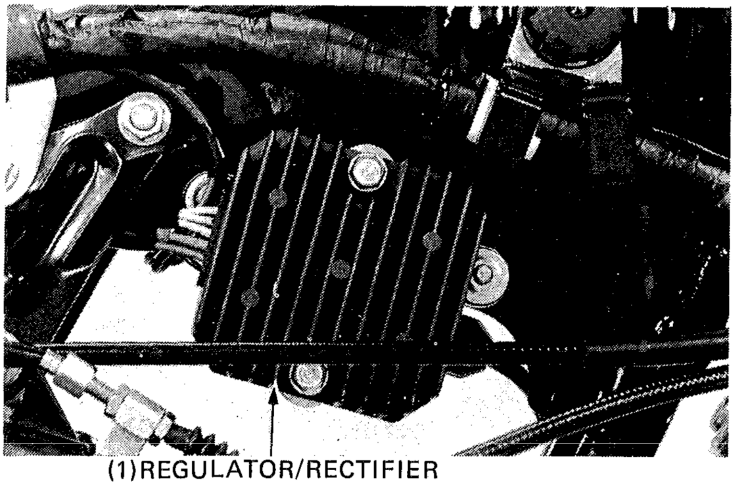

# VOLTAGE REGULATOR/ RECTIFIER

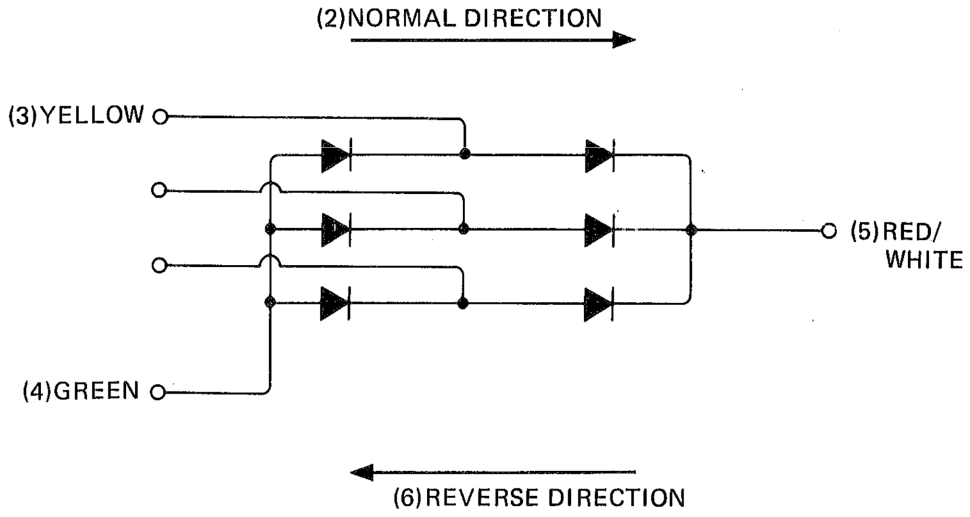
Check the resistances between the leads with an ohmmeter.

***WARNING***

***Do not use a high voltage source such as insulation resistance tester since it may damage the rectifier and give you a shock.***

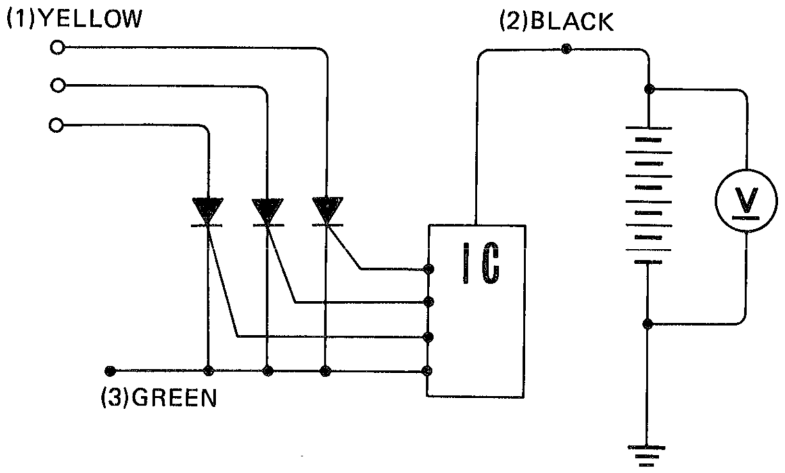
RESISTANCES IN NORMAL DIRECTION
GREEN LEAD AND ANY
YELLOW LEAD: 5~40 Ω
RED/WHITE LEAD AND ANY
YELLOW LEAD: 5~40 Ω
RESISTANCES IN REVERSE DIRECTION
RED/WHITE LEAD AND ANY
YELLOW LEAD: 2000 Ω minimum
GREEN LEAD AND ANY
YELLOW LEAD: 2000 Ω minimum



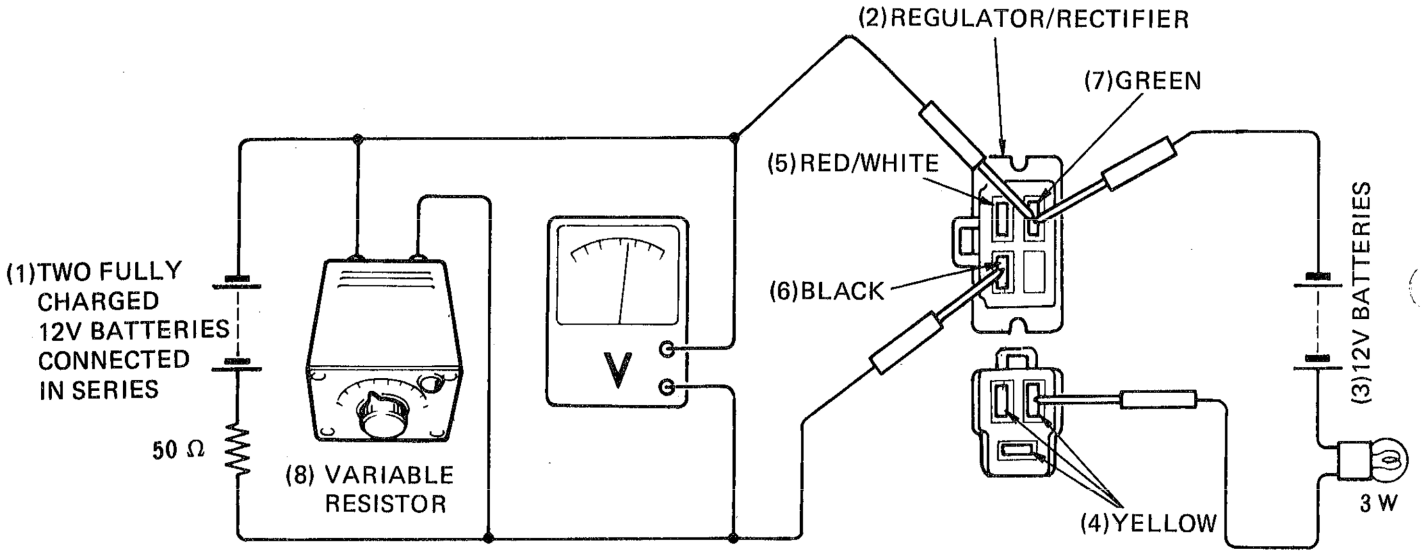



- VOLTAGE REGULATOR PERFORMANCE TEST

a. Testing with a voltmeter
Connect a voltmeter across the battery.
Check regulator performance with the engine running.
Regulator must divert current to ground when battery voltage reaches 14.0~15.0 V.




b. Testing with a variable resistor
Connect a variable resistor (0~100 Ω) across the battery with a 50 Ω resistor in between.
Test lamp must come on when voltage reads 14 to 15 V on the voltmeter by adjusting the variable resistor.



