

Official

HONDA

SHOP MANUAL

V65 MAGNA-VF1100C



'83-'86

HOW TO USE THIS MANUAL

Follow the Maintenance Schedule (Section 3) recommendations to ensure that the vehicle is in peak operating condition and the emission levels are within the standards set by the U.S. Environmental Protection Agency and California Air Resources Board. Performing the first scheduled maintenance is very important. It compensates for the initial wear that occurs during the break-in period.

Sections 1 through 3 apply to the whole motorcycle, while sections 4 through 21 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, service information and troubleshooting for the section. The subsequent pages give detailed procedures.

If you are not familiar with this motorcycle, read the TECHNICAL FEATURES in section 23.

If you don't know the source of the trouble, go to section 24, TROUBLESHOOTING.


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HONDA MOTOR CO., LTD.
SERVICE PUBLICATIONS OFFICE

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IMPORTANT SAFETY NOTICE

 **WARNING** *Indicates a strong possibility of severe personal injury or loss of life if instructions are not followed.*

CAUTION: *Indicates a possibility of personal injury or equipment damage if instructions are not followed.*

NOTE: Gives helpful information.

Detailed descriptions of standard workshop procedures, safety principles and service operations are not included. It is important to note that this manual contains *some* warnings and cautions against some specific service methods which could cause **PERSONAL INJURY** to service personnel or could damage a vehicle or render it unsafe. Please understand that those warnings could not cover all conceivable ways in which service, whether or not recommended by Honda might be done or of the possibly hazardous consequences of each conceivable way, nor could Honda investigate all such ways. Anyone using service procedures or tools, whether or not recommended by Honda *must satisfy himself thoroughly* that neither personal safety nor vehicle safety will be jeopardized by the service methods or tools selected.

1. GENERAL INFORMATION

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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 electrolyte gets in your eyes.

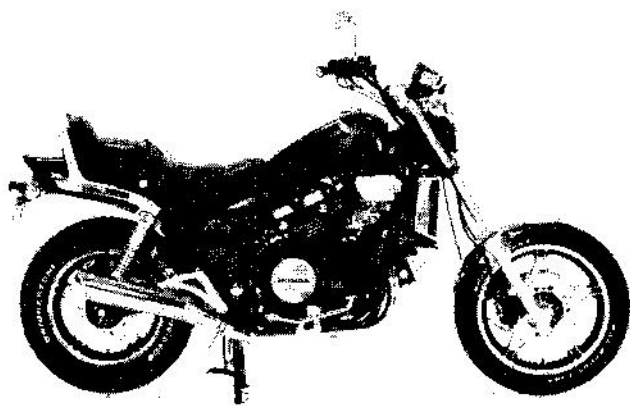
WARNING

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.

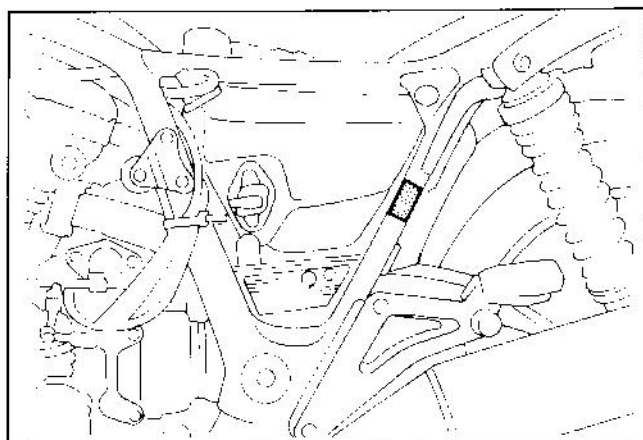
SERVICE RULES

1. Use genuine HONDA or HONDA-recommended parts and lubricants or their equivalent. Parts that do not meet HONDA's design specifications may damage the motorcycle.
2. Use the special tools designed for this product.
3. 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.
4. Install new gaskets, O-rings, cotter pins, lock plates, etc. when reassembling.
5. When tightening bolts or nuts, begin with larger-diameter or inner bolts first, and tighten to the specified torque diagonally, unless a particular sequence is specified.
6. Clean parts in cleaning solvent upon disassembly. Lubricate any sliding surfaces before reassembly.
7. After reassembly, check all parts for proper installation and operation.
8. Route all electrical wires as shown on pages 1-9 through 1-16 Cable and Harness Routing.

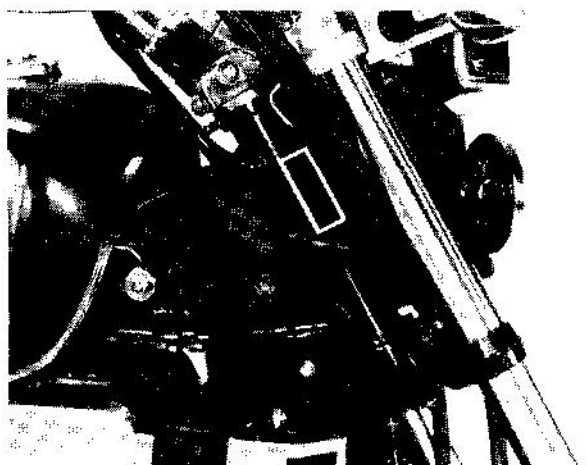
MODEL IDENTIFICATION



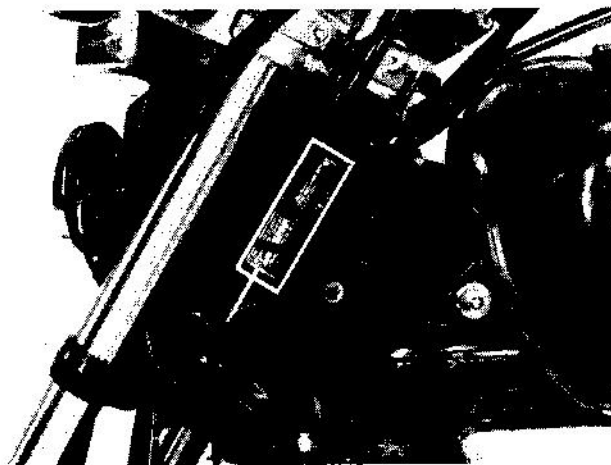
BEGINNING F NO. SC120-DM000029
E NO. SC12E-2000039



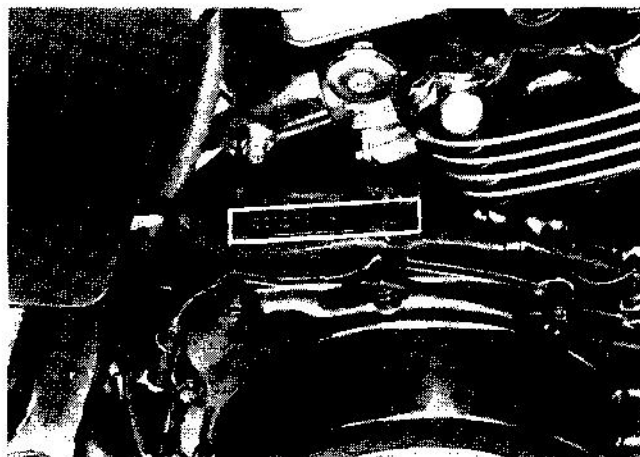
The color label is attached to the frame behind the left side cover.



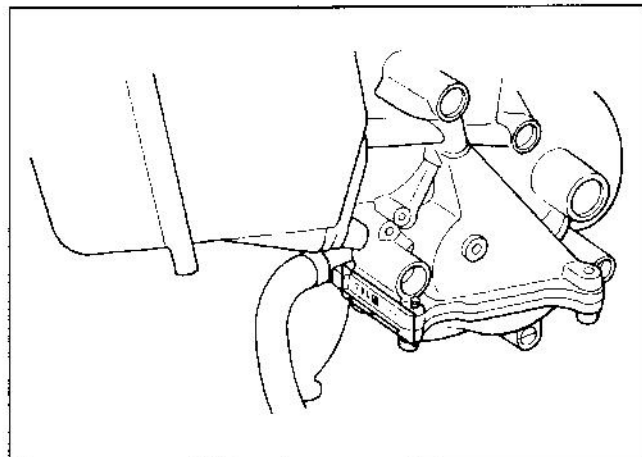
The frame serial number is stamped on the steering head right side.



The vehicle identification number (VIN) is on the steering head left side.



The engine serial number is stamped on top of the right crankcase.



The carburetor identification number is on the carburetor body left side.

SPECIFICATIONS

| ITEM | | | SPECIFICATIONS | |
|------------|--------------------------------|-----------------------------|--|--|
| DIMENSIONS | Overall length | | 2,280 mm (89.8 in) | |
| | Overall width | '83, After '85: | 810 mm (31.9 in) | |
| | | '84, '85: | 825 mm (32.5 in) | |
| | Overall height | '83, After '85: | 1,210 mm (47.6 in) | |
| | | '84, '85: | 1,230 mm (48.4 in) | |
| | Wheelbase | | 1,595 mm (62.8 in) | |
| | Seat height | | 800 mm (31.5 in) | |
| | Foot peg height | | 350 mm (13.8 in) | |
| | Ground clearance | | 155 mm (6.1 in) | |
| | Dry weight | | 245 kg (540 lb) | |
| | Curb weight | | 265 kg (584 lb) | |
| FRAME | Type | | Double cradle | |
| | Front suspension, travel | | Telescopic fork, 160 mm (6.3 in) | |
| | Rear suspension, travel | '83: | Swingarm/Shock absorber, 112 mm (4.4 in) | |
| | | After '83: | Swingarm/Shock absorber, 115 mm (4.5 in) | |
| | Gross vehicle weight rating | | 435 kg (960 lb) | |
| | Vehicle load capacity | | 168 kg (370 lb) | |
| | Front tire size | | M110/90-18 Tubeless | |
| | Rear tire size | | M140/90-16 Tubeless | |
| | Cold tire pressures | Up to 90 kg (200 lbs) load | Front | 32 psi (225 kPa, 2.25 kg/cm ²) |
| | | | Rear | 32 psi (225 kPa, 2.25 kg/cm ²) |
| | | Up to vehicle capacity load | Front | 32 psi (225 kPa, 2.25 kg/cm ²) |
| | | | Rear | 40 psi (280 kPa, 2.80 kg/cm ²) |
| | Front brake, lining swept area | | Double disc, 904 cm ² (140.1 sq in) | |
| | Rear brake, lining swept area | | Single disc, 516 cm ² (80 sq in) | |
| | Fuel capacity | | 17 liters (4.5 US gal, 3.7 Imp gal) | |
| | Fuel reserve capacity | | 3 liters (0.8 US gal, 0.7 Imp gal) | |
| | Caster angle | | 59° 40' | |
| | Trail | | 105 mm (4.1 in) | |
| | Front fork oil capacity | | R: 565 cc (19.1 oz), L: 580 cc (19.6 oz) | |
| ENGINE | Type | | Water cooled 4 stroke, DOHC engine | |
| | Cylinder arrangement | | 4 cylinders, 90°V | |
| | Bore and stroke | | 79.5 x 55.3 mm (3.13 x 2.18 in) | |
| | Displacement | | 1,098 cm ³ (67 cu-in) | |
| | Compression ratio | | 10.5 : 1 | |
| | Valve train | | Silent, multi-link chain drive and DOHC with rocker arms | |
| | Maximum horsepower | | 116.0 BHP/9,500 rpm | |
| | Maximum torque | | 9.7 kg-m (70.1 ft-lb)/7,500 rpm | |
| | Oil capacity | | 3.5 liters (3.7 US qt, 3.1 Imp qt) after disassembly | |
| | | | 3.0 liters (3.2 US qt, 2.6 Imp qt) after draining | |
| | Coolant capacity | '83, '84, '85: | 3.45 liters (3.65 US qt, 3.04 Imp qt) | |
| | | After '85: | 3.20 liters (3.38 US qt, 2.81 Imp qt) | |
| | Lubrication system | | Forced pressure and wet sump | |
| | Air filtration | | Paper filter | |
| | Cylinder compression | | 13 ± 2 kg/cm ² (184 ± 28 psi) | |
| | Intake valve | Opens | 8° (BTDC) | |
| | | Closes | 40° (ABDC) | |
| | Exhaust valve | Opens | 43° (BBDC) | |
| | | Closes | 7° (ATDC) | |
| | Valve clearance (Cold) | | IN/EX: 0.15 mm (0.006 in) | |
| | Engine weight | | 96.7 kg (213.2 lb) | |
| | Idle speed | | 1,000 ± 100 rpm | |

GENERAL INFORMATION

| ITEM | | SPECIFICATIONS | |
|-------------|---------------------------------------|--|----------------------|
| CARBURETION | Carburetor type/Throttle bore | CV/36 mm (1.42 in) | |
| | Identification number | VD70A VD70C (California: VD76A) VD79A | |
| | Pilot screw initial setting | See page 4-16 | |
| | Float level | 6.0 mm (0.24 in) 7.5 mm (0.29 in) 8.0 mm (0.31 in) | |
| DRIVE TRAIN | Clutch | Wet, multi-plate | |
| | Transmission | 5-speed with over drive | |
| | Primary reduction | 1.707 | |
| | Secondary reduction | 1.058 | |
| | Final reduction | 3.182 | |
| | Gear ratio I | 2.294 | |
| | Gear ratio II | 1.619 | |
| | Gear ratio III | 1.292 | |
| | Gear ratio IV | 1.074 | |
| | Gear ratio V | 0.897 | |
| | Over drive | 0.750 | |
| | Gear shift pattern | Left foot operated return system, 1-N-2-3-4-5-OD | |
| | Final drive gear oil capacity | 170 cc (5.7 oz) after disassembly 150 cc (5.1 oz) after disassembly 130 cc (4.4 oz) after draining | |
| | | | |
| | | | |
| ELECTRICAL | Ignition | Full transistor ignition | |
| | Ignition timing "F" mark | 10° BTDC at idle | |
| | Full advance | 37° BTDC at 3,800 rpm | |
| | Starting system | Starting motor | |
| | Alternator | 300W/5,000 rpm | |
| | Battery capacity | 12V-18AH | |
| | Spark plug | NGK | ND |
| | Standard | DPR 8EA-9 | X24EPR-U9 |
| | For cold climate (Below 5°C, 41°F) | DPR 7EA-9 | X22EPR-U9 |
| | For extended high speed riding | DPR 9EA-9 | X27EPR-U9 |
| LIGHTS | Spark plug gap | 0.8-0.9 mm (0.031-0.035 in) | |
| | Firing order | 1-2-3-4 | |
| | Fuse/Main fuse | 10A, 15A/30A | |
| | Headlight (high/low beam) | 60/55W | |
| | Tail/stoplight | 8/27W | 3/32 cp SAE NO. 1157 |
| | Front turn signal | 12V | 3/32 cp SAE NO. 1157 |
| | Rear turn signal | 8/32W | 3/32 cp SAE NO. 1034 |
| | Instrument lights | 12V | 32/3 cp SAE NO. 1034 |
| | Neutral indicator | 23W | 32 cp SAE NO. 1073 |
| | Turn signal indicator | 12V | 32 cp SAE NO. 1073 |
| | High beam indicator | 3.4W | 2 cp |
| | | 3.4W | 3.0W |
| | | 3W | |

TORQUE VALUES

● ENGINE

| Item | Q'ty | Thread Dia. (mm) | Torque N·m (kg·m, ft·lb) | Remarks |
|----------------------------------|------|------------------|----------------------------|---|
| Cylinder head cover | 8 | 6 | 8-12 (0.8-1.2, 5.8-9.0) | |
| Cylinder head | 16 | 6 | 10-14 (1.0-1.4, 7-10) | |
| | 8 | 8 | 21-25 (2.1-2.5, 15-18) | |
| | 16 | 10 | 48-52 (4.8-5.2, 35-38) | |
| Flywheel bolt | 1 | 12 | 80-100 (8.0-10.0, 58-72) | |
| Clutch center | 1 | 25 | 63-67 (6.3-6.7, 46-48) | |
| Crankcase | 14 | 10 | 43-47 (4.3-4.7, 31-34) | UBS |
| | 3 | 8 | 21-25 (2.1-2.5, 15-18) | |
| | 14 | 6 | 10-14 (1.0-1.4, 7-10) | |
| Rocker arm shaft | 8 | 22 | 45-50 (4.5-5.0, 33-36) | - Apply LOCTITE® - 271 to the threads |
| Cam sprocket | 8 | 7 | 18-20 (1.8-2.0, 13-14) | |
| Starter clutch | 1 | 8 | 26-30 (2.6-3.0, 19-22) | |
| Shift fork center | 1 | 7 | 16-20 (1.6-2.0, 12-14) | |
| Camshaft chain guide A | 1 | 12 | 21-25 (2.1-2.5, 15-18) | |
| Oil filter | 1 | 20 | 15-20 (1.5-2.0, 11-14) | |
| Output gear case | 4 | 8 | 21-25 (2.1-2.5, 15-18) | Socket bolts. |
| Output gear case bearing holder | 4 | 8 | 30-34 (3.0-3.4, 22-25) | |
| Output gear case bearing (outer) | 1 | 64 | 90-110 (9.0-11.0, 65-80) | |
| (inner) | 1 | 30 | 70-80 (7.0-8.0, 51-58) | |
| Valve adjustment nuts | 16 | 7 | 21-25 (2.1-2.5, 15-18) | - Apply oil to the thread and seating surface |
| Drain bolt | 1 | 12 | 35-40 (3.5-4.0, 25-29) | |
| Connecting rod nuts | 8 | 8 | 30-34 (3.0-3.4, 22-25) | |
| Drum stopper pivot shaft | 1 | 6 | 8-12 (0.8-1.2, 5.8-9.0) | |
| Primary drive gear | 1 | 12 | 80-100 (8.0-10.0, 58-72) | |
| Oil pressure switch | 1 | - | 10-14 (1.0-1.4, 7-10) | - Apply sealant to the threads |
| Pinion bearing retainer | 1 | - | 100-120 (10.0-12.0, 72-87) | |
| Pinion nut | 1 | 16 | 100-120 (10.0-12.0, 72-87) | |
| Gear case cover bolt | 2 | 10 | 35-45 (3.5-4.5, 25-33) | |
| | 6 | 8 | 23-28 (2.3-2.8, 17-20) | |
| Final gear case attaching nut | 3 | 10 | 45-70 (4.5-7.0, 33-51) | |

● CHASSIS

| Item | Q'ty | Thread Dia. (mm) | Torque N·m (kg·m, ft·lb) | Remarks |
|---|------|------------------|--------------------------|---------|
| Sub-frame bolts (Upper) | 2 | 10 | 60-70 (6.0-7.0, 43-51) | |
| (Lower) | 2 | 10 | 35-45 (3.5-4.5, 25-33) | |
| Shock absorber mount bolts/nuts (Upper) | 2 | 8 | 40-50 (4.0-5.0, 29-36) | |
| (Lower) | 2 | 10 | 30-40 (3.0-4.0, 22-29) | |
| Handlebar upper holder | 4 | 8 | 40-50 (4.0-5.0, 29-36) | |
| Rear brake pedal | 1 | 8 | 24-30 (2.4-3.0, 17-22) | |
| Change arm | 1 | 6 | 10-15 (1.0-1.5, 7-11) | |
| Side stand | 1 | 10 | 35-45 (3.5-4.5, 25-33) | |
| Engine hanger bolts | 2 | 8 | 20-30 (2.0-3.0, 14-22) | |
| | 4 | 10 | 35-45 (3.5-4.5, 25-33) | |

GENERAL INFORMATION

| Item | Q'ty | Thread Dia. (mm) | Torque N·m (kg·m, ft·lb) | Remarks |
|--------------------------------------|------|------------------|----------------------------|---------|
| Brake hose bolts '83, '84, '85: | 7 | 10 | 25-35 (2.5-3.5, 18-25) | |
| After '85: | *7 | *10 | 37-43 (3.7-4.3, 27-31) | |
| Caliper air bleed bolt | 3 | 7 | 4-7 (0.4-0.7, 2.9-5.1) | |
| Brake master cylinder holder | 4 | 6 | 10-14 (1.0-1.4, 7-10) | |
| Clutch master cylinder holder | 2 | 6 | 10-14 (1.0-1.4, 7-10) | |
| Axle pinch bolt | 1 | 8 | 20-30 (2.0-3.0, 14-22) | |
| Front fork stabilizer | 4 | 8 | 18-28 (1.8-2.8, 13-20) | |
| Brake master cylinder cap '83: | 2 | 4 | 2-3.5 (0.2-0.35, 1.4-2.5) | |
| After '83: | 2 | 4 | 1-2 (0.1-0.2, 0.7-1.4) | |
| Clutch master cylinder cap '83: | 2 | 4 | 2-3.5 (0.2-0.35, 1.4-2.5) | |
| After '83: | 2 | 4 | 1-2 (0.1-0.2, 0.7-1.4) | |
| Final gear oil filler cap | 1 | 30 | 10-14 (1.0-1.4, 7-10) | |
| Front caliper | 4 | 10 | 30-45 (3.0-4.5, 22-33) | |
| Rear brake torque rod | 2 | 8 | 18-25 (1.8-2.5, 13-18) | |
| Swingarm left pivot bolt | 1 | 30 | 90-120 (9.0-12.0, 65-87) | |
| Swingarm right pivot bolt | 1 | 30 | 16-20 (1.6-2.0, 12-14) | |
| Swingarm pivot lock nut | 1 | 30 | 100-130 (10.0-13.0, 72-94) | |
| Final gear case nut | 3 | 10 | 45-70 (4.5-7.0, 33-51) | |
| Steering stem nut '83, '84, '85: | 1 | 24 | 80-120 (8.0-12.0, 58-87) | |
| After '85: | *1 | 24 | 90-120 (9.0-12.0, 65-87) | |
| Front fork top pinch bolt | 2 | 7 | 9-13 (0.9-1.3, 7-9) | |
| Front fork bottom pinch bolts | 2 | 10 | 45-55 (4.5-5.5, 33-40) | |
| Steering stem pinch bolt | 1 | 8 | 18-30 (1.8-3.0, 13-22) | |
| Front axle | 1 | 12 | 55-65 (5.5-6.5, 40-47) | |
| Front axle pinch bolt | 1 | 8 | 18-30 (1.8-3.0, 13-22) | |
| Rear axle '83, '84, '85: | 1 | 18 | 85-105 (8.5-10.5, 61-76) | |
| After '85: | *1 | 18 | 80-100 (8.0-10.0, 58-72) | |
| Gearshift pedal pivot | 1 | 8 | 18-25 (1.8-2.5, 13-18) | |
| Fuel reserve sensor | 1 | — | 27-35 (2.7-3.5, 20-25) | |
| Handlebar pinch bolt | 2 | 8 | 25-30 (2.5-3.0, 18-22) | |
| Front fork socket bolt | 2 | 8 | 15-25 (1.5-2.5, 11-18) | |
| Fork tube cap | 2 | — | 15-25 (1.5-2.5, 11-18) | |
| Steering bearing adjustment nut '83: | 1 | — | 14-16 (1.4-1.6, 10-12) | |
| After '83: | 1 | — | 19-23 (1.9-2.3, 14-17) | |
| Brake disc '83, '84, '85: | 15 | 8 | 25-30 (2.5-3.0, 18-22) | |
| After '85: | 15 | 8 | 37-43 (3.7-4.3, 27-31) | |

Torque specifications listed above are for important fasteners. Others should be tightened to standard torque values listed below.

• STANDARD TORQUE VALUES

| Item | Torque Values N·m (kg·m, ft·lb) | Item | Torque Values N·m (kg·m, ft·lb) |
|--------------------|------------------------------------|---------------------------|------------------------------------|
| 5 mm bolt and nut | 4-6 (0.4-0.6, 3-4) | 5 mm screw | 3-5 (0.3-0.5, 2-4) |
| 6 mm bolt and nut | 8-12 (0.8-1.2, 6-9) | 6 mm screw | 7-11 (0.7-1.1, 5-8) |
| 8 mm bolt and nut | 18-25 (1.8-2.5, 13-18) | 6 mm flange bolt and nut | 10-14 (1.0-1.4, 7-10) |
| 10 mm bolt and nut | 30-40 (3.0-4.0, 22-29) | 8 mm flange bolt and nut | 20-30 (2.0-3.0, 14-22) |
| 12 mm bolt and nut | 50-60 (5.0-6.0, 36-43) | 10 mm flange bolt and nut | 30-40 (3.0-4.0, 22-29) |
| | | 6 mm SH flange bolt | 7.5-10.5 (0.75-1.05, 5.4-7.6) |

TOOLS

• SPECIAL

| DESCRIPTION | NUMBER | ALTERNATIVE | NUMBER | REF. SECT. |
|---|---------------|--|--------------------------------|------------|
| Lock nut wrench, 42/56 mm | 07916-MB40000 | | | 13 |
| Drive shaft dis/assembly tool | 07964-MB40100 | | | 14 |
| Valve guide driver attachment | 07943-MB40000 | | | 10 |
| Vacuum gauge set | 07404-0030000 | Vacuum gauge set | M937B-021-XXXXX | 3 |
| Oil pressure gauge | 07506-3000000 | Equivalent tools commercially available in U.S.A. | | 2 |
| Oil pressure gauge attachment | 07510-4220100 | | | 2 |
| Compression gauge attachment | 07510-MB00101 | | | 3 |
| Carburetor pilot screw wrench | 07908-4220201 | | | 3 |
| Swingarm lock nut wrench | 07908-4690001 | Lock nut wrench | KS-HBA-08-469 (U.S.A. only) | 16 |
| Valve adjusting wrench | 07908-MB00100 | | | 3 |
| Retainer wrench | 07910-4630100 | | | 14 |
| Snap ring pliers | 07914-3230001 | Equivalent tool commercially available in U.S.A. | | 7, 15, 17 |
| Steering stem socket | 07916-3710100 | | | 15 |
| Lock nut wrench | 07916-4220000 | | | 7 |
| Lock nut wrench, 30/64 mm | 07916-MB00000 | Equivalent tool commercially available in U.S.A. | | 13 |
| 6 mm hex. wrench | 07917-3230000 | | | 15 |
| Shaft holder | 07923-6890101 | | | 13 |
| Final pinion holder | 07926-ME90000 | | | 14 |
| Shaft puller | 07931-ME40000 | Pinion puller set or Pinion puller and Pinion puller attachment kit | 07935-MB00000 | 14 |
| | | | 07931-4630200 | |
| | | | 07931-MB00000 | |
| Bearing race insert attachment | 07931-4630300 | | | 14 |
| Bearing remover handle | 07936-3710100 | | | 13 |
| Bearing remover weight | 07936-3710200 | Bearing remover set | 07936-3710000 | 13 |
| Bearing remover, 17 mm | 07936-3710300 | | | 13 |
| Bearing puller & driver attachment | 07934-MB00000 | | | 14 |
| Bearing remover shaft | 07936-8890100 | | | 16 |
| Bearing remover head | 07936-8890200 | | | 16 |
| Driver | 07949-3710001 | Driver | 07949-3710000 | 11, 15 |
| Valve guide driver | 07942-3290100 | | | 10 |
| Socket bit, 17 mm | 07703-0020500 | Equivalent tool commercially available in U.S.A. | | 16 |
| Ball race & bearing driver attachment | 07945-3330300 | | | 14 |
| Ball race remover | 07946-3710500 | | | 15 |
| Ball race driver | 07946-3710701 | | | 15 |
| Steering stem driver | 07946-MB00000 | Attachment "B" collar Steering stem driver | 07964-MB00200 07946-3710601 | 15 |
| Fork seal driver | 07947-KA50100 | | | 15 |
| Fork seal driver attachment | 07947-KF00100 | | | 15 |
| Race remover attachment | 07953-MJ1000A | | (U.S.A. only) | 15 |
| Drive shaft dis/assembly tool (C) | 07964-MB00300 | | | 14 |
| Rear shock absorber compressor attachment | 07967-KC10000 | | | 16 |
| Valve guide reamer, 5.5 mm | 07984-2000000 | | | 10 |
| Flywheel cover | 07998-MB00000 | | | 3 |
| Attachment | 07946-3710200 | | | 11 |
| | | Vacuum pump | S1-AH-250-MC7 (U.S.A. only) | |
| | | Pressure pump | ST-AH-255-MC7 (U.S.A. only) | |
| Camshaft lifter | 07979-MK30000 | | | 3 |

GENERAL INFORMATION

• COMMON

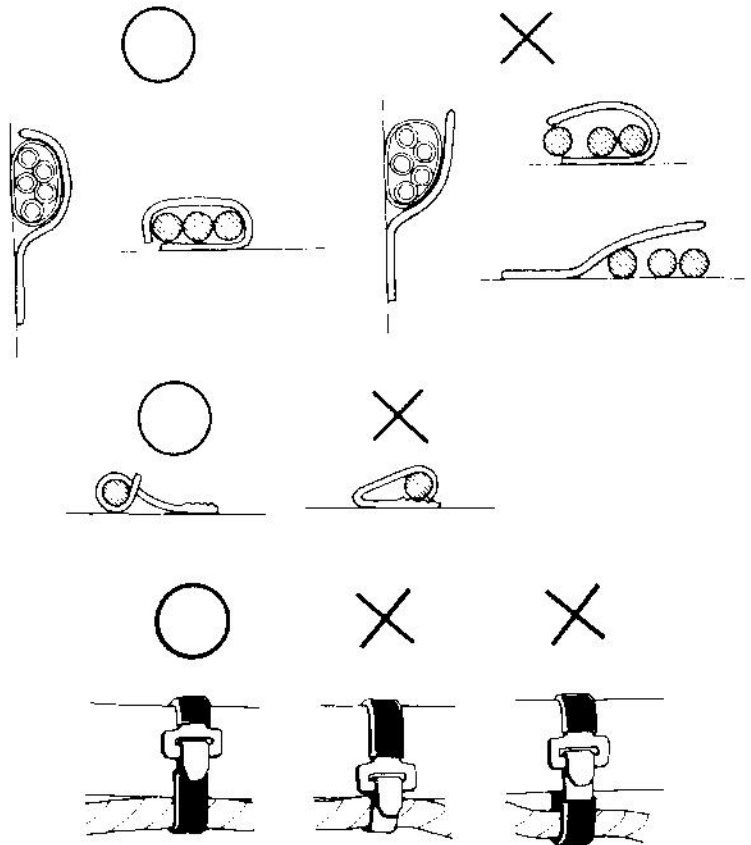
| DESCRIPTION | NUMBER | ALTERNATIVE | NUMBER | REF. SECT. |
|--------------------------------|---------------|---|---|-------------------|
| Float level gauge | 07401-0010000 | Equivalent tools commercially available in U.S.A. | 07725-0040000 07933-3290001 (U.S.A. only) | 1 |
| Adjusting wrench (A) | 07708-0030300 | | | 3 |
| Lock nut wrench, 30 x 32 mm | 07716-0020400 | | | 15 |
| Extension bar | 07716-0020500 | | | 15 |
| Universal holder | 07725-0030000 | | | 7, 9 |
| Rotor puller | 07733-0020001 | Rotor puller | | 9 |
| Attachment, 32 x 35 mm | 07746-0010100 | Driver | 07949-6110000 | 14 |
| Attachment, 37 x 40 mm | 07746-0010200 | | | 14, 16 |
| Attachment, 42 x 47 mm | 07746-0010300 | | | 7, 13, 14, 15, 16 |
| Attachment, 52 x 55 mm | 07746-0010400 | | | 13, 14, 16 |
| Attachment, 62 x 68 mm | 07746-0010600 | | | 13 |
| Pilot, 15 mm | 07746-0040300 | | | 15 |
| Pilot, 17 mm | 07746-0040400 | | | 13 |
| Pilot, 20 mm | 07746-0040500 | | | 16 |
| Pilot, 30 mm | 07746-0040700 | | | 13, 14 |
| Pilot, 35 mm | 07746-0040800 | | | 7, 13 |
| Driver | 07749-0010000 | Driver | 07945-3710200 | 13, 14 |
| Driver | 07742-0030100 | Driver | | 14 |
| Attachment, 25 mm | 07742-0030200 | | | 13 |
| Attachment, 30 mm | 07746-0030300 | | | 15, 16 |
| Bearing remover shaft | 07746-0050100 | | | 15 |
| Bearing remover head, 15 mm | 07746-0050400 | | | 16 |
| Bearing remover head, 20 mm | 07746-0050600 | | | 10 |
| Valve spring compressor | 07757-0010000 | | | 14, 16 |
| Rear shock absorber compressor | 07959-3290001 | | | |

CABLE & HARNESS ROUTING

Note the following when routing cables and wire harnesses.

A loose wire, harness or cable can be a safety hazard. After clamping, check each wire to be sure it is secure.

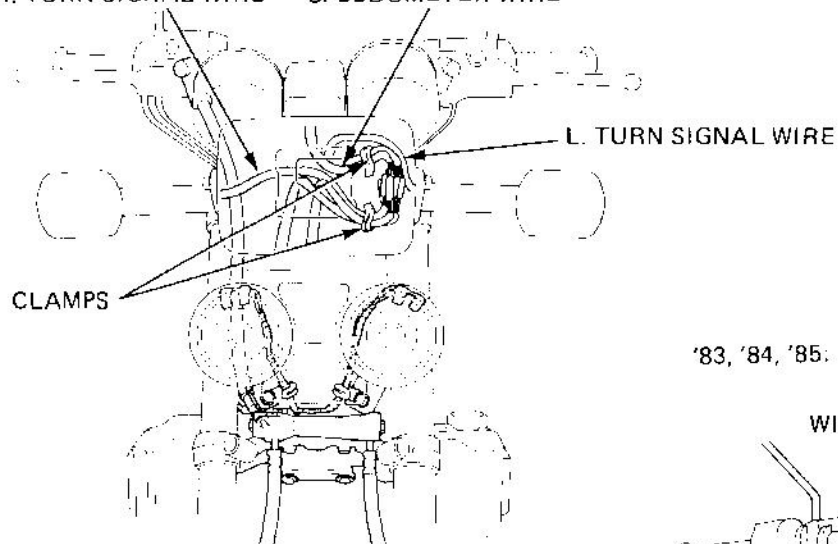
- Do not squeeze wires against the weld or end of its clamp.
- Secure wires and wire harnesses to the frame with their respective wire bands at the designated locations. Tighten the bands so that only the insulated surfaces contact the wires or wire harnesses.
- Route harnesses so they are not pulled taut or have excessive slack.
- Protect wires and harnesses with electrical tape or tubing if they contact a sharp edge or corner. Clean surfaces thoroughly before applying tape.
- Do not use wires or harnesses with a broken insulator. Repair by wrapping them with protective tape or replace them.
- Route wire harnesses to avoid sharp edges or corners.
- Avoid the projected ends of bolts and screws.
- Keep wire harnesses away from the exhaust pipes and other hot parts.
- Be sure grommets are seated in their grooves properly.
- After clamping, check each harness to be certain that it does not interfere with any moving or sliding parts.
- After routing, check that the wire harnesses are not twisted or kinked.
- Wire harnesses routed along the handlebars should not be pulled taut, have excessive slack, be pinched, or interfere with adjacent or surrounding parts in any steering position.



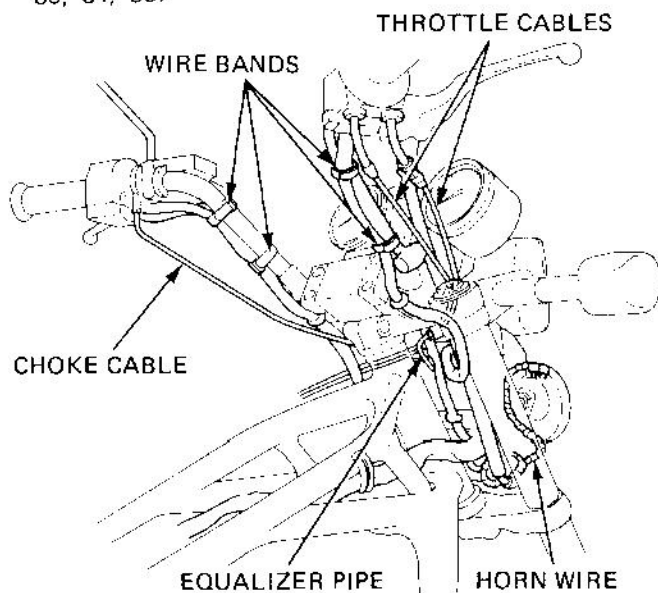
GENERAL INFORMATION

'83, '84, '85:

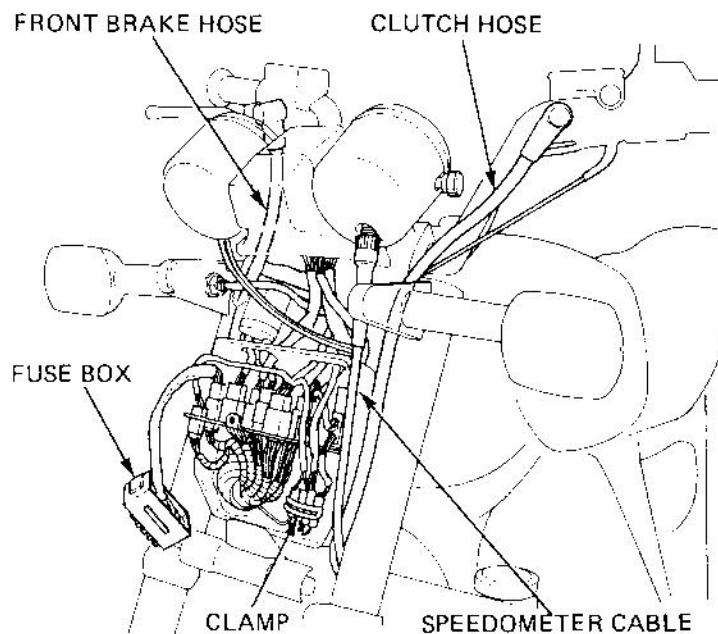
R. TURN SIGNAL WIRE SPEEDOMETER WIRE



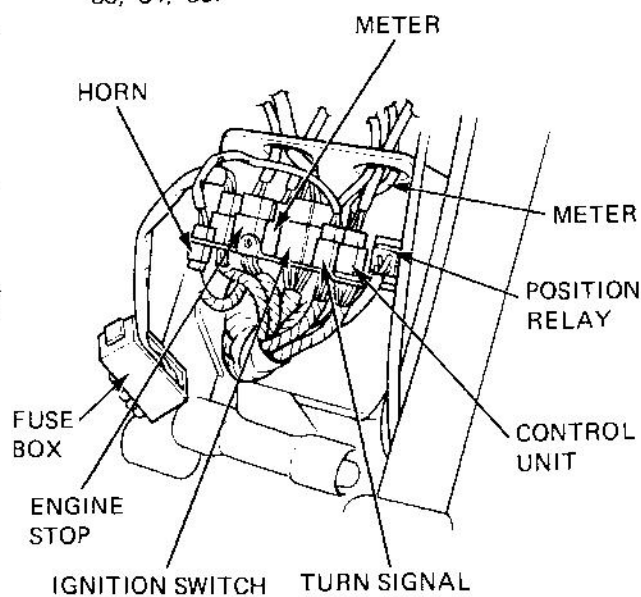
'83, '84, '85:



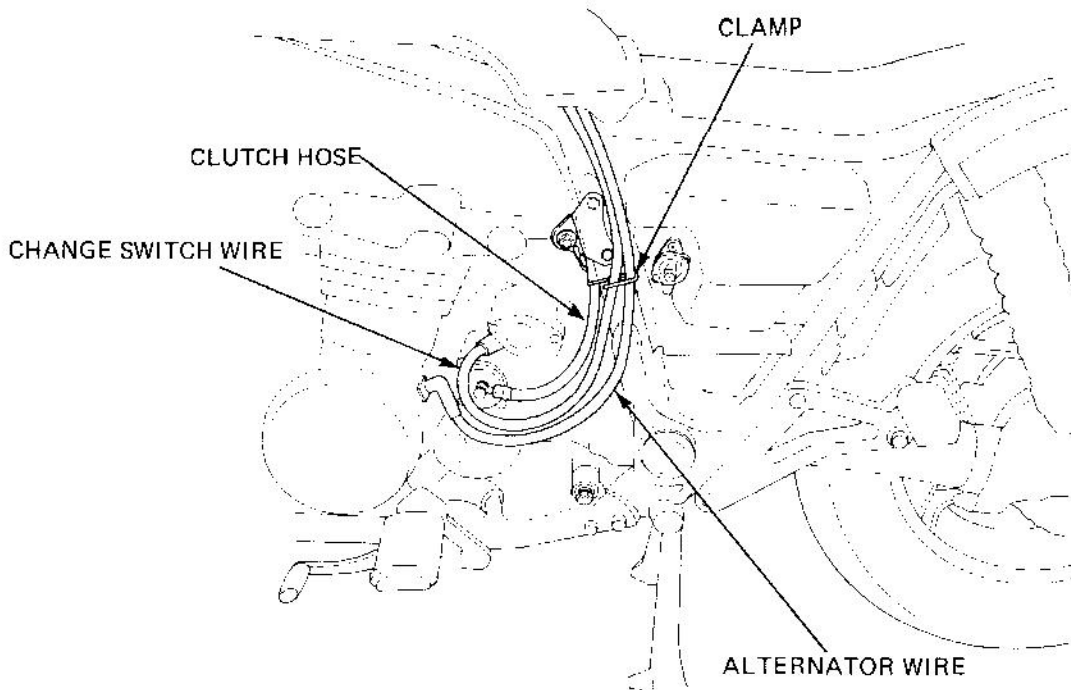
'83, '84, '85:



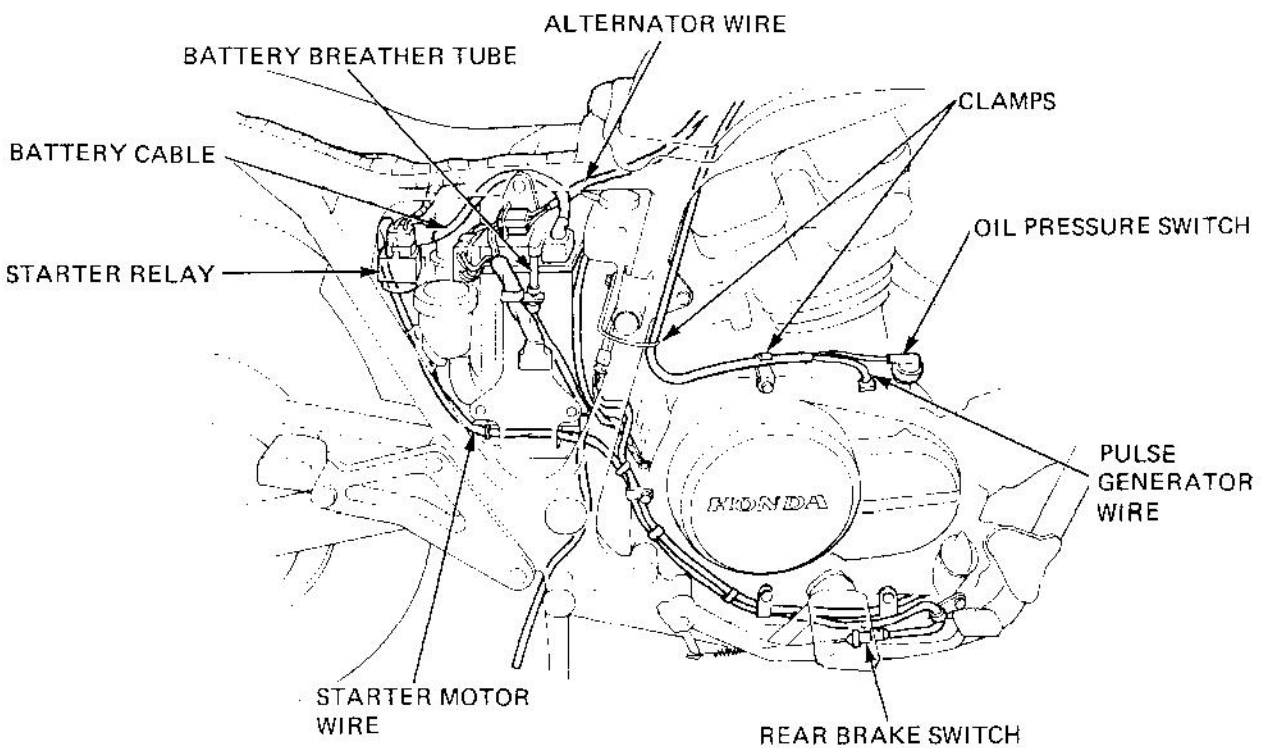
'83, '84, '85:



'83, '84, '85:

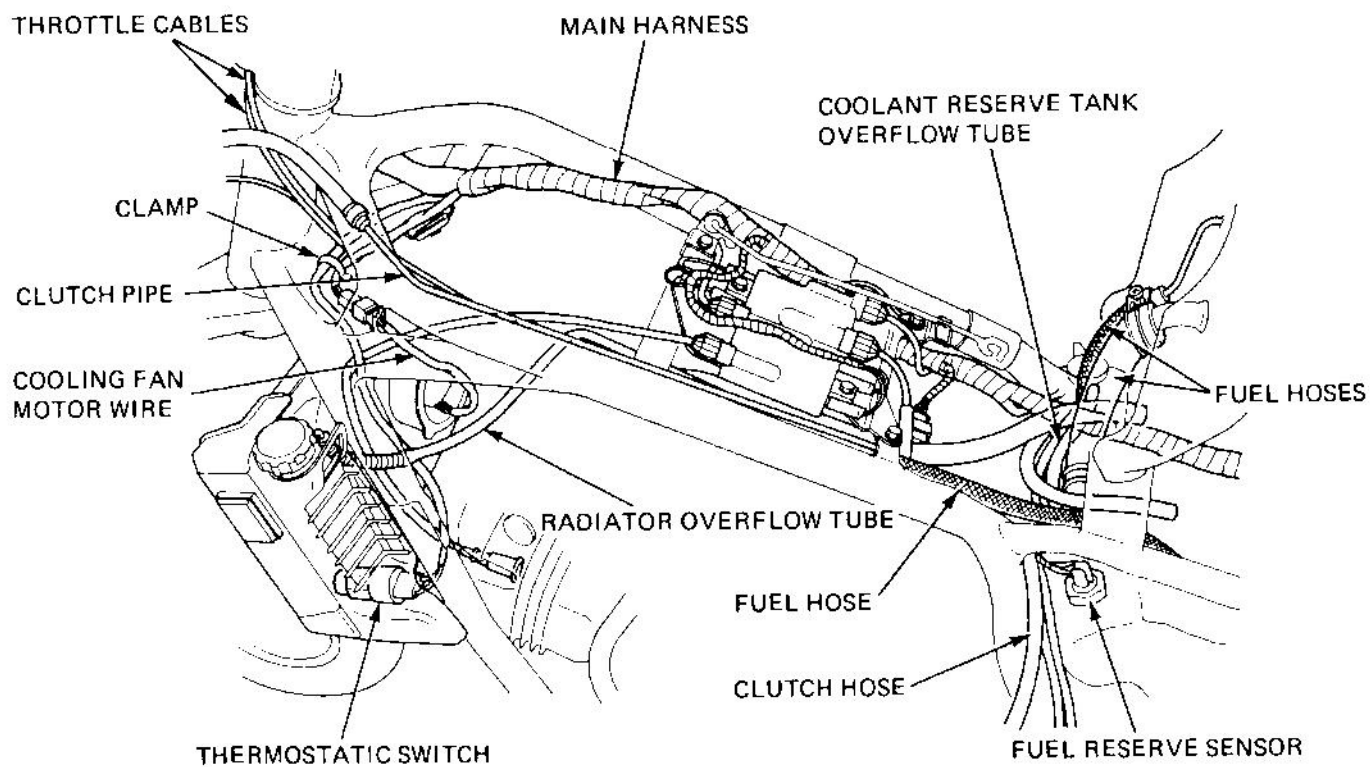


'83, '84, '85:

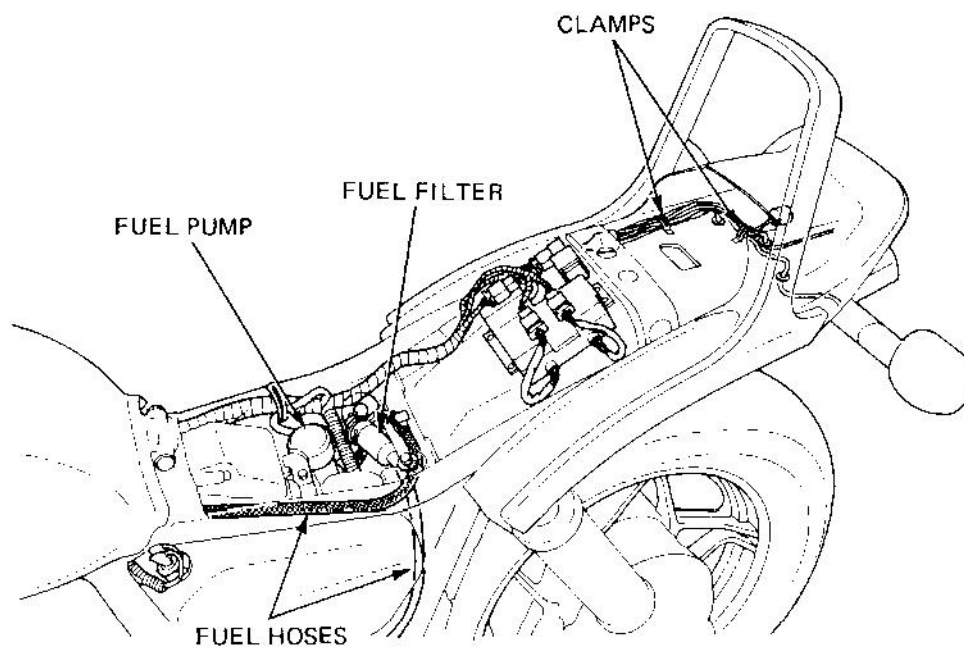


GENERAL INFORMATION

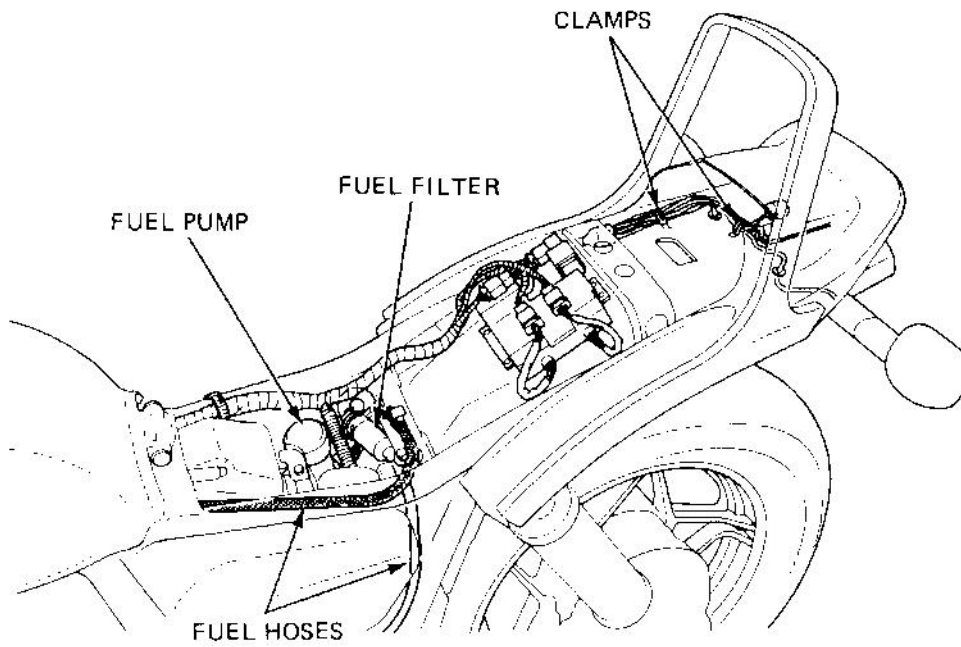
'83, '84, '85:



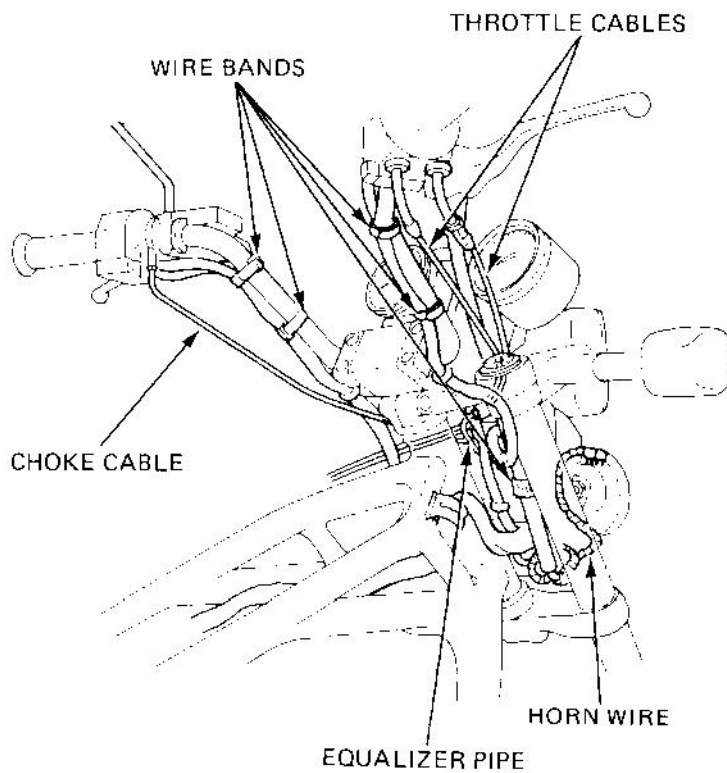
'83:



After '83:

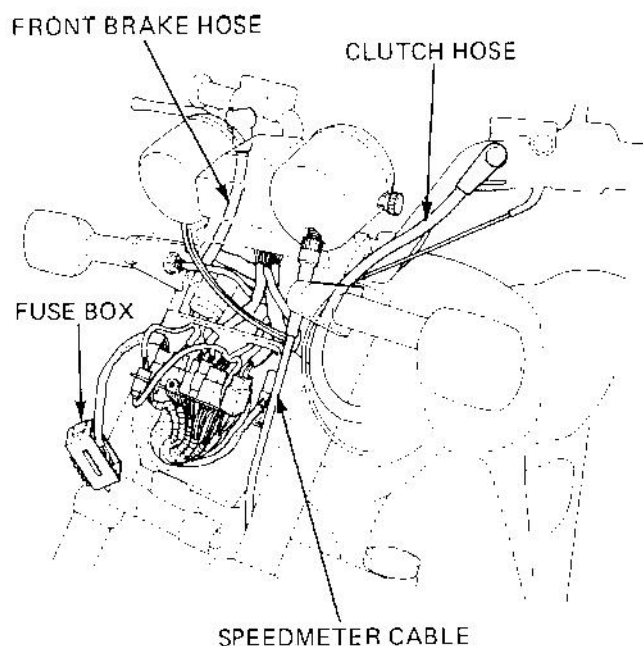


After '85:

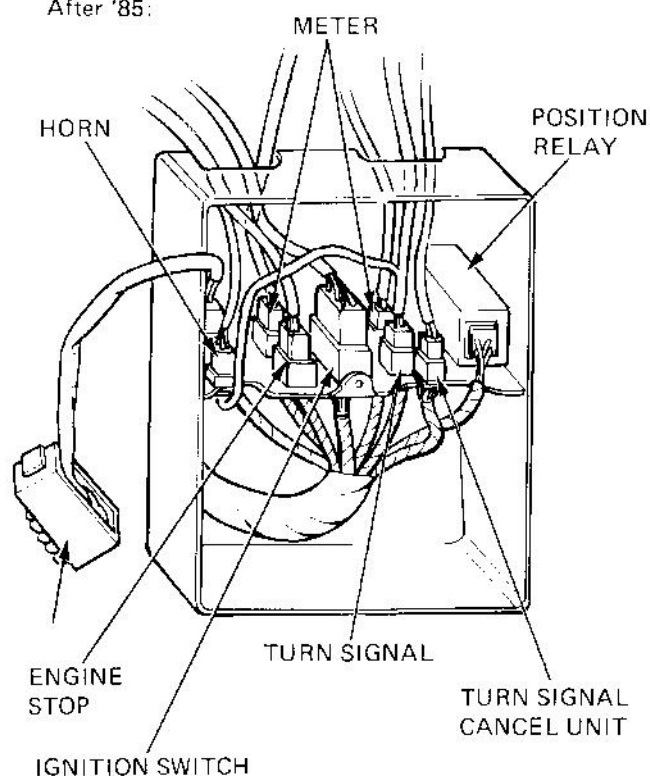


GENERAL INFORMATION

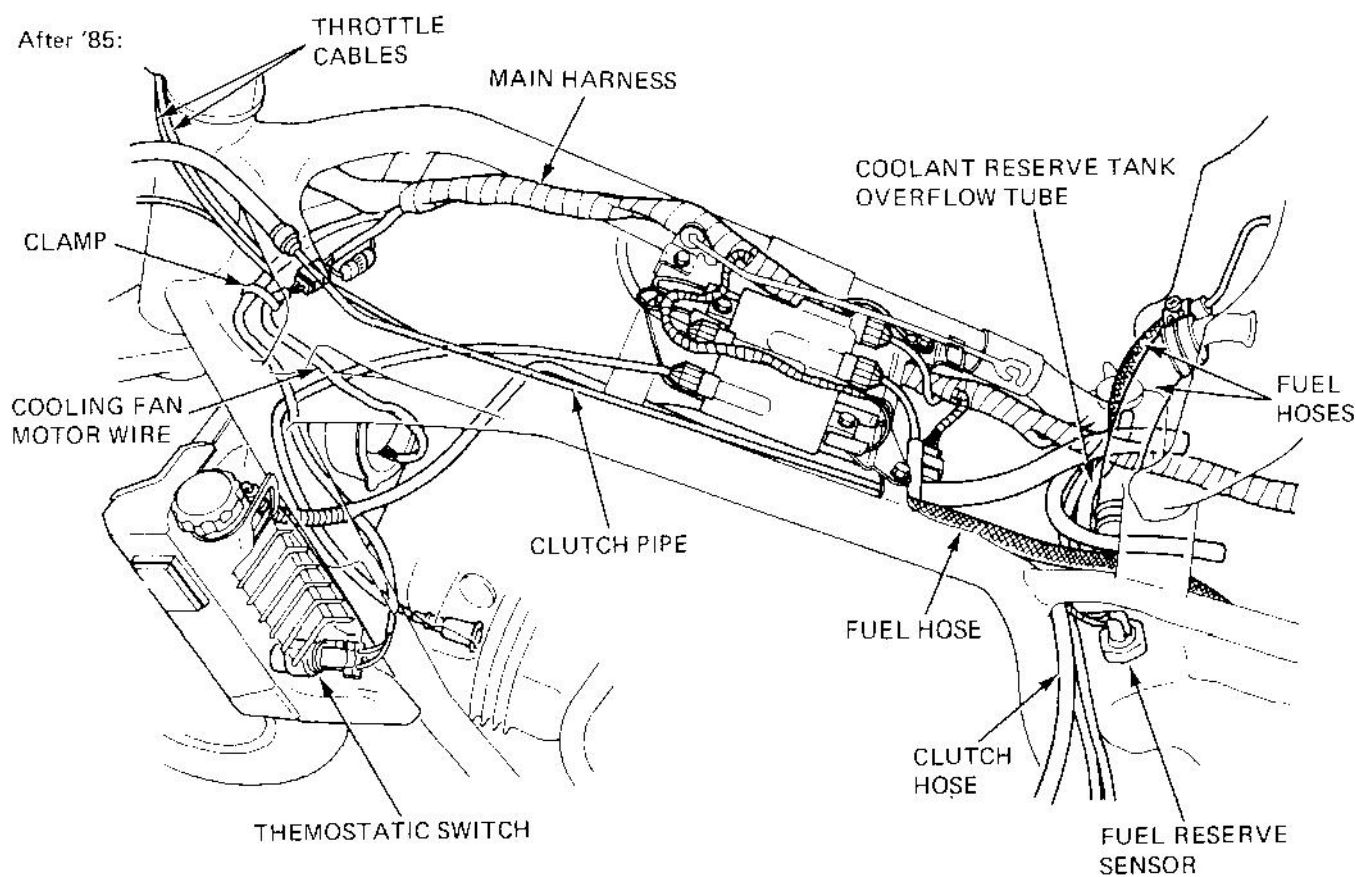
After '85:



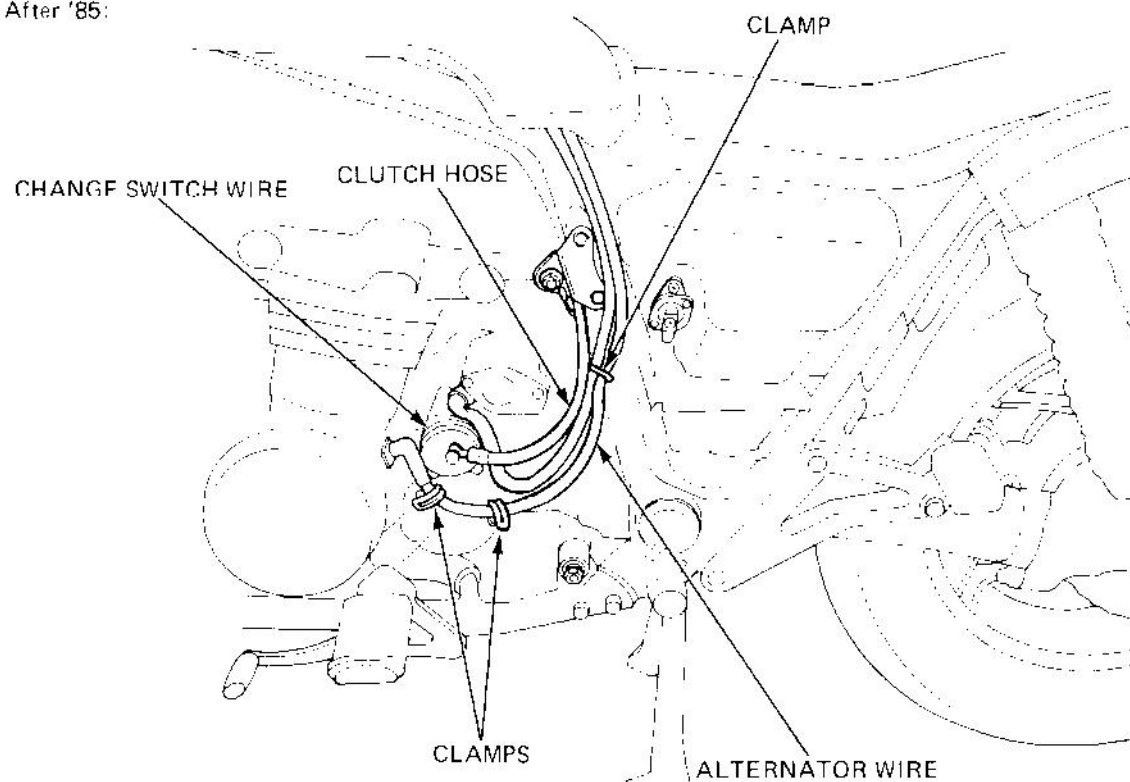
After '85:



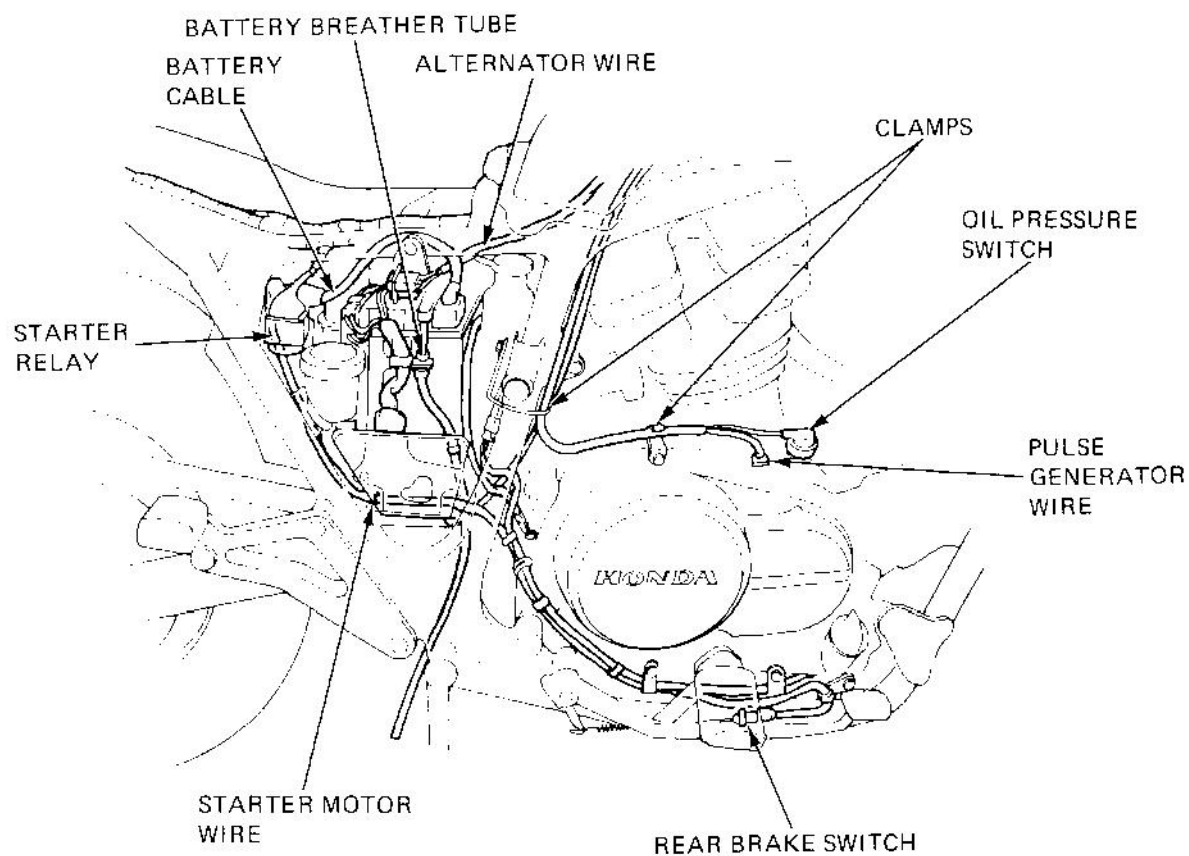
After '85:



After '85:

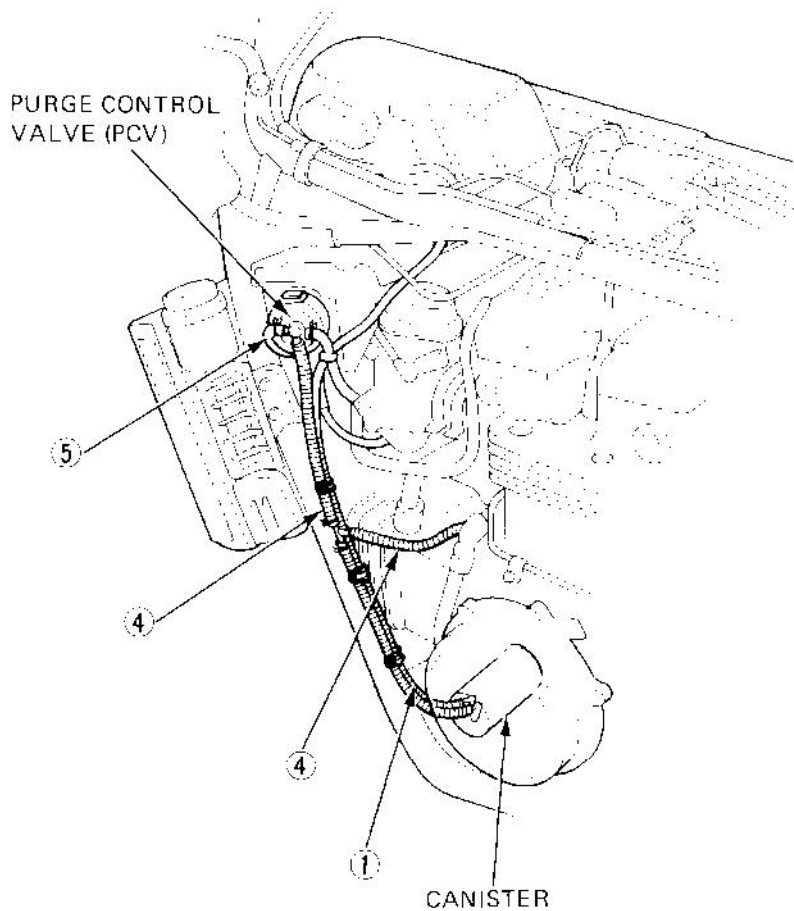
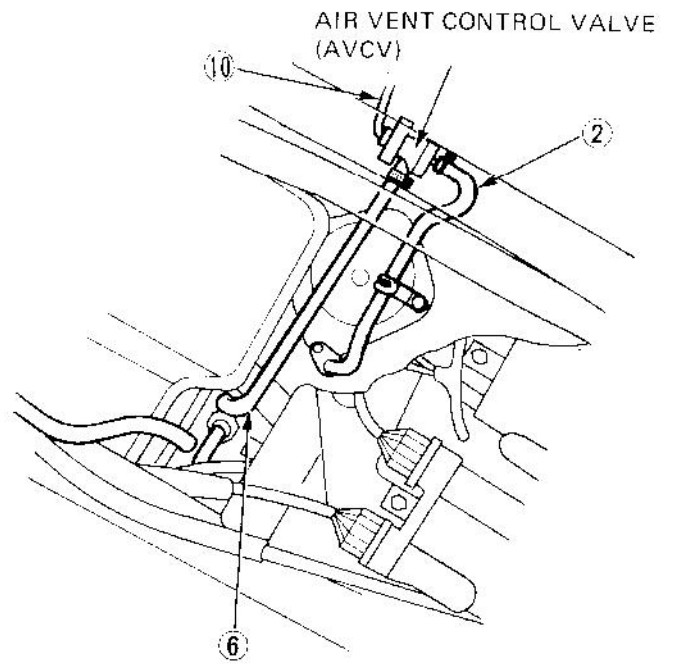
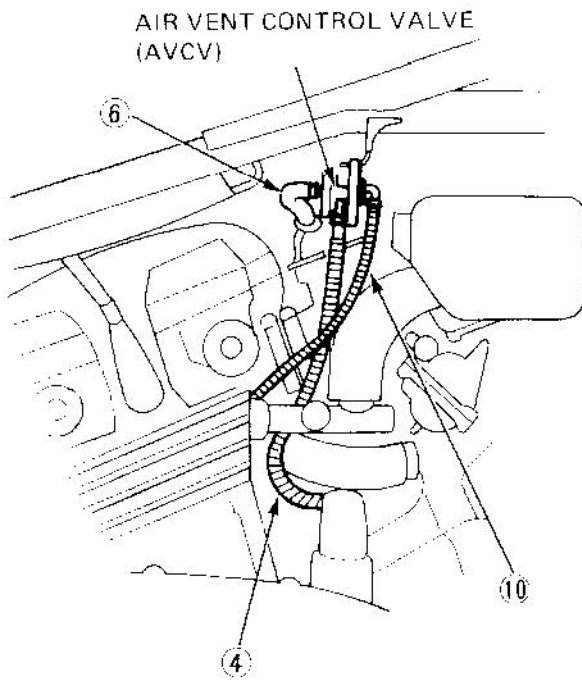


After '85:



GENERAL INFORMATION

After '85: (California model)



EMISSION CONTROL SYSTEM

The U.S. Environmental Protection Agency and California Air Resources Board (CARB) require manufacturers to certify that their motorcycles comply with applicable exhaust emission standards during their useful life, when operated and maintained according to the instructions provided, and that motorcycles built after January 1, 1983 comply with applicable noise emission standards for one year or 6,000 km (3,730 miles) after the time of sale to the ultimate purchaser, when operated and maintained according to the instructions provided. Compliance with the terms of the Distributor's Warranties for Honda Motorcycle Emission Control Systems is necessary in order to keep the emission warranty in effect.

SOURCE OF EMISSIONS

The combustion process produces carbon monoxide and hydrocarbons. Control of hydrocarbons is very important because, under certain conditions, they react to form photochemical smog when subjected to sunlight. Carbon monoxide does not react in the same way, but it is toxic.

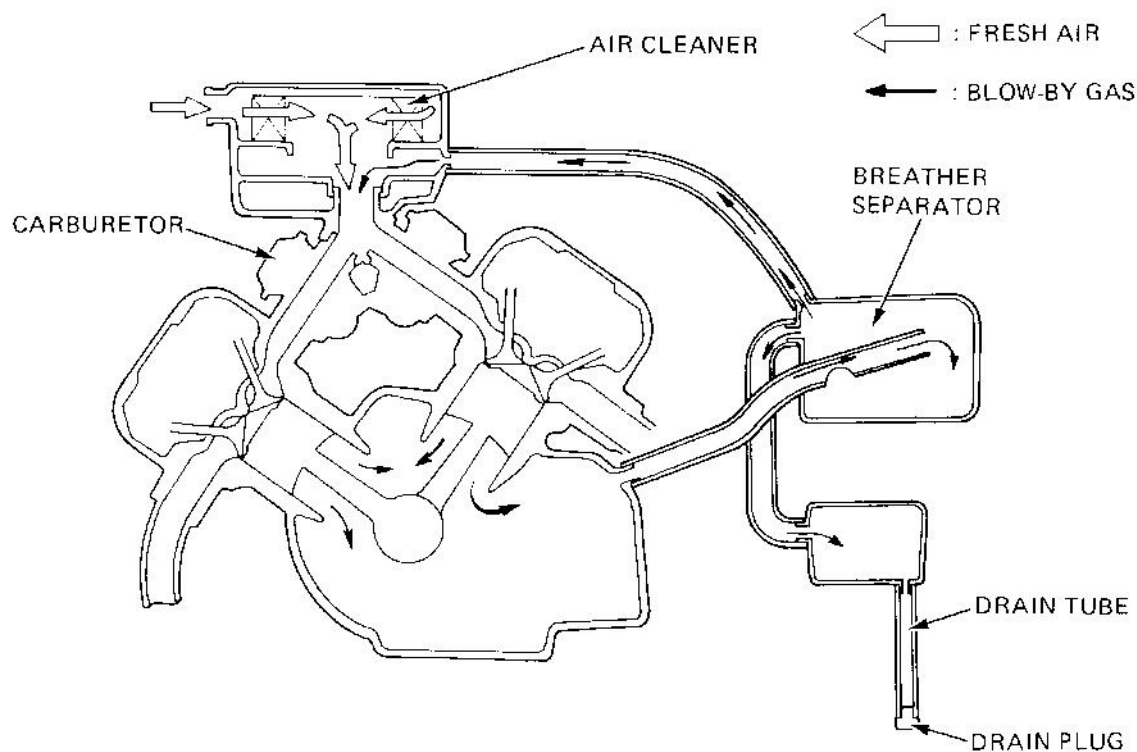
Honda Motor Co., Ltd. utilizes lean carburetor settings as well as other systems, to reduce carbon monoxide and hydrocarbons.

EXHAUST EMISSION CONTROL SYSTEM

The exhaust emission control system is composed of lean carburetor settings, and no adjustments should be made except idle speed adjustment with the throttle stop screw.

CRANKCASE EMISSION CONTROL SYSTEM

The V65 engine is equipped with a crankcase emission control system which routes crankcase emissions through the air cleaner and into the combustion chamber. Condensed crankcase vapors are accumulated in a storage tank which must be emptied periodically. See the Maintenance Schedule in Section 3.

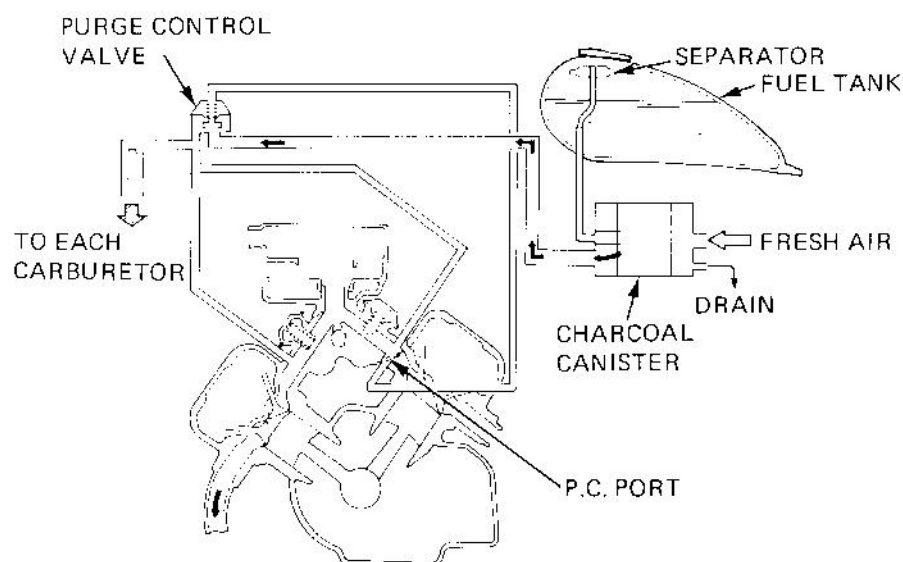


GENERAL INFORMATION

EVAPORATIVE EMISSION CONTROL SYSTEM ('84 California model)

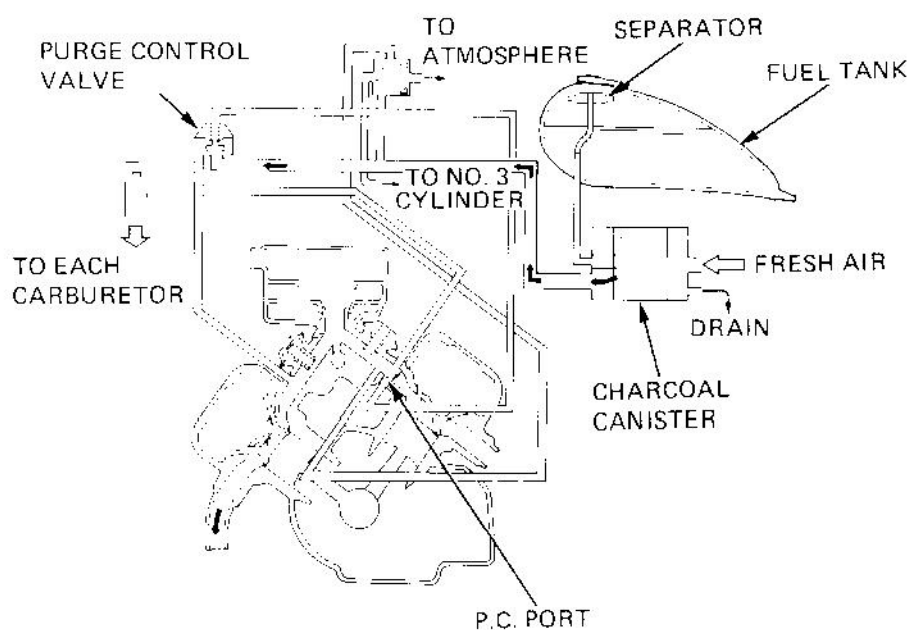
This model complies with California Air Resources Board requirements for evaporative emission regulations.

Fuel vapor from the fuel tank is routed into a charcoal canister where it is absorbed and stored while the engine is stopped. When the motorcycle is running and the purge control diaphragm valve is open, fuel vapor in the charcoal canister is drawn into the engine through the carburetor.



After '85:

This model complies with California Air Resources Board evaporative emission requirements. Fuel vapor from the fuel tank and carburetor is directed into the charcoal canister where it is absorbed and stored while the engine is stopped. When the engine is running and the purge control diaphragm valve is open, fuel vapor in the charcoal canister is drawn into the engine through the carburetor.



NOISE EMISSION CONTROL SYSTEM

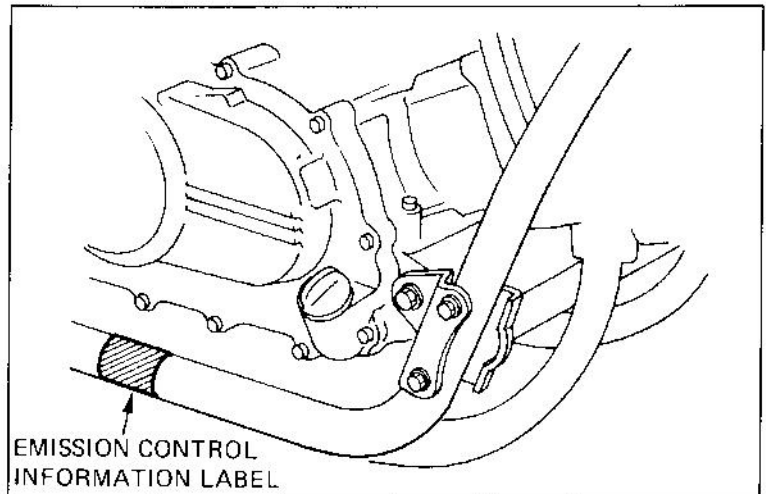
TAMPERING WITH THE NOISE CONTROL SYSTEM IS PROHIBITED: Federal law prohibits the following acts or the causing thereof: (1) The removal or rendering inoperative by any person, other than for purposes of maintenance, repair, or replacement, of any device or element of design incorporated into any new vehicle for the purpose of noise control prior to its sale or delivery to the ultimate purchaser or while it is in use; or (2) the use of the vehicle after such device or element of design has been removed or rendered inoperative by any person.

AMONG THOSE ACTS PRESUMED TO CONSTITUTE TAMPERING ARE THE ACTS LISTED BELOW:

1. Removal of, or puncturing the muffler, baffles, header pipes or any other component which conducts exhaust gases.
2. Removal of, or puncturing of any part of the intake system.
3. Lack of proper maintenance.
4. Replacing any moving parts of the vehicle, or parts of the exhaust or intake system, with parts other than those specified by the manufacturer.

EMISSION CONTROL INFORMATION LABEL

An Emission Control Information Label is located on the frame as shown. It gives basic tune-up specifications.