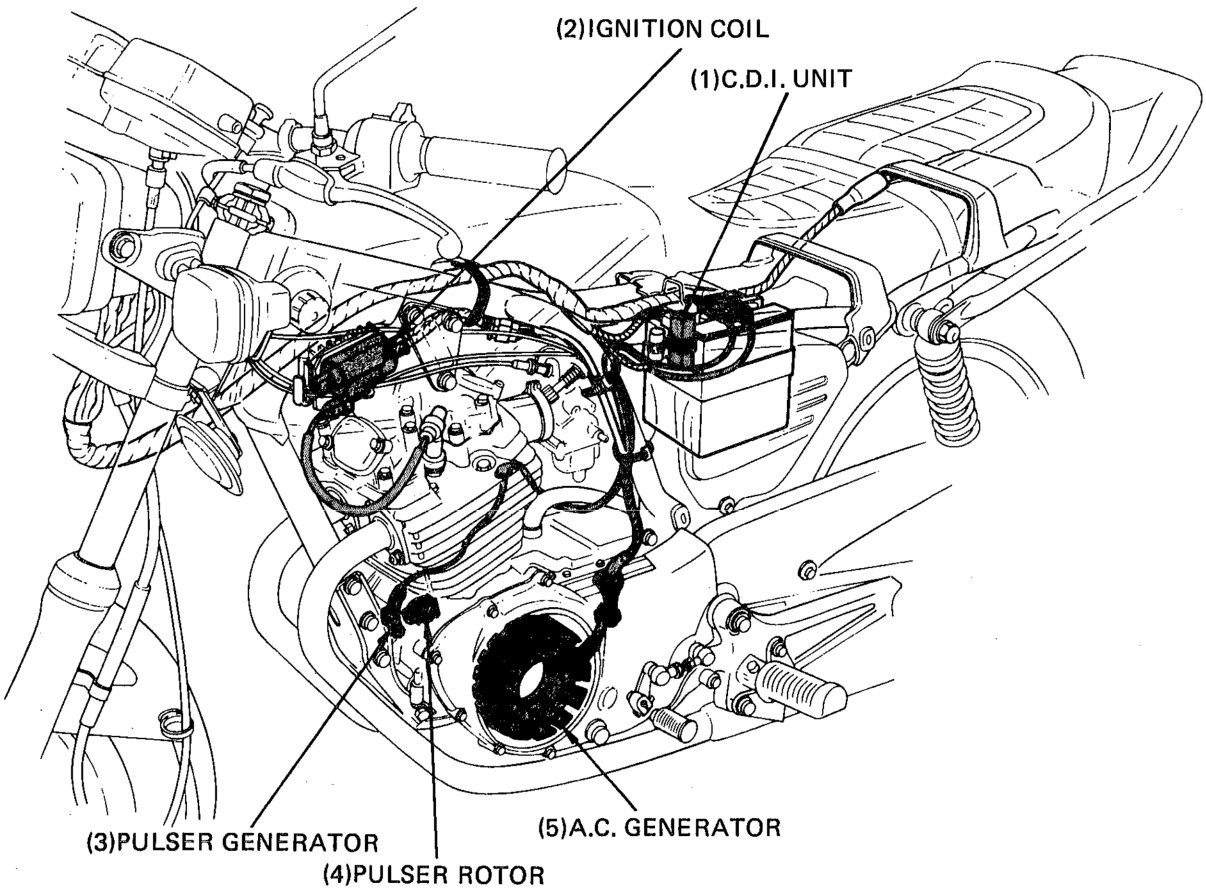

# AC GENERATOR REMOVAL/ INSTALLATION

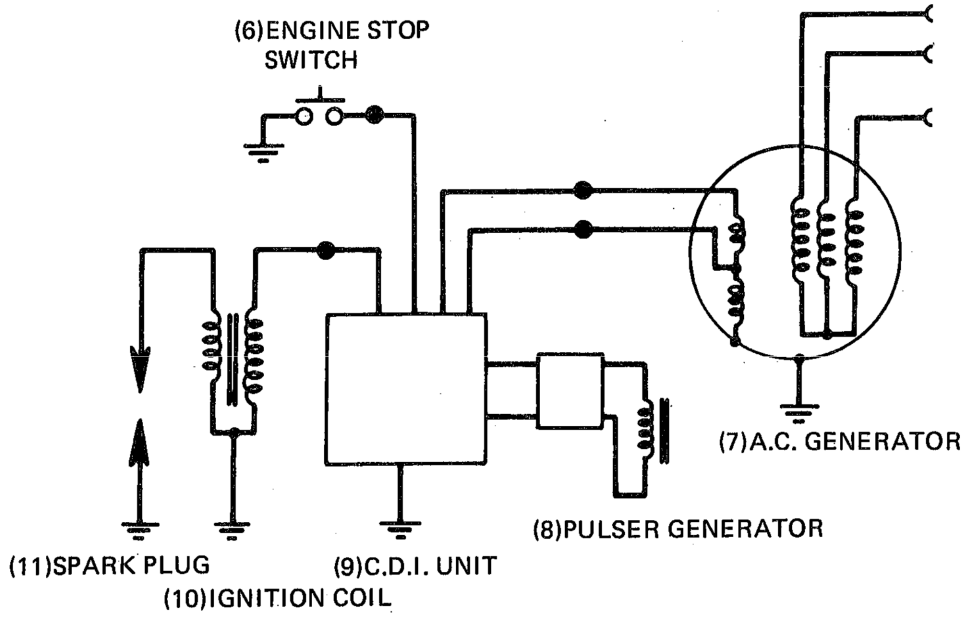
For removal and installation procedure, see Section 9.

# MEMO

# 17. IGNITION SYSTEM

HONDA
CB250RS



| | |
|---|---|
| SERVICE INFORMATION | 17–2 |
| TROUBLESHOOTING | 17–2 |
| SPARK PLUGS | 17–3 |
| IGNITION COIL | 17–3 |
| A.C. GENERATOR | 17–3 |
| C.D.I. UNIT | 17–4 |
| PULSER GENERATOR | 17–4 |

# SERVICE INFORMATION

## • WORKING PRACTICE

Ignition timing cannot be adjusted since the C.D.I. (Capacitive Discharge Ignition) unit is non-adjustable. If ignition timing is incorrect, check the C.D.I. unit, A.C. generator and pulsor generator and replace any defective part.

## • SPECIFICATIONS

| | | | E, G, F, B, ED, SW, SA | U |
|---|---|---|---|---|
| Spark plug | NGK | Standard | DR8ES | X27ESR-U |
| | | For cold climate (Below 5°C, 41°F) | DR8ES-L | X24ESR-U |
| | ND | Standard | D8EA | X24ES-U |
| | | For extended high speed driving | D9EA | X27ES-U |

Plug gap: 0.6–0.7 mm (0.024–0.028 in)
Ignition timing:
Initial: 12° B.T.D.C. at 1,200 $min^{-1}$ (rpm) (F mark)
Advance start: 1° B.T.D.C. at 2,250 $min^{-1}$ (rpm)
Full advance: 25° B.T.D.C. at 3,450 $min^{-1}$ (rpm)

# TROUBLESHOOTING

**No Sparks at Plugs**

1. Engine stop switch "OFF"
2. Poorly connected, broken or shorted wires
   - Between A.C. generator and C.D.I. unit
   - Between C.D.I. unit and engine stop switch
   - Between C.D.I. unit and ignition coil
   - Between C.D.I. unit and main switch
   - Between ignition coil and plug
   - Between pulser generator and C.D.I. unit
3. Faulty main switch
4. Faulty ignition coil
5. Faulty C.D.I. unit
6. A.C. generator out of order
7. Faulty pulser generator

**Engine Starts but Runs Poorly**

1. Ignition primary circuit
   - Faulty ignition coil
   - Loose or bare wire
   - Faulty pulser generator
2. Secondary circuit
   - Faulty plug
   - Faulty high tension cord
3. Ignition timing
   - A.C. generator at fault
   - C.D.I. unit faulty
   - Faulty pulser generator
   - Faulty spark advancer

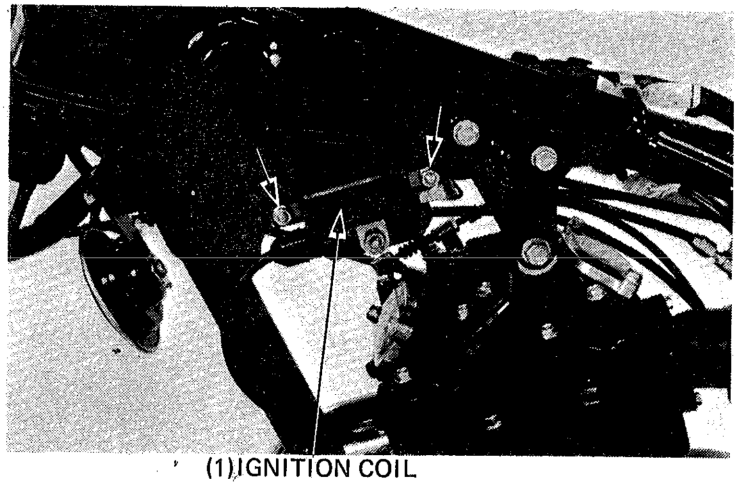
# SPARK PLUGS

For spark plug gap inspection and adjustment procedure, see Page 3–4.

# IGNITION COIL

- REMOVAL

Remove the fuel tank.
Disconnect the wire leads.
Remove the attaching bolt and remove the coil.

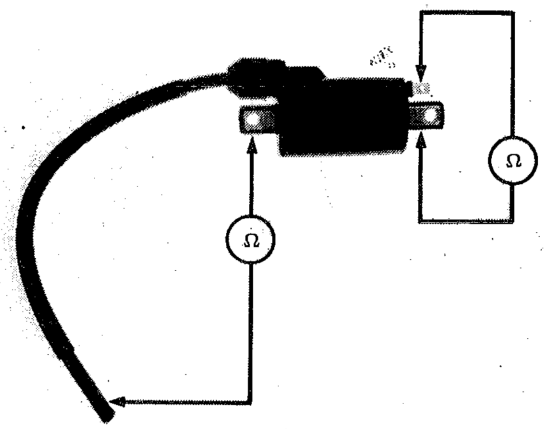


(1)IGNITION COIL

- INSPECTION

Measure the resistances of the primary and secondary coils.

**PRIMARY:** **0.2–0.8 Ω**
**SECONDARY:** **8–15 kΩ**



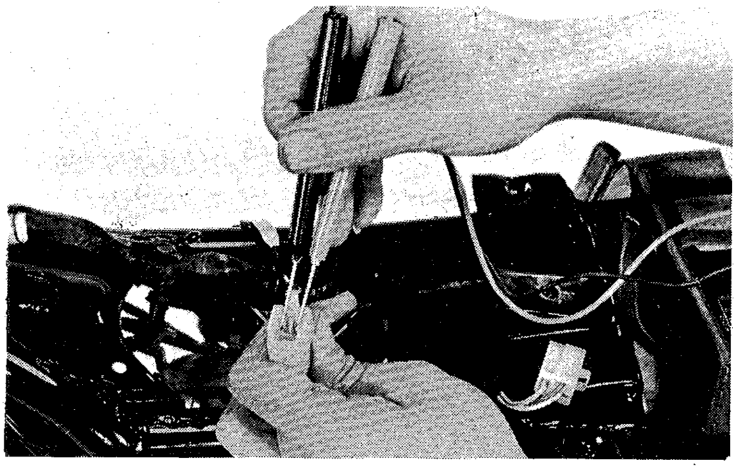

# A.C. GENERATOR

- INSPECTION

Disconnect the stator wire leads.
Measure the resistances between the terminals:

**Yellow-yellow:** **0.3–0.53 Ω**
**White-ground:** **259–351 Ω**
**White-blue:** **73–99 Ω**

(1)BLACK/RED



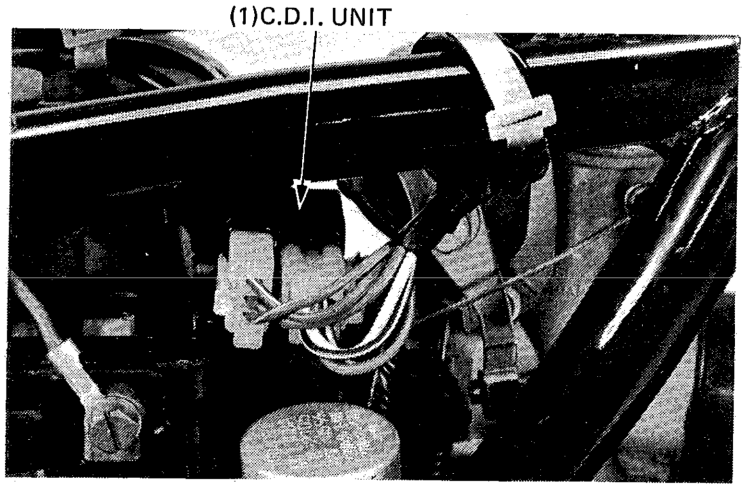
# C.D.I. UNIT

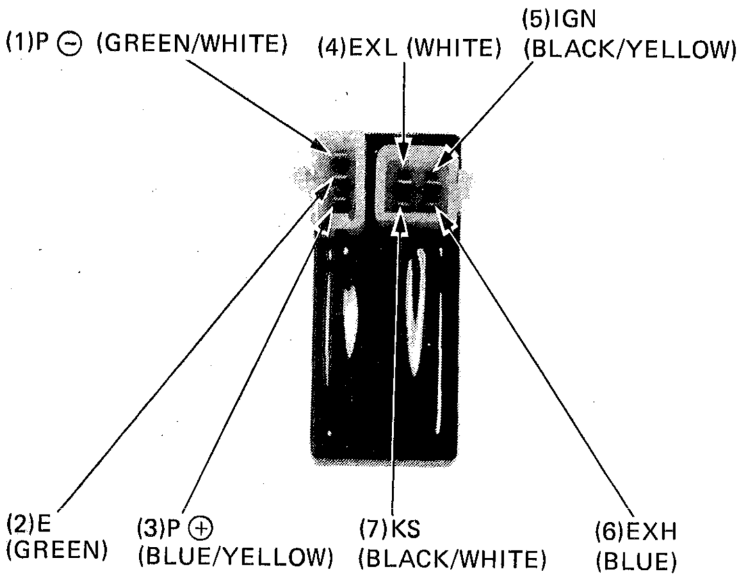
- INSPECTION

Disconnect the wirings at their connections.
Measure resistances between the terminals.
Compare the readings with the figures in the table.
Replace the C.D.I. unit with a new one if the readings do not fall within the limits shown in the table.

NOTE

- The C.D.I. unit is fully transistorized.
- For accurate testing, it is necessary to use a specified electric tester. Use of an improper tester or measurements in improper range may give a false readings.
- Use SANWA ELECTRIC TESTER (P/N 07308-0020000) or KOWA ELECTRIC TESTER (TH-5H).




SANWA: x kΩ
KOWA: x 100Ω

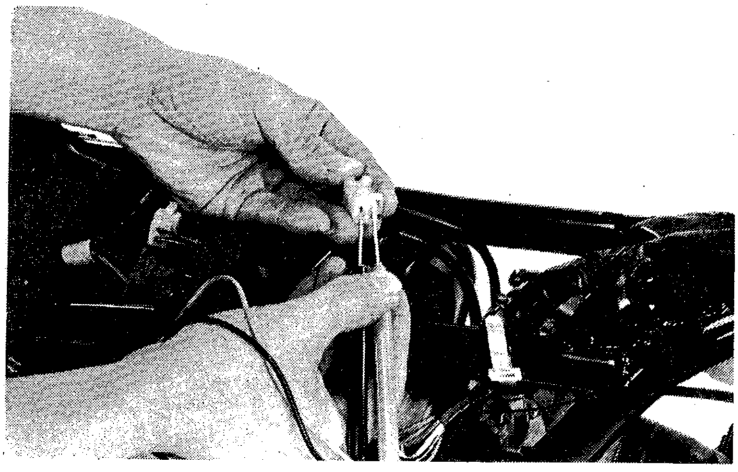
| PROBE ⊖ \ ⊕ PROBE | KS | EXH | EXL | E | P ⊕ | P ⊖ | IGN |
|---|---|---|---|---|---|---|---|
| KS | | ∞ | ∞ | ∞ | ∞ | ∞ | ∞ |
| EXH | 5~100 | | ∞ | ∞ | ∞ | ∞ | ∞ |
| EXL | ∞ | ∞ | | ∞ | ∞ | ∞ | ∞ |
| E | ∞ | ∞ | 1~50 | | ∞ | 0 | ∞ |
| P ⊕ | ∞ | ∞ | 2~60 | 2~60 | | 2~60 | ∞ |
| P ⊖ | ∞ | ∞ | 1~50 | 0 | ∞ | | ∞ |
| IGN | ∞ | ∞ | ∞ | ∞ | ∞ | ∞ | |

# PULSER GENERATOR

- INSPECTION

Disconnect the pulser generator wire coupler.
Measure the resistance between the Blue/Yellow and Green wires.

**SPECIFICATION: 90–110 Ω**



# SWITCHES 18.


| | |
|---|---|
| SERVICE INFORMATION | 18–2 |
| TROUBLESHOOTING | 18–2 |
| IGNITION SWITCH | 18–3 |
| TURN SIGNAL/DIMMER/HORN/ PASSING SWITCH | 18–3 |
| LIGHTING/ENGINE STOP/FRONT STOP SWITCH | 18–4 |
| REAR BRAKE STOPLIGHT SWITCH | 18–4 |

# SERVICE INFORMATION

## • WORKING PRACTICE

All electrical wires and connectors are color-coded. When two or more different colored wires are connected, a colored tube that matches the major color of the other wire appears on the wire near the connector. Observe the color codes before disconnecting any wires. All plastic plugs have locking tabs that must be released before disconnecting, and must be aligned when reconnecting.

In order to isolate an electrical failure, check the continuity of the electrical path through the part. A continuity check can usually be made without removing the part from the motorcycle — by simply disconnecting the wires and connecting a continuity tester or voltmeter to the terminals or connections.

G ... Green
R ... Red
W ... White
Br ... Brown
Bk ... Black
LG ... Light Green
Y ... Yellow
B ... Blue
P ... Pink
O ... Orange
Gr ... Grey
LB ... Light Blue

## • SPECIFICATIONS

| LIGHTS \ TYPE | E, F, GI, GII, ED, B | U, SA |
|---|---|---|
| Headlight (High/Low) | 45 W/40 W | 50 W/40 W |
| Tail/stoplight | 5 W/21 W | 23 W/8 W |
| Turn signal light | 21 W | 23 W |
| Speedometer light | 3.4 W | 3.4 W |
| Neutral indicator | 3.4 W | 3.4 W |
| Turn signal indicator | 3.4 W | 3.4 W |
| High beam indicator | 3.4 W | 3.4 W |
| Position light | 4 W | 3.4 W |

# TROUBLESHOOTING

**No Lights Come On When Ignition Switch Is Turned ON:**

1. Bulb at fault or burned out
2. Faulty switch
3. Wiring to that component has open circuit
4. Fuse blown
5. Wiring loose, broken, or at fault
6. Battery dead or disconnected

**All Lights Come On, But Dimly, When Ignition Switch Is Turned ON:**

1. Battery low
2. Wiring or switch has excessive resistance

**Headlight Beams Do Not Shift When HI-LO Switch Is Operated:**

1. Beam Filament burned out
2. Faulty dimmer switch

# IGNITION SWITCH

- IGNITION SWITCH INSPECTION

Remove the headlight and disconnect the 4-P (White) coupler and Bk and R connectors.
Check for continuity between terminals.

| | R | Bk | Br/W | Br | Bk/W | G |
|---|---|---|---|---|---|---|
| OFF | | | | | ○—○ | |
| ON | ○—○ | | ○—○ | | | |
| P | ○— | | —— | —○ | ○—○ | |

Continuity should exist between color coded wires indicated by interconnected circles.



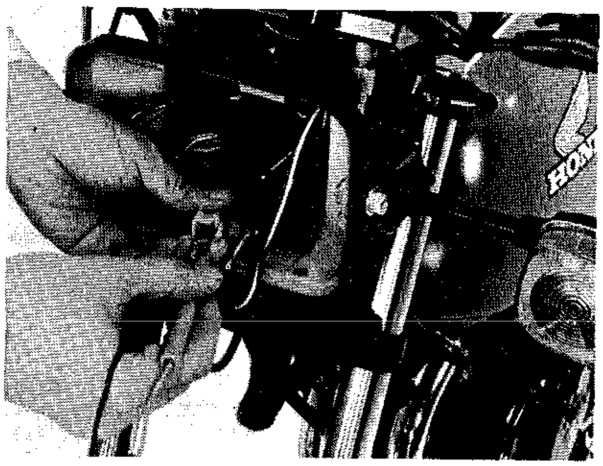

OFF




ON




P



# TURN SIGNAL/DIMMER/ HORN/PASSING SWITCH

Remove the headlight.
Disconnect the 9-P (Black) coupler.
Check for continuity between terminals.

Continuity should exist between color coded wires indicated by interconnected circles (○—○).

- TURN SIGNAL SWITCH

| | Gr | LB | O |
|---|---|---|---|
| R | ○— | —○ | |
| N | | | |
| L | ○— | | —○ |

- DIMMER SWITCH

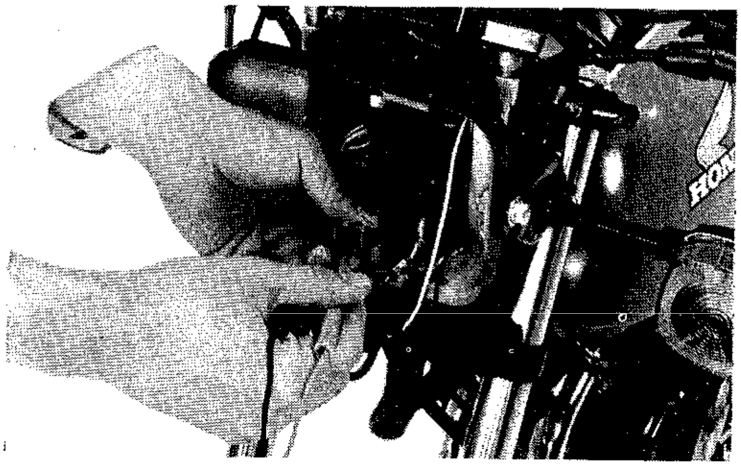
| | Bk/Y | W | B |
|---|---|---|---|
| Lo | ○— | —○ | |
| (N) | ○— | —○ | —○ |
| Hi | ○— | | —○ |

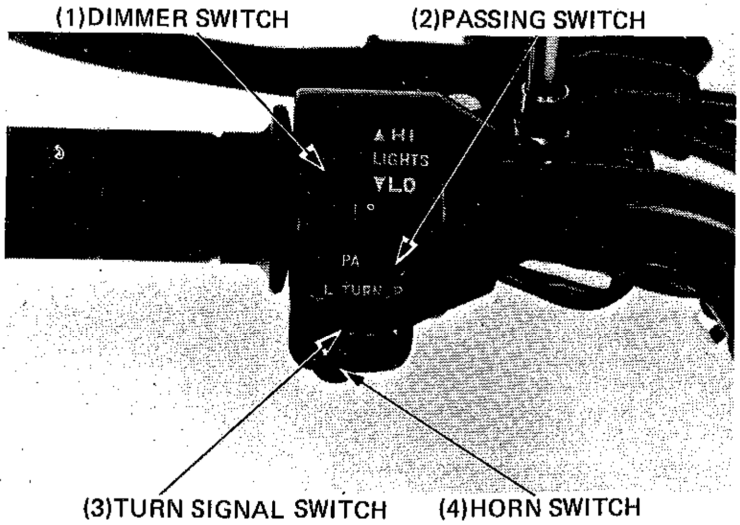
- HORN SWITCH

| | LG | G |
|---|---|---|
| FREE | | |
| PUSH | ○— | —○ |

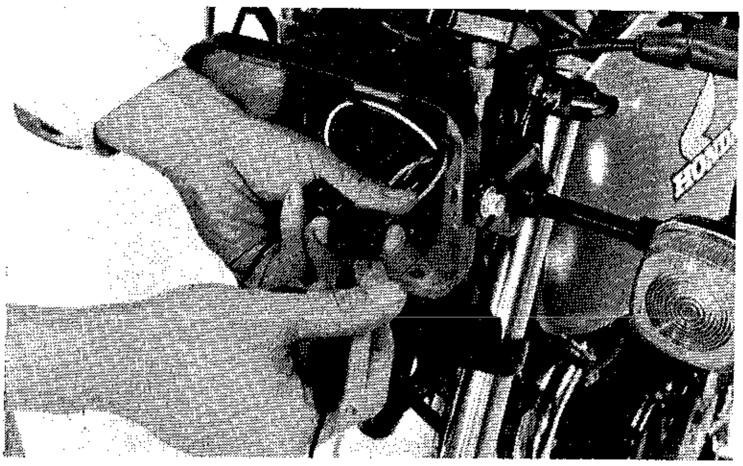
- PASSING SWITCH

| | B | Bk |
|---|---|---|
| FREE | | |
| PUSH | ○— | —○ |





# LIGHTING/ENGINE STOP/ FRONT STOP SWITCH



Remove the headlight.
Disconnect the 6-P (Red) coupler.
Check for continuity between terminals.
Continuity should exist between color coded wires indicated by interconnected circles.