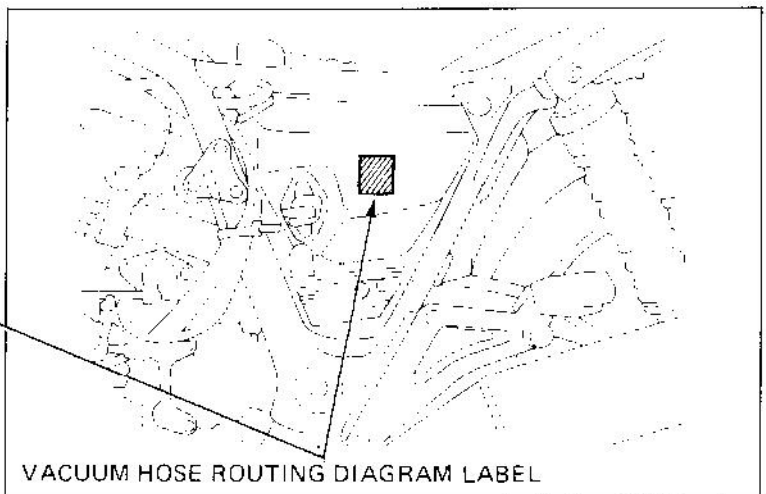
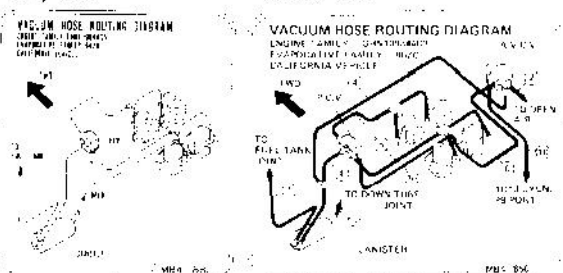


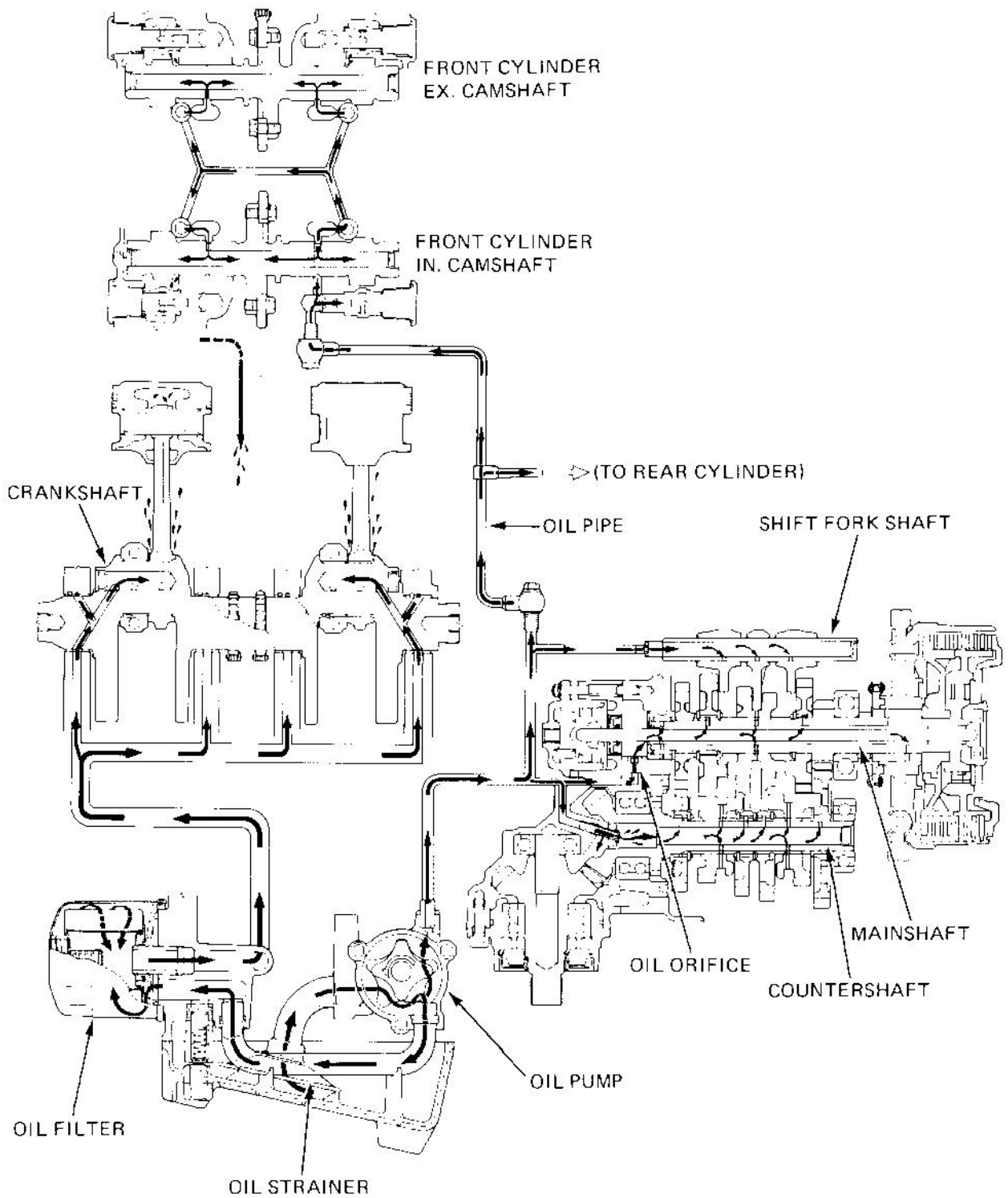
VACUUM HOSE ROUTING DIAGRAM LABEL (California model only)

The Vacuum Hose Routing Diagram Label is on the frame behind the left side cover. Route the vacuum hoses as shown on this label.

'84, '85:

After '85:





2. LUBRICATION

2

| | | | |
|----------------------------|-----|---------------------------|------|
| SERVICE INFORMATION | 2-1 | OIL PRESSURE CHECK | 2-4 |
| TROUBLESHOOTING | 2-2 | OIL PUMP | 2-5 |
| ENGINE OIL LEVEL | 2-3 | FINAL DRIVE OIL | 2-10 |
| ENGINE OIL & FILTER CHANGE | 2-3 | CONTROL CABLE LUBRICATION | 2-10 |
| OIL STRAINER CLEANING | 2-4 | LUBRICATION POINTS | 2-11 |

SERVICE INFORMATION

GENERAL

To service the oil pump, it is necessary to remove the right side cover and water pump assembly. See section 6 for water pump removal and installation.

SPECIFICATIONS

Engine oil

| | |
|--|---|
| Oil capacity | 3.0 liter (3.2 US qt, 2.6 Imp qt) after draining 3.5 liter (3.7 US qt, 3.1 Imp qt) after disassembly |
| Oil recommendation | <p>Use HONDA 4-STROKE OIL or equivalent. API SERVICE CLASSIFICATION: SE or SF. VISCOSITY: SAE 10W-40</p> <p>Other viscosities shown in the chart may be used when the average temperature in your riding area is within the indicated range.</p> |
| | <p>OIL VISCOSITIES CHART</p> <p>The chart shows four horizontal bars representing different oil grades and their applicable temperature ranges in both Fahrenheit (°F) and Celsius (°C):</p> <ul style="list-style-type: none"> SAE 20W-50: -20°F to 100°F (-28°C to 38°C) SAE 20W-40: -10°F to 100°F (-23°C to 38°C) SAE 10W-40: -20°F to 100°F (-28°C to 38°C) SAE 10W-30: -10°F to 80°F (-23°C to 27°C) |
| Oil pressure (at oil pressure switch) | 5.4 ± 0.7 kg/cm ² (77 ± 10 psi) at 5,000 rpm (80°C/176°F) |
| Oil pump delivery | 28.8 liter (30.5 US qt)/min. at 5,000 rpm |

Oil pump service data

| | STANDARD | SERVICE LIMIT |
|---------------------|-------------------------------|--------------------|
| Rotor tip clearance | 0.15 mm (0.006 in) | 0.20 mm (0.008 in) |
| Pump body clearance | 0.15–0.22 mm (0.006–0.009 in) | 0.35 mm (0.014 in) |
| Pump end clearance | 0.02–0.07 mm (0.001–0.003 in) | 0.10 mm (0.004 in) |

Final drive gear

| | '83: | After '83: |
|-----------------|---|---|
| Oil capacity | 170 cc (5.7 oz.) after disassembly 130 cc (4.4 oz.) after draining | 150 cc (5.1 oz) after disassembly 130 cc (4.4 oz) after draining |
| Recommended oil | Hypoid gear oil Above 5°C/41°F SAE #90 Below 5°C/41°F SAE #80 | Hypoid gear oil SAE #80 |

LUBRICATION

TORQUE VALUES

| | | |
|-----------------------|---------------------------------------|--|
| Engine oil drain plug | 35–40 N·m (3.5–4.0 kg-m, 25–29 ft-lb) | |
| Engine oil filter | 15–20 N·m (1.5–2.0 kg-m, 11–14 ft-lb) | — Apply Loctite® to crankcase bolt threads. |
| Oil pressure switch | 10–14 N·m (1.0–1.4 kg-m, 7–10 ft-lb) | — Apply 3-BOND® or its equivalent to the bolt threads. |

TOOLS

Special

| | | |
|-------------------------------|---------------|---|
| Oil pressure gauge | 07506–3000000 | } or commercially available equivalent. |
| Oil pressure gauge attachment | 07510–4220100 | |

TROUBLESHOOTING

Oil level too low

1. External oil leaks
2. Worn piston rings
3. Worn valve guide or seal

Oil contamination

1. Oil or filter not changed often enough
2. Head gasket faulty
3. Worn piston rings

Low oil pressure

1. Oil level low
2. Pressure relief valve stuck open
3. Plugged oil pick-up screen
4. Oil pump worn
5. External oil leaks

High oil pressure

1. Pressure relief valve stuck open
2. Plugged oil filter, gallery, or metering orifice
3. 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

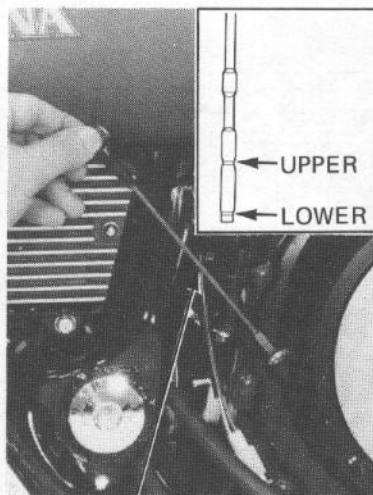
ENGINE OIL LEVEL

Put the motorcycle on its center stand on level ground. Start the engine and let it idle for 2–3 minutes. Turn off the engine. Remove the dipstick, wipe it clean and insert it without screwing it in. Remove the dipstick and check the oil level.

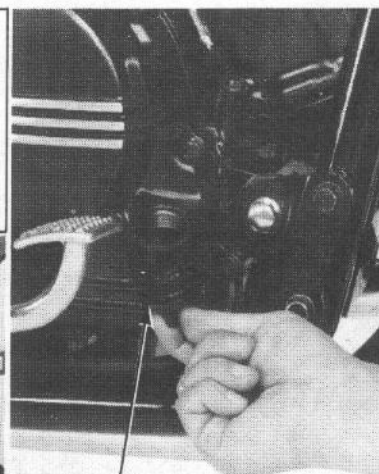
If the level is below the lower level mark, remove the filler cap and fill to the upper level mark.

Check the oil pressure with the warning indicator switch after the engine starts. The indicator should go off after one or two seconds.

If it does not, stop the engine and check the oil pump function and/or oil circuit.



DIPSTICK



FILLER CAP

ENGINE OIL & FILTER CHANGE

NOTE:

Change engine oil with the engine warm and the motorcycle on its center stand to assure complete and rapid draining.

Stop the engine.

Remove the canister (California model only).

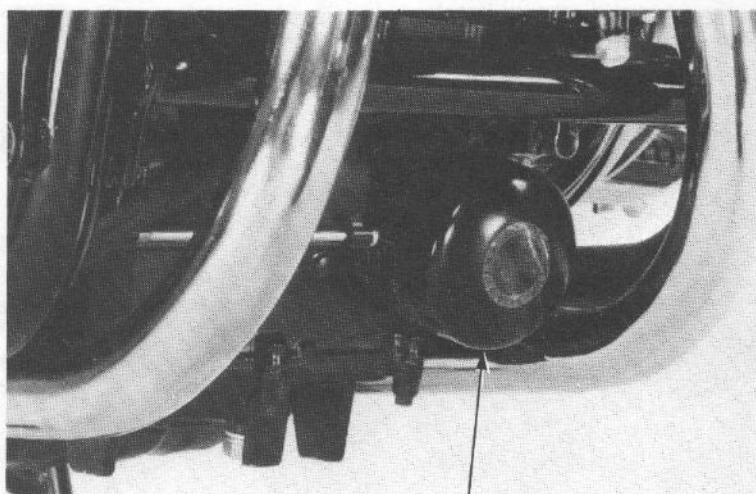
Remove the oil filler cap, cylinder head oil drain plug, engine bottom oil drain plug and drain the oil. Remove the oil filter with a filter wrench and let the remaining oil drain out. Discard the oil filter.

Make sure that the sealing washers on the drain plugs are in good condition, then install the plugs. After completely draining the oil replace the oil filter with a new one. Check that the oil filter O-ring is in good condition, and coat it with oil before installing it. Fill the crankcase with 3.0 liters (3.2 US qt, 2.6 Imp qt) of the recommended oil (page 2-1).

Start the engine and let it idle for 2–3 minutes, then stop the engine.

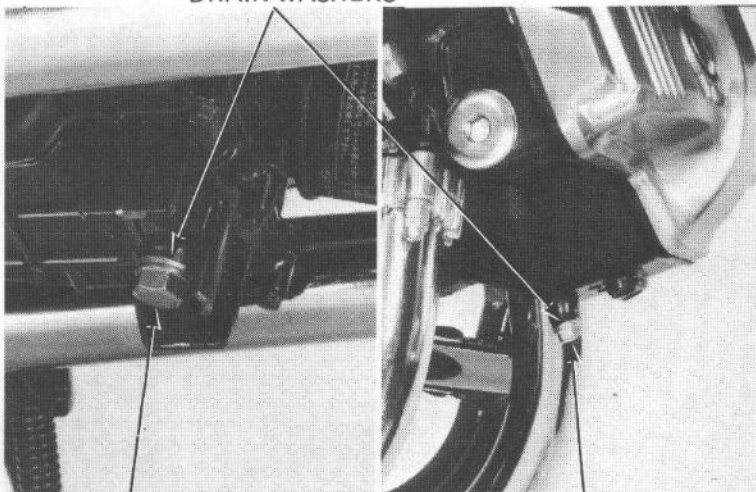
Make sure that the oil level is at the upper level mark.

Make sure that there are no oil leaks.



OIL FILTER 15–20 N·m
(1.5–2.0 kg-m, 11–14 ft-lb)

DRAIN WASHERS



DRAIN PLUG 35–40 N·m
(3.5–4.0 kg-m, 25–29 ft-lb)

CYLINDER HEAD OIL DRAIN PLUG
10–14 N·m (1.0–1.4 kg-m, 7–10 ft-lb)

OIL STRAINER CLEANING

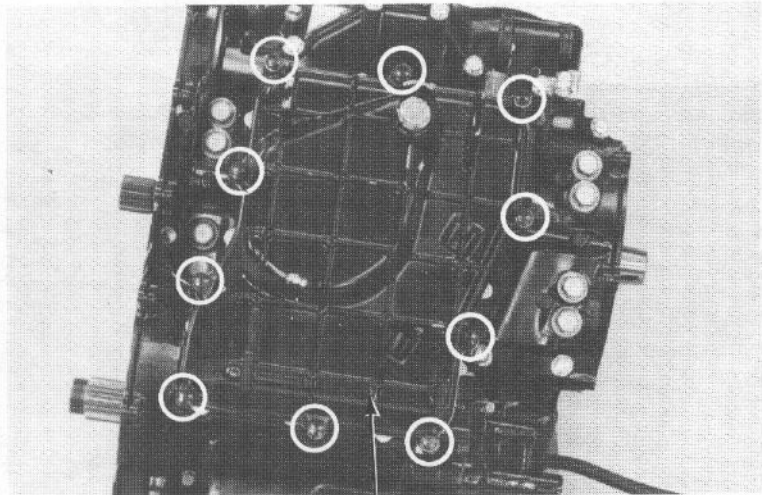
NOTE:

The oil strainer can be removed with the engine mounted in the frame.

Remove the front exhaust pipes.

Drain the engine oil (page 2-3).

Remove the oil pan bolts and oil pan.



OIL PAN

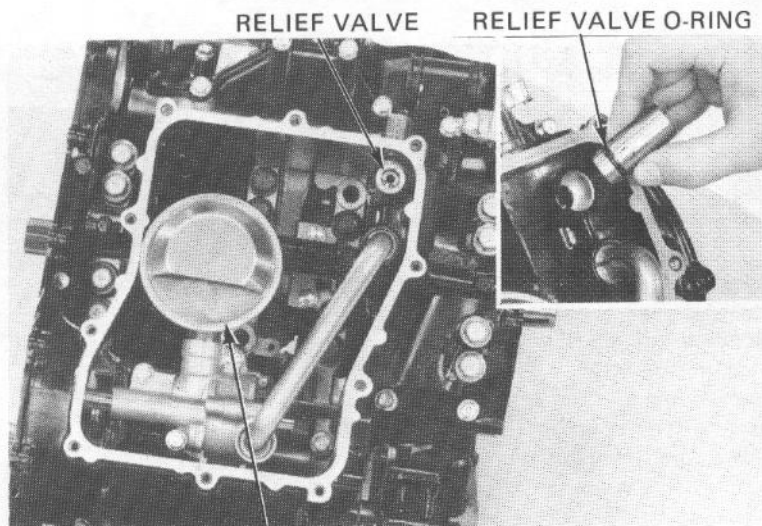
Remove and clean the oil strainer.

Check the operation of the pressure relief valve. Make sure the O-ring is in good condition whenever the relief valve is removed.

Install the oil strainer and oil pan.

Install the exhaust pipes.

Fill the crankcase with the recommended oil (page 2-1).



OIL STRAINER

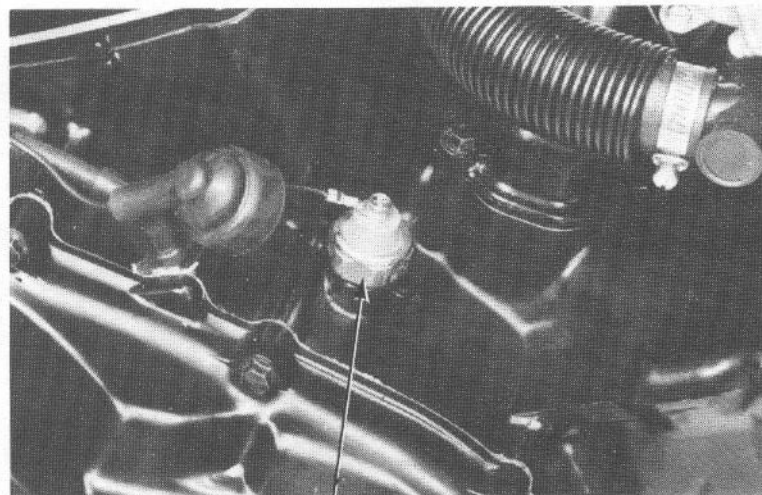
OIL PRESSURE CHECK

Warm the engine up to normal operating temperature (approximately 80°C/176°F).

Stop the engine and disconnect the oil pressure switch wire.

Remove the oil pressure switch and connect an oil pressure gauge to the pressure switch hole (page 2-5).

Check the oil level.



OIL PRESSURE SWITCH

Start the engine and check the oil pressure at 5,000 rpm.

OIL PRESSURE:

$5.4 \pm 0.7 \text{ kg/cm}^2$ ($77 \pm 10 \text{ psi}$) at 5,000 rpm
($80^\circ\text{C}/176^\circ\text{F}$)

Stop the engine.

Apply 3-BOND® sealant or equivalent to the pressure switch threads and install.

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

Connect the oil pressure switch wire.

Start the engine.

Operate the warning indicator switch.

Check that the oil pressure warning indicator goes out after one or two seconds.

If the oil pressure warning indicator stays on, stop the engine immediately and determine the cause.

OIL PRESSURE GAUGE
07506–3000000



OIL PRESSURE GAUGE
ATTACHMENT 07510–4220100

OIL PUMP

REMOVAL

NOTE:

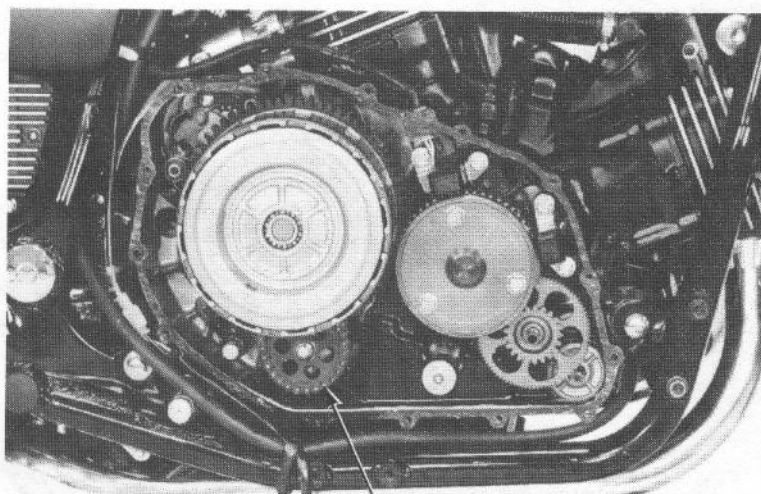
The oil pump can be removed with the engine mounted in the frame.

Drain the engine oil. Remove the exhaust system.

Remove the right side cover.

Remove the oil pump driven sprocket by removing the bolt and washer.

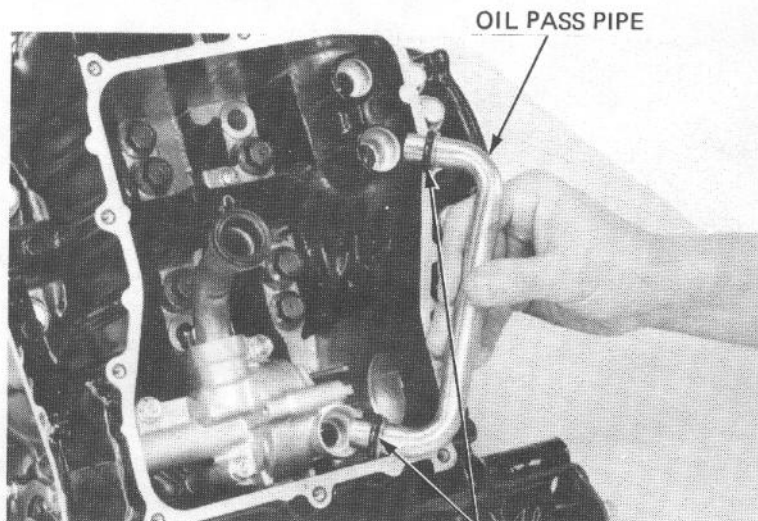
Remove the water pump assembly (page 6-10).



OIL PUMP DRIVEN SPROCKET

Remove the oil strainer (page 2-4) and the oil pass pipe.

Make sure the O-rings are in good condition.

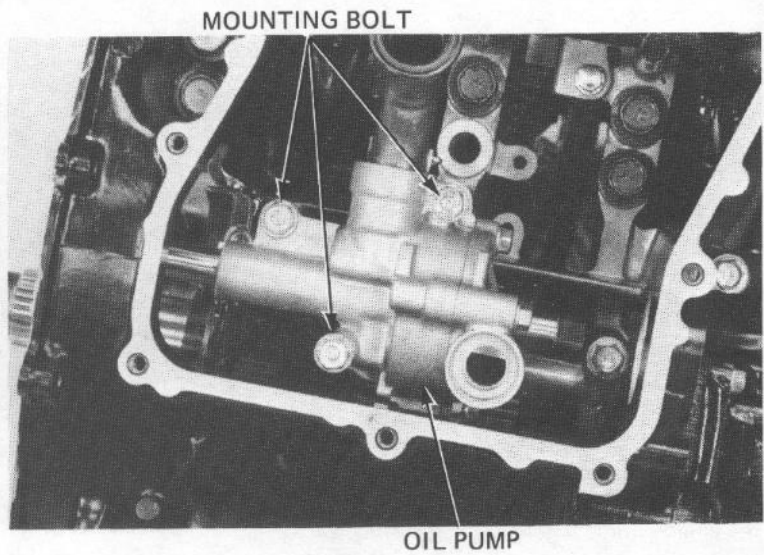


OIL PASS PIPE

O-RINGS

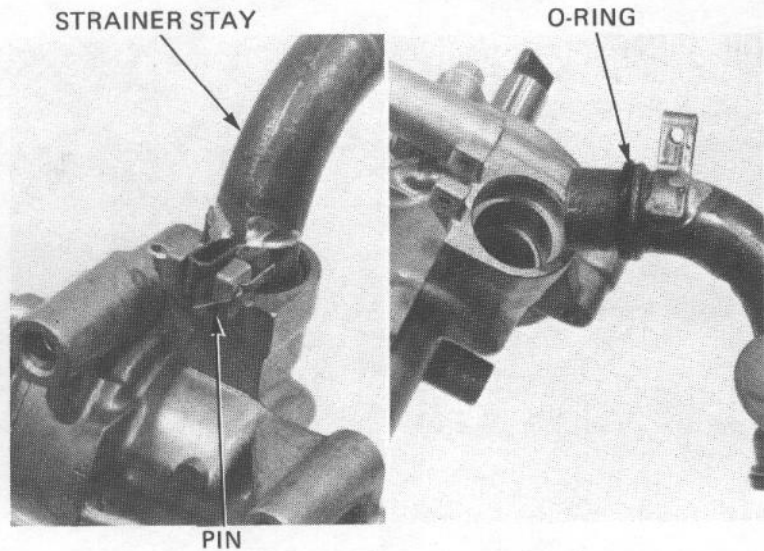
LUBRICATION

Remove the oil pump by removing the mounting bolts.



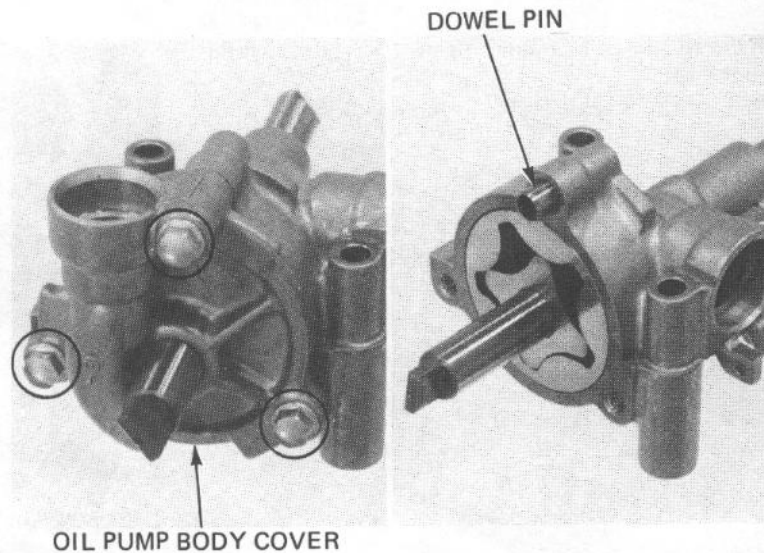
Straighten and remove the pin holding the oil strainer stay.
Remove the oil strainer stay.

Make sure the O-rings are in good conditions.



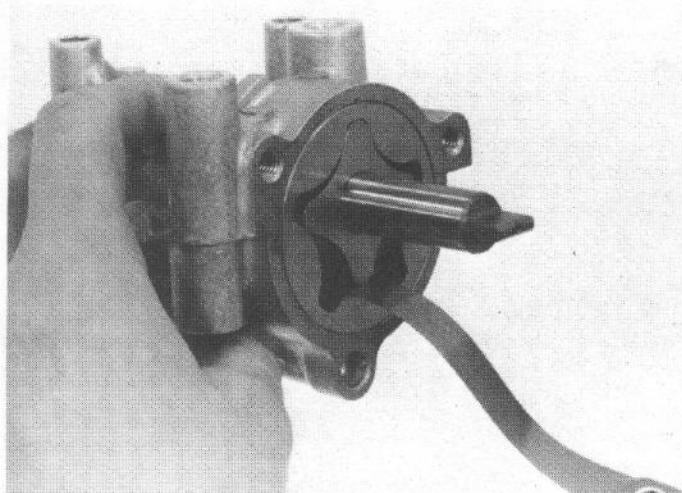
DISASSEMBLY

Remove the oil pump body cover and remove the dowel pin.
Remove the drive pin from the rotor shaft.



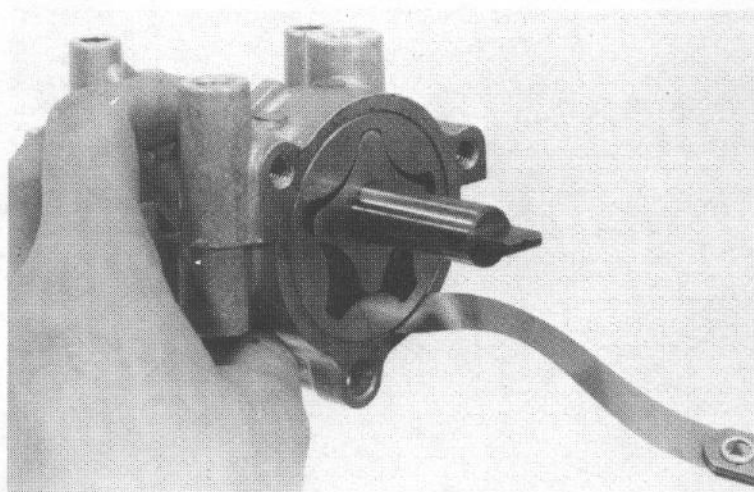
Measure the rotor tip clearance.

SERVICE LIMIT: 0.20 mm (0.008 in)



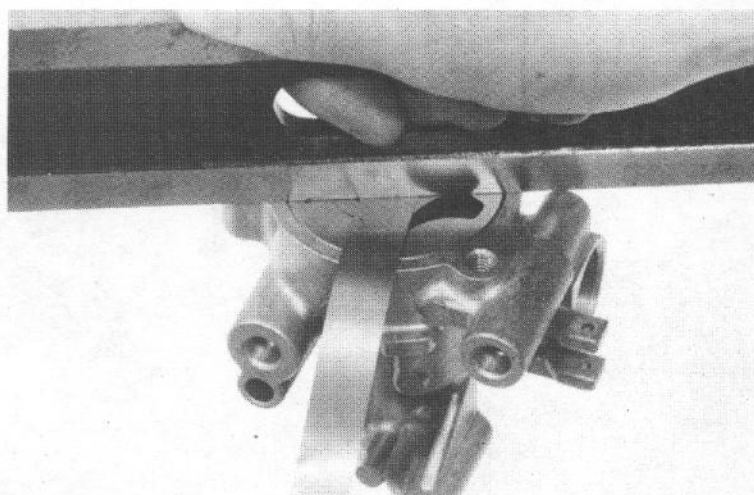
Measure the pump body clearance.

SERVICE LIMIT: 0.35 mm (0.014 in)



Remove the rotor shaft and measure the pump end clearance.

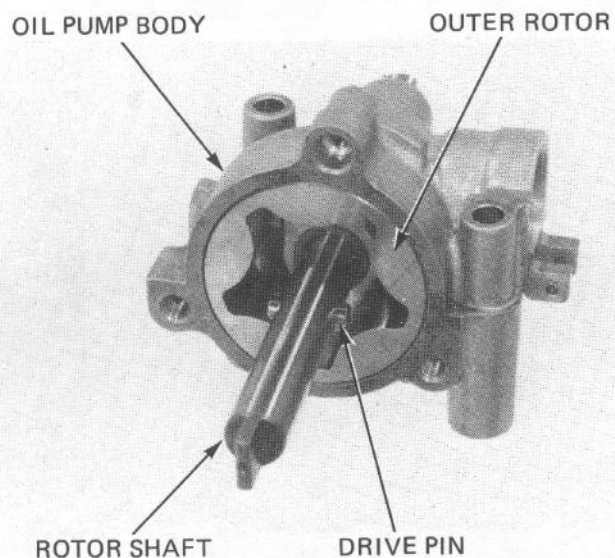
SERVICE LIMIT: 0.10 mm (0.004 in)



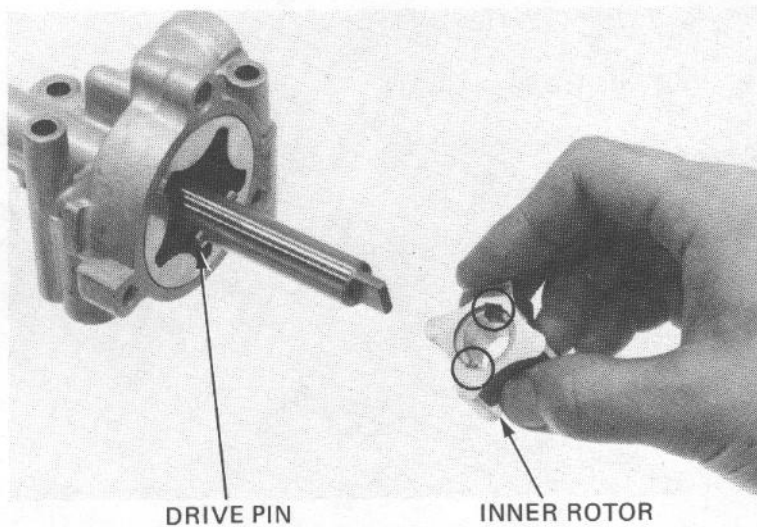
LUBRICATION

ASSEMBLY

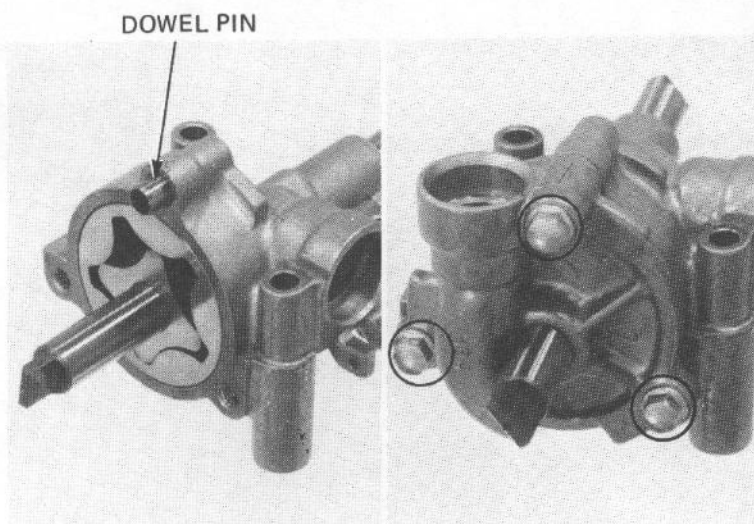
Install the outer rotor into the body and insert the rotor shaft.
Insert the drive pin into the rotor shaft.



Align the slots in the inner rotor with the drive pin.



Install the dowel pin and oil pump body cover.



INSTALLATION

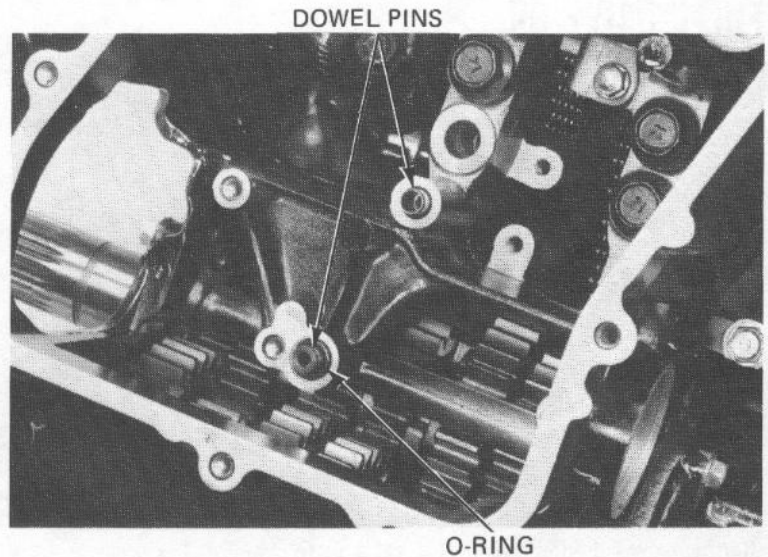
Install the dowel pins and O-ring and install the oil pump.

Install the strainer stay with a new pin and install the oil pipe.

NOTE:

Make sure the O-rings are installed on the strainer stay and oil pipe.

Install the oil strainer and oil pan.



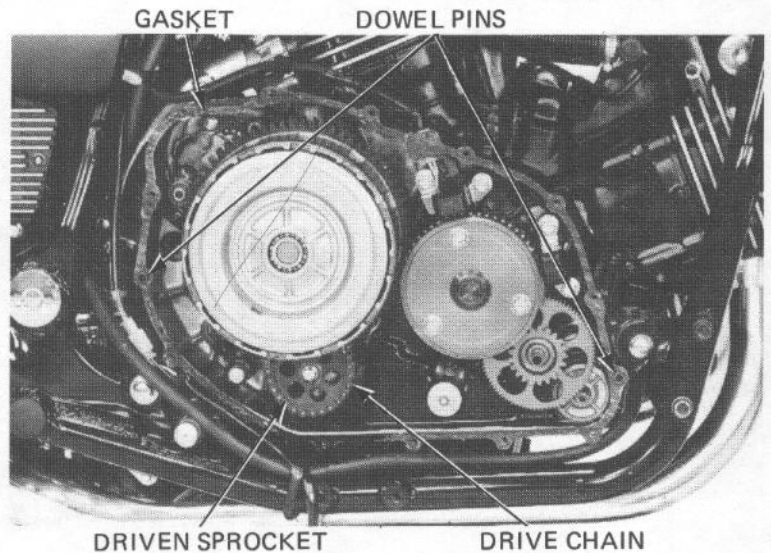
Place the oil pump driven sprocket into the drive chain.

NOTE:

The "IN" mark on the driven sprocket should face the crankcase.

Install the washer and tighten the bolt.
Install the dowel pins and a new gasket.
Install the right side cover.

Install the water pump assy (page 6-11).
Install the exhaust pipe.
Fill the engine with the recommended oil (page 2-1).



LUBRICATION

FINAL DRIVE OIL

CHECK

Place the motorcycle on its center stand on level ground.

Remove the oil filler cap.

Check that the oil level reaches the lower edge of the oil filler cap hole.

Check for leaks, if the level is low. Pour fresh oil through the oil filler hose until it reaches the lower edge.

CHANGE

Remove the oil filler cap and drain bolt to drain all oil from the final gear case.

Install the drain bolt securely.

Fill the gear case with the recommended oil up to the correct level (above).

OIL CAPACITY: 130 cc (4.4 oz)

RECOMMENDED OIL:

'83:

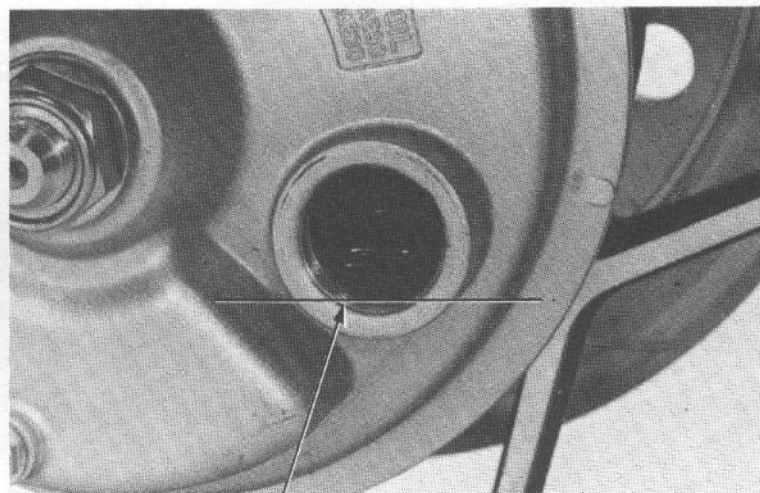
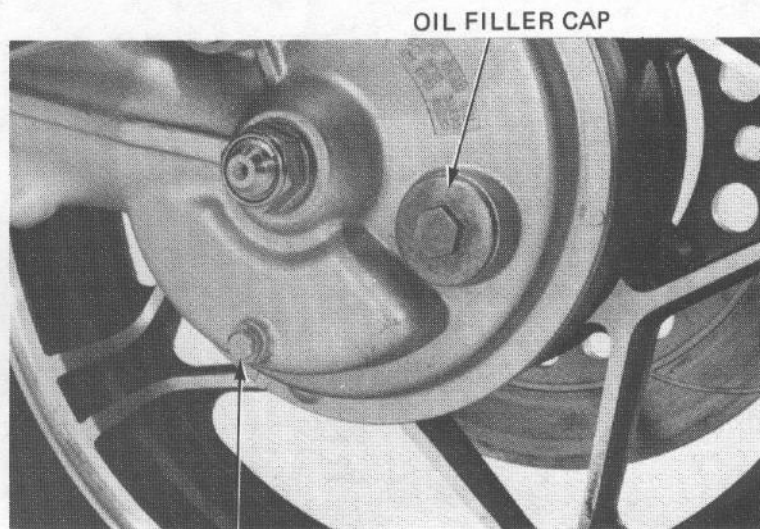
HYPOID GEAR OIL API,

GL-5 SAE #90 (Above 5°C/41°F)

SAE #80 (Below 5°C/41°F)

After '83:

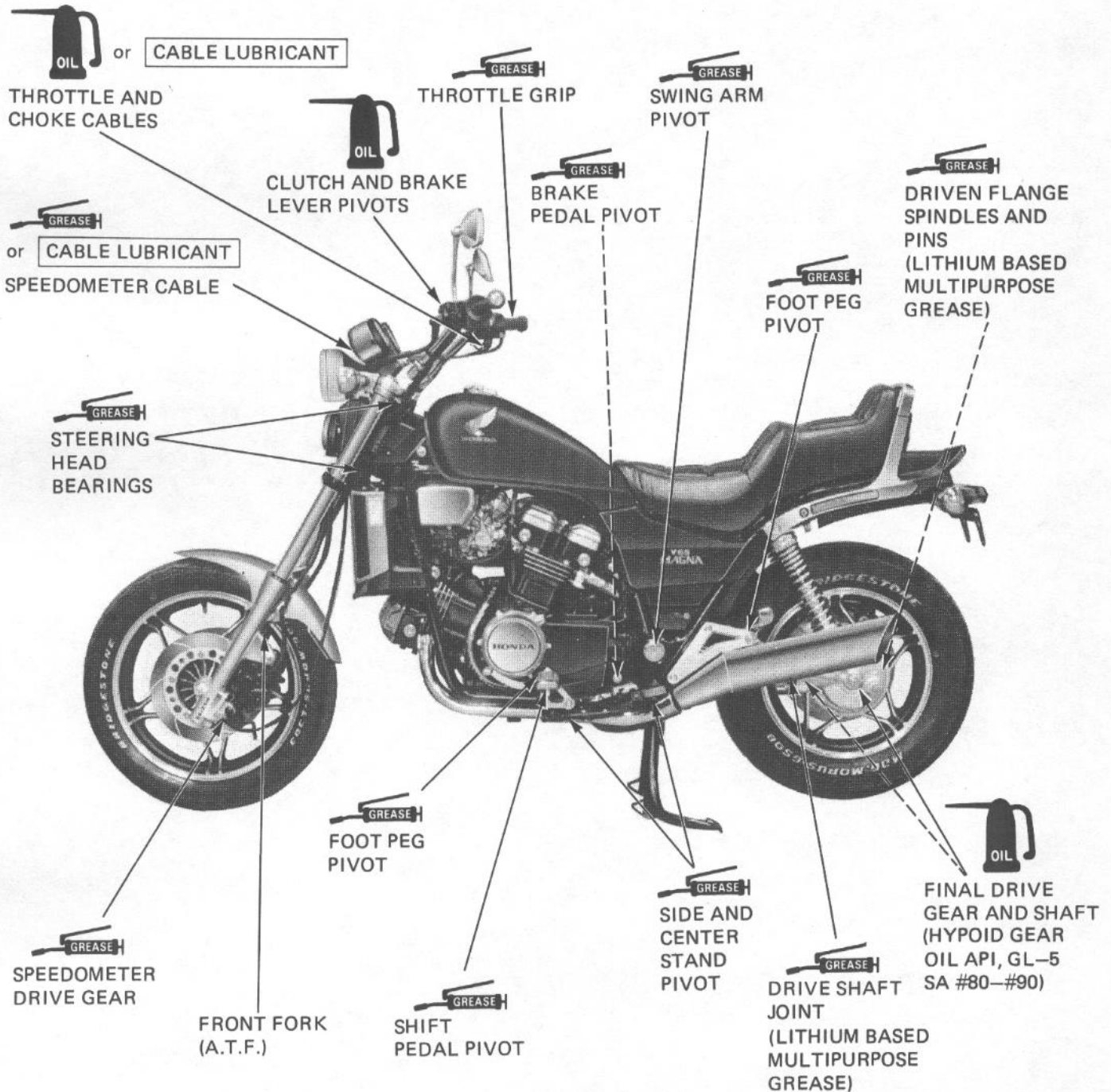
HYPOID GEAR OIL: SAE #80



CONTROL CABLE LUBRICATION

Periodically, disconnect the throttle cables at their upper ends. Thoroughly lubricate the cables and their pivot points with a commercially available cable lubricant or a light weight oil.