- LIGHTING SWITCH

| | Bk | Br/B | Bk/R |
|---|---|---|---|
| OFF | | | |
| P | ○—— | ——○ | |
| HL | ○—— | ——○ | ——○ |

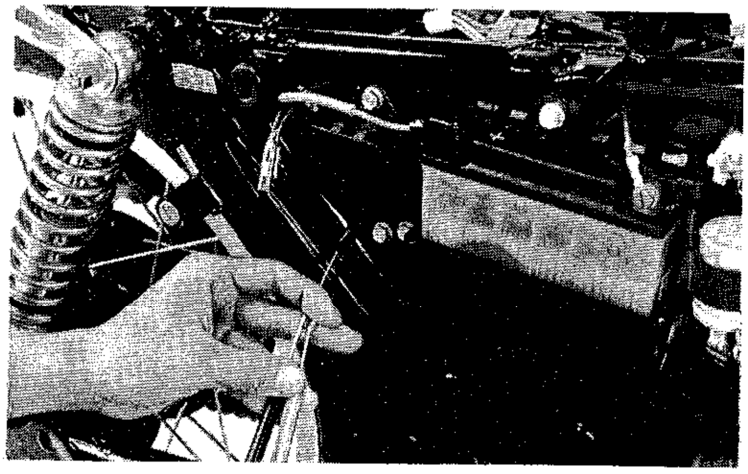
- ENGINE STOP SWITCH

| | Bk/W | G |
|---|---|---|
| OFF | ○—— | ——○ |
| RUN | | |
| OFF | ○—— | ——○ |

- FRONT STOP SWITCH

| | Bk | G/Y |
|---|---|---|
| ON (PULL LEVER) | ○—— | ——○ |
| OFF (FREE) | | |

# REAR BRAKE STOPLIGHT SWITCH



Remove the right side cover.
Disconnect the black, and green and yellow wire connectors.

Check rear brake stop switch for continuity with rear brake applied.

| | Bk | G/Y |
|---|---|---|
| ON | ○—— | ——○ |
| OFF | | |

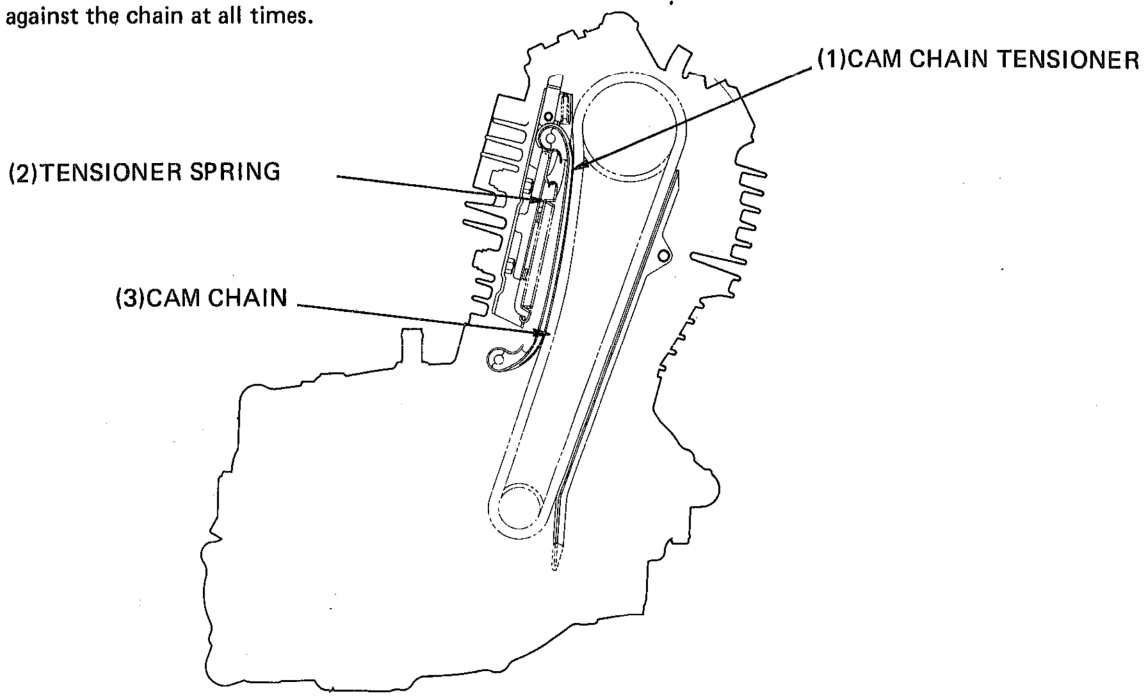
Switch is normal if there is continuity.

| | |
|---|---|
| AUTOMATIC CAM CHAIN TENSIONER | 19–2 |
| BALANCER MECHANISM | 19–3 |
| 4-VALVE, 2-EXHAUST PORT | 19–6 |
| C.D.I. (Capacitive Discharge Ignition) SYSTEM | 19–7 |
| STARTER DECOMPRESSOR | 19–10 |

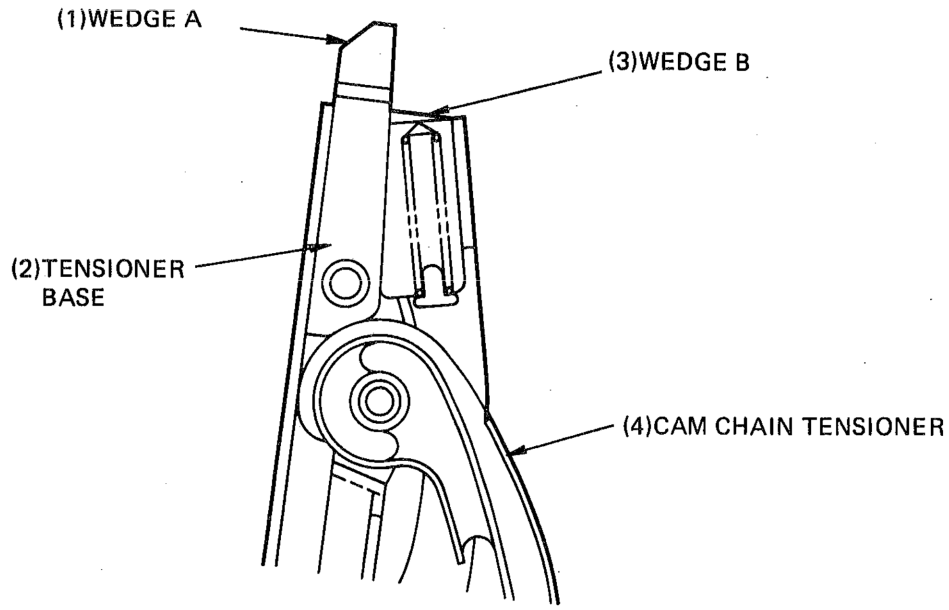
# AUTOMATIC CAM CHAIN TENSIONER

The motorcycle is equipped with an automatic cam chain tensioner to compensate for natural wear on the chain, eliminating periodic adjustment and maintenance service. Operation is as follows:

1. The device consists of the tensioner spring, tensioner, wedges A and B, and tensioner base. The wedge A is connected to the tensioner whereas the wedge B is attached to the tensioner base. The spring exerts pressure on the tensioner so as to deflect the tensioner against the chain at all times.

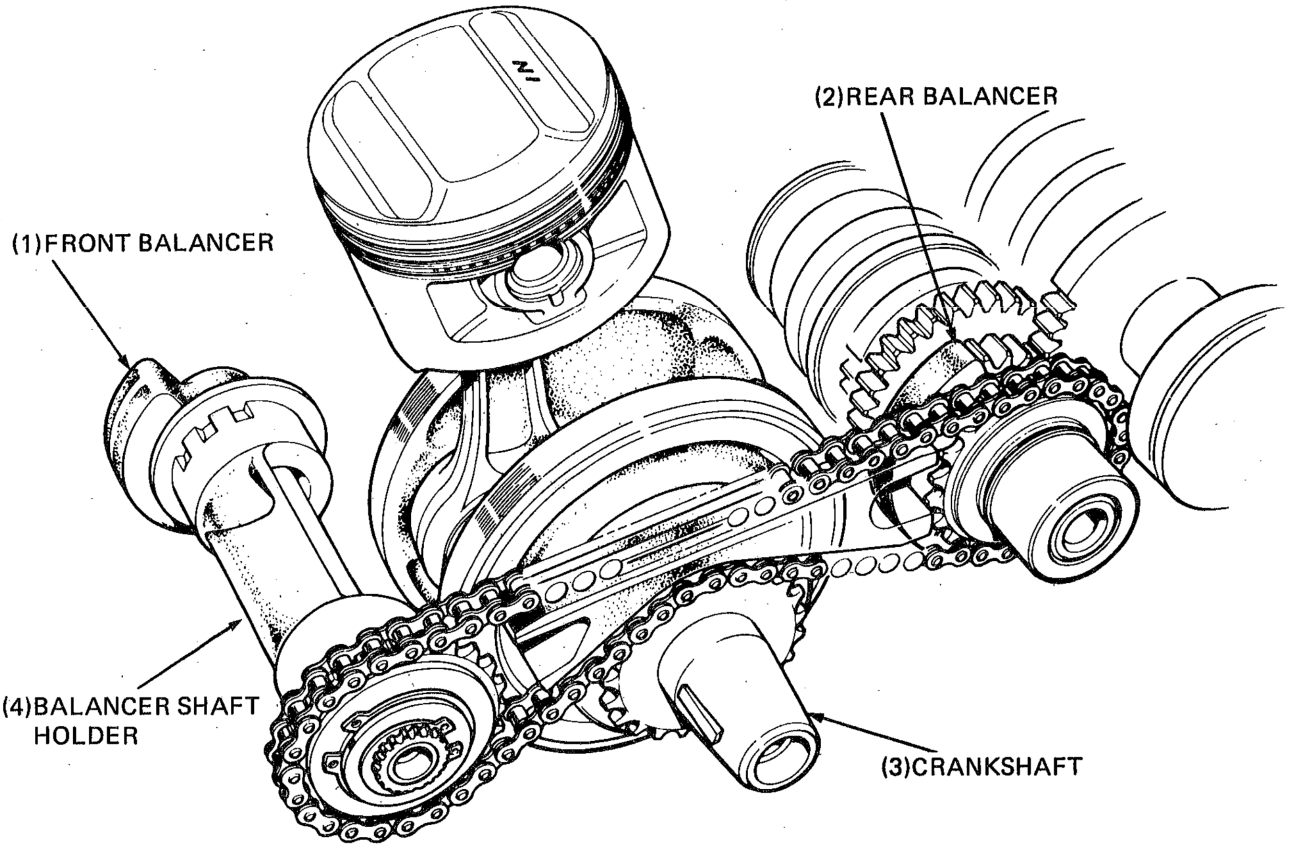



2. As the chain is elongated due to wear, the tensioner is pulled by the spring to take up slack on the chain. The wedges A and B combine to prevent the tensioner from returning to the original shape, thus maintaining adequate pressure on the chain.



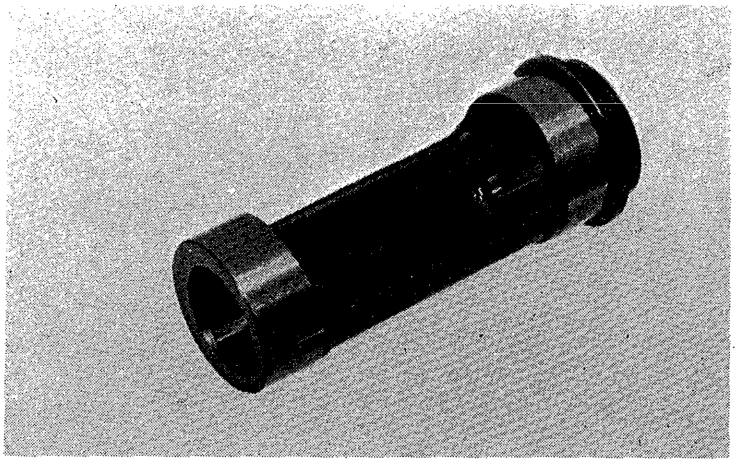
# BALANCER MECHANISM

The front and rear balancers counteract large inertia forces inherent in the single cylinder engine, allowing it to produce smooth power.




## • BALANCER SHAFT HOLDER

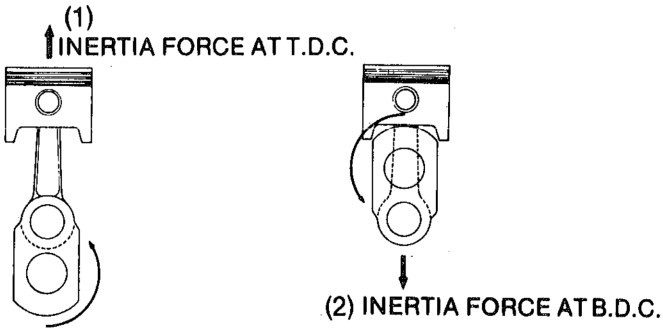
The holder allows balancer chain tension adjustment.



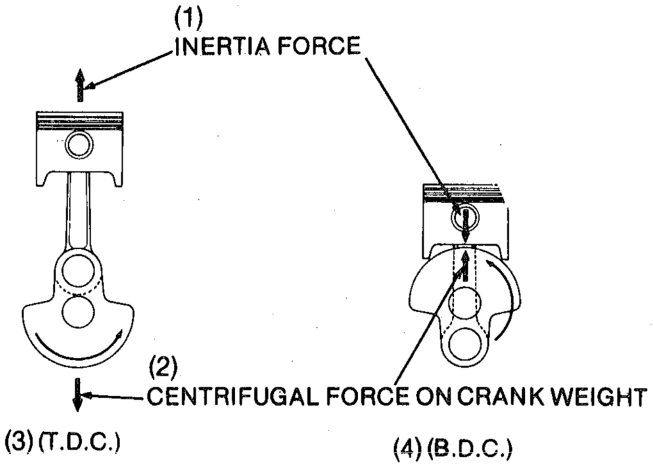
## • OPERATING PRINCIPLE OF BALANCER

The source of vibration in a reciprocating engine is the "inertia" force created by the rotating or reciprocating masses. For example, the inertia force which acts on the main bearings of a single cylinder, 4-cycle, 200 cc engine at TDC will be:

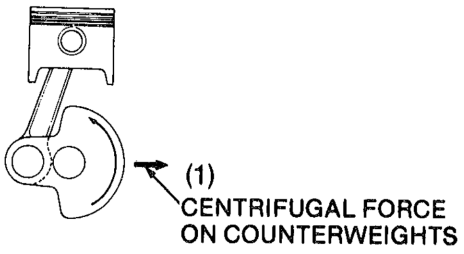
400 kg ( 882 lb) approx. . . . . at 600 rpm
1,000 kg (2,205 lb) approx. . . . . at 10,000 rpm



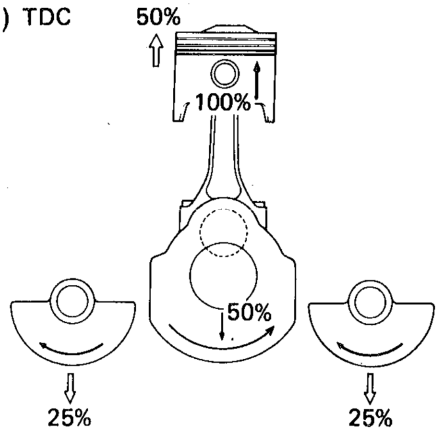

Inertia force created by the rotating mass is in general canceled by counterweights. Their use will reduce vibration caused by the primary inertia force which occurs once every crankshaft revolution. (Hereinafter, inertia force refers to this primary inertia force).



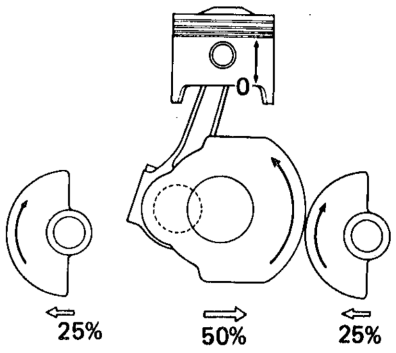

Although the counterweights will balance the inertia force at T.D.C., they will create a corresponding horizontal imbalance of their own at 90° B.T.D.C. and 90° A.T.D.C. due to centrifugal force. The balancers are designed to counteract this force including part of the inertia force created by the reciprocating mass.



(1) TDC

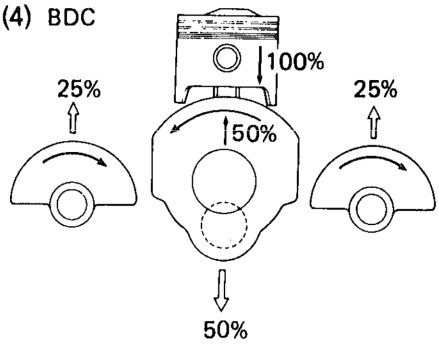



(2) The counterweight creates a centrifugal force to neutralize one-half of the inertia force. The remaining inertia will be totally balanced by two balancers. Each balancer counteracts one-fourth of the total inertia.

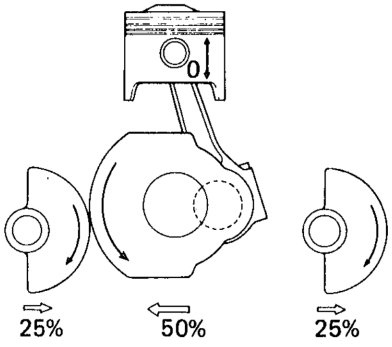



(3) The inertia force is balanced by the counterweight as shown (1). However, the centrifugal force acting on the counterweight is still present. The centrifugal force on the balancers cancels this remaining force.

(4) BDC




(5) The centrifugal force on the counterweight neutralizes one-half of the downward inertia force. The balancers counteract the remainder.

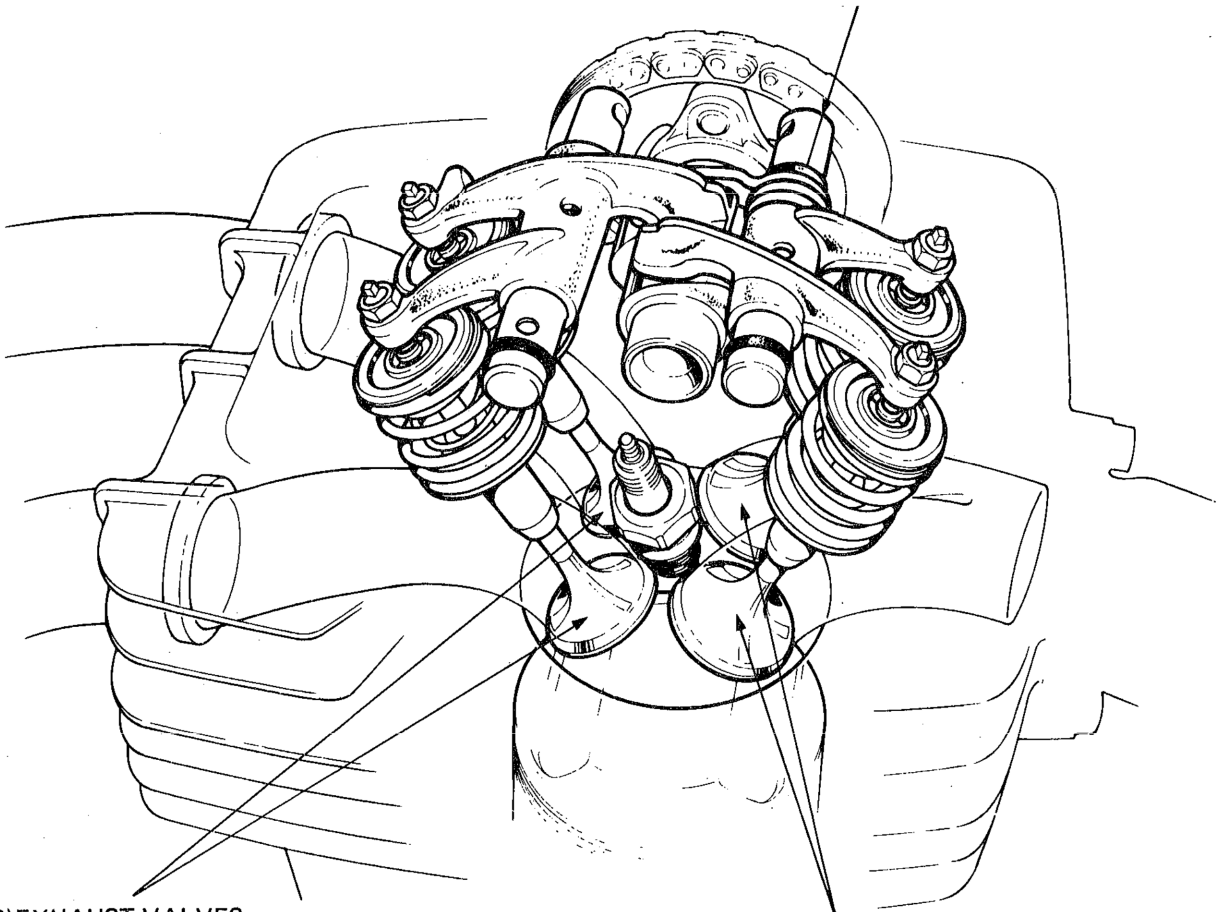



(6) The centrifugal force on the counterweight is balanced by the balancers.