LUBRICATION POINTS



3. MAINTENANCE

3

| | | | |
|----------------------------|------|-------------------------------------|------|
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| MAINTENANCE SCHEDULES | 3-3 | EVAPORATIVE EMISSION CONTROL SYSTEM | 3-17 |
| < ENGINE > | | < CHASSIS > | |
| FUEL LINES | 3-5 | BATTERY | 3-18 |
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| THROTTLE OPERATION | 3-6 | After '84: FRONT BRAKE LEVER | 3-18 |
| CARBURETOR CHOKE | 3-7 | BRAKE PAD WEAR | 3-19 |
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| COOLING SYSTEM HOSES | 3-16 | NUTS, BOLTS, FASTENERS | 3-23 |

SERVICE INFORMATION

GENERAL

- Engine oil See page 2-3
- Engine oil filter See page 2-3
- Final drive gear oil See page 2-10

SPECIFICATIONS

< Engine >

Spark plugs:

| Standard | | For cold climate (below 5°C, 41°F) | | For extended high speed riding | |
|----------|-----------|------------------------------------|-----------|--------------------------------|-----------|
| NGK | ND | NGK | ND | NGK | ND |
| DPR8EA-9 | X24EPR-U9 | DPR7EA-9 | X22EPR-U9 | DPR9EA-9 | X27EPR U9 |

Spark plug gap: 0.8–0.9 mm (0.031–0.035 in)

MAINTENANCE

Ignition timing

| | |
|-----------------|-----------------------|
| At idle: | 10° BTDC |
| Advance starts: | 10° BTDC at 1,500 rpm |
| Full advance: | 37° BTDC at 3,800 rpm |

Valve clearance

| | |
|--------------------------|------------------------------------|
| Cold (Below 35°C, 95°F): | Intake/Exhaust: 0.15 mm (0.006 in) |
|--------------------------|------------------------------------|

Idle speed:

1,000 ± 100 rpm

Carburetor synchronization:

All carburetors within 60 mm (2.4 in) Hg

Cylinder compression:

13 ± 2 kg/cm² (184 ± 28 psi)

Throttle grip free play:

2–6 mm (1/8–1/4 in)

< CHASSIS >

Tire:

| Tire size | | Front | Rear |
|--|---|----------------|----------------|
| | | M110/90-18 | M140/90-16 |
| Cold tire pressure, psi (kPa, kg/cm ²) | Up to 90 kg (200 lbs) load | 32 (225, 2.25) | 32 (225, 2.25) |
| | 90 kg (200 lbs) load to vehicle capacity load | 32 (225, 2.25) | 40 (280, 2.80) |
| Tire brand | Bridgestone | L303 | G508H |
| | Dunlop | F11 | K627 |

Front fork air pressure: 0–6 psi (0–40 kPa, 0–0.4 kg/cm²)

TORQUE VALUES

| | |
|---------------------|---------------------------------------|
| Valve adjusting nut | 21–25 N·m (2.1–2.5 kg·m, 15–18 ft·lb) |
|---------------------|---------------------------------------|

TOOLS

Special

| | |
|-------------------------------|--|
| Vacuum gauge set | 07404–0030000 or M937B–021–XXXXX (U.S.A. only) |
| Carburetor pilot screw wrench | 07908–4220201 |
| Compression gauge attachment | 07510–MB00101 –Equivalent commercially available in U.S.A. |
| Valve adjusting wrench | 07908–MB00100 |
| Flywheel cover | 07998–MB00000 |
| Adjusting wrench (A) | 07708–0030300 –Equivalent commercially available in U.S.A. |
| Camshaft holder | 07979–MK30000 |

MAINTENANCE SCHEDULES

'83, '84, '85:

Perform the PRE-RIDE INSPECTION in the Owner's Manual at each scheduled maintenance period.

I: INSPECT AND CLEAN, ADJUST, LUBRICATE, OR REPLACE IF NECESSARY.

C: CLEAN, R: REPLACE, A: ADJUST, L: LUBRICATE

| FREQUENCY | | | WHICHEVER COMES FIRST ↓ | ODOMETER READING (NOTE 3) | | | | | | | | |
|----------------------------|-------------------------------------|------------------------------------|----------------------------------|---------------------------|------------------------|-------------------------|--------------------------|--------------------------|--------------------------|--------------------------|------------------|------|
| | | | | 600 mi (1,000 km) | 4,000 mi (6,400 km) | 8,000 mi (12,800 km) | 12,000 mi (19,200 km) | 16,000 mi (25,600 km) | 20,000 mi (32,000 km) | 24,000 mi (38,400 km) | Refer to page | |
| ITEM | | | EVERY | | | | | | | | | |
| EMISSION RELATED ITEMS | * | FUEL LINES | | | | I | | I | | I | 3-5 | |
| | * | FUEL FILTER | | | | | | | | R | 3-5 | |
| | * | THROTTLE OPERATION | | I | | I | | I | | I | 3-6 | |
| | * | CARBURETOR-CHOKE | | | | I | | I | | I | 3-7 | |
| | | AIR CLEANER | NOTE 1 | | | R | | R | | R | 3-7 | |
| | | CRANKCASE BREATHER | NOTE 2 | | C | C | C | C | C | C | 3-8 | |
| | | SPARK PLUGS | | | R | R | R | R | R | R | 3-8 | |
| | * | VALVE CLEARANCE | | I | | I | | I | | I | 3-9 | |
| | | ENGINE OIL | YEAR | R | | R | | R | | R | 2-3 | |
| | | ENGINE OIL FILTER | YEAR | R | | R | | R | | R | 2-3 | |
| | * | CARBURETOR-SYNCHRONIZATION | | I | | I | | I | | I | 3-14 | |
| | * | CARBURETOR-IDLE SPEED | | I | I | I | I | I | I | I | 3-15 | |
| | | RADIATOR COOLANT | | | | I | | I | | *R | 3-16 | |
| | * | RADIATOR CORE | | | | I | | I | | I | 3-16 | |
| | * | COOLING SYSTEM HOSES & CONNECTIONS | | I | | I | | I | | I | 3-16 | |
| * | EVAPORATIVE EMISSION CONTROL SYSTEM | NOTE 3 | | | | I | | I | | I | 3-17 | |
| NON-EMISSION RELATED ITEMS | | FINAL DRIVE OIL | | | | | I | | I | | R | 2-10 |
| | | BATTERY | MONTH | | I | I | I | I | I | I | I | 3-18 |
| | | BRAKE FLUID | MONTH 1 2 YEARS* R | | I | I | I | *R | I | I | *R | 3-18 |
| | | BRAKE PAD WEAR | | | | I | I | I | I | I | I | 3-19 |
| | | BRAKE SYSTEM | | | I | | I | | I | | I | 3-19 |
| | * | BRAKE LIGHT SWITCH | | | I | | I | | I | | I | 3-20 |
| | * | HEADLIGHT AIM | | | I | | I | | I | | I | 3-20 |
| | | CLUTCH FLUID | MONTH 1 2 YEARS* R | | I | I | I | *R | I | I | *R | 3-20 |
| | | CLUTCH SYSTEM | | | I | | I | | I | | I | 3-20 |
| | | SIDE STAND | | | | | I | | I | | I | 3-21 |
| | * | SUSPENSION | | | I | | I | | I | | I | 3-21 |
| | * | NUTS, BOLTS, FASTENERS | | | I | | I | | I | | I | 3-23 |
| | ** | WHEELS | | | I | | I | | I | | I | 3-23 |
| | ** | STEERING HEAD BEARINGS | | | I | | I | | I | | I | 3-23 |

* SHOULD BE SERVICED BY AN AUTHORIZED HONDA DEALER, UNLESS THE OWNER HAS PROPER TOOLS AND SERVICE DATA AND IS MECHANICALLY QUALIFIED.

** IN THE INTEREST OF SAFETY, WE RECOMMENDED THAT THESE ITEMS BE SERVICED ONLY BY AN AUTHORIZED HONDA DEALER.

NOTES: 1. SERVICE MORE FREQUENTLY WHEN RIDING IN DUSTY AREAS.

2. SERVICE MORE FREQUENTLY WHEN RIDING IN RAIN OR AT FULL THROTTLE (U.S.A. ONLY).

3. '84 CALIFORNIA MODEL ONLY.

4. FOR HIGHER ODOMETER READINGS, REPEAT AT THE FREQUENCY INTERVAL ESTABLISHED HERE.

MAINTENANCE

AFTER '85

Perform the Pre-ride Inspection at each scheduled maintenance period.

I: INSPECT AND CLEAN, ADJUST, LUBRICATE OR REPLACE IF NECESSARY

C: CLEAN, R: REPLACE, A: ADJUST, L: LUBRICATE

| FREQUENCY | | | WHICHEVER COMES FIRST | ODOMETER READING (NOTE 4) | | | | | | | |
|----------------------------|----|-------------------------------------|-----------------------------|---------------------------|------------------------|-------------------------|--------------------------|--------------------------|--------------------------|--------------------------|------------------|
| | | | | 600 mi (1,000 km) | 4,000 mi (6,400 km) | 8,000 mi (12,800 km) | 12,000 mi (19,200 km) | 16,000 mi (25,600 km) | 20,000 mi (32,000 km) | 24,000 mi (38,400 km) | Refer to page |
| ITEM | | | EVERY | | | | | | | | |
| EMISSION RELATED ITEMS | * | FUEL LINES | | | | I | | I | | I | 3-5 |
| | * | FUEL FILTER | | | | | | | | R | 3-5 |
| | * | THROTTLE OPERATION | | | | I | | I | | I | 3-6 |
| | * | CARBURETOR-CHOKE | | | | I | | I | | I | 3-7 |
| | | AIR CLEANER | NOTE 1 | | | | R | | | R | 3-7 |
| | | CRANKCASE BREATHER | NOTE 2 | | C | C | C | C | C | C | 3-8 |
| | | SPARK PLUGS | | | R | R | R | R | R | R | 3-8 |
| | * | VALVE CLEARANCE | | I | I | I | | I | | I | 3-11 |
| | | ENGINE OIL | | R | | R | | R | | R | 2-3 |
| | | ENGINE OIL FILTER | | R | | R | | R | | R | 2-3 |
| | * | CARBURETOR-SYNCHRONIZATION | | I | | I | | I | | I | 3-14 |
| | * | CARBURETOR-IDLE SPEED | | I | I | I | I | I | I | I | 3-15 |
| | | RADIATOR COOLANT | 2 YEARS *R | | | I | | I | | *R | 3-16 |
| | * | RADIATOR SYSTEM | | | | I | | I | | I | 3-16 |
| | * | EVAPORATIVE EMISSION CONTROL SYSTEM | NOTE 3 | | | I | | I | | I | 3-17 |
| NON-EMISSION RELATED ITEMS | | FINAL DRIVE OIL | | | | I | | I | | R | 2-10 |
| | | BATTERY | MONTH | | I | I | I | I | I | I | 3-18 |
| | | BRAKE FLUID | 2 YEARS *R | | I | I | *R | I | I | *R | 3-18 |
| | | BRAKE PAD WEAR | | | I | I | I | I | I | I | 3-19 |
| | | BRAKE SYSTEM | | I | | I | | I | | I | 3-19 |
| | * | BRAKE LIGHT SWITCH | | | | I | | I | | I | 3-20 |
| | * | HEADLIGHT AIM | | | | I | | I | | I | 3-20 |
| | | CLUTCH FLUID | 2 YEARS *R | | I | I | *R | I | I | *R | 3-20 |
| | | CLUTCH SYSTEM | | | | I | | I | | I | 3-20 |
| | | SIDE STAND | | | | I | | I | | I | 3-21 |
| | * | SUSPENSION | | | | I | | I | | I | 3-21 |
| | ** | NUTS, BOLTS, FASTENERS | | I | | I | | I | | I | 3-23 |
| | ** | WHEELS | | | | I | | I | | I | 3-23 |
| | ** | STEERING HEAD BEARINGS | | I | | I | | I | | I | 3-23 |

* SHOULD BE SERVICED BY AN AUTHORIZED HONDA DEALER, UNLESS THE OWNER HAS PROPER TOOLS AND SERVICE DATA AND IS MECHANICALLY QUALIFIED.

** IN THE INTEREST OF SAFETY, WE RECOMMENDED THESE ITEMS BE SERVICED ONLY BY AN AUTHORIZED HONDA DEALER.

NOTES: 1. SERVICE MORE FREQUENTLY WHEN RIDING IN DUSTY AREAS.

2. SERVICE MORE FREQUENTLY WHEN RIDING IN RAIN, OR AT FULL THROTTLE.

3. CALIFORNIA TYPE ONLY.

4. FOR HIGHER ODOMETER READING, REPEAT AT THE FREQUENCY INTERVAL ESTABLISHED HERE.

FUEL LINES

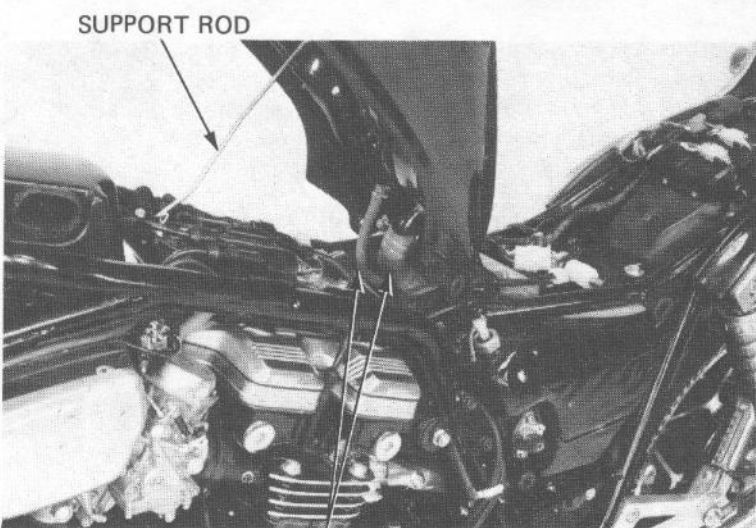
Remove the left and right side covers, and seat. Make sure the fuel tank is less than half-full. Drain it, if it is more than half-full. Remove the tank mounting bolts, lift the fuel tank up and hold it in place with the tank support rod.



TANK MOUNTING BOLT

Check the fuel lines and replace any parts which show deterioration, damage, or leakage.

Disengage the tank support rod by lifting the tank slightly. Let the fuel tank down into place and install the mounting bolts. Be careful not to pinch or kink the vent and fuel lines.



FUEL LINES

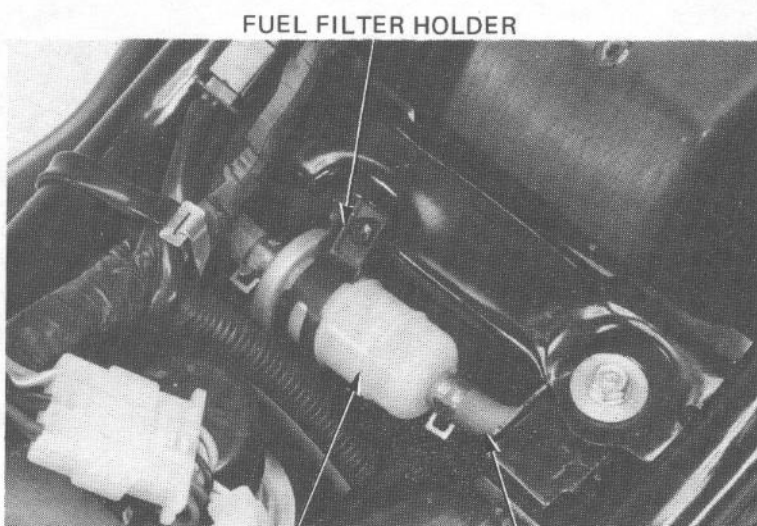
FUEL FILTER

Remove the seat. Remove the fuel filter from the holder. Unclip the fuel lines. Disconnect the fuel lines from the filter. Replace the fuel filter with a new one when indicated by the maintenance schedule. (See page 3-3) Install the fuel filter.

WARNING

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

After installing, check that there are not fuel leaks.



FUEL FILTER

FUEL LINE

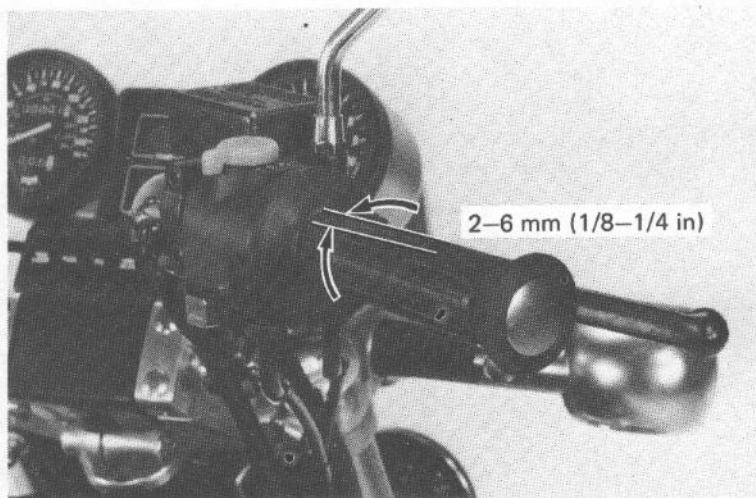
THROTTLE OPERATION

Check for smooth throttle grip full opening and automatic full closing in all steering positions. Check the throttle cables and replace them if they are deteriorated, kinked, or damaged.

Lubricate the throttle cables (page 2-11), if throttle operation is not smooth.

Measure throttle grip free play at the throttle grip flange.

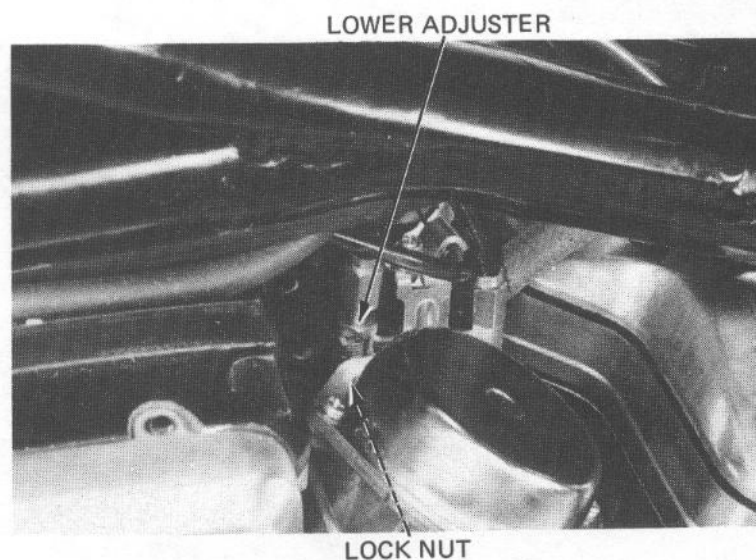
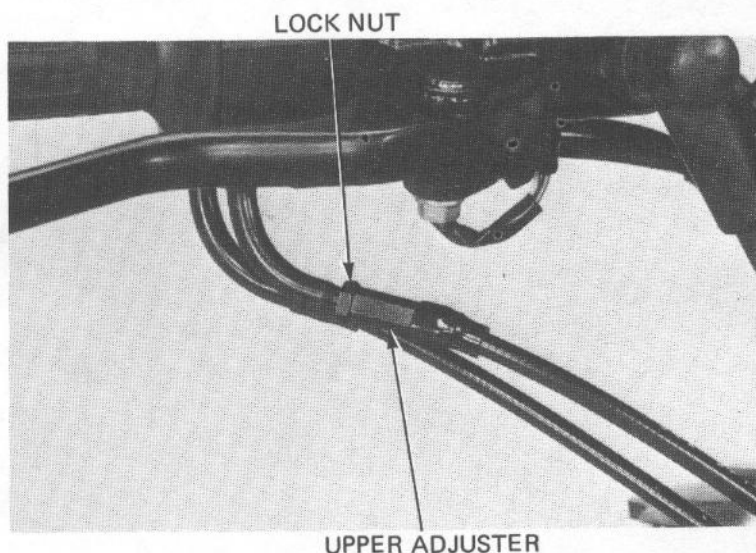
FREE PLAY: 2–6 mm (1/8–1/4 in)



Adjustment can be made at either end of the throttle cable. Minor adjustments are made with the upper adjuster and major adjustments are made with the lower adjuster after lifting the fuel tank up. Adjust by loosening the lock nut and turning the adjuster.

Tighten the lock nut and recheck throttle operation.

Lower fuel tank into place and check throttle free play once more.



CARBURETOR CHOKE

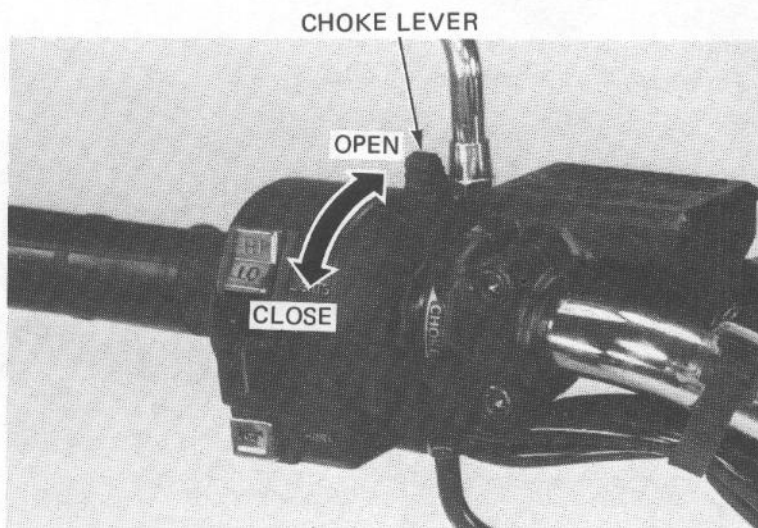
The V65 choke system uses a fuel enriching circuit controlled by a bystarter valve. The bystarter valve opens the enriching circuit via cable when the choke lever on the handlebar is pushed up. Check for smooth upper choke lever operation. Lubricate the choke cable, if the operation is not smooth.

Push the choke lever on the handlebar all the way up to fully open. Make sure the choke valve is open by trying to move the choke lever on the carburetor, after lifting the fuel tank up.

There should be no free play.

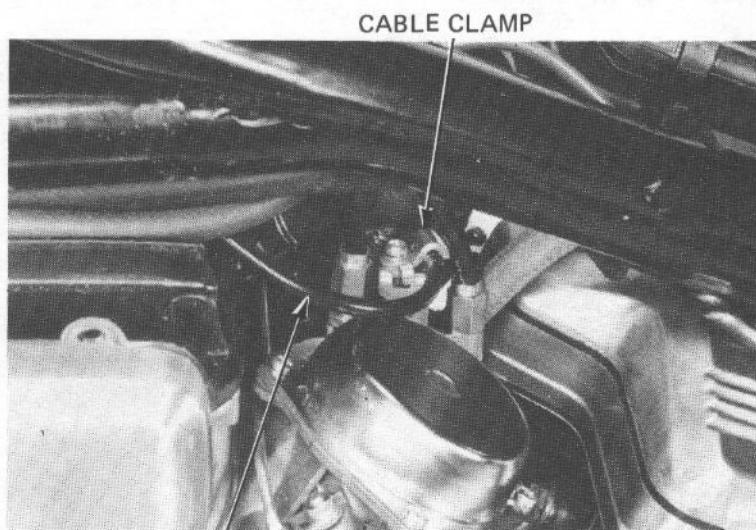
Adjust if necessary, by loosening the choke cable clamp on the carburetor and moving the choke cable casing so the choke lever is fully open.

Tighten the clamp.



Pull the choke lever all the way to fully closed. Make sure the choke valve is fully closed by checking for free play in the cable between the lever on the carburetor and cable casing.

Reinstall the removed parts in the reverse order of disassembly.



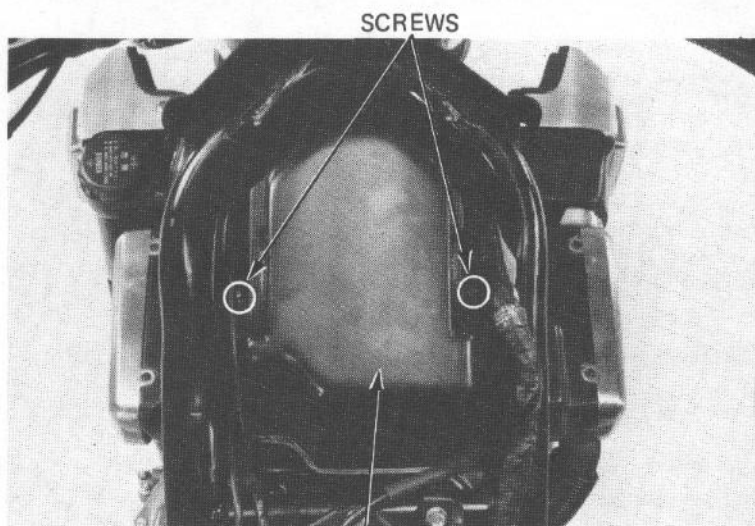
CHOKE CABLE

AIR CLEANER

Make sure the fuel tank is less than half-full. Drain it, if it is more than half-full.

Remove the tank mounting bolts and lift the fuel tank up and hold it in place with the tank support rod.

Remove the air cleaner cover screws.



AIR CLEANER COVER

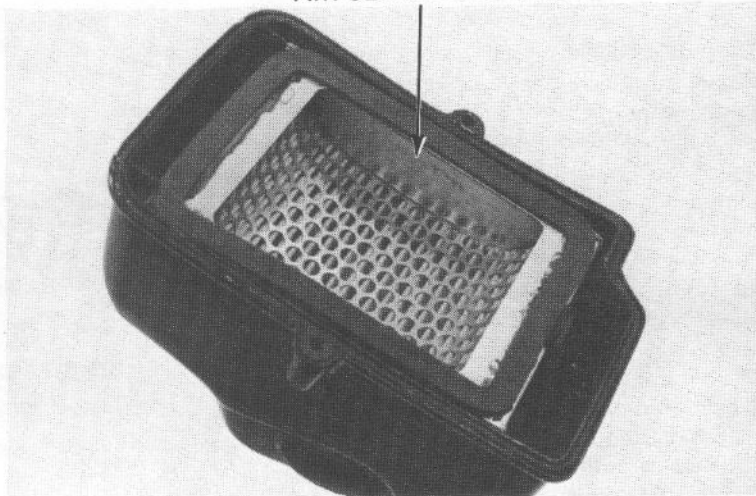
MAINTENANCE

Remove the air cleaner element and discard it in accordance with the maintenance schedule.

Also, replace the element any time it is excessively dirty or damaged.

Install a new element and install the cover.
Disengage the tank support rod by lifting up slightly. Let the fuel tank down into place and install the fuel tank mounting bolts. Be careful not to pinch or kink the vent and fuel lines.

AIR CLEANER ELEMENT



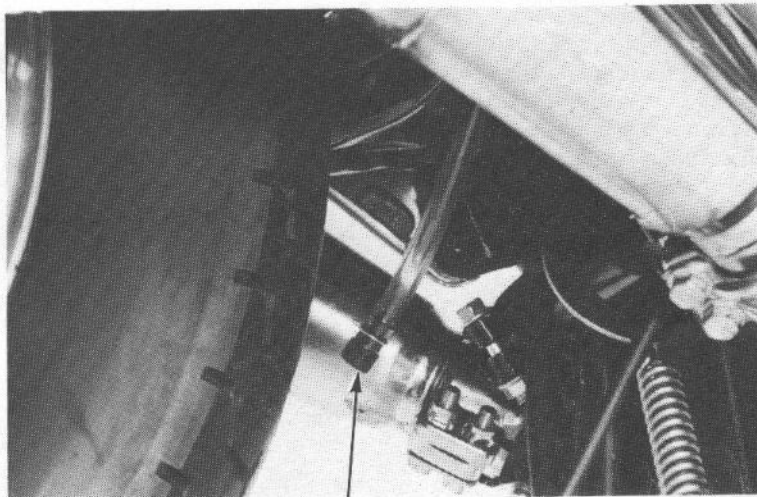
CRANKCASE BREATHER

Remove the plug from the drain tube to empty any deposits.

Install the drain plug.

NOTE:

Service more frequently when riding in rain or at full throttle, or if the deposit level can be seen in the transparent section of the drain tube.



DRAIN PLUG

SPARK PLUGS

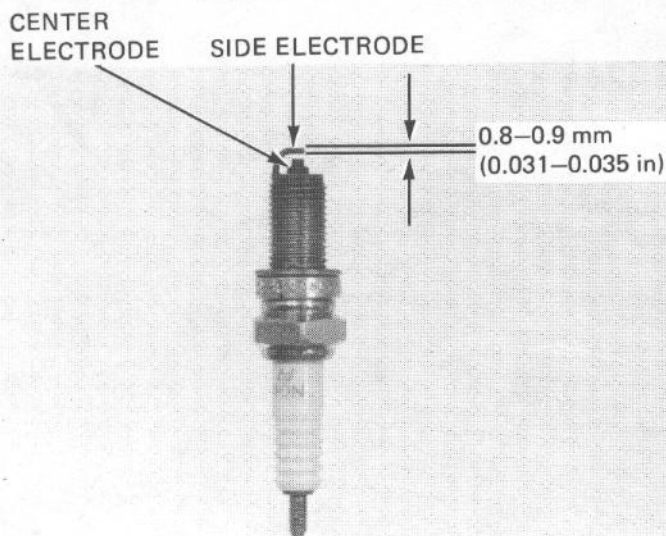
RECOMMENDED SPARK PLUGS

| | NGK | ND |
|---------------------------------------|----------|-----------|
| Standard | DPR8EA-9 | X24EPR-U9 |
| For cold climate (Below 5°C, 41°F) | DPR7EA-9 | X22EPR-U9 |
| For extended high speed riding | DPR9EA-9 | X27EPR-U9 |

Disconnect the spark plug caps.
Clean any dirt from around the spark plug bases.
Remove and discard the spark plugs.
Measure the new spark plug gaps using a wire-type feeler gauge.

SPARK PLUG GAP: 0.8–0.9 mm (0.031–0.035 in)

Adjust by bending the side electrode carefully.
With the plug washer attached, thread each spark plug in by hand to prevent crossthreading.
Tighten the spark plugs another 1/2 turn with a spark plug wrench to compress the plug washer.
Connect the spark plug caps.



IGNITION SYSTEM

NOTE:

The ignition system is transistorized and cannot be adjusted. If the ignition timing is incorrect, check the spark unit and pulse generator and replace any faulty parts (Section 19).

Remove the alternator and left crankcase covers.

Install a flywheel cover (07998-MB00000).

Wipe off the oil from the flywheel.

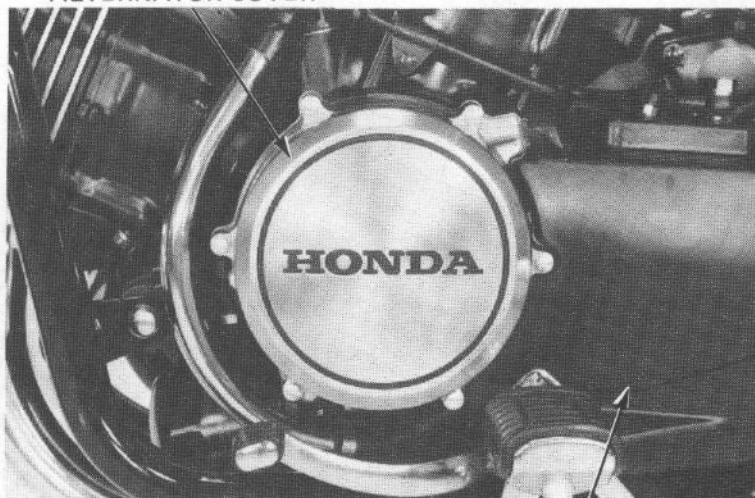
Connect the timing light to the high tension wire of the No. 1 cylinder.

Start the engine and let it idle.

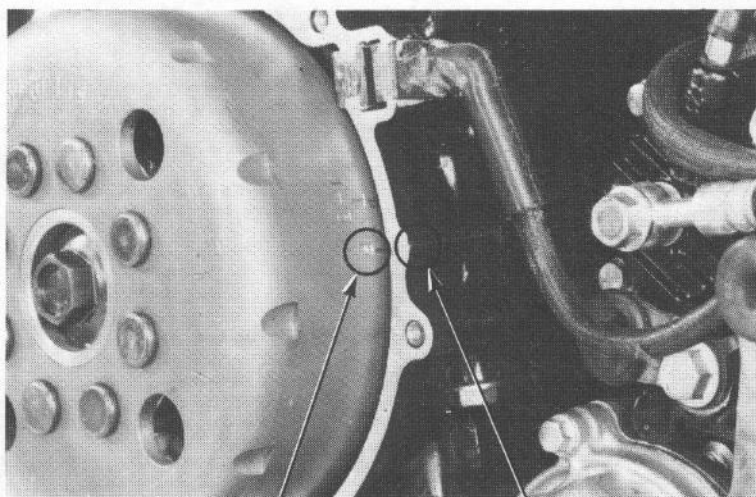
IDLE SPEED: 1,000 ± 100 rpm

The timing is correct if the "F" mark on the flywheel aligns with the crankcase rear mating surface.

ALTERNATOR COVER



LEFT CRANKCASE COVER



"F" MARK

REAR CRANKCASE
MATING SURFACE

VALVE CLEARANCE

'83, '84, '85:

NOTE:

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

Remove the heat guard, radiator cap, and drain bolt. Drain coolant from engine and frame (page 6-3).

NOTE:

Drain the coolant into a clean container for reuse. Scheduled coolant replacement is every 2 years or 24,000 miles (38,600 km).

Remove the right and left frame side covers and remove the seat.

Lift up the fuel tank by removing the front mounting bolts. Be sure the tank is less than half-full.

If not, drain the tank.

Remove the spark plug caps and the spark plugs.



SIDE COVER

MAINTENANCE

Remove the ignition coils with their bracket and remove the insulator cover.

Remove the radiator (See page 6-6).

Remove the front and rear cylinder head cover bolts and both cylinder head covers.

Remove the alternator cover.

INSPECTION

Measure and adjust the intake and exhaust valve clearances as described below.

Rotate the crankshaft clockwise to align the T1-3 mark with the crankcase mating surfaces.

Make sure the No. 1 piston is at TDC (Top Dead Center) on the compression stroke.

Insert the camshaft holder as shown and tighten it.

Check the valve clearance for the No. 1 cylinder using two feeler gauges for each pair of valves.

VALVE CLEARANCE (IN, EX):
0.15 mm (0.006 in)

If adjustment is necessary, loosen the lock nuts and turn the adjusting screws until there is a slight drag on both feeler gauges. Both feeler gauges should remain inserted during adjustment.

Hold the adjusting screws and tighten the lock nuts.

TORQUE: 21-25 N·m (2.1-2.5 kg-m, 15-18 ft-lb)

CAUTION:

The lock nuts will come loose if not tightened to the correct torque value.

Recheck the valve clearance.

Rotate the crankshaft 270° clockwise to align the T2-4 mark with the crankcase mating surfaces and check the valve clearances for No. 2 cylinder using No. 1 cylinder procedure.

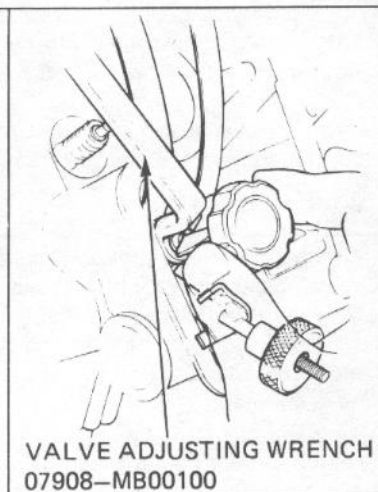
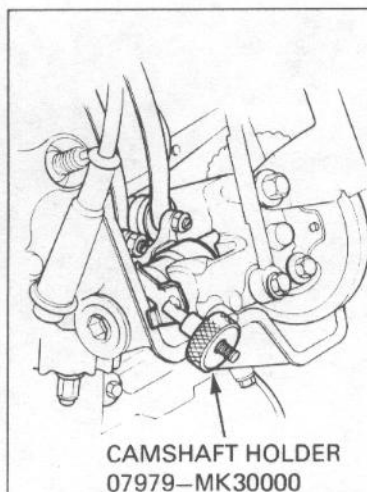
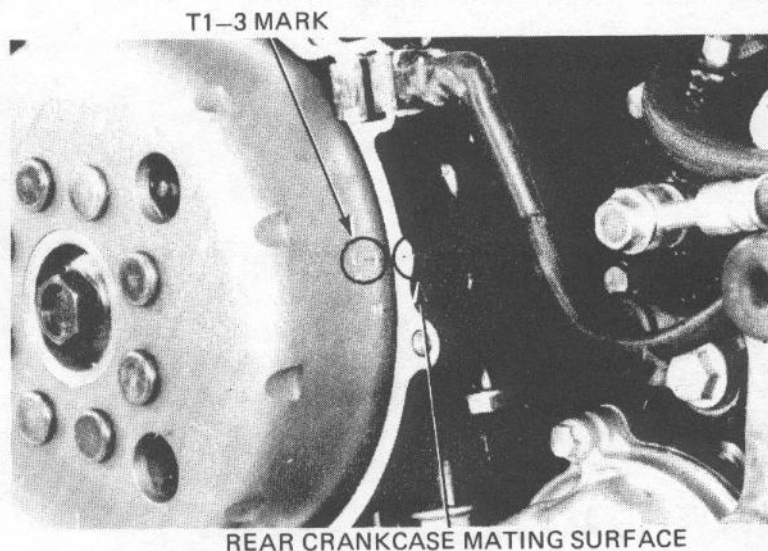
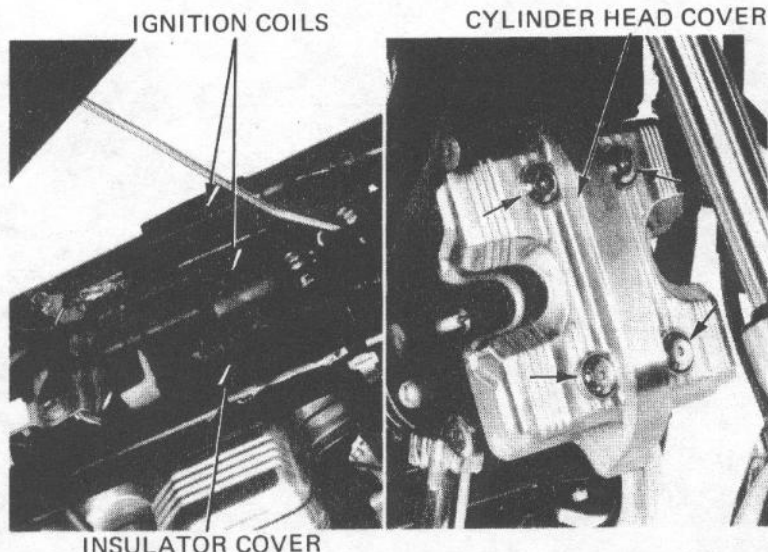
Adjust if necessary using the procedure for No. 1 cylinder.

Rotate the crankshaft 90° clockwise to align the T1-3 mark with the crankcase mating surface and check the valve clearance for No. 3 cylinder.

Adjust using the procedures for No. 1 cylinder.

Rotate the crankshaft 270° clockwise to align the T2-4 mark with the crankcase mating surface and check the valve clearance for No. 4 cylinder.

Adjust if necessary using the procedure for No. 1 cylinder.

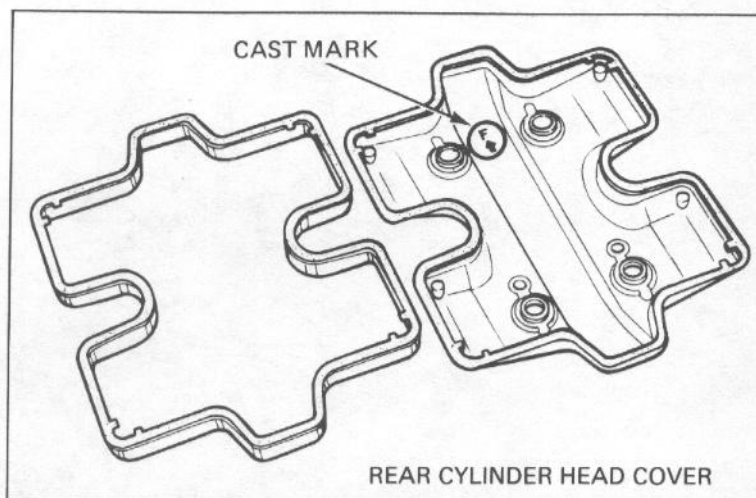


Install the removed parts, except the radiator cap, in the reverse order of disassembly.

Be sure the cast mark inside the rear cylinder head cover faces the front and the tabs of the front cylinder head cover face the rear.

Check the engine oil level.

Fill and bleed the cooling system (page 6-3).



AFTER '85:

NOTE:

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

NOTE:

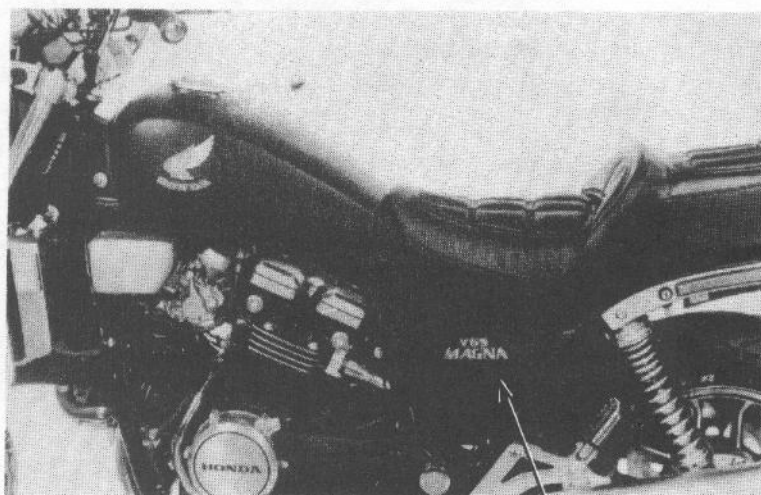
Drain the coolant into a clean container for reuse. Scheduled coolant replacement is every 2 years or 24,000 miles (38,600 km).