# 4-VALVE, 2-EXHAUST PORT

The 2 intake and 2 exhaust valves reduce the individual valve mass thus allowing a higher maximum rpm and also provide a greater port area. A pair of exhaust pipes makes the entire exhaust system compact and aids cooling in the exhaust port area.

(1)ROCKER ARM SPRING
The spring holds the arm against the value to minimize noise.

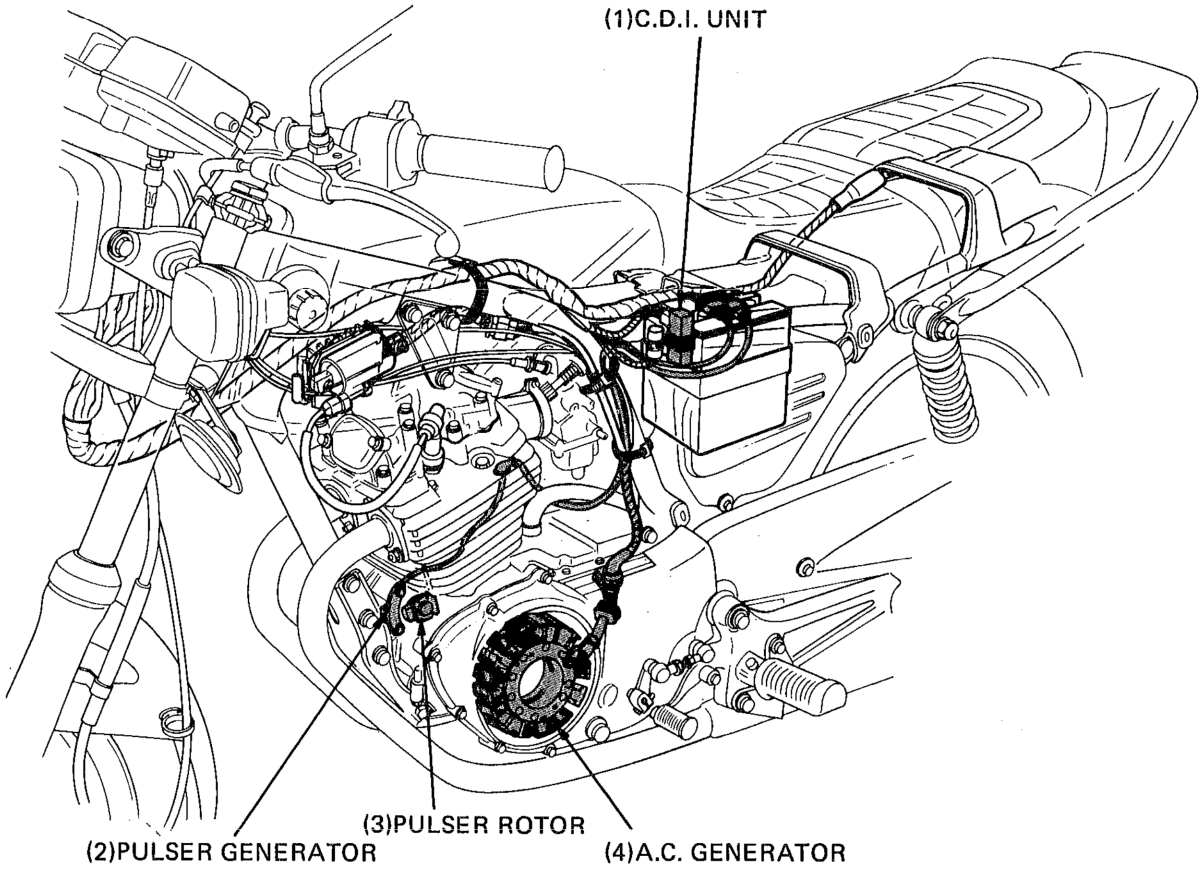


(3)EXHAUST VALVES
The dual exhaust valves allow faster heat dissipation and provides high rpm potential.

(2)INTAKE VALVES
The dual valve arrangement insures effective breathing at high rpm without floating.

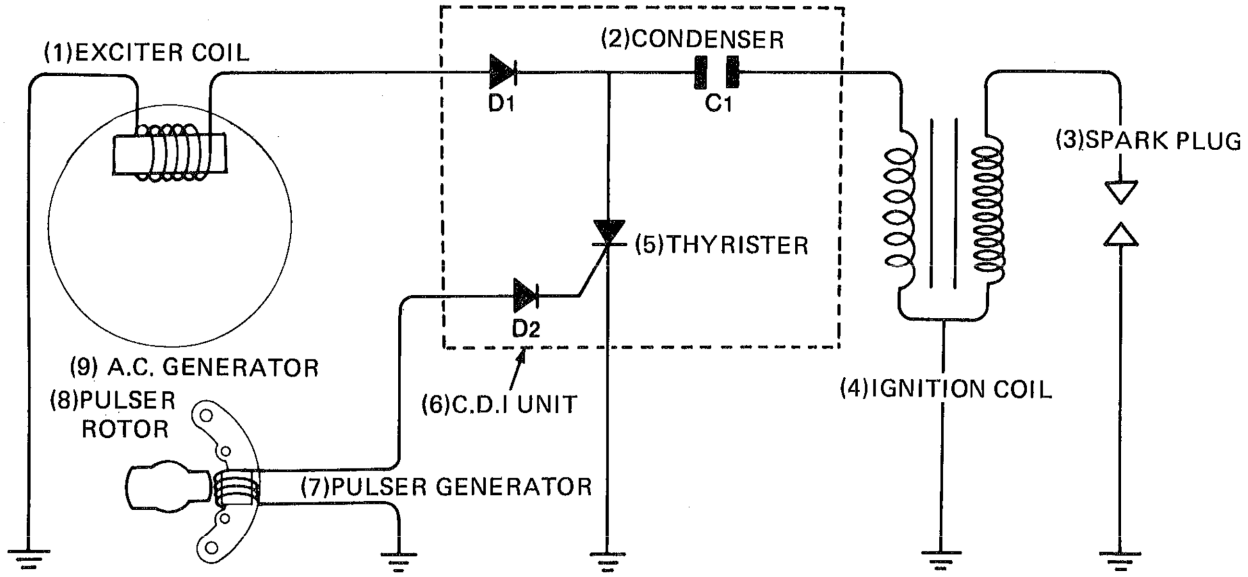
# C.D.I. (Capacitive Discharge Ignition) SYSTEM

The C.D.I. electronic ignition system is designed to provide a powerful spark, especially at high rpm, with no scheduled maintenance.

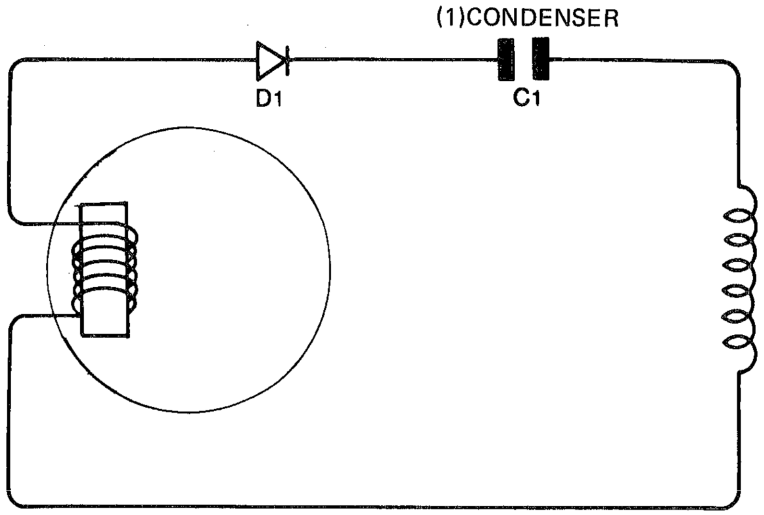



- FEATURES

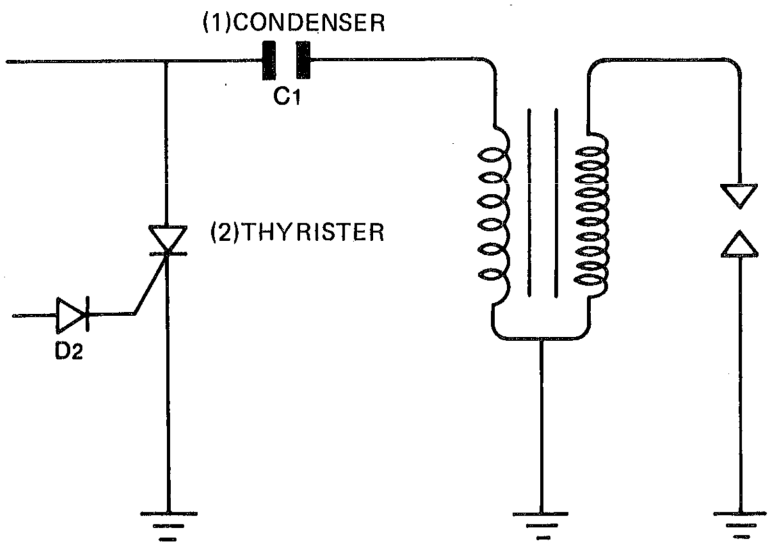
- There are no contact points to require attention.
- C.D.I can develop more voltage potential at the spark plug than conventional systems and is more resistant to spark plug fouling.
- Working on A.C, the secondary voltage is more stable, regardless of battery condition.
- The overall design eliminates initial and periodic adjustments and maintenance services.




1. As the A.C. generator rotor turns, current is induced in the A.C. generator (exciter coil). This current is rectified as it passes through the diode D1 and is stored in the condenser C1. During this process, the thyrister is kept OFF.

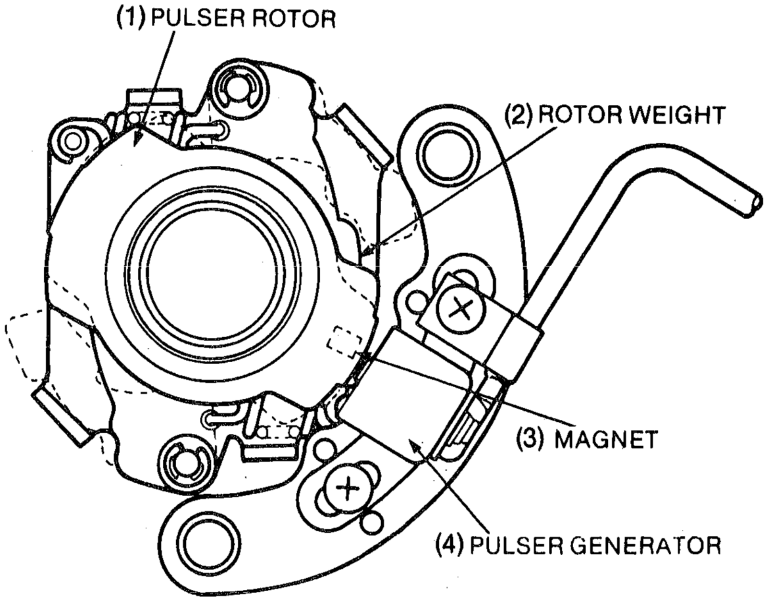


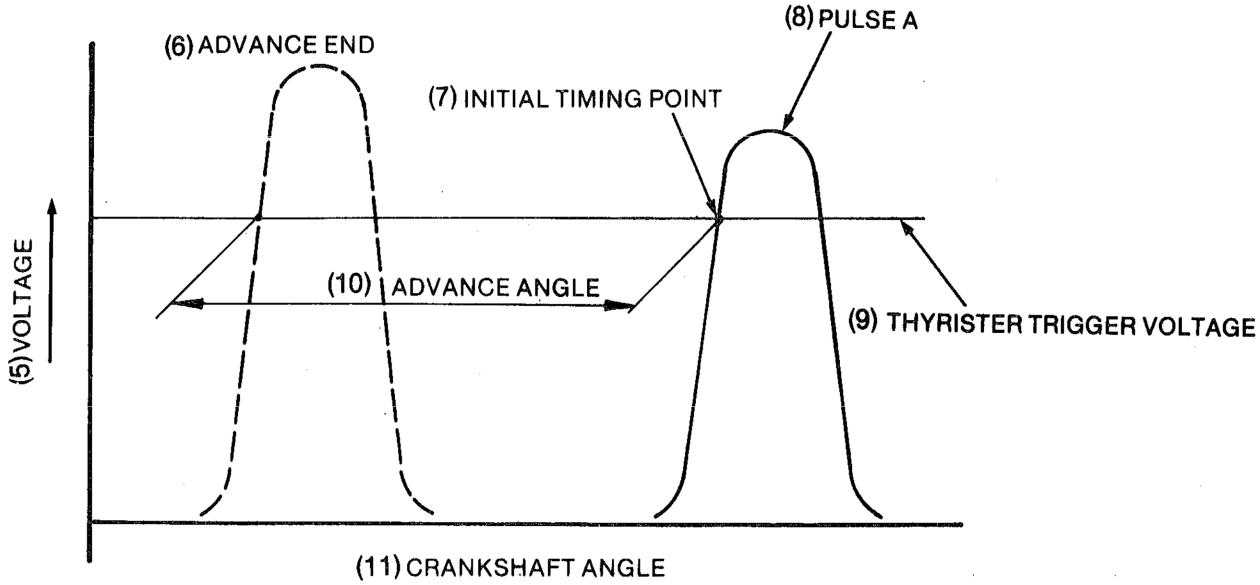

2. An electric pulse is generated by the pulse generator when the advancer rotor (pick-up) reaches the point where ignition must start. This is due to changes in the flux.
The pulse is rectified by diode D2 and is applied to the thyrister gate. As this happens, the thyrister is turned ON which in turn discharges the energy stored in the condenser through the primary coil. Sufficient potential is then developed at the spark plug to ignite the air-fuel mixture in the combustion chamber.



- ADVANCER MECHANISM

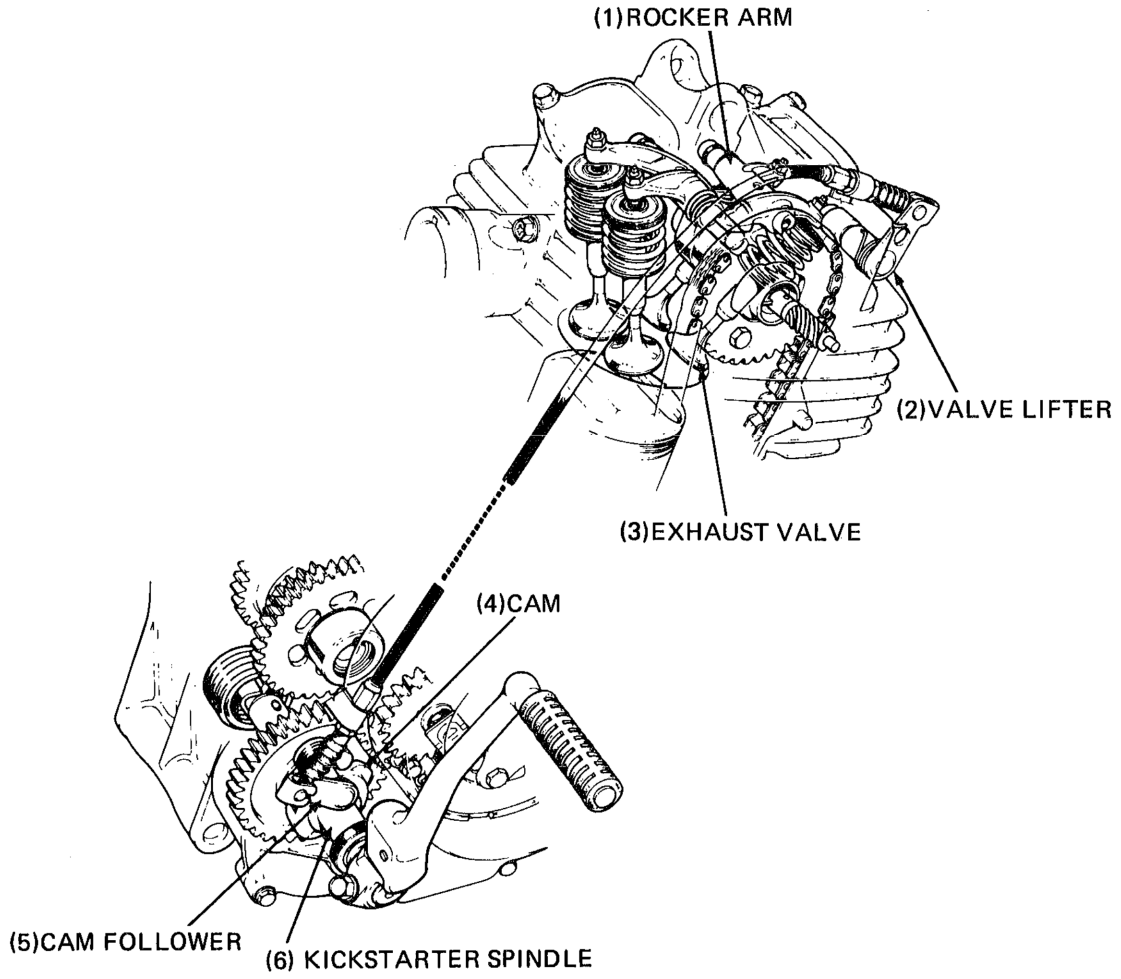
In the C.D.I. system, the initial firing is determined by the relative position between the advancer rotor magnet and the pulser generator. Timing advance depends on the centrifugal force acting on the rotor weights. That is, the greater the centrifugal force on the rotor weights, the faster the ignition takes place.



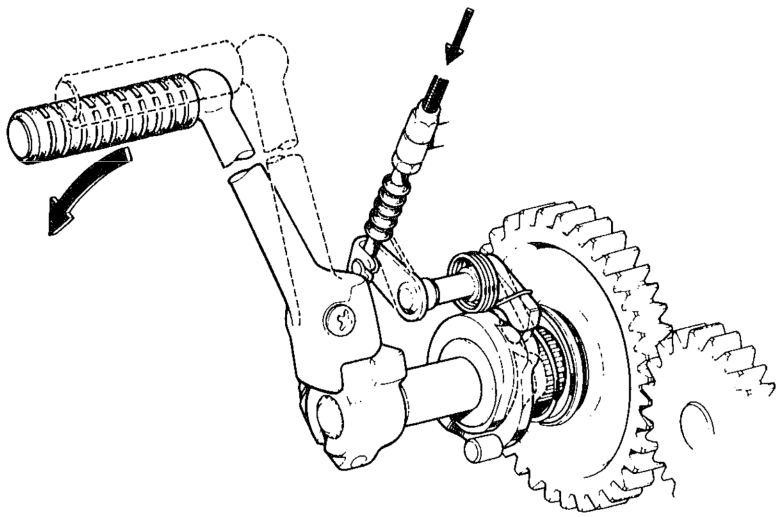



# STARTER DECOMPRESSOR

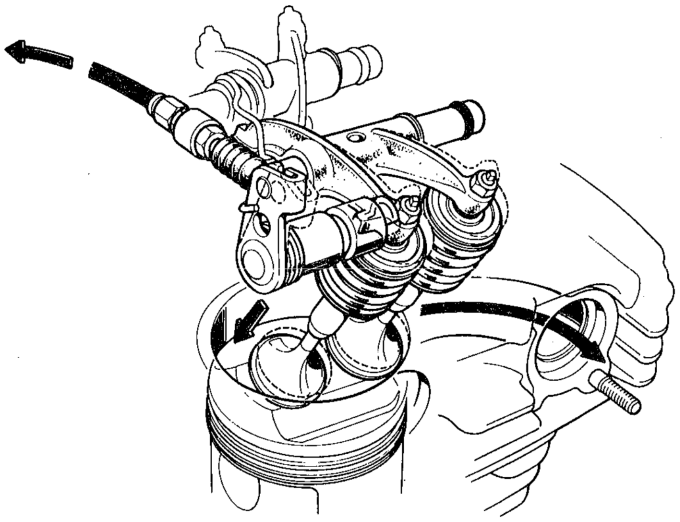
The decompression mechanism is used to decompress the cylinder so that the engine can be cranked easily by the kickstarter.



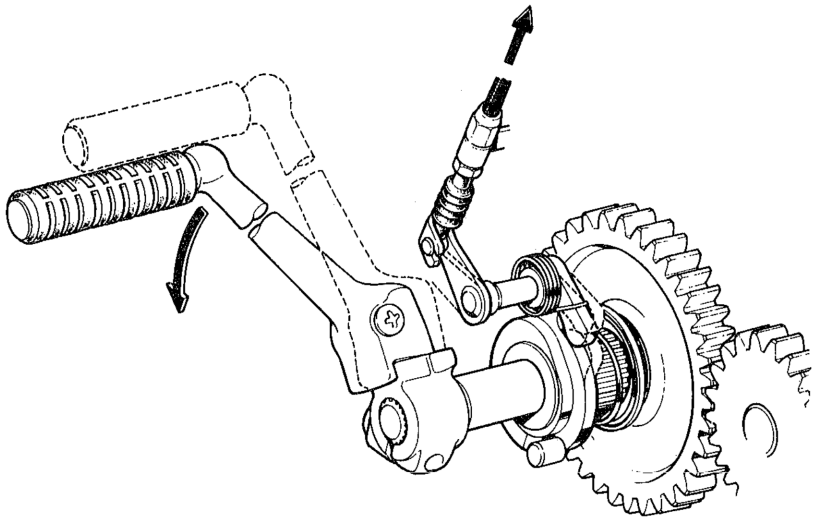

1. As the kick pedal is depressed, the movement is transmitted to the decompression cam, causing the cam follower to rise.