Remove the right and left frame side covers and remove the seat.

Lift up the fuel tank by removing the front mounting bolts. Be sure the tank is less than half-full.

If not, drain the tank.

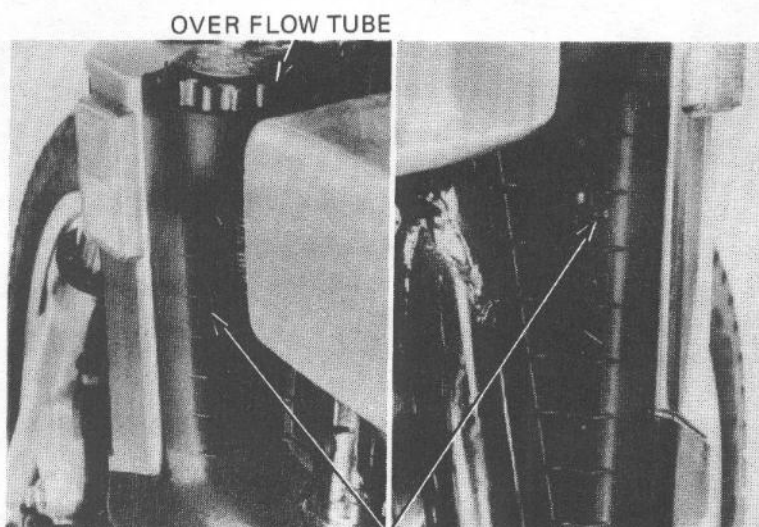
Remove the spark plug caps and the spark plugs.



SIDE COVER

Remove the right and left radiator side covers.

Disconnect the over flow tube at the radiator filler neck.

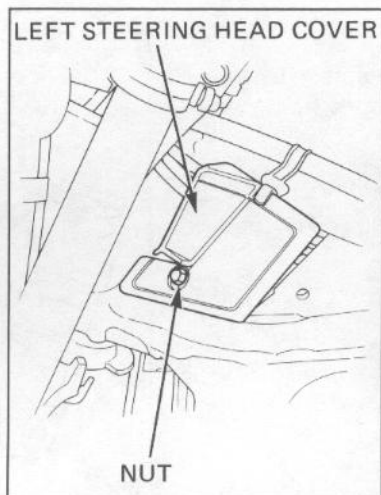


SCREWS

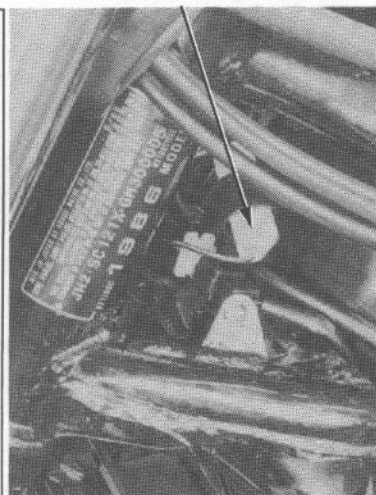
MAINTENANCE

Remove the left steering head cover attaching nut and cover.

Disconnect the fan motor coupler.



FAN MOTOR COUPLER

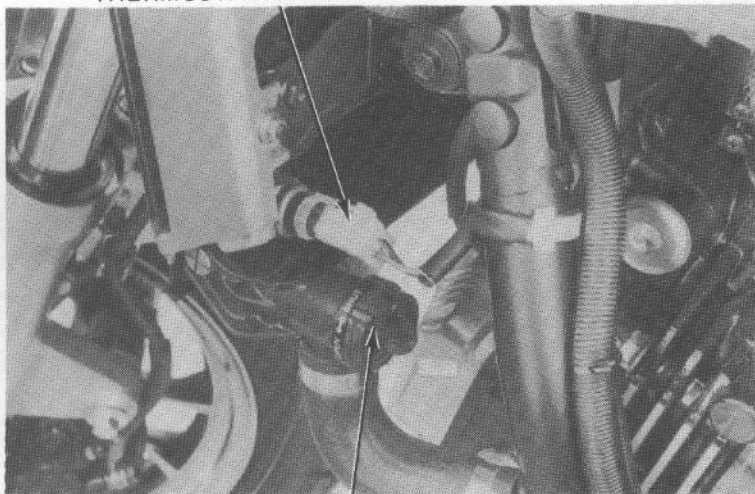


Disconnect the thermostatic switch wire from the switch and turn the radiator valve to "SHUT".

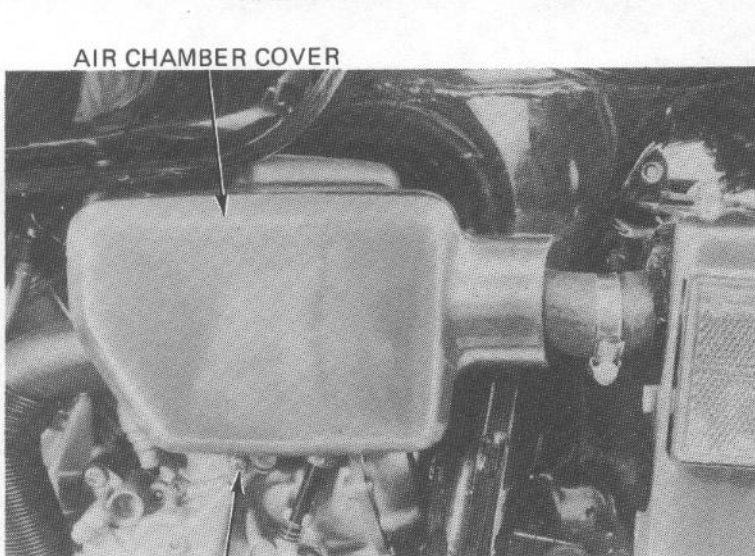
Loosen the coolant drain plug on the sub frame (page 6-3) once to release coolant pressure, then retighten the drain plug.

Loosen the lower radiator hose band and disconnect the lower radiator hose from the subframe.

THERMOSTATIC SWITCH WIRE



RADIATOR VALVE



AIR CHAMBER COVER

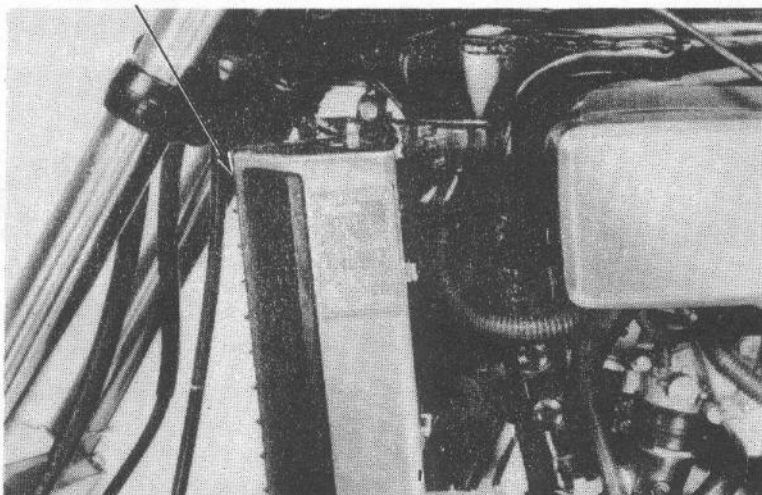
SCREW

Remove the air chamber cover screw and right air chamber cover.

Remove the radiator mounting bolts.

Slide the radiator to the right and suspend it from the handlebar with a piece of wire.

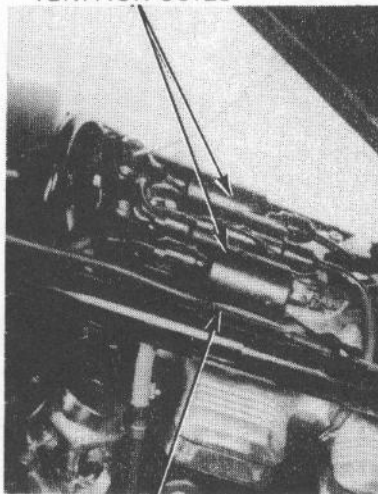
RADIATOR



Remove the ignition coils with their bracket and remove the insulator cover.

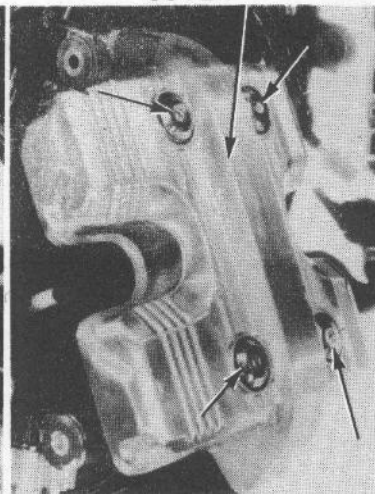
Remove the front and rear cylinder head cover bolts and both cylinder head covers.

IGNITION COILS



INSULATOR COVER

CYLINDER HEAD COVER



INSPECTION

Remove the alternator cover.

Turn the flywheel clockwise until the "T1-3" mark aligns with the crankcase mating surfaces in compression stroke.

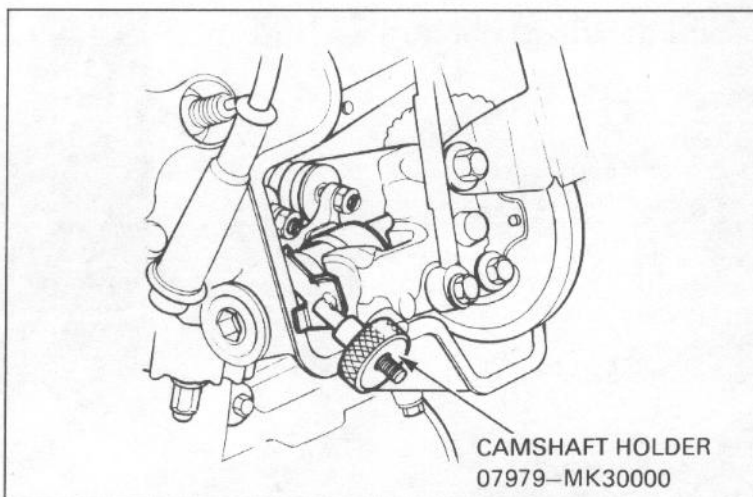
Make sure that the No. 1 piston is at TDC (Top Dead Center) on the compression stroke.

Insert the camshaft holder as shown and tighten it.

Check the valve clearance for the No. 1 cylinder using two feeler gauges for each pair of valves.

VALVE CLEARANCE (IN, EX):
0.15 mm (0.006 in)

If adjustment is necessary, loosen the lock nuts and turn the adjusting screws until there is a slight drag on both feeler gauges. Both feeler gauges should remain inserted during adjustment.



MAINTENANCE

Hold the adjusting screws and tighten the lock nuts.

TORQUE: 21–25 N·m (2.1–2.5 kg-m, 15–18 ft-lb)

CAUTION:

The lock nuts will come loose if not tightened to the correct torque value.

Recheck the valve clearance.

Rotate the crankshaft 270° clockwise to align the T2–4 mark with the crankcase mating surfaces and check the valve clearances for No. 2 cylinder using No. 1 cylinder procedure.

Adjust if necessary using the procedure for No. 1 cylinder.

Rotate the crankshaft 90° clockwise to align the T1–3 mark with the crankcase mating surface and check the valve clearance for No. 3 cylinder.

Adjust using the procedures for No. 1 cylinder.

Rotate the crankshaft 270° clockwise to align the T2–4 mark with the crankcase mating surface and check the valve clearance for No. 4 cylinder.

Adjust if necessary using the procedure for No. 1 cylinder.

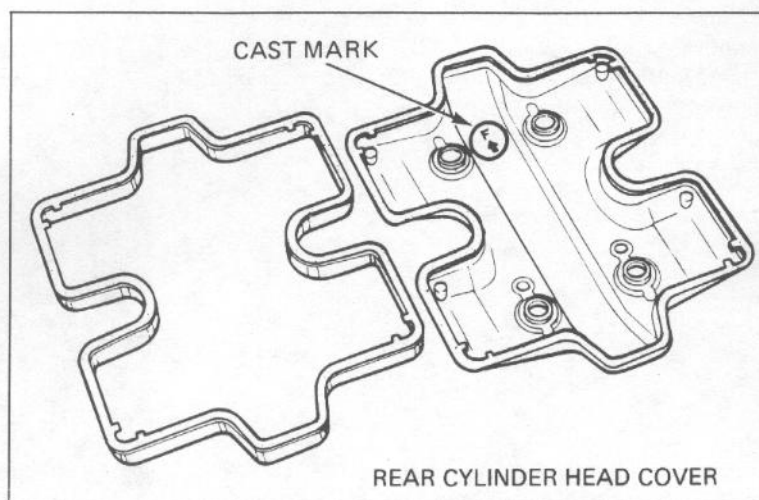
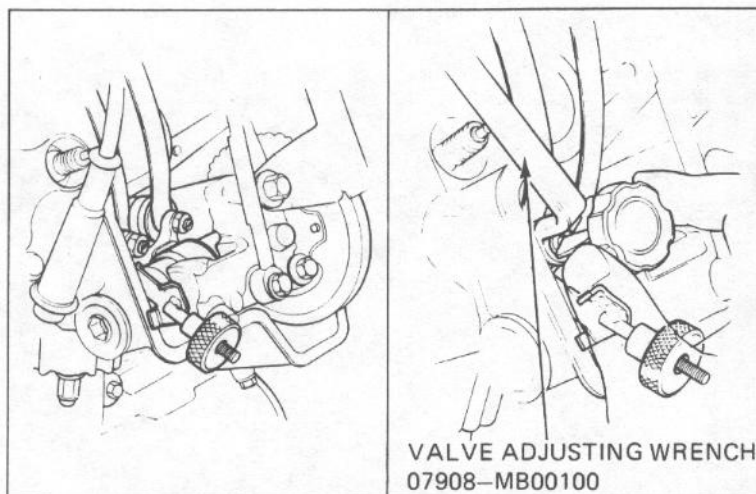
Install the removed parts, except the radiator cap, in the reverse order of disassembly.

Be sure the cast mark inside the rear cylinder head cover faces the front and the tabs of the front cylinder head cover face the rear.

Check the engine oil level.

Turn the radiator valve to "OPEN" (see page 3-12). Fill and bleed the cooling system (page 6-3).

Install the radiator cap.



NO. 1 CYLINDER
HEAD PORT PLUG

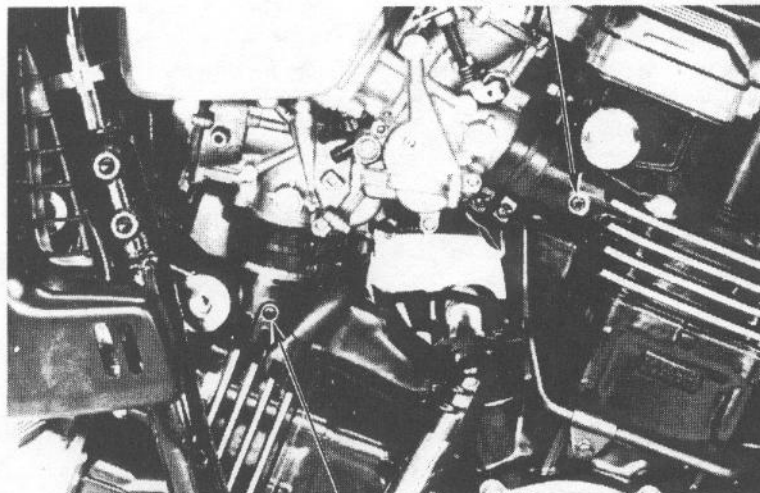
CARBURETOR SYNCHRONIZATION

NOTE

Synchronize the carburetors with the engine at normal operating temperature, transmission in neutral, and motorcycle on the center stand.

Remove the plugs from the No. 1, 2, 3 and 4 cylinder head ports and install the vacuum gauge adapters.

Connect the vacuum gauges.



NO. 2 CYLINDER HEAD PORT PLUG

ADJUSTMENT

NOTE

The No. 1 carburetor cannot be adjusted; It is the base carburetor.

Start the engine and adjust the idle speed.

IDLE SPEED: $1,000 \pm 100$ rpm

Install the vacuum gauge adapter and connect the vacuum gauge.

Check that all carburetors are within 60 mm (2.4 in) Hg.

VACUUM GAUGE 07404-0030000
or M937B-021-XXXXX (USA only)



ADAPTERS

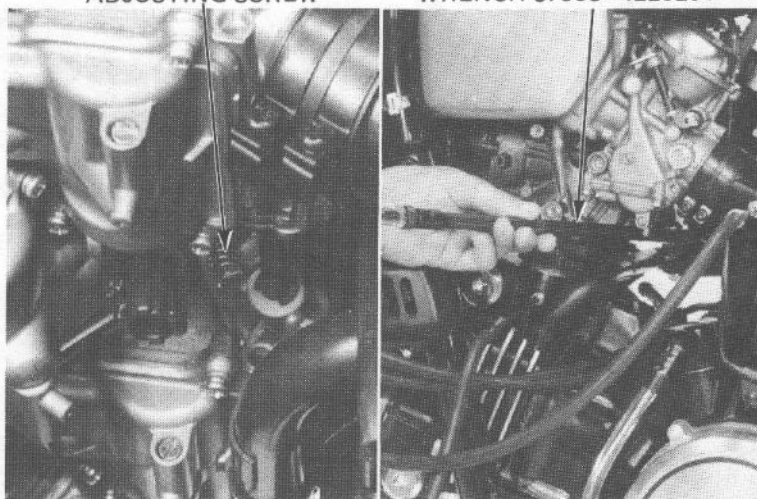
CARBURETOR PILOT SCREW
WRENCH 07908-4220201

ADJUSTING SCREW

Synchronize to specification by turning the adjusting screws with the special tool.

Recheck the idle speed and synchronization.

Remove the gauge adapters and install the plugs.



CARBURETOR IDLE SPEED

NOTE

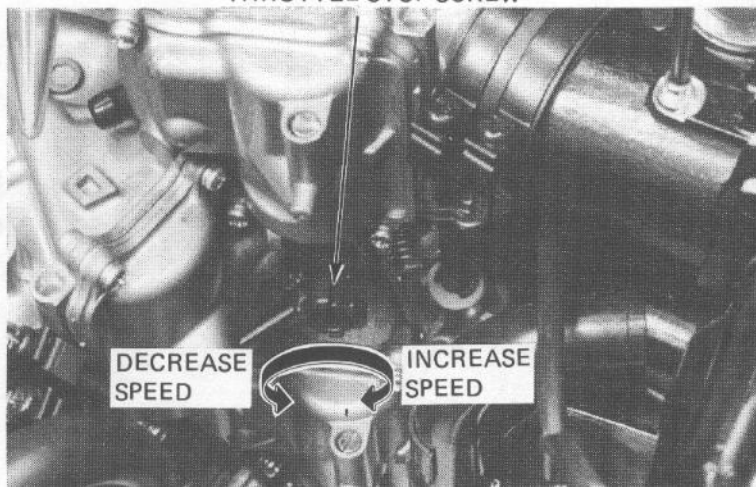
- Inspect and adjust idle speed after all other engine adjustments are within specifications.
- The engine must be warm for accurate adjustment. Ten minutes of stop-and-go riding is sufficient.

Warm up the engine, shift to NEUTRAL, and place the motorcycle on its center stand.

Turn the throttle stop screw as required to obtain the specified idle speed.

IDLE SPEED: $1,000 \pm 100$ rpm

THROTTLE STOP SCREW



MAINTENANCE

RADIATOR COOLANT

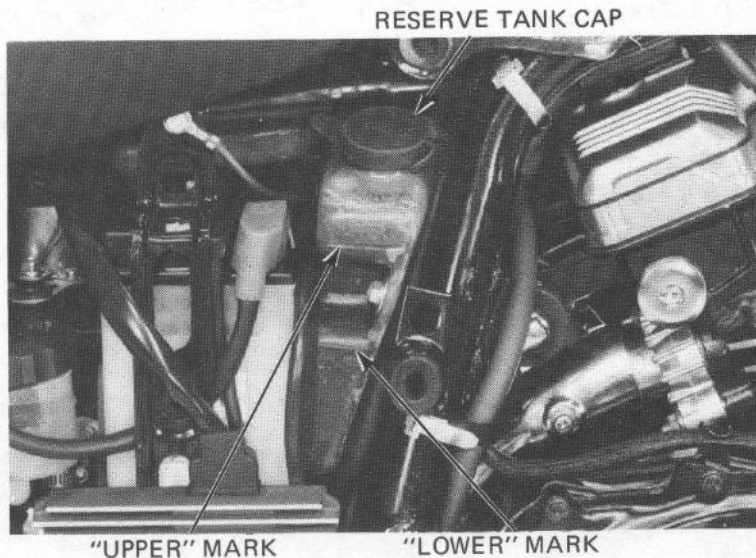
Remove the frame right side cover.

Check the coolant level of the reserve tank with the engine running at normal operating temperature.

The level should be between the "UPPER" and "LOWER" level lines.

If necessary, remove the reserve tank cap and fill to the "UPPER" level line with a 50/50 mixture of distilled water and anti-freeze.

Reinstall the cap and frame side cover.



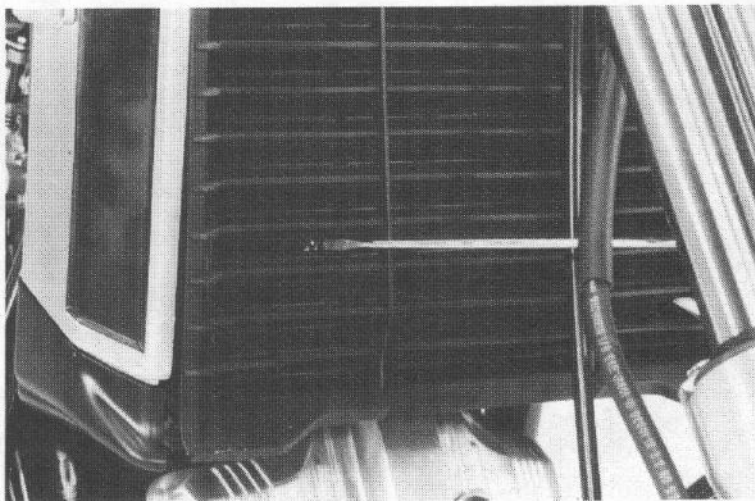
RADIATOR CORE

Check the air passages for clogging or damage.

Straighten bent fins and collapsed core tubes.

Remove insects, mud, or any obstruction with compressed air or low water pressure.

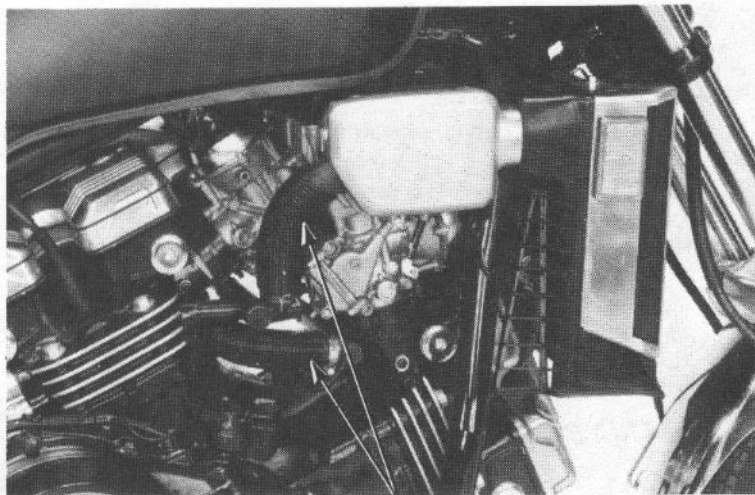
Replace the radiator if the air flow is restricted over more than 20% of the radiating surface.



COOLING SYSTEM HOSES

Inspect the hoses for cracks or deterioration, and replace if necessary.

Check the tightness of all hose clamps.



CYLINDER COMPRESSION

Warm up the engine.

Stop the engine, then disconnect the spark plug caps and remove the spark plugs.

Insert the compression gauge.

Open the throttle all the way and crank the engine with the starter motor.

NOTE:

Crank the engine until the gauge reading stops rising. The maximum reading is usually reached within 4-7 seconds.

COMPRESSION PRESSURE:

$13 \pm 2 \text{ kg/cm}^2$ ($184 \pm 28 \text{ psi}$)

If compression is low, check for the following:

- Improper valve clearance
- Leaky valves
- Leaking cylinder head gasket
- Worn piston/ring/cylinder

If compression is high, it indicates that carbon deposits have accumulated on the combustion chamber and/or the piston crown.

EVAPORATIVE EMISSION CONTROL SYSTEM (California model only)

Check the system hoses for damage, deterioration, clogging, or loose connections.

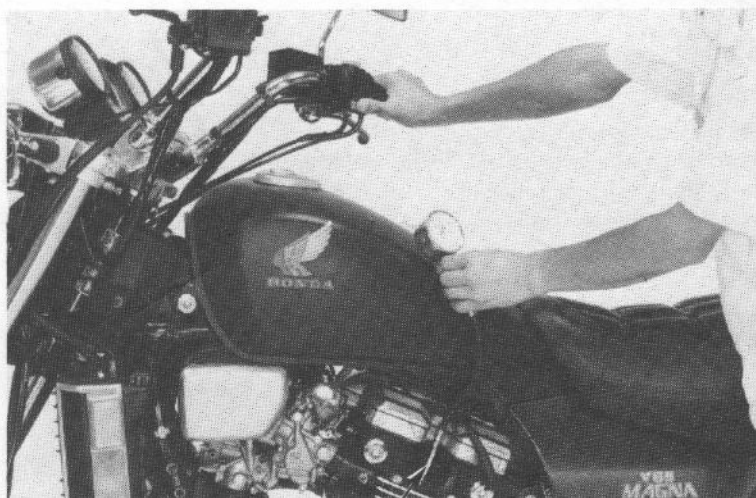
Check the charcoal canister for cracks or damage.

Refer to the vacuum hose routing diagram label for the hose connections.

CARBURETOR PIPING

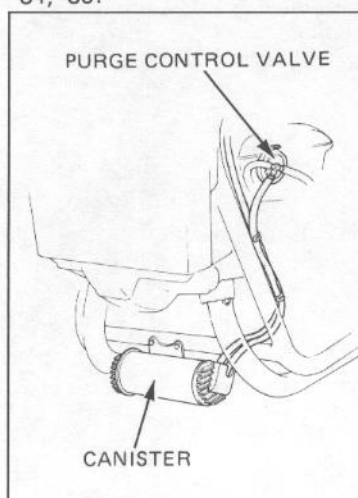
NOTE:

- Be careful not to bend, twist, or kink the tubes when installing.
- Slide the end of each tube onto its fitting fully and secure with hose clamps. Secure with the hose clamps whenever specified.
- Check that the hoses do not contact sharp edges or corners.

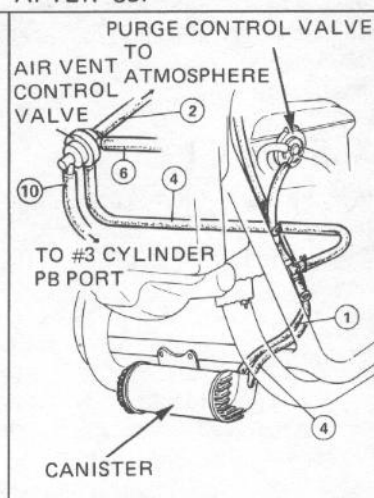


COMPRESSION GAUGE ATTACHMENT 07510-MB00101
COMMERCIALLY AVAILABLE IN U.S.A.

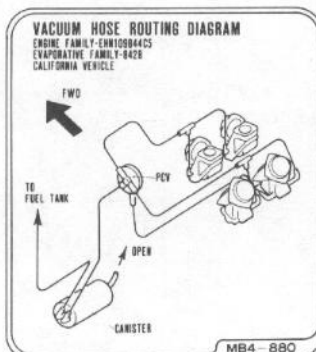
'84, '85:



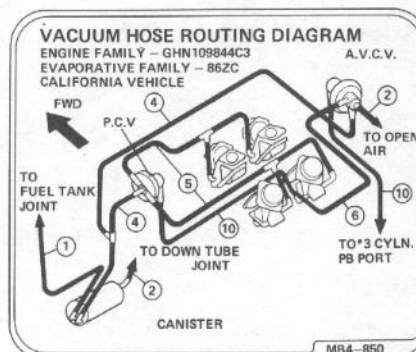
AFTER '85:



'84, '85:



AFTER '85:



<CHASSIS>

BATTERY

Remove the right frame side cover and inspect the battery fluid level.

When the fluid level nears the lower level, remove the battery and add distilled water to the upper level line as follows:

Remove the battery holder bolt and pull out the battery. Disconnect the negative cable at the battery terminal, then disconnect the positive cable.

Remove the filler caps and add distilled water to the upper level line. Reinstall the battery.

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. If electrolyte gets in your eyes, flush them thoroughly with water and get prompt medical attention.

BRAKE FLUID

Check the brake fluid reservoir level.

If the level nears the lower level mark, fill the reservoir with DOT-4 BRAKE FLUID to the upper level mark.

Check the entire system for leaks.

CAUTION:

- 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.
- Do not mix different types of fluid, as they are not compatible.

Refer to section 17 for brake bleeding procedures.

FRONT BRAKE LEVER

After '84:

Measure the distance the front brake lever moves before the brake starts to take hold.

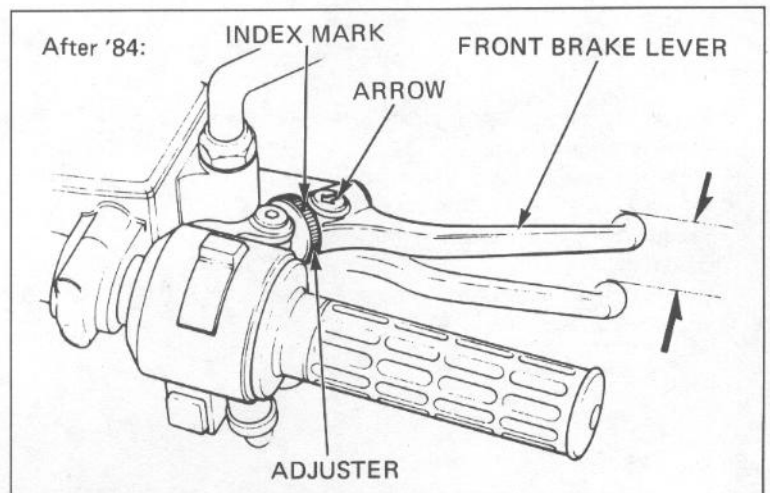
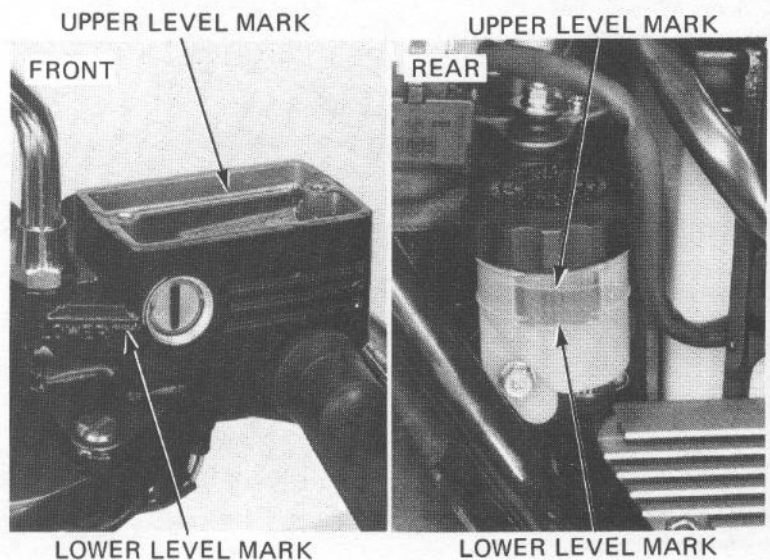
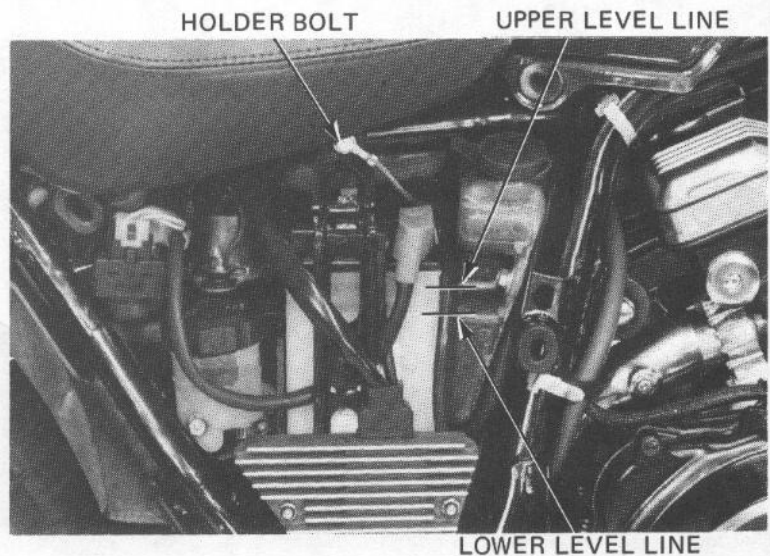
The lever free play should be 20–30 mm (3/4–1-1/4 in.) at the tip of the brake lever.

If adjustment is necessary, turn the adjuster.

CAUTION:

Align the arrow on the brake lever with the index mark on the adjuster.

Apply the brake lever several times and rotate the front wheel to check for excessive drag.



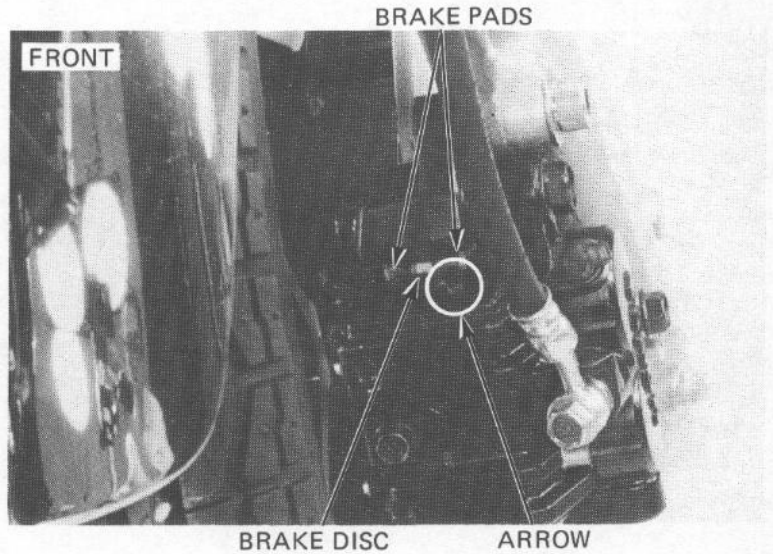
BRAKE PAD WEAR

Check the brake pads for wear by looking through the slot indicated by the arrow cast on the caliper assembly.

Replace the brake pads if the wear line on the pads reaches the edge of the brake disc (page 17-5).

CAUTION:

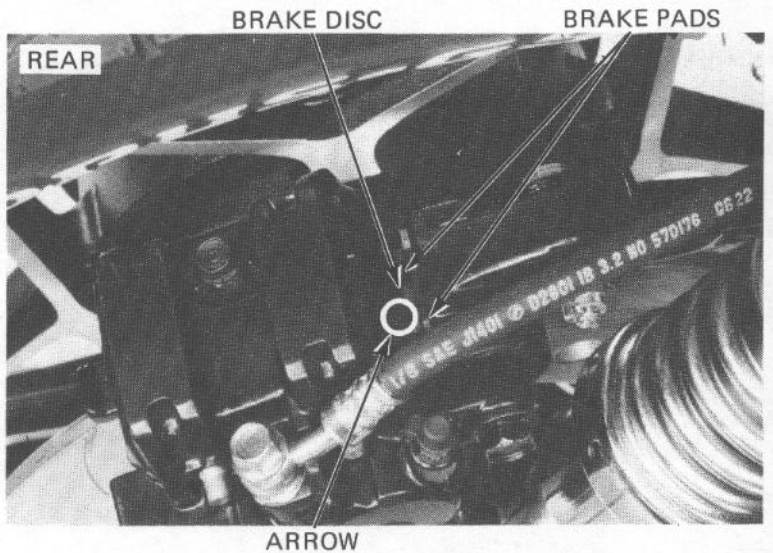
Always replace the brake pads in pairs to assure even disc pressure.



BRAKE SYSTEM

Inspect the brake hoses and fittings for deterioration, cracks and signs of leakage. Tighten any loose fittings.

Replace hoses and fittings as required.



BRAKE PEDAL HEIGHT

Adjust brake pedal height so the pedal is 30 mm (1-1/4 in) above the top of the footpeg.

CAUTION:

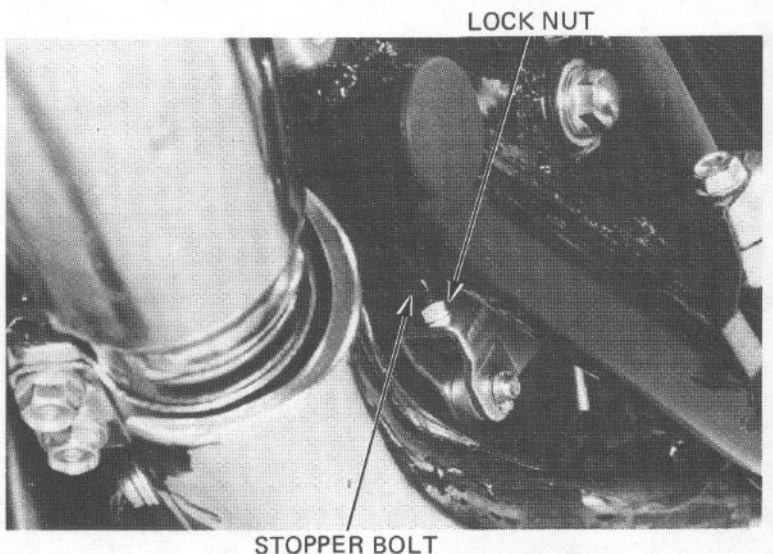
Incorrect brake pedal height can cause brake drag.

To Adjust:

Loosen the stopper bolt lock nut and turn the stopper bolt.
Retighten the lock nut.

NOTE:

After adjusting the brake pedal height, check the rear brake light switch and brake pedal free play and adjust if necessary.



BRAKE LIGHT SWITCH

NOTE:

Perform brake light switch adjustment after adjusting the brake pedal play and height.

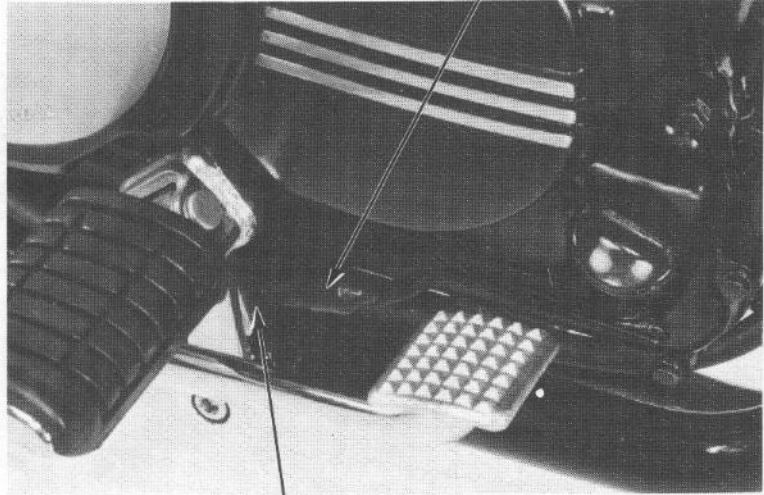
Adjust the brake light switch so that the brake light will come on when the brake engagement begins.

Adjust by holding the switch body and turning the adjusting nut. Do not turn the switch body.

NOTE:

The front brake light switch does not require adjustment.

BRAKE LIGHT SWITCH



ADJUSTING NUT

HEADLIGHT AIM

Adjust horizontally by loosening both headlight bracket mounting bolts.

Adjust vertically by loosening both headlight case mounting bolts.

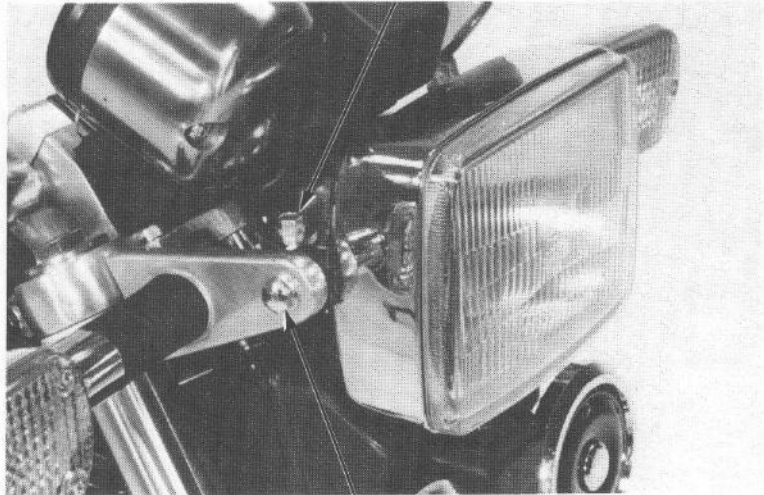
NOTE:

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

WARNING

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

CASE MOUNTING BOLT



BRACKET MOUNTING BOLT

UPPER LEVEL MARK



LOWER LEVEL MARK

After '84:



CLUTCH

Check the clutch fluid reservoir level.

If the level nears the lower level mark, fill the reservoir with DOT-4 BRAKE FLUID to the upper level mark.

Check the entire system for leaks.

CAUTION:

- Do not remove the cover until the handlebar has been turned so that the reservoir is level.
- Avoid operating the clutch lever with the cap removed. Fluid will squirt out if the lever is pulled.
- Do not mix different types of fluid, as they are not compatible.