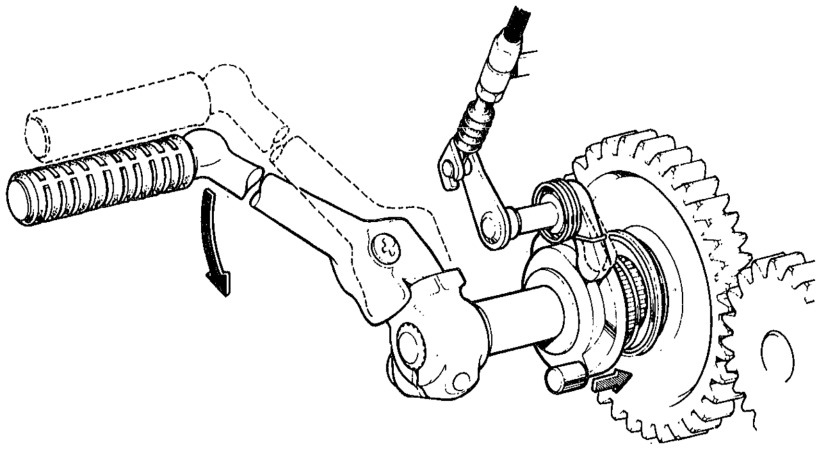
2. When the cam follower is raised by the cam, both exhaust valves are pushed down by the valve lifter away from their seats, since the cam follower is connected to the lifter by a cable. The engine can then be cranked easily with the cylinder decompressed.



3. With the further rotation of the kick spindle, the cam follower passes over the cam so that the cylinder is sealed.



4. When the kick pedal reaches the end of its stroke, the decompression cam is moved sideways out of engagement with the cam follower by the guide pin. Returning the kick pedal allows the kick spindle and cam to assume the original position.



# MEMO

# TROUBLESHOOTING 20.


| | |
|---|---|
| ENGINE DOES NOT START OR IS HARD TO START | 20–2 |
| ENGINE LACKS POWER | 20–3 |
| POOR PERFORMANCE AT LOW AND IDLE SPEEDS | 20–4 |
| POOR PERFORMANCE AT HIGH SPEED | 20–5 |
| POOR HANDLING | 20–5 |

# ENGINE DOES NOT START OR IS HARD TO START

| | | Probable Cause: |
|---|---|---|
| 1. Check if fuel is getting to carburetor<br><br>GETTING TO CARBURETOR<br>↓ | NOT GETTING TO CARBURETOR → | (1) No fuel in fuel tank<br>(2) Clogged fuel tube or fuel filter<br>(3) Clogged float valve<br>(4) Clogged fuel tank cap breather hole. |
| 2. Try spark test<br><br>SPARKS JUMP<br>↓ | WEAK OR NO SPARK → | (1) Faulty spark plug<br>(2) Fouled spark plug<br>(3) Faulty C.D.I. unit<br>(4) Broken or shorted high tension cord<br>(5) Faulty A.C. generator<br>(6) Broken or shorted ignition coil<br>(7) Faulty ignition switch<br>(8) Faulty pulse generator<br>(9) Poorly connected, broken or shorted wires |
| 3. Test cylinder compression<br><br>COMPRESSION NORMAL<br>↓ | LOW COMPRESSION → | (1) Kick pedal slipping<br>(2) Valve clearance too small<br>(3) Valve stuck open<br>(4) Worn cylinder and piston rings<br>(5) Damaged cylinder head gasket<br>(6) Seized valve<br>(7) Improper valve timing<br>(8) Improperly adjusted de-compression mechanism |
| 4. Start by following normal starting procedure<br><br>ENGINE DOES NOT FIRE<br>↓ | ENGINE FIRES BUT SOON STOPS → | (1) Choke excessively open<br>(2) Carburetor pilot screw excessively closed<br>(3) Air leaking past manifold<br>(4) Improper ignition timing (C.D.I. unit or pulse generator at fault) |
| 5. Remove spark plug<br><br>DRY<br>↓ | WET PLUG → | (1) Carburetor flooded<br>(2) Carburetor choke excessively closed<br>(3) Throttle valve excessively open |
| 6. Start with choke applied | | |

# ENGINE LACKS POWER

| | | Probable Cause: |
|---|---|---|
| 1. Raise wheels off ground and spin by hand<br><br>WHEEL SPINS FREELY<br>↓ | WHEEL DOES NOT SPIN FREELY → | (1) Brake dragging<br>(2) Worn or damaged wheel bearing<br>(3) Wheel bearing needs lubrication<br>(4) Drive chain too tight<br>(5) Rear axle nut excessively tightened |
| 2. Check tire pressure with tire gauge<br><br>PRESSURE NORMAL<br>↓ | PRESSURE TOO LOW → | (1) Punctured tire<br>(2) Faulty tire valve |
| 3. Try rapid acceleration from low to second<br><br>ENGINE SPEED LOWERED WHEN CLUTCH IS RELEASED<br>↓ | ENGINE SPEED DOES NOT CHANGE WHEN CLUTCH IS RELEASED → | (1) Clutch slipping<br>(2) Worn clutch disc/plate<br>(3) Warped clutch disc/plate |
| 4. Lightly accelerate engine<br><br>ENGINE SPEED INCREASED<br>↓ | ENGINE SPEED NOT INCREASED SUFFICIENTLY → | (1) Carburetor choke closed<br>(2) Clogged air cleaner<br>(3) Restricted fuel flow<br>(4) Clogged fuel tank breather tube<br>(5) Clogged muffler |
| 5. Check ignition timing<br><br>CORRECT<br>↓ | INCORRECT → | (1) Faulty C.D.I. unit<br>(2) Faulty pulser generator<br>(3) Faulty ignition advancer |
| 6. Check valve clearance<br><br>CORRECT<br>↓ | INCORRECT → | (1) Improper valve adjustment<br>(2) Worn valve seat |
| 7. Test cylinder compression using compression gauge<br><br>NORMAL<br>↓ | TOO LOW → | (1) Valve stuck open<br>(2) Worn cylinder and piston rings<br>(3) Leaking head gasket<br>(4) Improper valve timing<br>(5) Improperly adjusted decompression mechanism |
| 8. Check carburetor for clogging<br><br>NOT CLOGGED<br>↓ | CLOGGED → | (1) Carburetor not serviced frequently enough |
| 9. Remove spark plug<br><br>NOT FOULED OR DISCOLORED<br>↓ | FOULED OR DISCOLORED → | (1) Plug not serviced frequently enough<br>(2) Use of plug with improper heat range |

| | | |
|---|---|---|
| 10. Remove oil level gauge and check oil level and fouling | OIL LEVEL INCORRECT → | (1) Oil level too high<br>(2) Oil level too low<br>(3) Contaminated oil |
| CORRECT ↓ | | |
| 11. Remove cylinder head cover and inspect lubrication | VALVE TRAIN NOT LUBRICATED PROPERLY → | (1) Clogged oil passage<br>(2) Clogged oil control orifice |
| VALVE TRAIN LUBRICATED PROPERLY ↓ | | |
| 12. Check if engine overheats | OVERHEATED → | (1) Excessive carbon build-up in combustion chamber<br>(2) Use of improper quality of fuel<br>(3) Clutch slipping<br>(4) Fuel air mixture too lean |
| NOT OVERHEATED ↓ | | |
| 13. Accelerate or run at high speed | ENGINE KNOCKS → | (1) Worn piston and cylinder<br>(2) Fuel air mixture too lean<br>(3) Use of improper grade of fuel<br>(4) Excessive carbon build-up in combustion chamber<br>(5) Ignition timing too advanced (Faulty C.D.I. unit or advancer) |
| ENGINE DOES NOT KNOCK | | |

# POOR PERFORMANCE AT LOW AND IDLE SPEEDS

| | | Probable Cause: |
|---|---|---|
| 1. Check ignition timing and valve clearance | INCORRECT → | (1) Improper valve clearance<br>(2) Improper ignition timing (Faulty C.D.I. unit or spark advancer) |
| CORRECT ↓ | | |
| 2. Check carburetor pilot screw adjustment | INCORRECT → | (1) Fuel-air mixture too lean (To correct, screw out)<br>(2) Fuel-air mixture too rich (To correct, screw in) |
| CORRECT ↓ | | |
| 3. Check if air is leaking past manifold | LEAKING → | (1) Deteriorated insulator O-ring<br>(2) Loose carburetor |
| NOT LEAKING ↓ | | |
| 4. Try spark test | WEAK OR INTERMITTENT SPARK → | (1) Faulty, carbon or wet fouled spark plug<br>(2) Faulty C.D.I. unit<br>(3) A. C. generator faulty<br>(4) Faulty ignition coil<br>(5) Faulty pulser advancer |
| GOOD SPARK | | |

# POOR PERFORMANCE AT HIGH SPEED

| | | Probable Cause: |
|---|---|---|
| 1. Check ignition timing and valve clearance | INCORRECT → | (1) Improper valve clearance<br>(2) Faulty C.D.I. unit<br>(3) Faulty pulser<br>(4) Faulty advancer |
| CORRECT ↓ | | |
| 2. Disconnect fuel tube at carburetor | FUEL FLOW RESTRICTED → | (1) Lack of fuel in tank<br>(2) Clogged fuel line<br>(3) Clogged fuel tank cap breather hole<br>(4) Clogged fuel valve |
| FUEL FLOWS FREELY ↓ | | |
| 3. Remove carburetor and check for clogged jet | CLOGGED → | (1) Clean |
| NOT CLOGGED ↓ | | |
| 4. Check valve timing | INCORRECT → | (1) Cam sprocket not installed properly |
| CORRECT ↓ | | |
| 5. Check valve spring tension | WEAK → | (1) Faulty spring |
| NOT WEAKENED | | |

# POOR HANDLING — Check tire pressure

| | Probable Cause: |
|---|---|
| 1. If steering is heavy → | (1) Steering head adjuster too tight<br>(2) Damaged steering cones or steel balls |
| 2. If either wheel is wobbling → | (1) Excessive wheel bearing play<br>(2) Distorted rim<br>(3) Improperly installed wheel hub<br>(4) Swingarm pivot bushing excessively worn<br>(5) Distorted frame<br>(6) Improper drive chain tension or adjustment |
| 3. If the motorcycle pulls to one side → | (1) Misaligned shock absorbers<br>(2) Front and rear wheels not aligned<br>(3) Bent front fork<br>(4) Bent swingarm |

# MEMO

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