CLUTCH LEVER

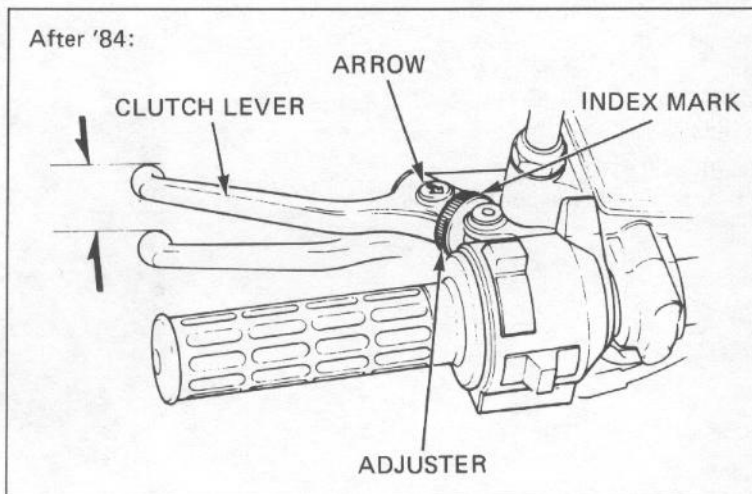
After '84:

Measure the distance the clutch lever moves before the clutch starts to disengage.

Lever free play should be 20–30 mm (3/4–1-1/4 in.) at tip of the lever. If adjustment is necessary, turn the adjuster.

CAUTION:

Align the index mark on the adjuster with the arrow on the lever.

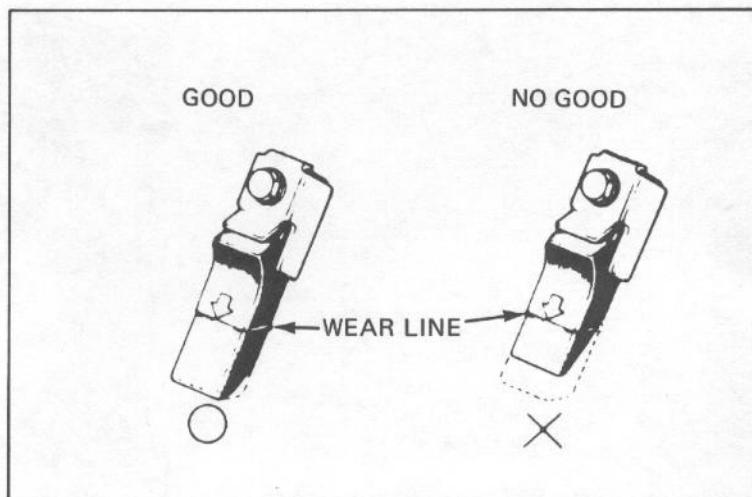


SIDE STAND

Check the rubber pad for deterioration or wear. Replace if any wear extends to wear line as shown. Check the side stand spring for damage and loss of tension, and the side stand assembly for freedom of movement. Make sure the side stand is not bent.

NOTE:

- When replacing, use a rubber pad with the mark "Over 260 lbs ONLY".
- Spring tension is correct if the measurements fall within 2–3 kg (4.4–6.6 lb), when pulling the side stand lower end with a spring scale.



SUSPENSION

WARNING

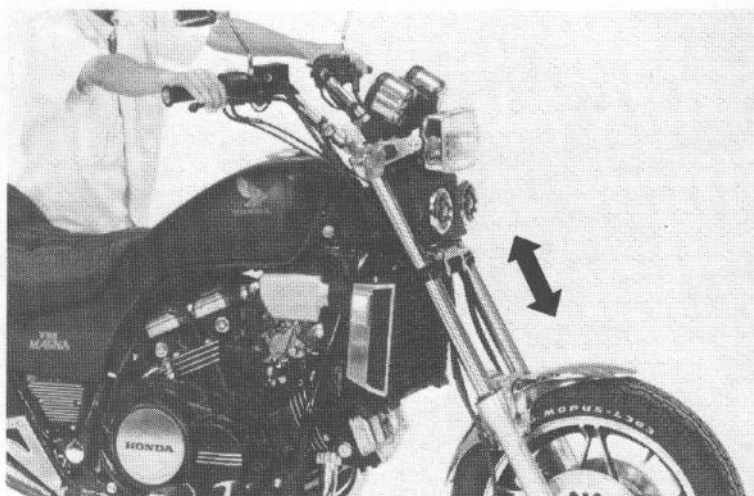
Do not ride a vehicle with faulty suspension. Loose, worn, or damaged suspension parts impair vehicle stability and control.

FRONT

Check the action of the front forks by compressing them several times.

Check the entire fork assembly for leaks or damage. Replace damaged components which cannot be repaired.

Tighten all nuts and bolts.



MAINTENANCE

Check the front fork air pressure when the forks are cold.

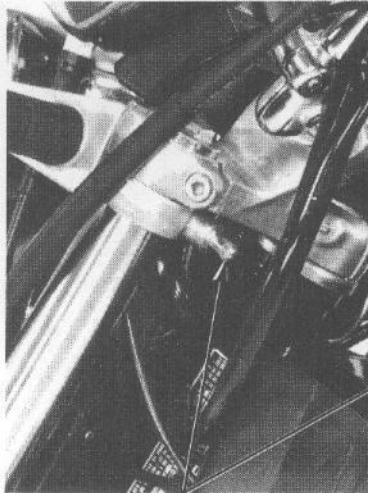
Place the vehicle on its center stand.

Remove the air valve cap and measure the air pressure.

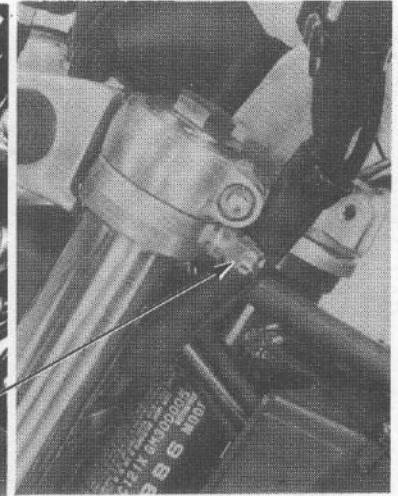
AIR PRESSURE:

0–6 psi (0–40 kPa, 0–0.4 kg/cm²)

'83, '84, '85:



AFTER '85:



AIR VALVE CAP

ANTI-DIVE SYSTEM INSPECTION

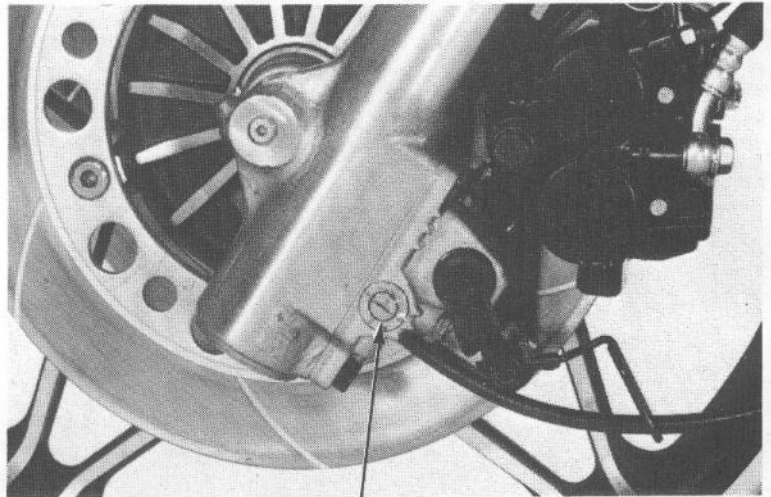
WARNING

Select a safe place away from traffic to perform this inspection.

Check the operation of the anti-dive system by riding the motorcycle and firmly applying the brakes.

| Position | Anti-dive damper force |
|----------|------------------------|
| I | LIGHT ANTI-DIVE |
| II | MEDIUM |
| III | HARD |
| IV | MAXIMUM ANTI-DIVE |

Inspect and, if necessary, repair the system (Refer to section 15).



ADJUSTER

REAR

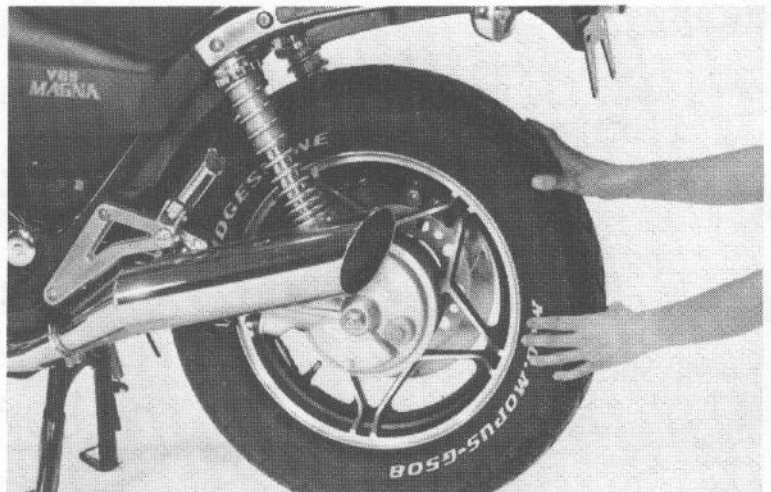
Place the motorcycle on its center stand.

Move the rear wheel sideways with force to see if the swingarm bearings are worn.

Replace the bearings if there is any looseness (page 16-15).

Check the shock absorbers for leaks or damage.

Tighten all rear suspension nuts and bolts.



WHEELS

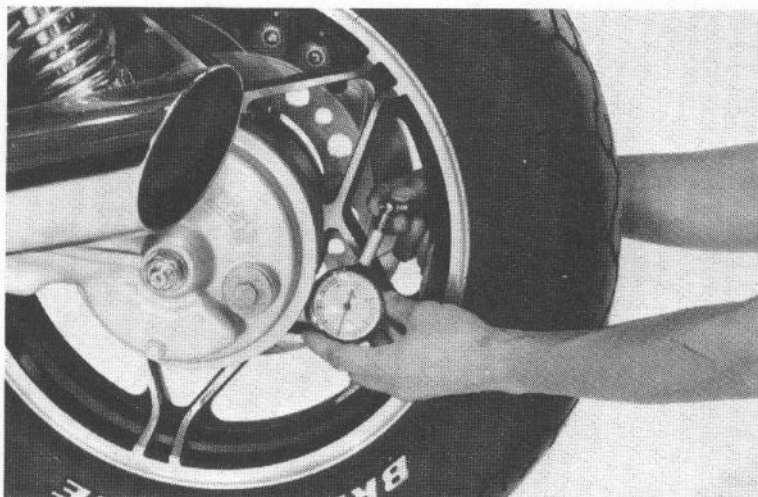
NOTE:

Tire pressure should be checked when tires are **COLD**.

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

RECOMMENDED TIRES AND PRESSURES:

| | | Front | Rear |
|---|---|----------------|----------------|
| Tire size | | M110/90-18 | M140/90-16 |
| Cold tire pressure psi (kPa, kg/cm ²) | Up to 90 kg (200 lbs) load | 32 (225, 2.25) | 32 (225, 2.25) |
| | 90 kg (200 lbs) load to vehicle capacity load | 32 (225, 2.25) | 40 (280, 2.8) |
| Tire brand | BRIDGE-STONE | L303 | G508 |
| | DUNLOP | F11 | K627 |



Check the front and rear wheels for trueness (Sections 15 and 16).

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 BEARINGS

NOTE:

Check that the control cables do not interfere with handlebar rotation.

Raise the front wheel off the ground and check that the handlebar rotates freely.

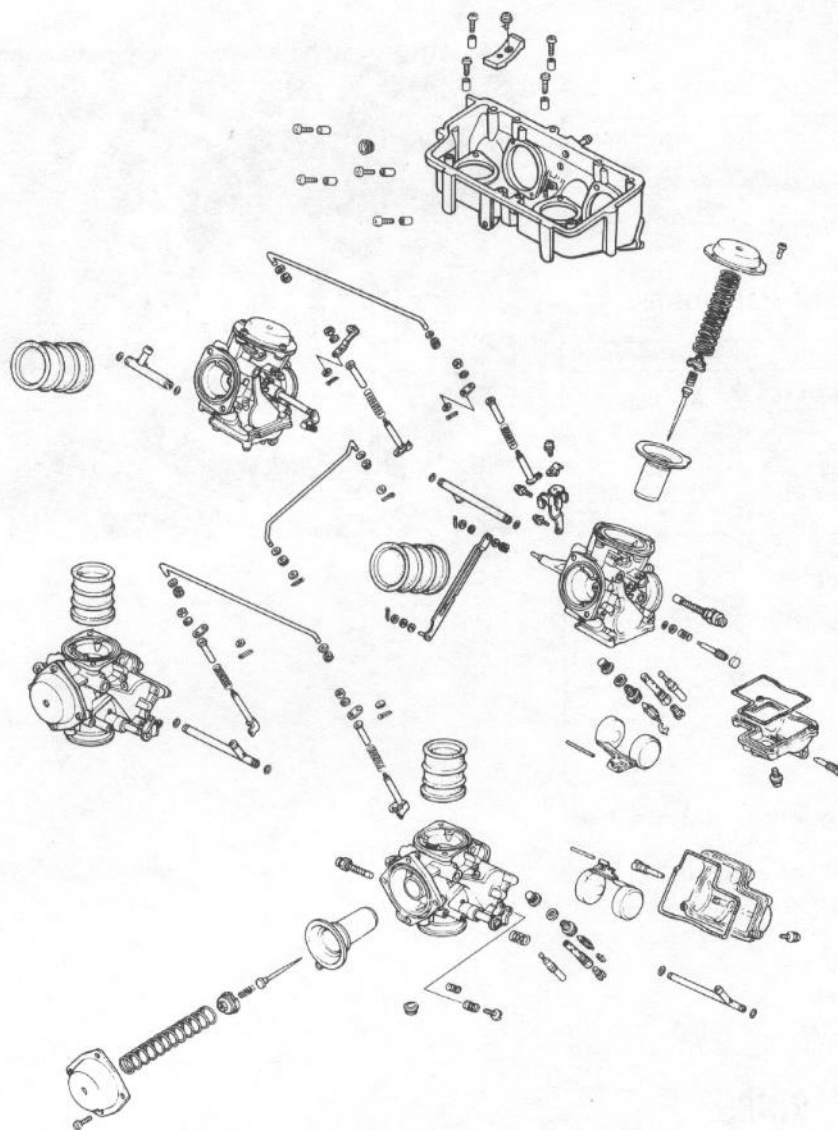
If the handlebar moves unevenly, binds, or has vertical movement, adjust the steering head bearing by turning the steering head adjusting nut (page 15-4).

NUTS, BOLTS, FASTENERS

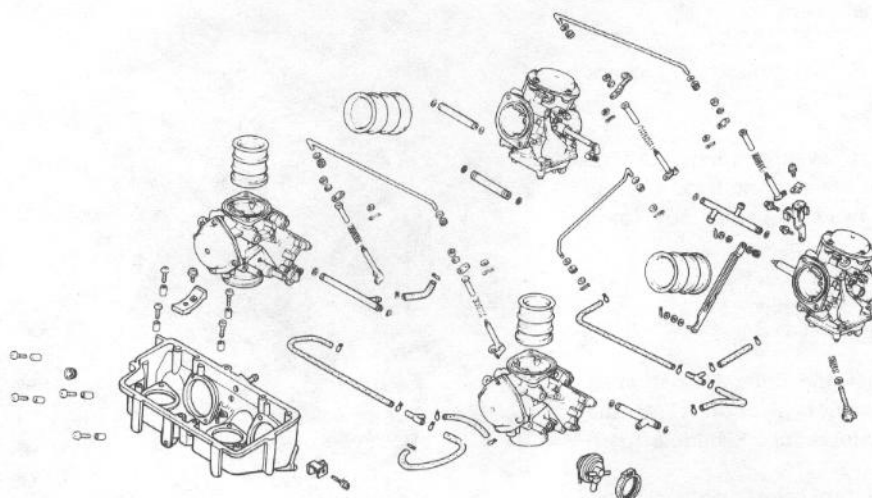
Check that all chassis nuts and bolts are tightened to their correct torque values (Section 1) at the intervals shown in the Maintenance Schedule (page 3-3).

Check all cotter pins, safety clips, hose clamps, and cable stays.





California model only



4. FUEL SYSTEM

| | | | |
|-------------------------|------|--|------|
| SERVICE INFORMATION | 4-1 | PILOT SCREW ADJUSTMENT | 4-16 |
| TROUBLESHOOTING | 4-2 | FUEL TANK | 4-17 |
| CARBURETOR REMOVAL | 4-3 | AUXILIARY FUEL TANK | 4-17 |
| VACUUM CHAMBER | 4-5 | AIR CLEANER | 4-18 |
| FLOAT CHAMBER | 4-6 | FUEL PUMP | 4-18 |
| PILOT SCREW | 4-8 | HIGH ALTITUDE ADJUSTMENT (USA only) | 4-19 |
| CARBURETOR SEPARATION | 4-10 | EVAPORATIVE EMISSION CONTROL SYSTEM (California model only) | 4-20 |
| CARBURETOR ASSEMBLY | 4-12 | AIR VENT CONTROL VALVE | 4-21 |
| CARBURETOR INSTALLATION | 4-16 | | |

SERVICE INFORMATION

GENERAL

WARNING

Gasoline is extremely flammable and is explosive under certain conditions. Work in a well ventilated area. Do not smoke or allow flames or sparks in the work area.

- The front cylinders use down draft carburetors.
- When disassembling fuel system parts, note the locations of the O-rings. Replace them with new ones on reassembly.
- The float bowls have drain screws that can be loosened to drain residual gasoline.
- Fuel pump inspection is in section 21.
- The No. 1 and No. 3 carburetors use different jet needles (thinner) and shorter springs than the No. 2 and No. 4 carburetors. Do not interchange these parts.

'85:

- Refer to the label on the air cleaner cover below the fuel tank for the hose connections of the evaporative emission control system (California model only).

After '85:

- All hoses used in the evaporative emission control system are numbered for identification. When connecting one of these hoses, compare the hose number with the Vacuum Hose Routing Diagram Label, page 1-19 (California model only), for its correct routing and connection.

TOOLS

Special

Valve guide driver, 7 mm

Vacuum pump

Pressure pump

07942-8230000 (U.S.A. only)

ST-AH-260-MC7 (U.S.A. only)

ST-AH-255-MC7 (U.S.A. only)

Common

Float gauge

07401-0010000

SPECIFICATIONS

| | '83 | '84, '85 | After '85 |
|-----------------------------|--|---------------------------|------------------|
| Venturi dia. | Primary 12.0 mm (0.48 in) Secondary 33.2 mm (1.31 in) | ← ← | ← ← |
| Identification No. | VD70A | VD70C (California: VD76A) | VD79A |
| Float level | 6.0 mm (0.24 in) | 7.5 mm (0.29 in) | 8.0 mm (0.31 in) |
| Main jet | Front #140 | #118 | #115 |
| | Rear #140 | #120 | #118 |
| Idle speed | 1,000 ± 100 rpm | ← | ← |
| Throttle grip free play | 2-6 mm (0.08-0.24 in) | ← | ← |
| Pilot screw initial opening | See page 4-16 | ← | ← |

TROUBLESHOOTING

Engine cranks but won't start

1. No fuel in tank
2. No fuel to carburetor
3. Engine flooded with fuel
4. No spark at plug (ignition system faulty)
5. Air cleaner clogged
6. Intake air leak
7. Improper choke operation
8. Improper throttle operation
9. Faulty purge control valve

Hard starting or stalling after starting

1. Improper choke operation
2. Ignition malfunction
3. Carburetor faulty
4. Fuel contaminated
5. Intake air leak
6. Idle speed incorrect
7. Faulty purge control valve

Rough idle

1. Ignition system faulty
2. Idle speed incorrect
3. Incorrect carburetor synchronization
4. Carburetor faulty
5. Fuel contaminated

Misfiring during acceleration

1. Ignition system faulty

Backfiring

1. Ignition system faulty
2. Carburetor faulty

Poor performance (driveability) and poor fuel economy

1. Fuel system clogged
2. Ignition system faulty

Lean mixture

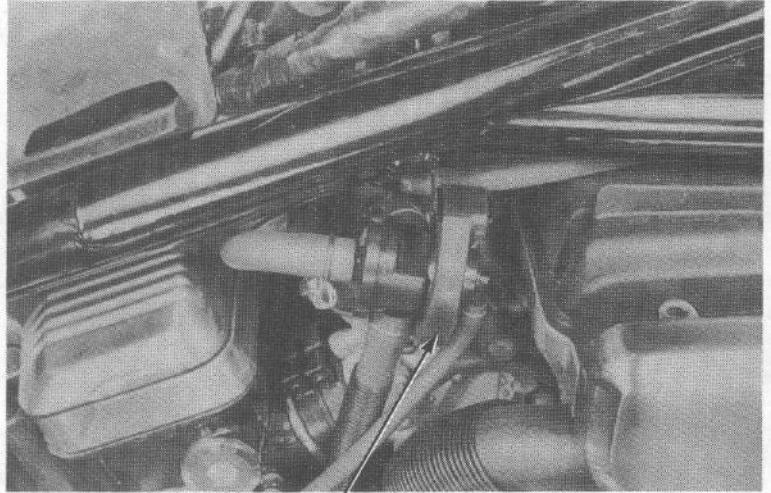
1. Clogged fuel jets
2. Vacuum piston stuck closed
3. Faulty float valve
4. Float level low
5. Fuel cap vent blocked
6. Fuel strainer screen clogged
7. Restricted fuel line
8. Air vent tube clogged
9. Intake air leak
10. Restricted or faulty fuel pump

Rich mixture

1. Clogged air jets
2. Faulty float valve
3. Float level too high
4. Choke stuck or clogged
5. Dirty air cleaner

CARBURETOR REMOVAL

Disconnect the air vent tube and remove the air vent cut-off valve. (After '85: California model only).



AIR VENT CUT-OFF VALVE

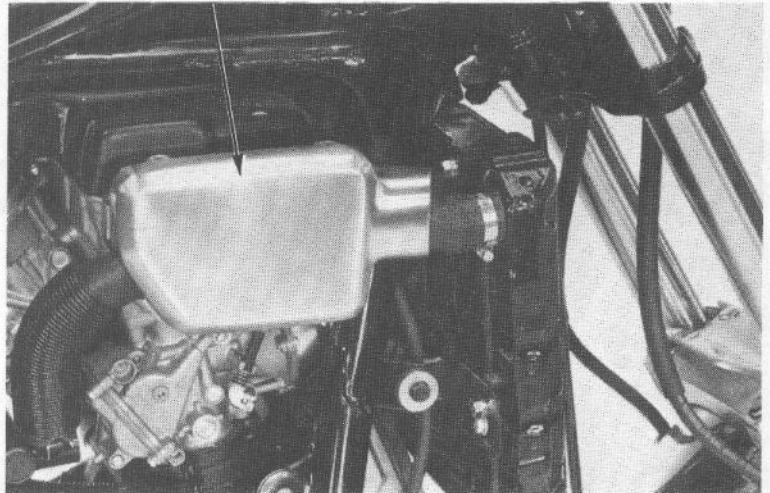
Check that the fuel tank is at least one-half empty. Otherwise, drain the fuel tank until it is one-half empty before raising the tank.

Remove the seat and front fuel tank mounting bolts. Lift the fuel tank up and put the support arm down.

Remove the air cleaner cover and element.

Remove the right and left air chamber covers.

AIR CHAMBER COVER



Remove the bolt attaching the thermostat housing to the air chamber and the ground cable.

BOLT

GROUND CABLE

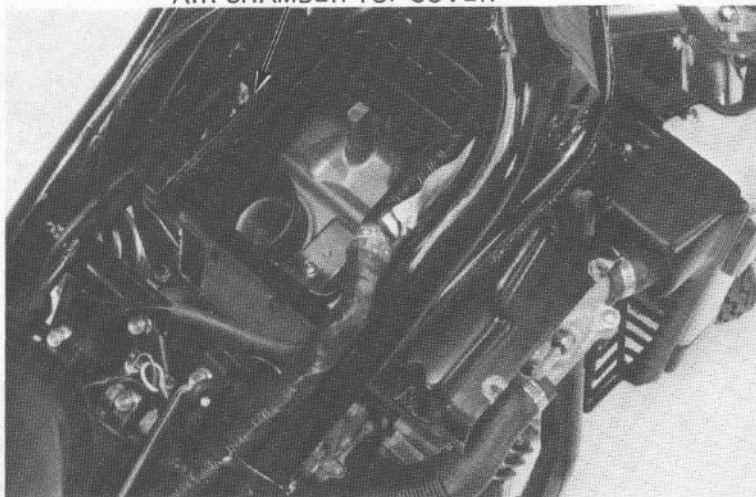


FUEL SYSTEM

Remove the six screws and the air chamber top cover.

Disconnect the breather tube.

AIR CHAMBER TOP COVER



Remove the carburetor choke clamp and disconnect the choke and throttle cables.

THROTTLE CABLES



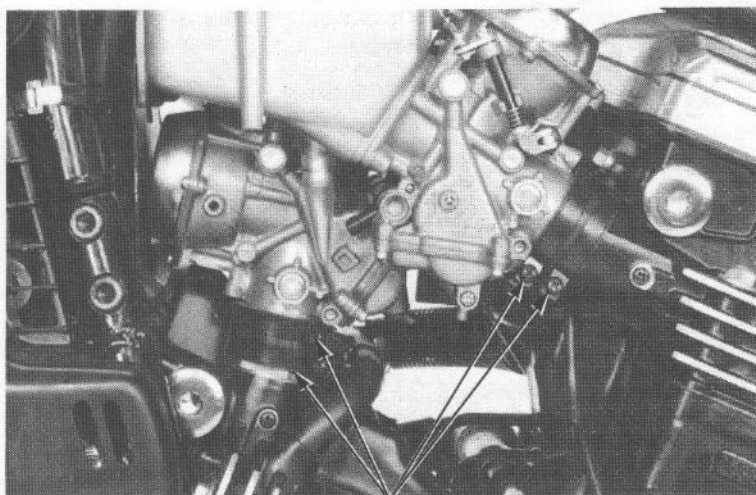
CHOKE CABLE

CLAMP

Loosen the carburetor bands and remove the carburetor assembly from the left side.

NOTE:

It may be necessary to loosen the engine mount bolts and move the engine on its rubber mounts to provide clearance for carburetor removal.



CARBURETOR BANDS

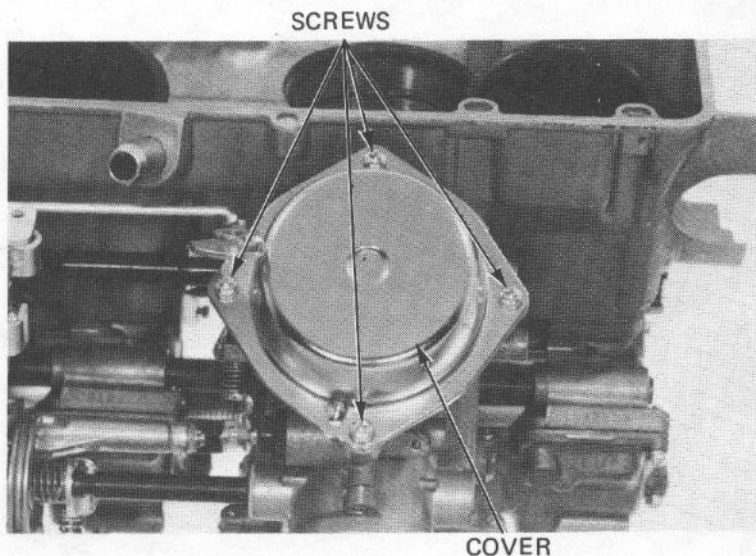
VACUUM CHAMBER

REMOVAL

Remove the four vacuum chamber cover screws and cover.

CAUTION

Do not interchange vacuum chamber covers, springs, pistons or jet needles between carburetors.



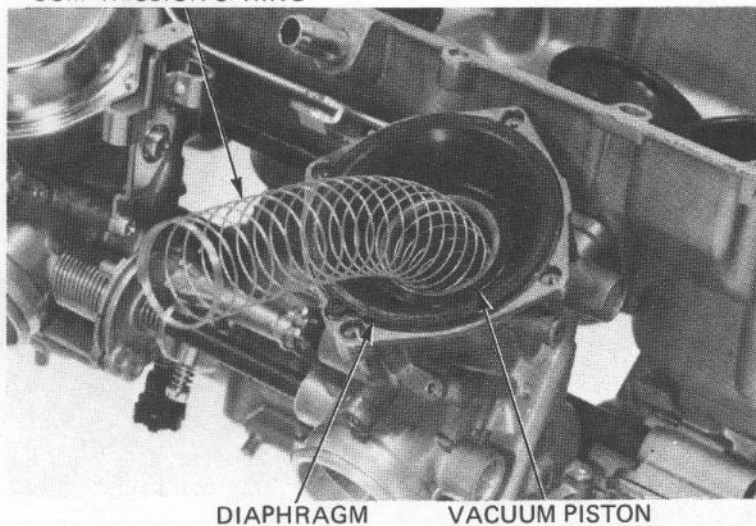
Remove the compression spring, diaphragm, and vacuum piston.

Inspect the vacuum piston for wear, nicks, scratches, or other damage.

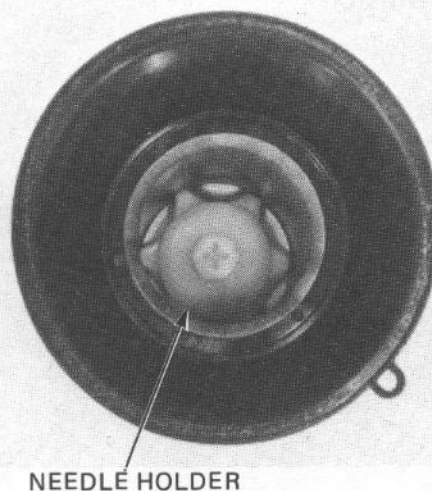
Make sure the piston moves up and down freely in the chamber.

Note that the No. 1 and No. 3 carburetors use thinner jet needles and shorter springs than the No. 2 and No. 4 carburetors.

COMPRESSION SPRING



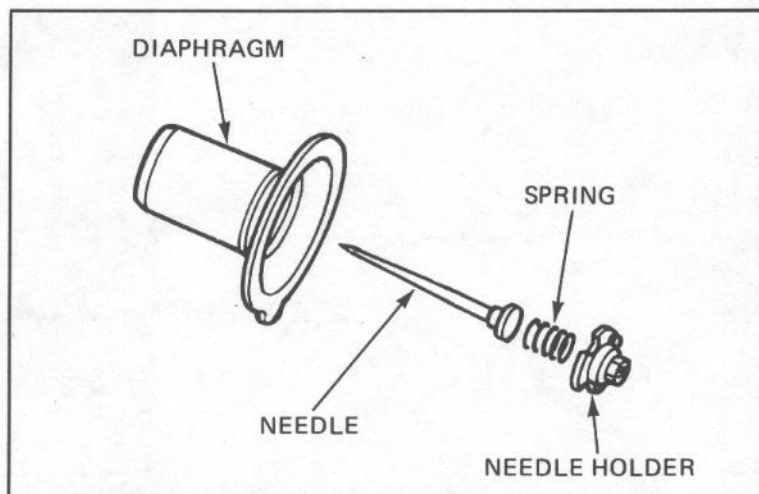
Push the needle holder in and turn it 60 degrees with an 8 mm socket. Then remove the needle holder, spring and needle from the piston.



FUEL SYSTEM

Inspect the needle for excessive wear at the tip and for bending, or other damage.

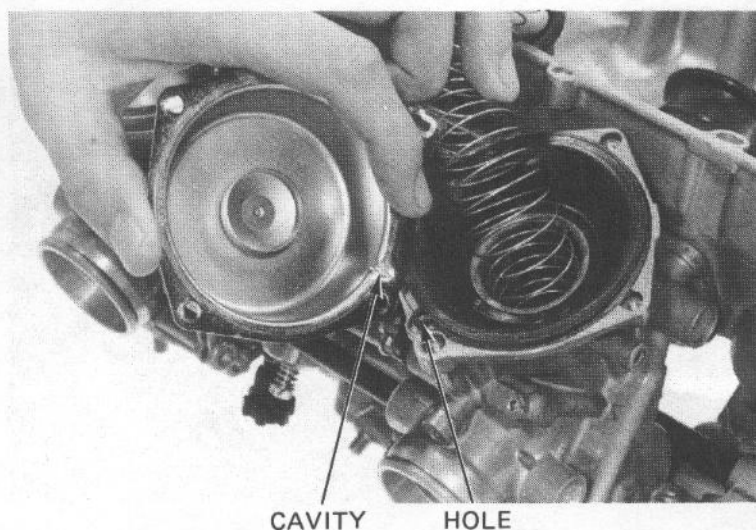
Check the diaphragm for deterioration and tears.



INSTALLATION

Installation is essentially the reverse of removal. Install the chamber cover so that its cavity aligns with the hole in the diaphragm.

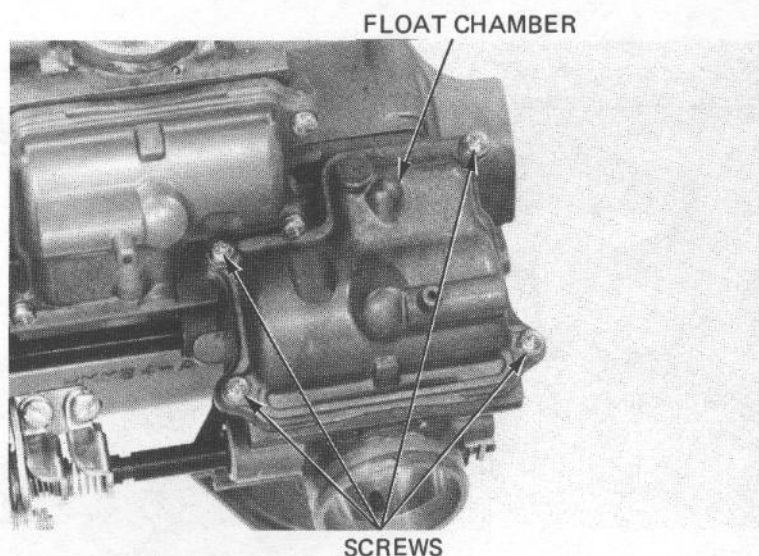
Be sure the thinner jet needles and shorter springs are installed in the No. 1 and No. 3 carburetors.



FLOAT CHAMBER

REMOVAL

Remove the four float chamber screws and the float chamber.



FLOAT LEVEL

Measure the float level with the carburetor inclined 15° – 45° from vertical and the float tang just contacting the float valve.

SPECIFICATION: '83: 6.0 mm (0.24 in)
'84, '85: 7.5 mm (0.29 in)
After '85: 8.0 mm (0.31 in)

NOTE:

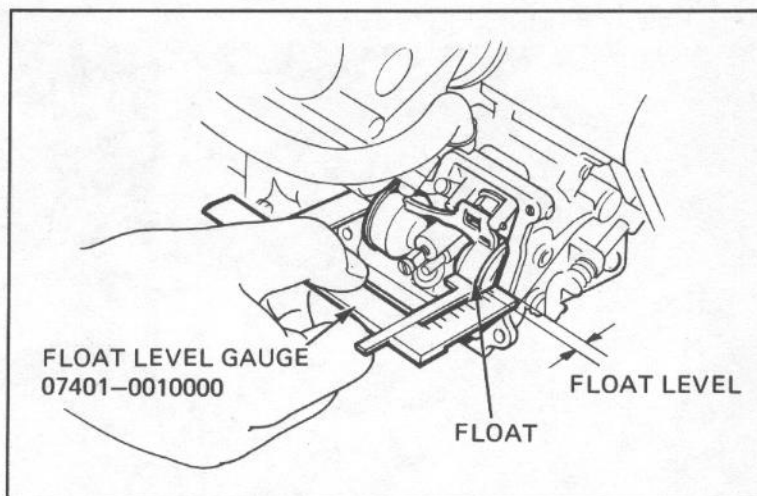
Measure the float level nearest the float valve.

'83, '84, '85:

Adjust the float level by carefully bending the float tang.

After '85:

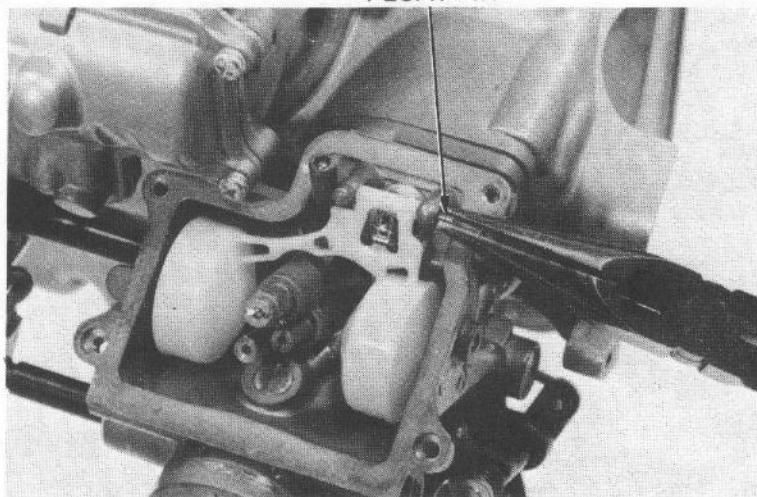
Replace the float assembly if it is out of specification.



FLOAT AND JETS

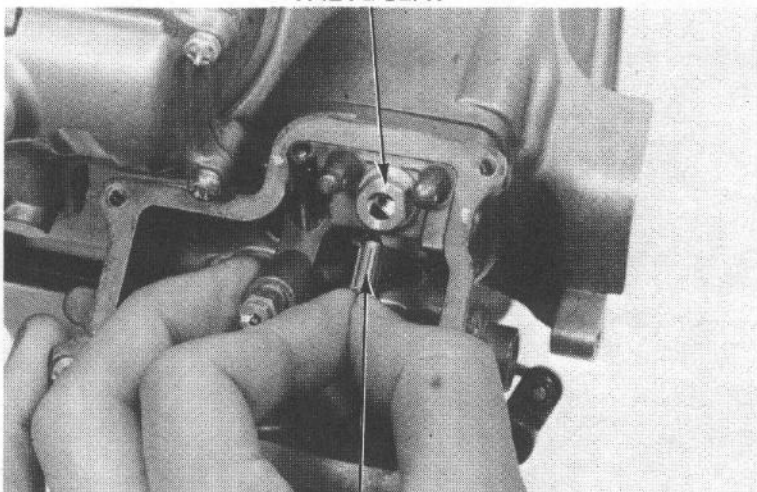
Remove the float pin, float, and float valve.

FLOAT PIN



Inspect the float valve for grooves and nicks.
Inspect the operation of the float valve.

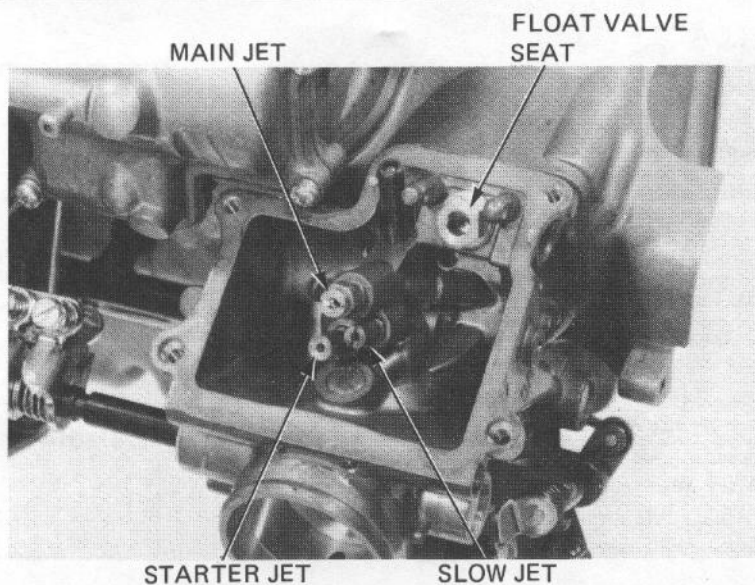
VALVE SEAT



FLOAT VALVE

FUEL SYSTEM

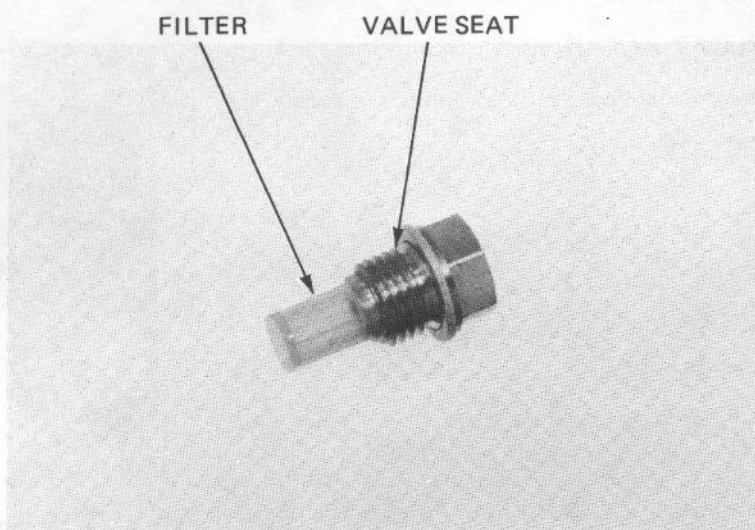
Remove the starter jet, main jet, and slow jet.
Remove the float valve seat and filter.



Inspect the float valve seat and filter for grooves, nicks, or deposits.

ASSEMBLY

Assemble the float chamber components in the reverse order of disassembly.



PILOT SCREW

REMOVAL

NOTE:

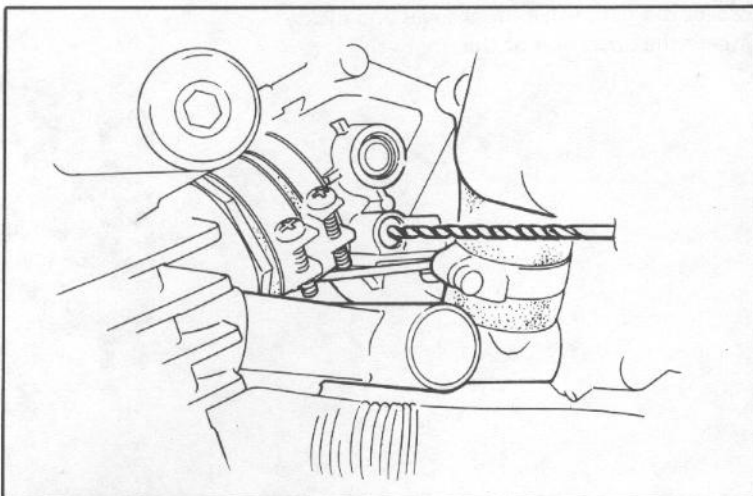
- The pilot screws are factory pre-set and should not be removed unless the carburetors are overhauled.
- The pilot screw plugs are factory installed to prevent pilot screw misadjustment. Do not remove the plugs unless the pilot screws are being removed.
- Cover all opening with tape to keep metal particles out when the plugs are drilled.

Center punch the pilot screw plug to center the drill point.

Drill through the plug with a 4 mm (5/32 in) drill bit, being careful not to drill into the pilot screw.

CAUTION:

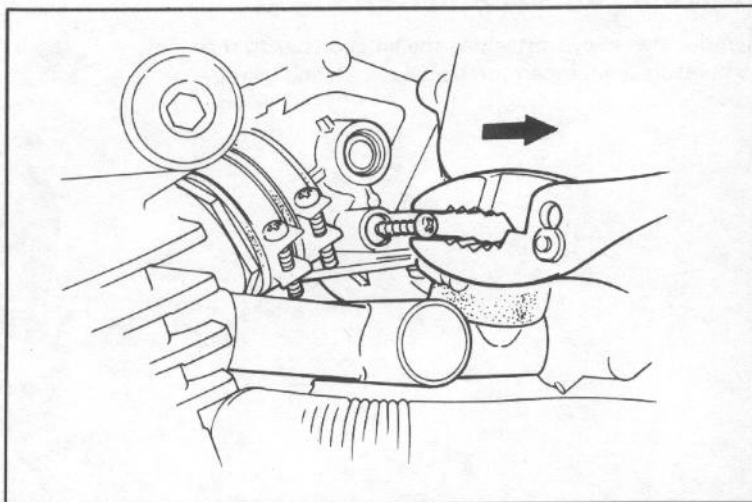
Be careful not to drill into the pilot screw. All pilot screws must be replaced even if only one requires it for proper pilot screw adjustment (page 4-16).



Force a self-tapping 4 mm screw (H/C 069399, P/N 93903-35410) into the drilled plug and continue turning the screwdriver until the plug rotates with the screw.

Pull on the screw head with pliers to remove the plug.

Use compressed air to clean the pilot screw area and remove metal shavings.



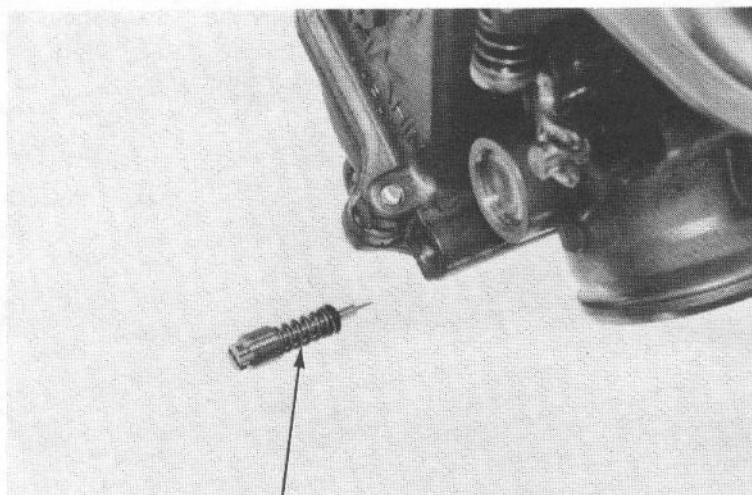
Turn each pilot screw in and carefully count the number of turns before it seats lightly.

Make a note of this to use as a reference when reinstalling the pilot screws.

CAUTION

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

Remove the pilot screws and inspect them. Replace them if they are worn or damaged.



PILOT SCREW

INSTALLATION

Install the pilot screws and return them to their original position as noted during removal.

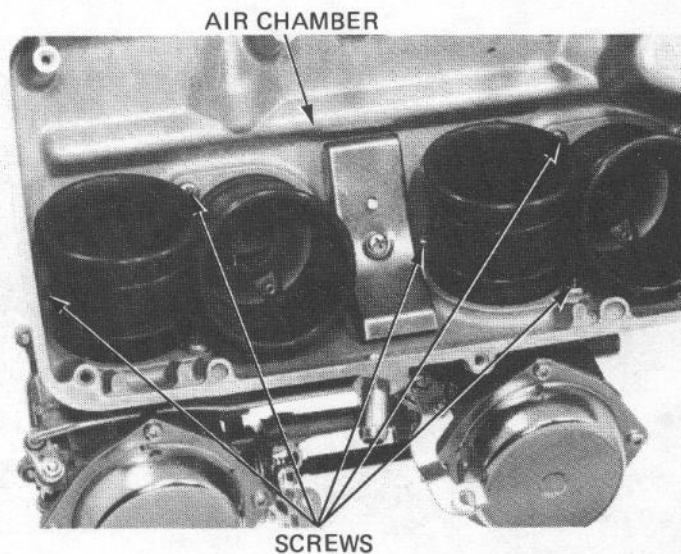
Perform pilot screw adjustment if new pilot screws are installed (page 4-16).

NOTE

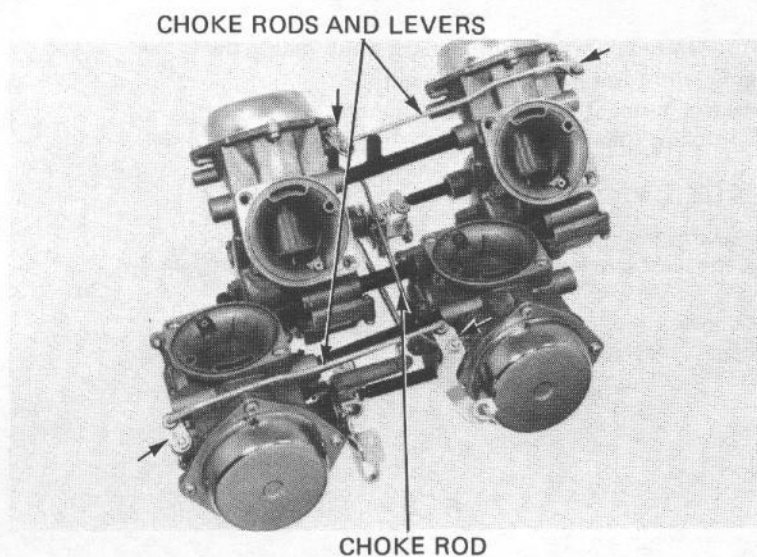
- Do not install new plugs on new pilot screw holes until after adjustment has been made.
- If you replace the pilot screw in one carburetor, you must replace the pilot screws in the other carburetors for proper pilot screw adjustment.

CARBURETOR SEPARATION

Remove the screws attaching the air chamber to the carburetors and separate the chamber and carburetors.



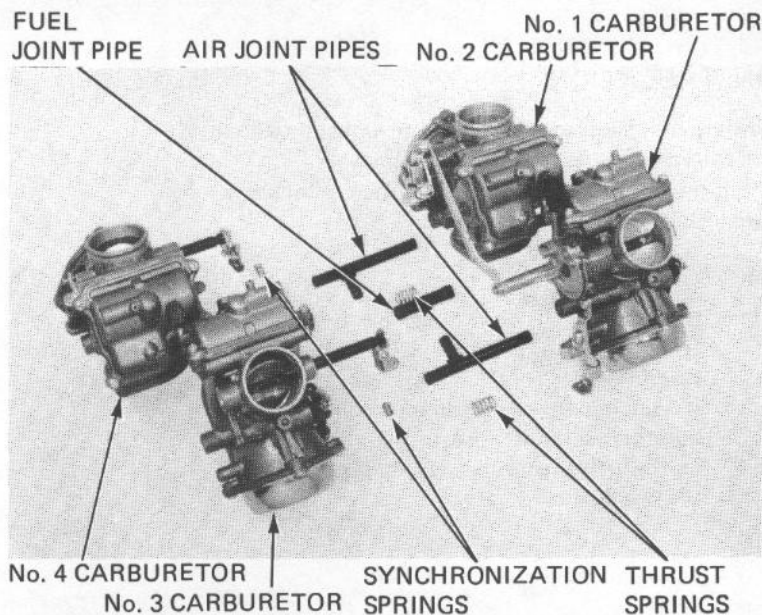
Remove the nuts, and remove the choke levers and rods.
Remove the cotter pins and washers, and remove the choke rod.



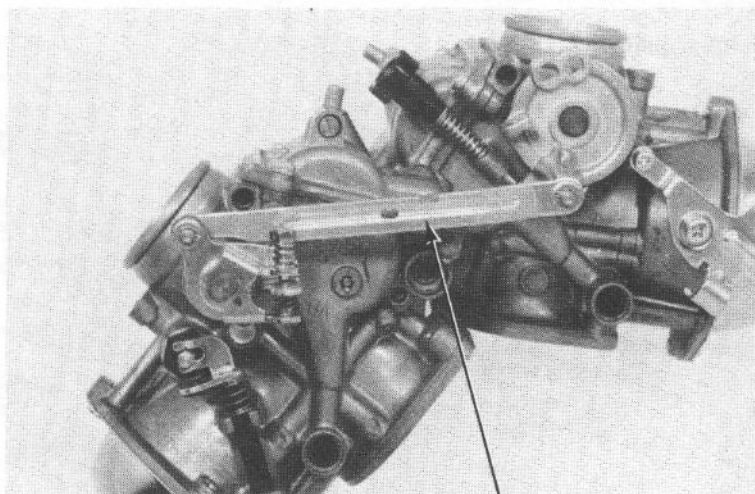
Carefully separate the No. 3 carburetor from the assembly. Then separate the No. 4 carburetor.

CAUTION

Separate the carburetors horizontally to prevent damage to the joint pipes.

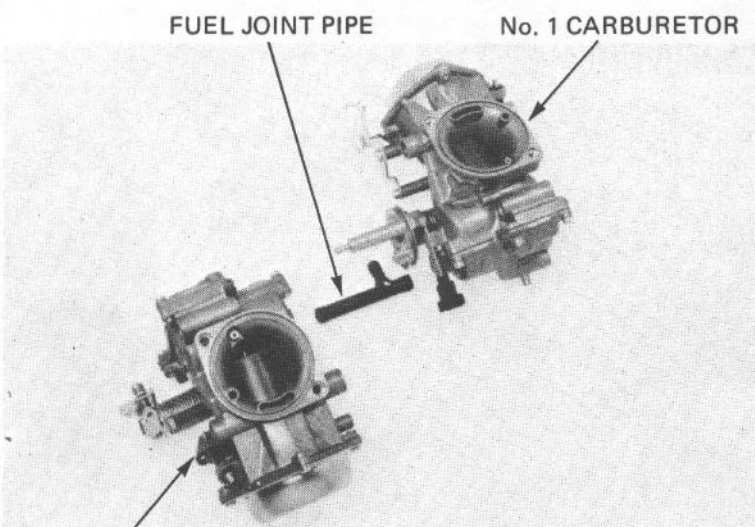


Disconnect the throttle link from the No. 1 and No. 2 carburetors by removing the cotter pins.



THROTTLE LINK

Carefully separate the No. 1 and No. 2 carburetors.

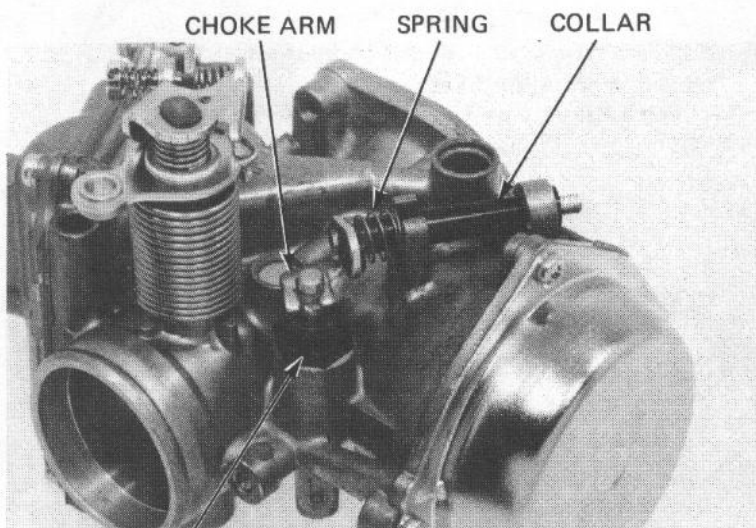


FUEL JOINT PIPE

No. 1 CARBURETOR

No. 2 CARBURETOR

Remove the choke arm collar and remove the choke arm and spring.
Remove the choke valve nut, spring, and valve.



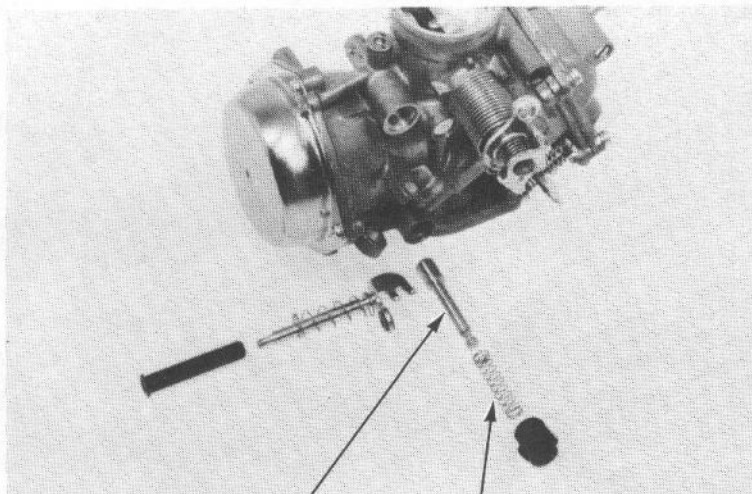
CHOKE ARM

SPRING

COLLAR

NUT

Check the choke valve and spring for nicks, grooves, or other damage.

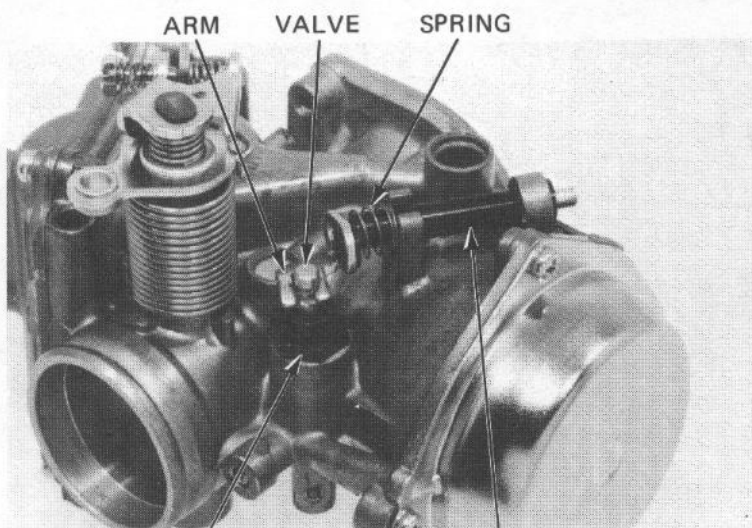


CHOKE VALVE SPRING

CARBURETOR ASSEMBLY

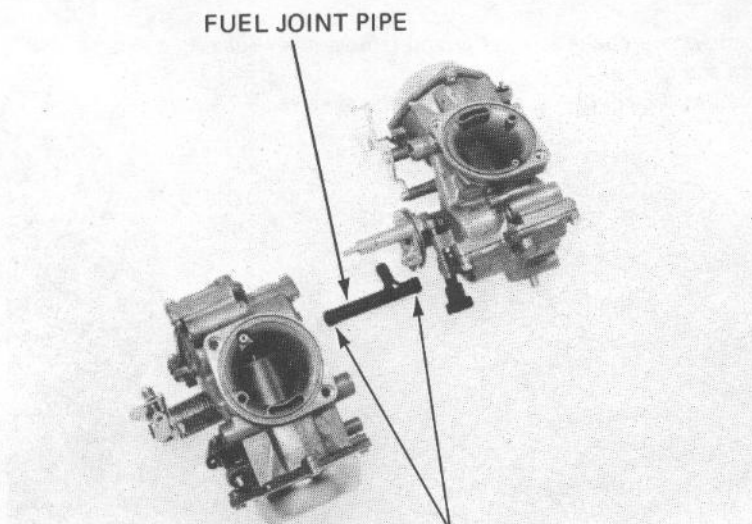
Install the choke valve, valve spring, and nut and tighten the nut.

Install the choke arm and spring while hooking the arm to the groove in the choke valve. Install the choke arm collar.



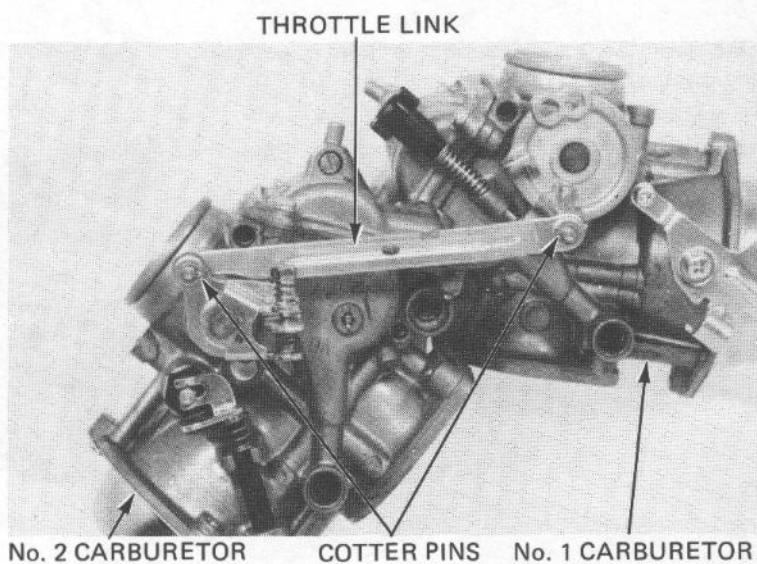
NUT COLLAR

Coat the new O-rings with oil and install them on the fuel joint pipe for No. 1 and No. 2 carburetors. Install the fuel joint pipe to the No. 1 and No. 2 carburetors.

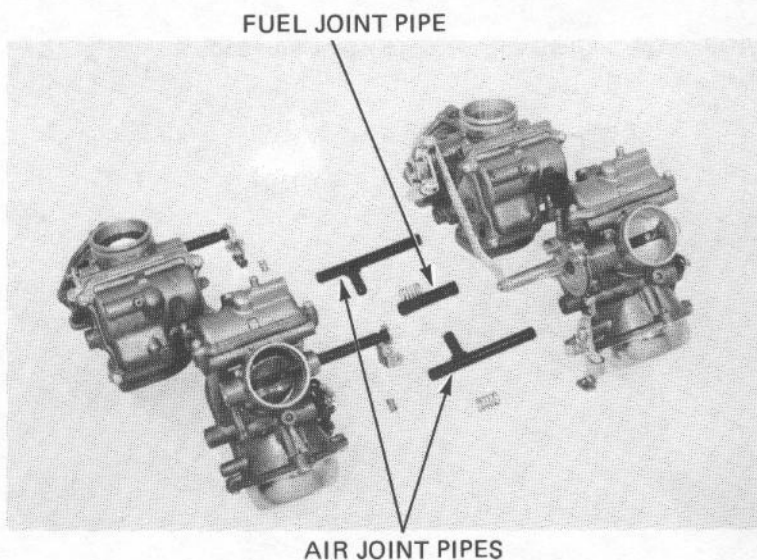


O-RINGS

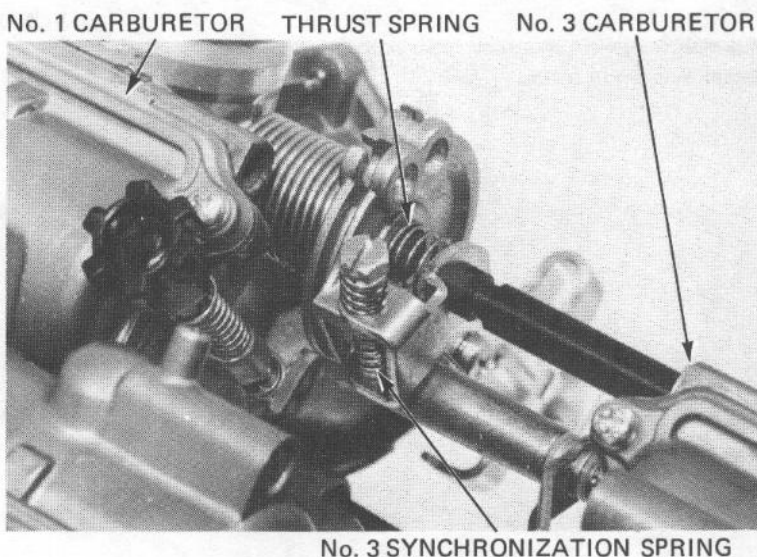
Reconnect the throttle linkage between the No. 1 and No. 2 carburetors, using new cotter pins.



Coat new O-rings with oil and install them on the fuel and air joint pipes. Put the No. 3 and No. 4 carburetors together with the joint pipes.

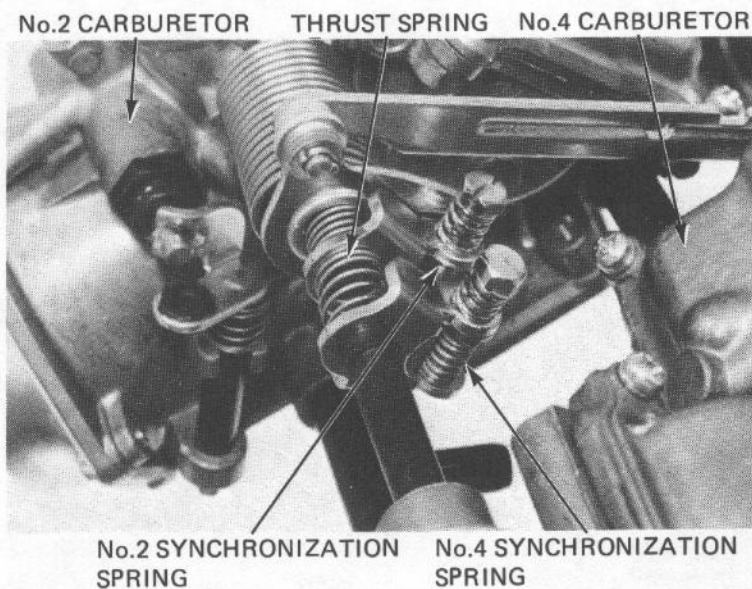


Loosen the synchronization adjusting screws until there is no tension. Install the synchronization springs. Install the thrust springs between the throttle valve shafts.

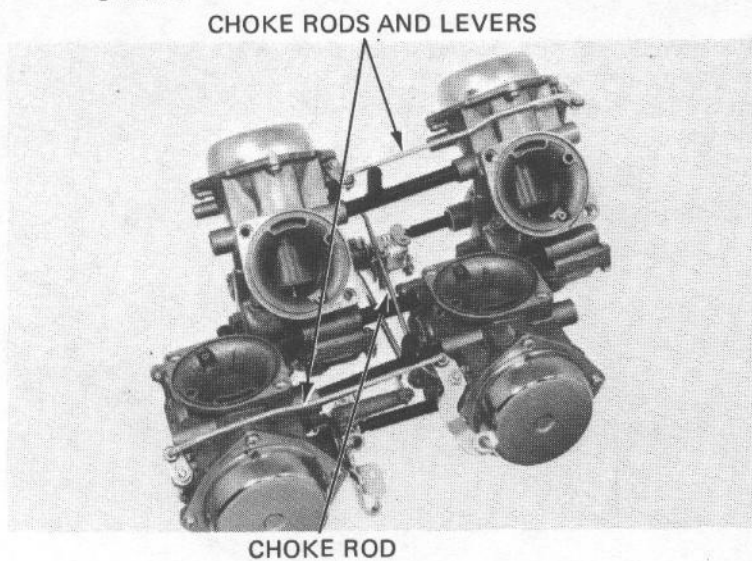


FUEL SYSTEM

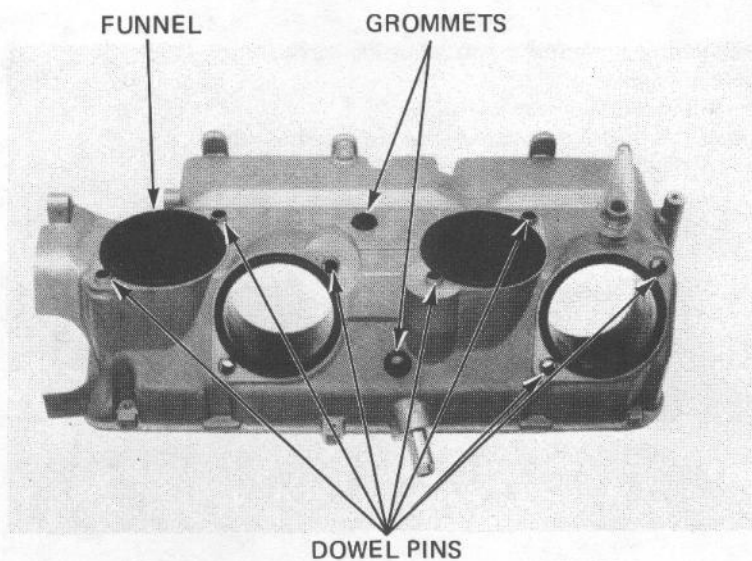
Make sure the fuel joint and air joint pipes are securely installed.



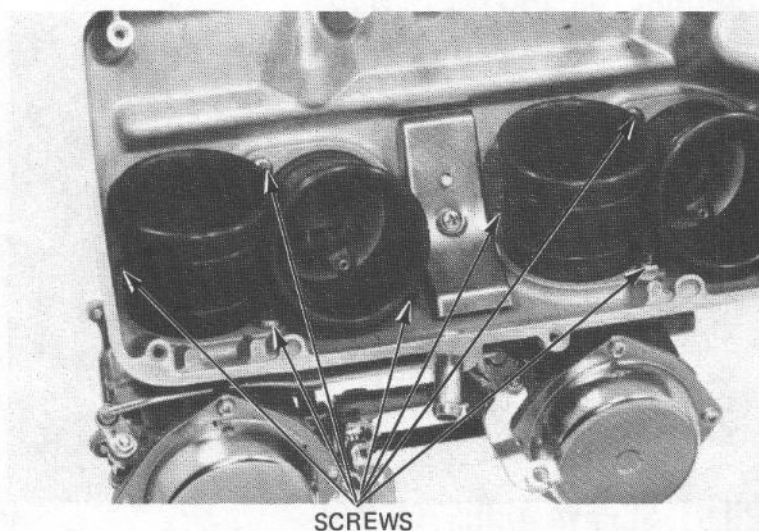
Install the choke rods and levers, using the nuts and new cotter pins.



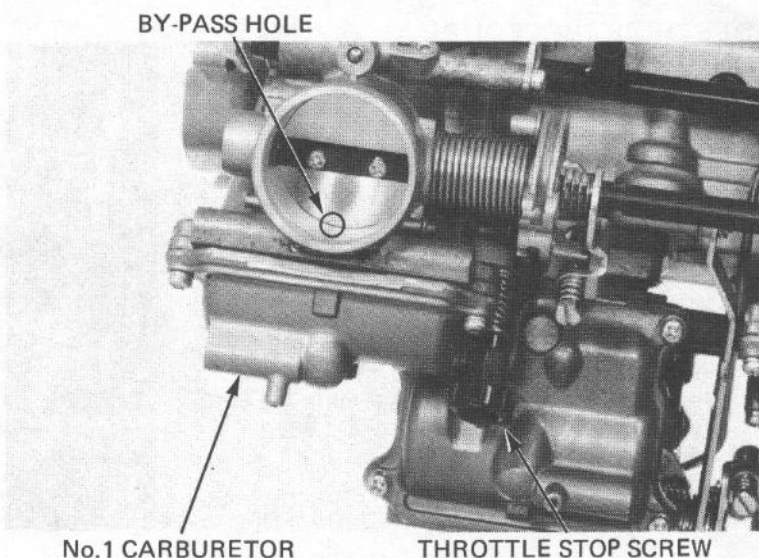
Make sure the air chamber funnels, grommets, and dowel pins are in place.



Place the air chamber over the carburetors aligning the dowel pins with the carburetor holes. Attach the air chamber to the carburetors with the eight screws.



Turn the throttle stop screw to align the No. 1 throttle valve with the edge of the by-pass hole.



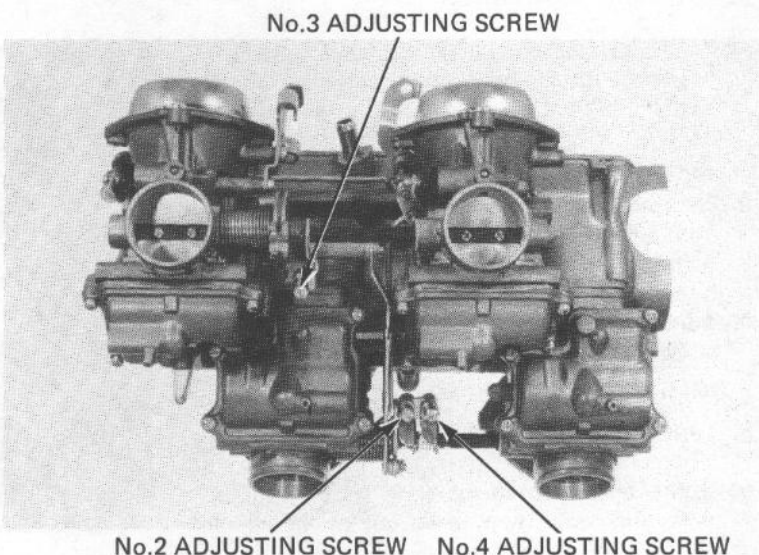
Align each throttle valve with the by-pass hole edge by turning the synchronization adjusting screws.

Inspect throttle operation as described below:

- Open the throttle slightly by pressing the throttle linkage. Then release the throttle.
- Make sure that it returns smoothly.
- Make sure that there is no drag when opening and closing the throttle.

Make sure that choke valve operation is smooth by moving the choke linkage.

Close the choke valve by turning the choke linkage. Release the choke linkage and make sure that it returns smoothly.



CARBURETOR INSTALLATION

Install the air vent cut-off valve and connect the air vent tube (After '85 California model only).

Installation is essentially the reverse of removal.

NOTE

Route the throttle and choke cables properly (pages 1-10 through 1-15).

Perform the following inspections and adjustments.

- Throttle operation (page 3-6).
- Carburetor choke (page 3-7).
- Carburetor idle speed (page 3-15).
- Carburetor synchronization (page 3-14).

PILOT SCREW ADJUSTMENT

IDLE DROP PROCEDURE (U.S.A. ONLY)

NOTE

- The pilot screws are factory pre-set and no adjustment is necessary unless the pilot screws are replaced (page 4-8).
- Use a tachometer with graduations of 50 rpm or smaller that will accurately indicate a 50 rpm change.

1. Turn each pilot screw clockwise until it seats lightly and back it out to the specification given. This is an initial setting prior to the final pilot screw adjustment.

INITIAL OPENING:

- '83: 3 turns out
'84~'85: 2-3/4 turns out
3 turns out (California only)
After '85: 2-1/2 turns out

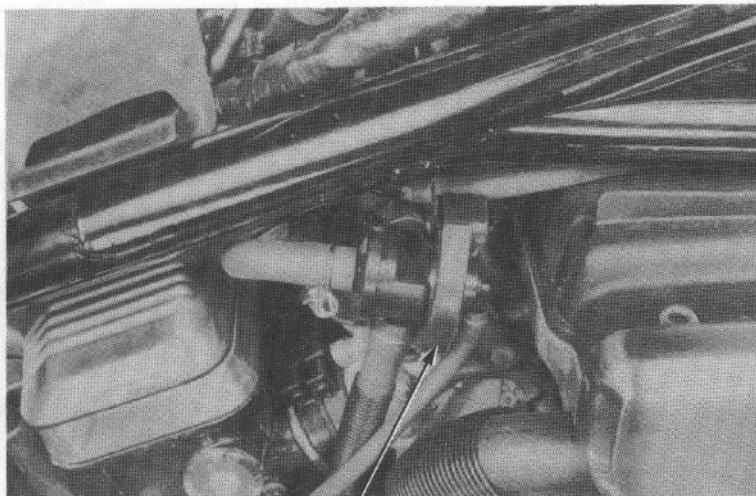
CAUTION:

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

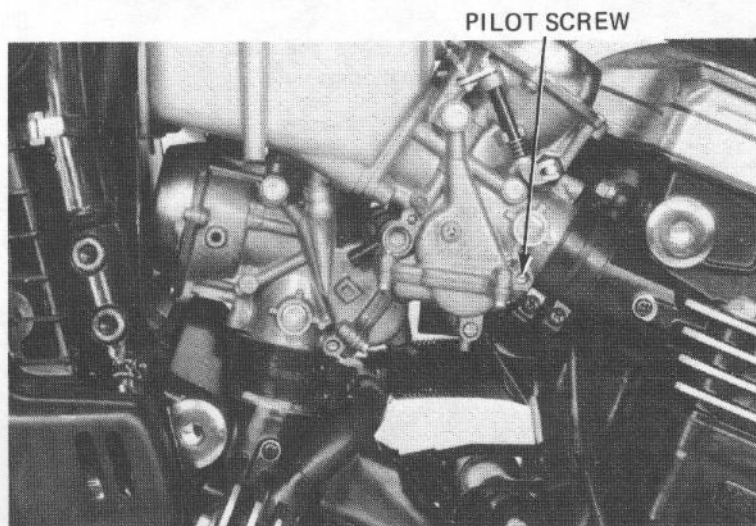
2. Warm up the engine to operating temperature. Stop and go driving for 10 minutes is sufficient.
3. Attach a tachometer according to its manufacturer's instructions.
4. Adjust the idle speed with the throttle stop screw.

IDLE SPEED: 1,000 ± 100 rpm

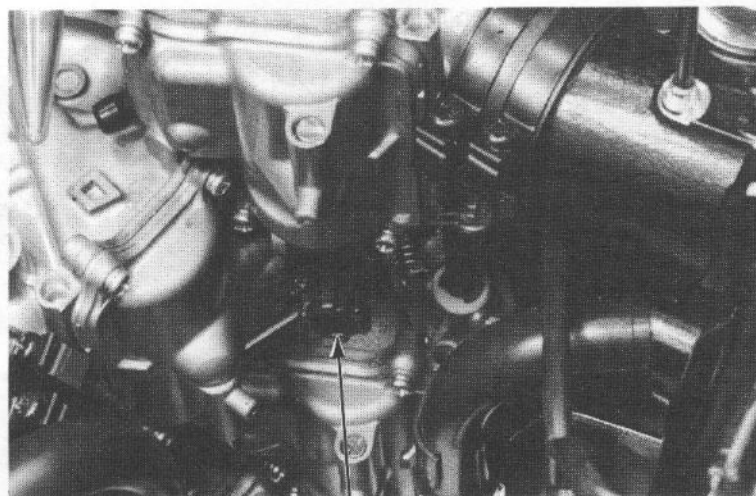
5. Turn each pilot screw 1/2 turn out from the initial setting.
6. If the engine speed increases by 50 rpm or more, turn each pilot screw out by a continual 1/2 turn until engine speed drops by 50 rpm or less.



AIR VENT CUT-OFF VALVE

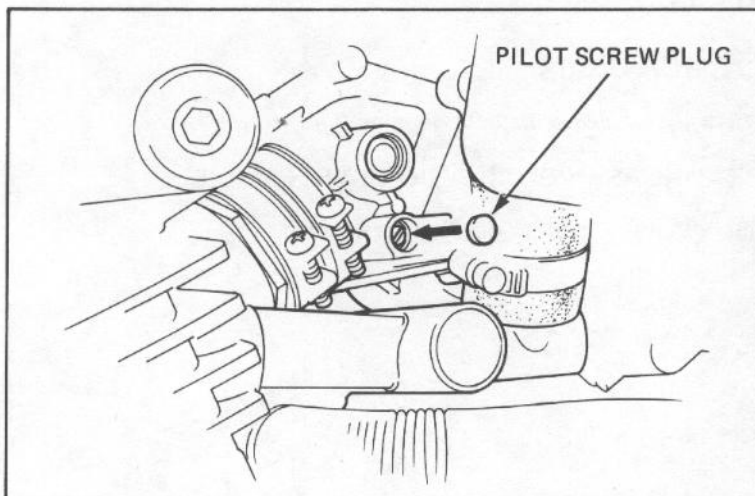


PILOT SCREW



THROTTLE STOP SCREW

7. Adjust the idle speed with the throttle stop screw.
8. Turn the No. 1 carburetor pilot screw in until the engine speed drops 50 rpm.
9. Turn the No. 1 carburetor pilot screw 1 turn out from the position obtained in step 8.
10. Adjust the idle speed with the throttle stop screw.
11. Perform steps 8, 9 and 10 for the No. 2, 3 and 4 carburetor pilot screws.
12. Drive new pilot screw plugs into the pilot screw bores with a 7 mm valve guide driver (P/N 07942-8230000). When fully seated the plug surfaces will be recessed 1 mm into the pilot screw bore.



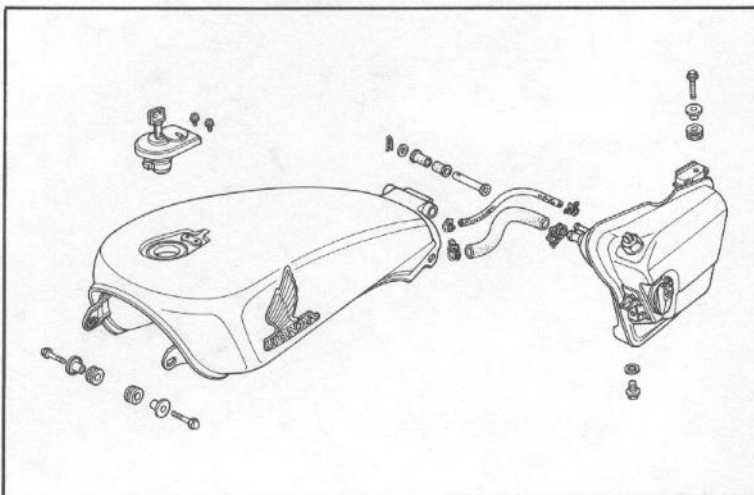
FUEL TANK

WARNING

Do not allow flames or sparks near gasoline. Wipe up spilled gasoline at once.

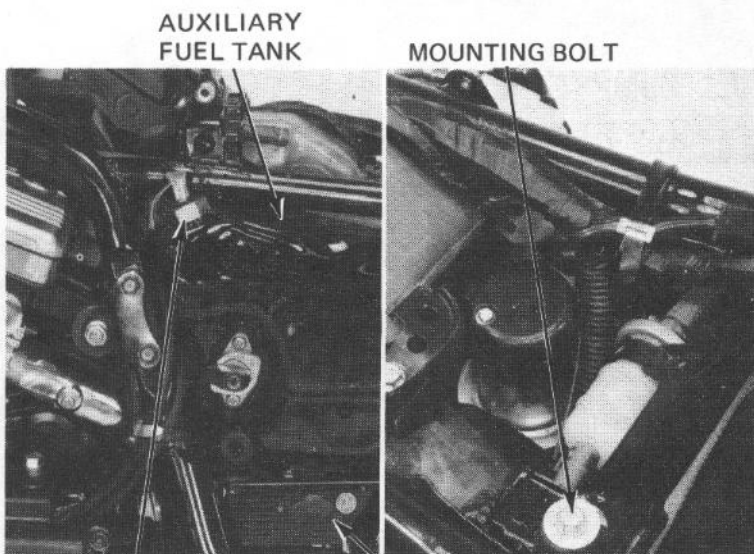
Check the vent hole of the filler cap for blockage. Check that fuel is flowing out of the fuel valve freely. If fuel flow is restricted, clean the fuel strainer.

Make sure that there are no fuel leaks.



AUXILIARY FUEL TANK

Drain fuel from the main and auxiliary tank. Remove the seat, main fuel tank, and side covers. Remove the regulator/rectifier. Disconnect the battery negative cable, then positive cable and remove the battery. Remove the rear wheel (page 16-3). Remove rear fenders A and B. Detach the auxiliary fuel tank hose from the fuel pump. Disconnect the fuel level sensor wire terminals. Remove the auxiliary fuel tank mounting bolt and tank. Install the auxiliary fuel tank in the reverse order of removal.



LEVEL SENSOR REGULATOR/RECTIFIER

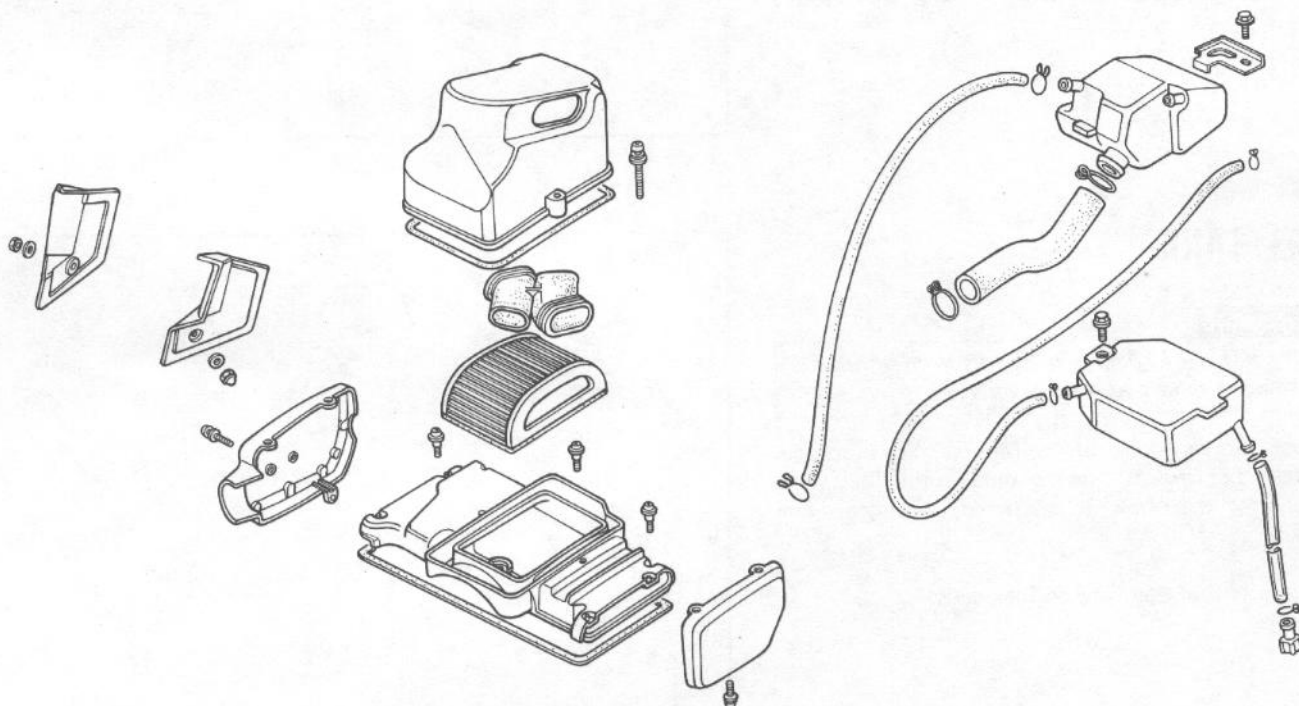
AIR CLEANER

CASE/CHAMBER

Check the air cleaner case for deterioration.

CRANKCASE VENTILATION SYSTEM

Check that the breather tube is not restricted.

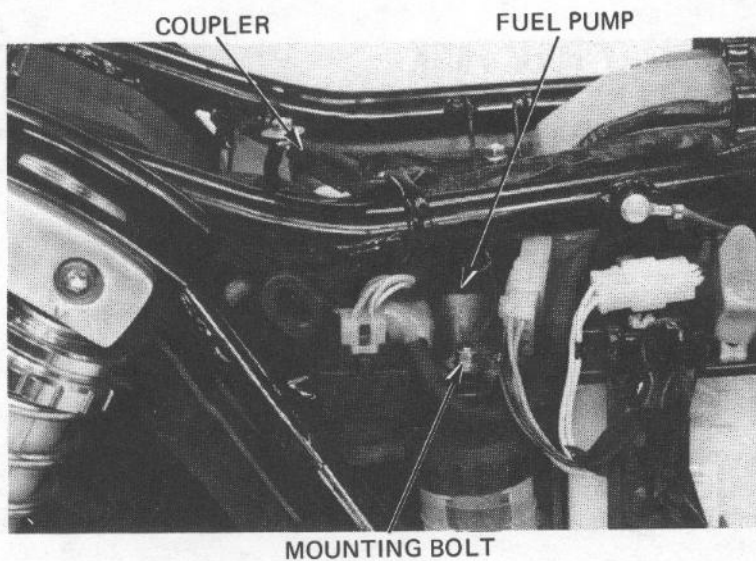


FUEL PUMP

Remove the seat and side covers.
Disconnect the fuel pump coupler.
Remove the fuel pump mounting bolts.
Disconnect the fuel lines from the pump and remove the pump.

NOTE:

Before disconnecting the fuel lines, turn the fuel valve off and clamp the fuel lines to prevent the fuel from flowing out.



HIGH ALTITUDE ADJUSTMENT (USA only)

When the vehicle is to be operated continuously above 2,000 m (6,500 feet) the carburetor must be readjusted as follows to improve driveability and decrease exhaust emissions.

Warm up the engine to operating temperature. Stop and go driving for 10 minutes is sufficient.

Remove each pilot screw plug (page 4-8).

Turn each pilot screw clockwise 1 turn.

Adjust the idle speed to $1,000 \pm 100$ rpm with the throttle stop screw.

Drive new pilot screw plugs into the pilot screw bores (page 4-17).

NOTE:

This adjustment must be made at high altitude to ensure proper high altitude operation.

Attach a Vehicle Emission Control Information Update label onto the frame as shown. Refer to Service Bulletin #SL132 for information on obtaining the label.

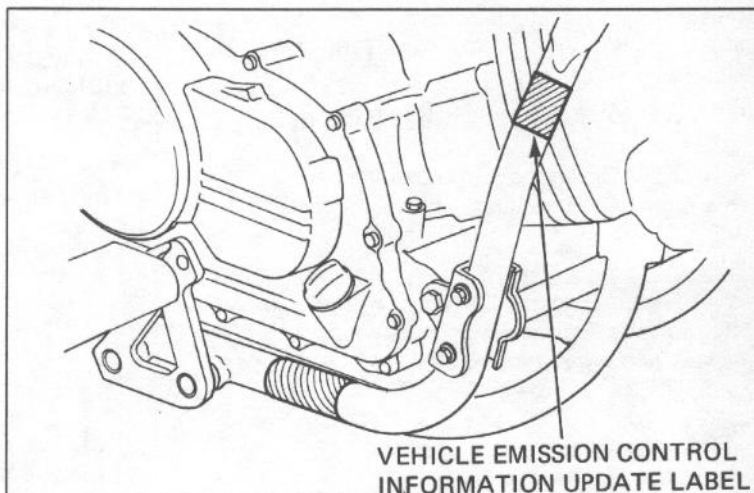
NOTE:

Do not attach the label to any part that can be easily removed from the vehicle.

WARNING

Operation at an altitude lower than 1,500 m (5,000 feet) with the carburetor adjusted for high altitudes may cause the engine to idle roughly and stall.

When the vehicle is to be operated continuously below 1,500 m (5,000 feet), turn each pilot screw counterclockwise 1 turn to its original position after removing each pilot screw plug and adjust the idle speed to $1,000 \pm 100$ rpm. Drive new pilot screw plugs into the pilot screw bores (page 4-17). Be sure to do these adjustments at low altitude.



EVAPORATIVE EMISSION CONTROL SYSTEM (California model only)

PURGE CONTROL VALVE (PCV) INSPECTION

NOTE:

The purge control valve should be inspected if hot restart is difficult.

Disconnect the PCV hoses from their connections and remove the PCV from its mount. Refer to the routing label diagram on the frame behind the left side cover.

Connect a vacuum pump to the hose that goes to the No. 2 carburetor body. Apply the specified vacuum to the PCV.

SPECIFIED VACUUM: 250 mm (9.8 in) Hg

The specified vacuum should be maintained. Replace the PCV if vacuum is not maintained.

CAUTION:

To prevent damage to the purge control valve, do not use high air pressure sources. Use a hand operated air pump only.

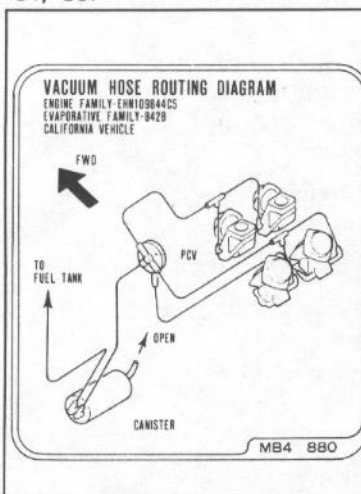
Plug the hose that goes to the No. 2, 4 carburetors.

Remove the vacuum pump and connect it to the hose that goes to the No. 1, 3 carburetor bodies. Apply the specified vacuum to the PCV.

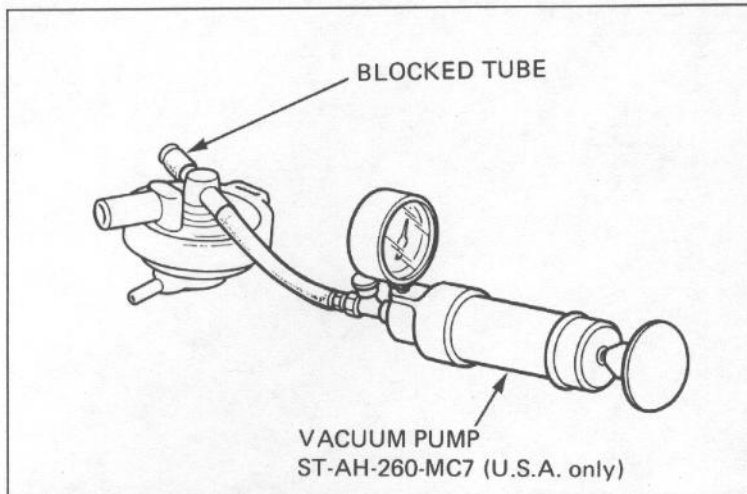
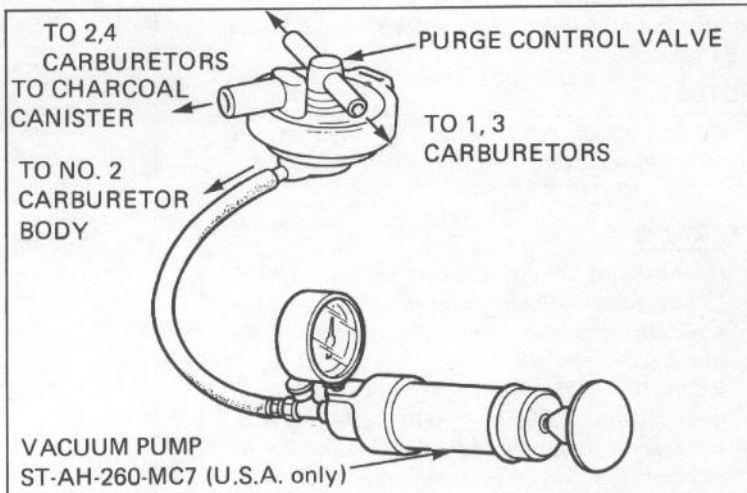
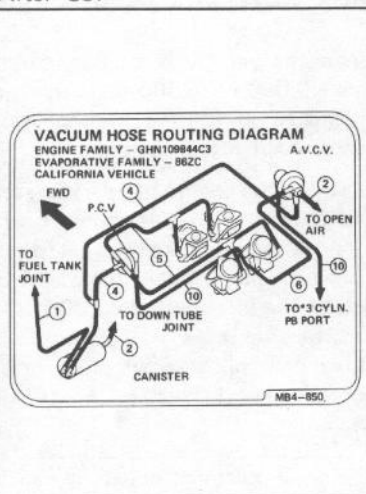
SPECIFIED VACUUM: 250 mm (9.8 in) Hg

The specified vacuum should be maintained. Replace the PCV if vacuum is not maintained.

'84, '85:



After '85:



Connect a pressure pump to the 8 mm I.D. hose that goes to the charcoal canister. While applying the specified vacuum to the PCV hose that goes to the No. 2 carburetor body, pump air through the canister hose. Air should flow through the PCV and out the hose that goes to the No. 1, 3 carburetor body. Replace the PCV if air does not flow out.

Remove the pump, install the PCV on its mount, route and reconnect the hoses according to the routing label.

AIR VENT CONTROL VALVE (California model only, AFTER '84)

AIR VENT CONTROL VALVE (AVCV) INSPECTION

Disconnect the AVCV hoses from their connections and remove the AVCV from its mount. Refer to the routing label on rear fender behind the seat for hose connections.

Connect a vacuum pump to the hose that goes to the No. 3 cylinder intake port.

Apply the specified vacuum to the AVCV.

SPECIFIED VACUUM: 250 mm (9.8 in) Hg

The specified vacuum should be maintained.
Replace the AVCV if vacuum is not maintained.

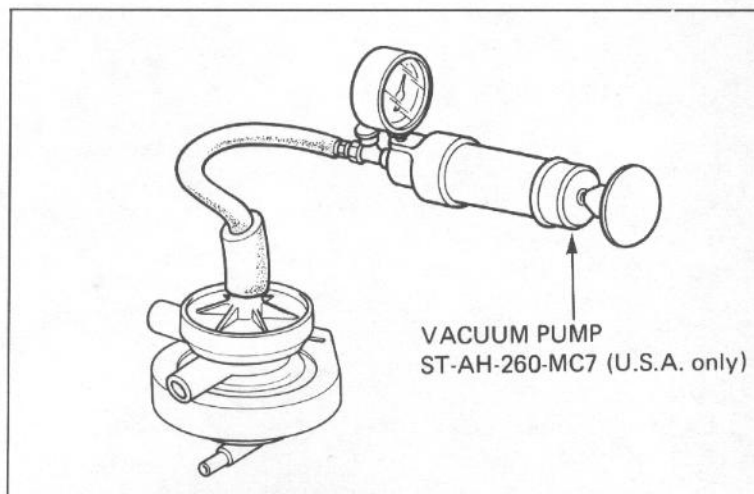
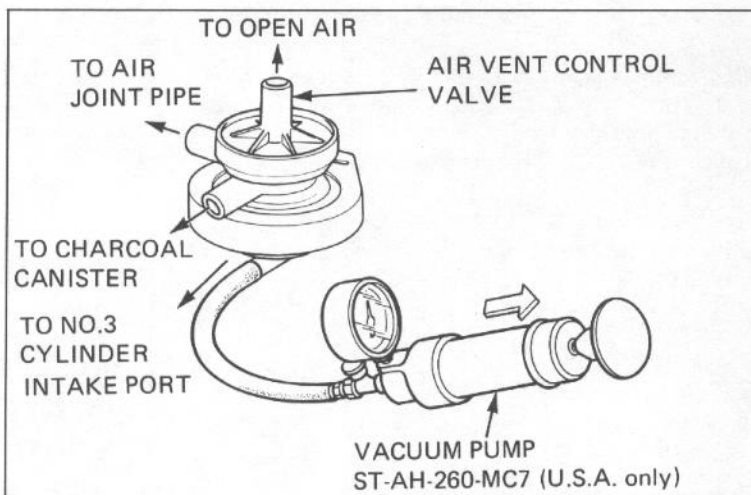
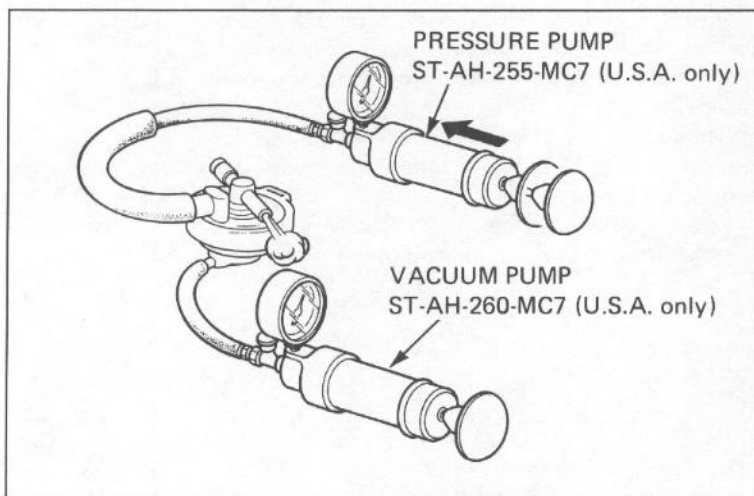
CAUTION:

*To prevent damage to the air vent control valve, do not use high air pressure sources.
Use a hand operated air pump only.*

Connect the vacuum pump to the air vent port of the AVCV.

Apply vacuum to the AVCV. The vacuum should hold steady.

Replace the AVCV if vacuum leaks.



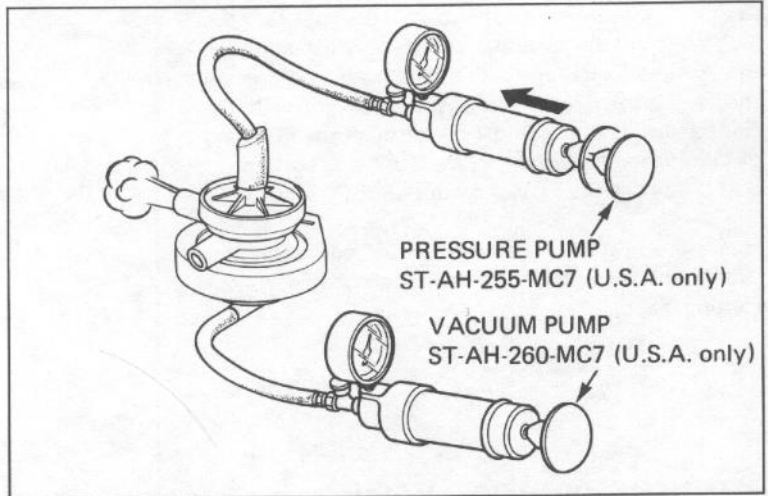
FUEL SYSTEM

Connect the vacuum pump to the hose that goes to the No. 3 cylinder intake port.

Connect the pressure pump to the air vent port of the AVCV.

While applying the vacuum to the AVCV hose that goes to the No. 3 cylinder intake port, pump air through the air vent port.

Air should flow through the AVCV and out the hose that goes to the carburetor air joint pipe.

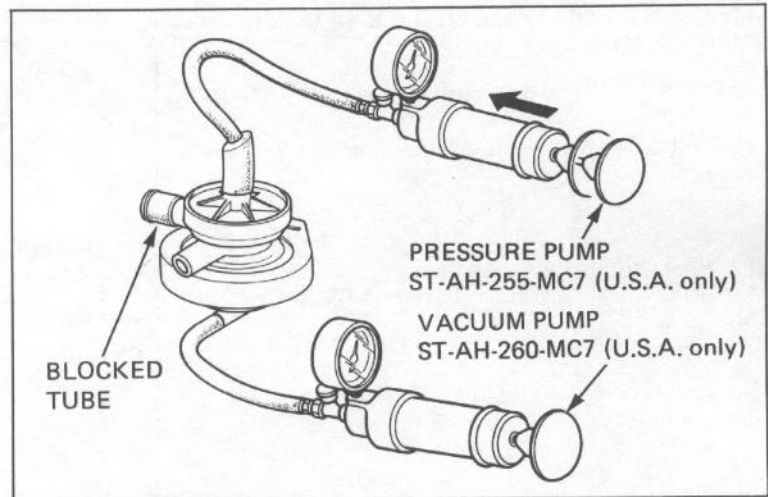


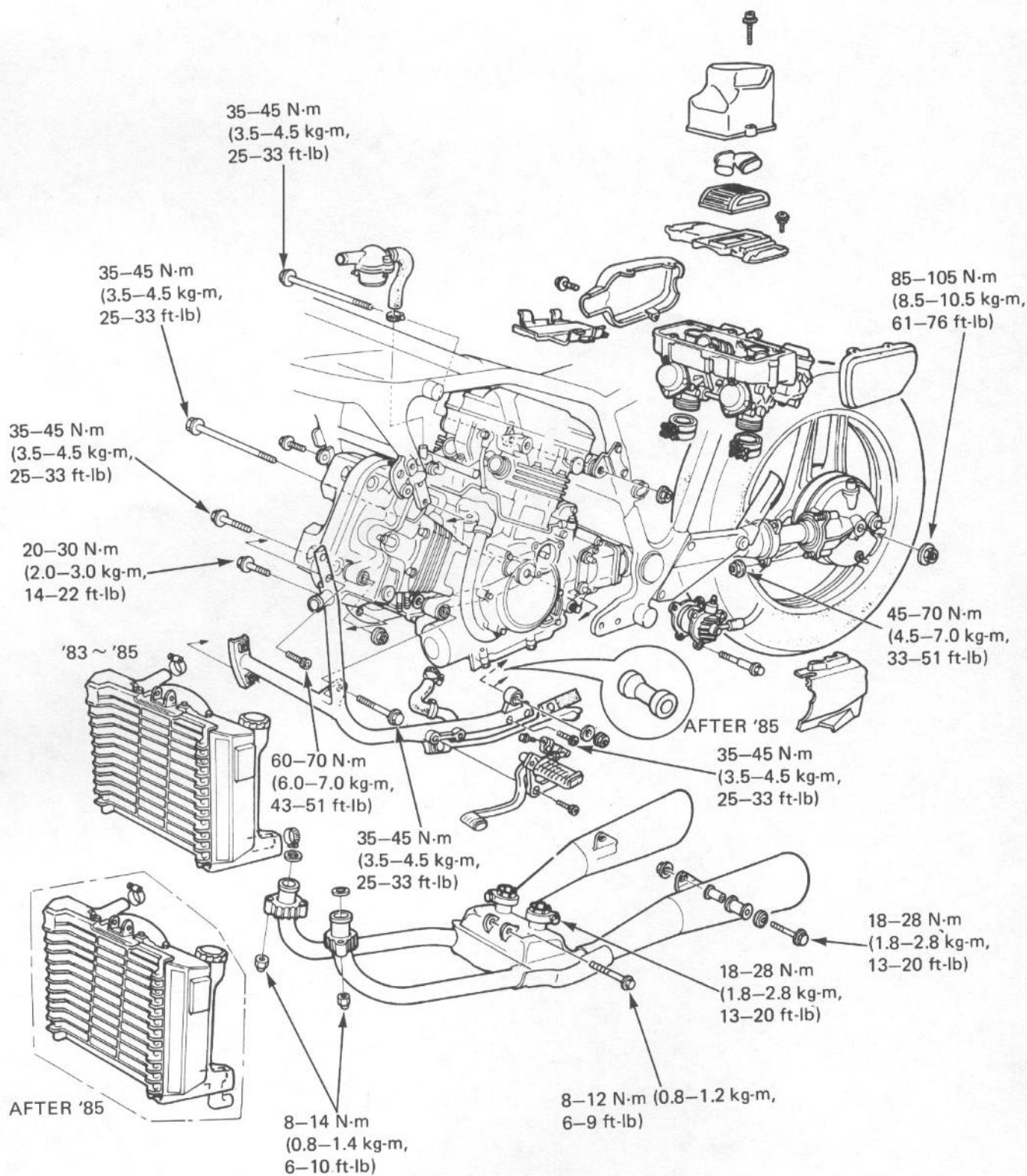
Plug the hose that goes to the carburetor air joint pipe.

While applying vacuum to the AVCV hose that goes to the No. 3 cylinder intake port, apply air pressure. It should hold steady.

Replace the AVCV if pressure is not retained.

Remove the pumps, install the AVCV on its mount, route and reconnect the hoses according to the routing label.





5. ENGINE REMOVAL/ INSTALLATION

| | |
|---------------------|-----|
| SERVICE INFORMATION | 5-1 |
| ENGINE REMOVAL | 5-2 |
| ENGINE INSTALLATION | 5-5 |

SERVICE INFORMATION

5

GENERAL

- A floor jack or other adjustable support is required to support and maneuver the engine.
- The following parts or components can be serviced with the engine installed in the frame:
 - Clutch
 - Gearshift linkage
 - Cylinder heads
 - Alternator
 - Starter motor
 - Carburetors

SPECIFICATIONS

| | |
|-------------------|--------------------------|
| Engine dry weight | 96.7 kg (213.2 lb) |
| Oil capacity | 3.5 liters (3.7 U.S. qt) |

TORQUE VALUES

| | |
|----------------------|---|
| Engine hanger bolt | |
| 8 mm bolt | 20–30 N·m (2.0–3.0 kg-m, 14–22 ft-lb) |
| 10 mm bolt | 35–45 N·m (3.5–4.5 kg-m, 25–33 ft-lb) |
| Sub-frame bolts | |
| Upper | 60–70 N·m (6.0–7.0 kg-m, 43–51 ft-lb) |
| Lower | 35–45 N·m (3.5–4.5 kg-m, 25–33 ft-lb) |
| Rear axle nut | 85–105 N·m (8.5–10.5 kg-m, 61–76 ft-lb) |
| Rear axle pinch bolt | 20–30 N·m (2.0–3.0 kg-m, 14–22 ft-lb) |
| Final gear case nut | 45–70 N·m (4.5–7.0 kg-m, 33–51 ft-lb) |

ENGINE REMOVAL

Place the motorcycle on its center stand.
Remove the seat and raise the fuel tank.
Remove the left and right frame side covers.
Drain the engine oil (page 2-3) and the coolant (page 6-3).

Remove the rear wheel (page 16-3).

Remove the radiator (page 6-6).

Remove the carburetor (page 4-3).

Remove the exhaust chamber mount bolt.

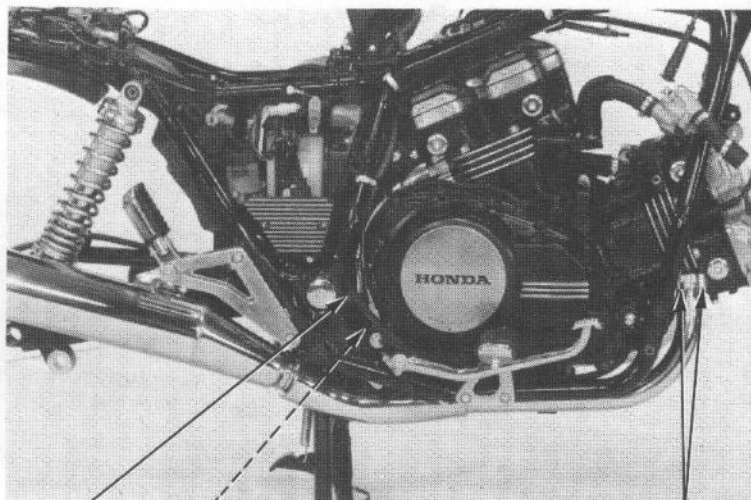
Remove the exhaust muffler mount bolts and joint nuts.

Loosen the exhaust pipe clamp bolts and remove the exhaust mufflers.

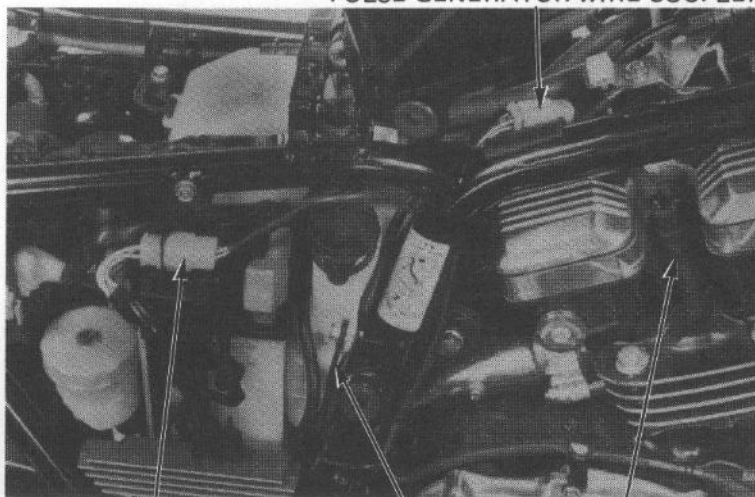
Disconnect the wire couplers for the alternator, oil pressure switch, and pulse generator.

Remove the wire clamp

Disconnect the spark plug caps.

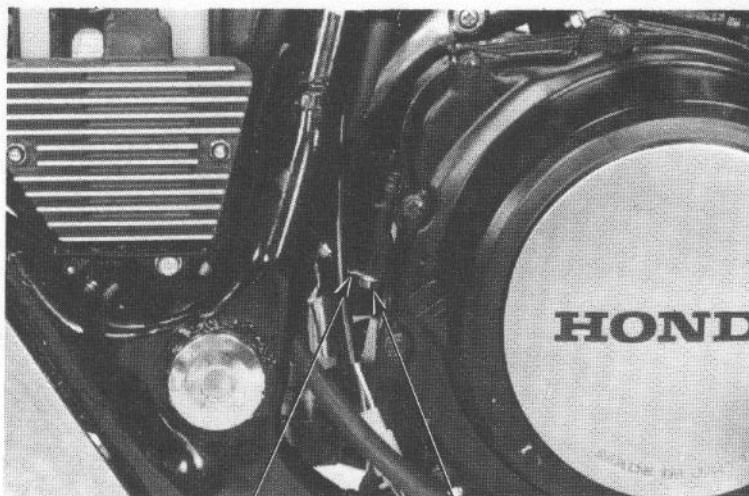


CLAMP BOLT CHAMBER MOUNT BOLT JOINT NUTS
OIL PRESSURE SWITCH AND PULSE GENERATOR WIRE COUPLER



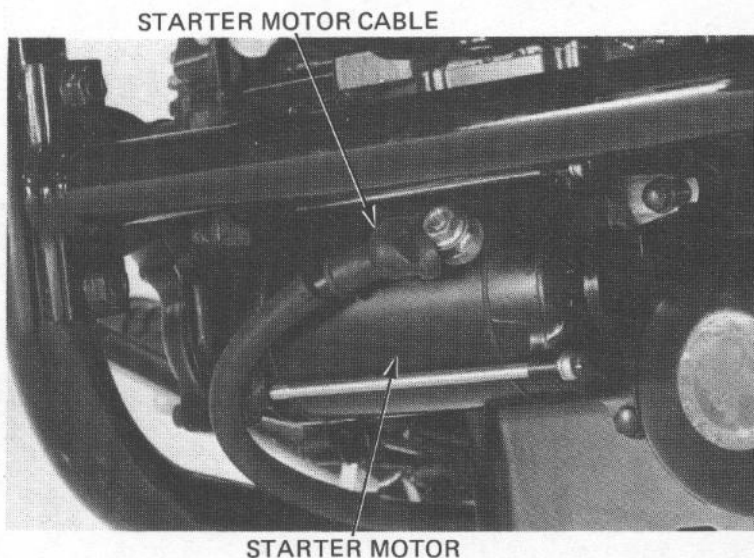
ALTERNATOR WIRE COUPLER WIRE CLAMP SPARK PLUG WIRE

Remove the bolt attaching the ground cable to the crankcase and disconnect the ground cable.



GROUND CABLE BOLT

Disconnect the starter motor cable.



Remove the crankcase rear cover.



Remove the crankcase rear cover front bracket.

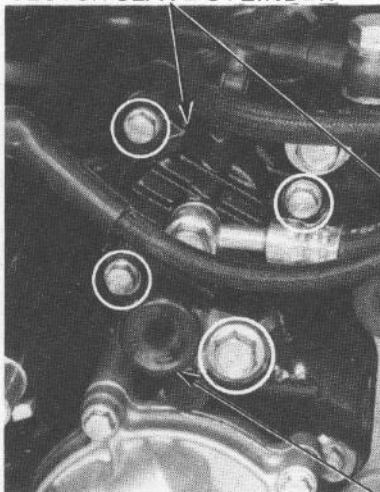
Remove the clutch slave cylinder.

NOTE:

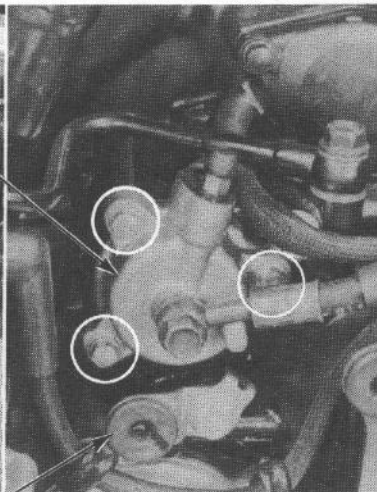
Do not operate the clutch lever after removing the clutch slave cylinder. To do so will cause difficulty in reinstalling the slave cylinder.

'83, '84, '85:

CLUTCH SLAVE CYLINDER



AFTER '85:



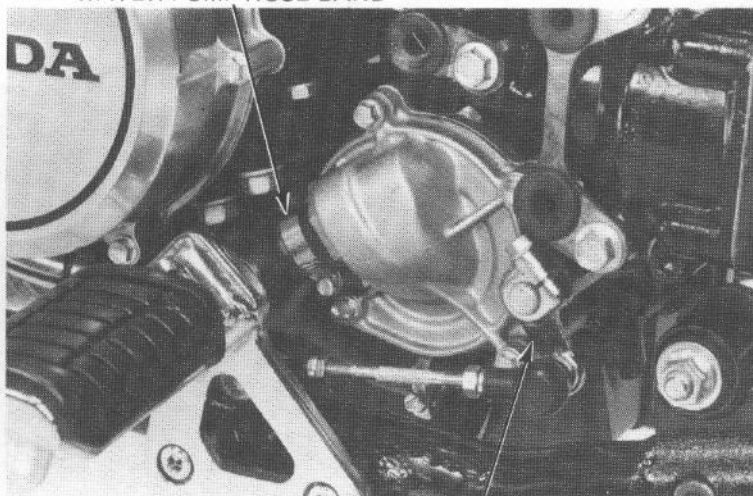
CRANKCASE REAR COVER
FRONT BRACKET

ENGINE REMOVAL/INSTALLATION

Remove the gearshift arm from the shift spindle.

Loosen the water pump hose band.

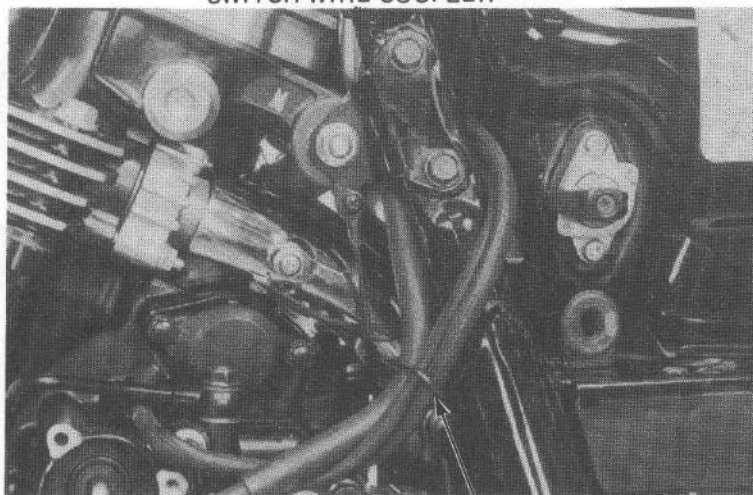
WATER PUMP HOSE BAND



GEARSHIFT ARM

GEARSHAFT INDICATOR
SWITCH WIRE COUPLER

Disconnect the gearshift indicator switch coupler and remove the wire clamp.



WIRE BAND

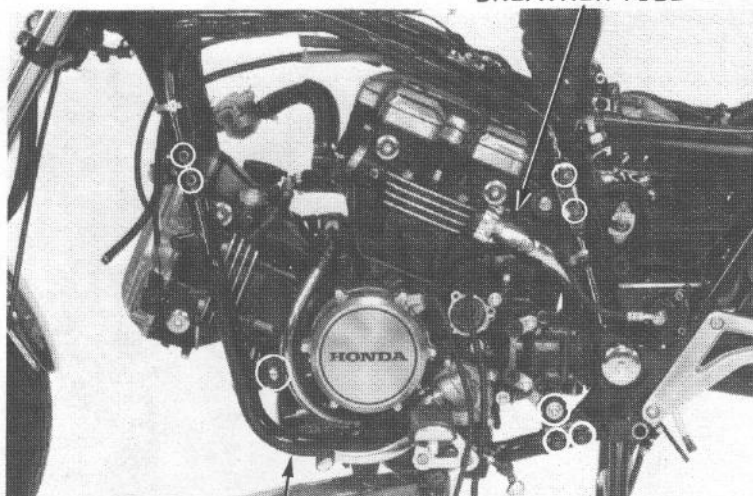
Disconnect the crankcase breather tube.
Place a floor jack or other adjustable support under the engine.

NOTE:

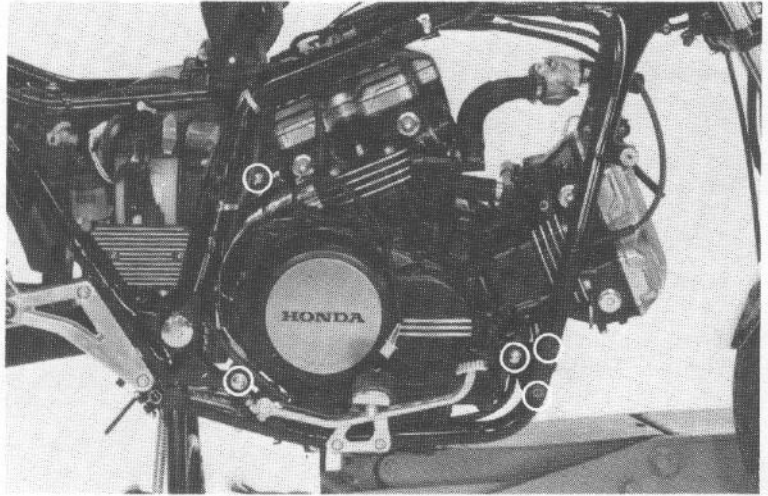
The jack height must be continuously adjusted so that mounting bolts can be removed, and so stress is relieved from other bolts until they are removed.

Remove the engine mounting bolts.
Remove the left sub-frame bolts and the sub-frame.
Remove the engine from the left side.

BREATHER TUBE



LEFT SUB-FRAME



ENGINE INSTALLATION

Check the engine mount rubbers for damage or wear and replace if necessary.

Install the engine mount rubbers.

Engine installation is essentially the reverse of removal.

Use a floor jack or other adjustable support to carefully maneuver the engine into place.

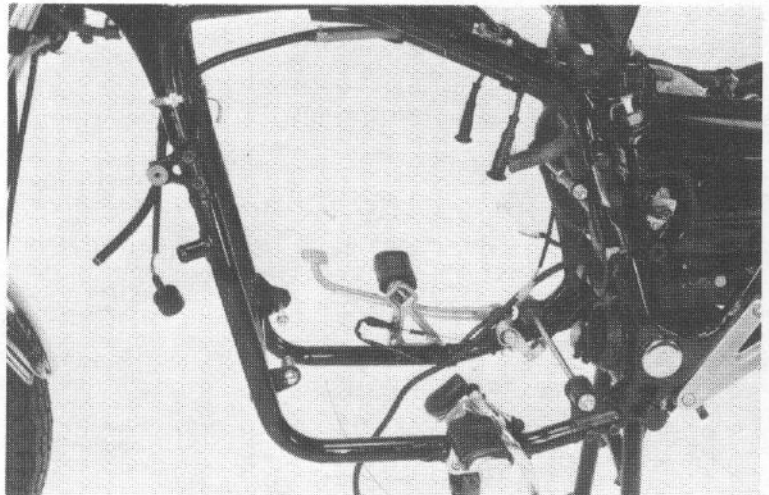
CAUTION:

Carefully align mounting points with the jack to prevent damage to mounting bolt threads and wire harness and cables.

Tighten all fasteners to the torque values given on page 5-1.

NOTE

- Route the wires and cables properly (page 1-9).
- Fill the crankcase to the proper level with the recommended oil (page 2-1).
- Fill the cooling system (page 6-3).
- Perform the following inspection and adjustments:
 - Throttle operation (page 3-6).
 - Clutch (page 3-20).



ENGINE REMOVAL/INSTALLATION

Install the exhaust system:

Install new exhaust pipe joint gaskets.

Assemble the left and right exhaust pipes.

Tighten the exhaust pipe band loosely and install the exhaust pipes.

Hand tighten all bolts and nuts, then torque them in the order given below:

1. Tighten the exhaust pipe joint nuts.

TORQUE: 8–14 N·m

(0.8–1.4 kg-m, 6–10 ft-lb)

2. Tighten the exhaust chamber mounting bolt.

TORQUE: 8–12 N·m

(0.8–1.2 kg-m, 6–9 ft-lb)

3. Tighten the rear muffler hanger setting bolts.

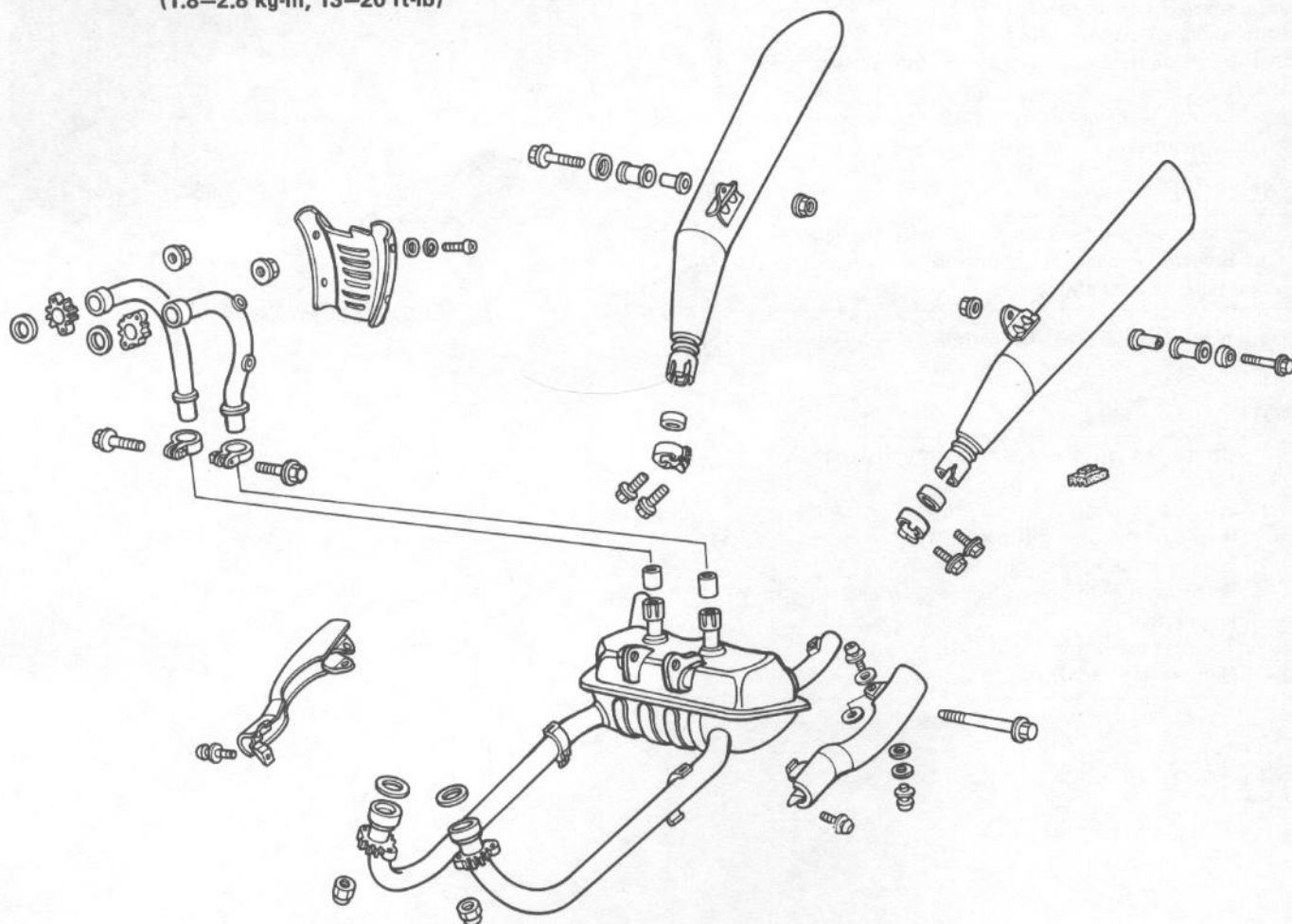
TORQUE: 18–28 N·m

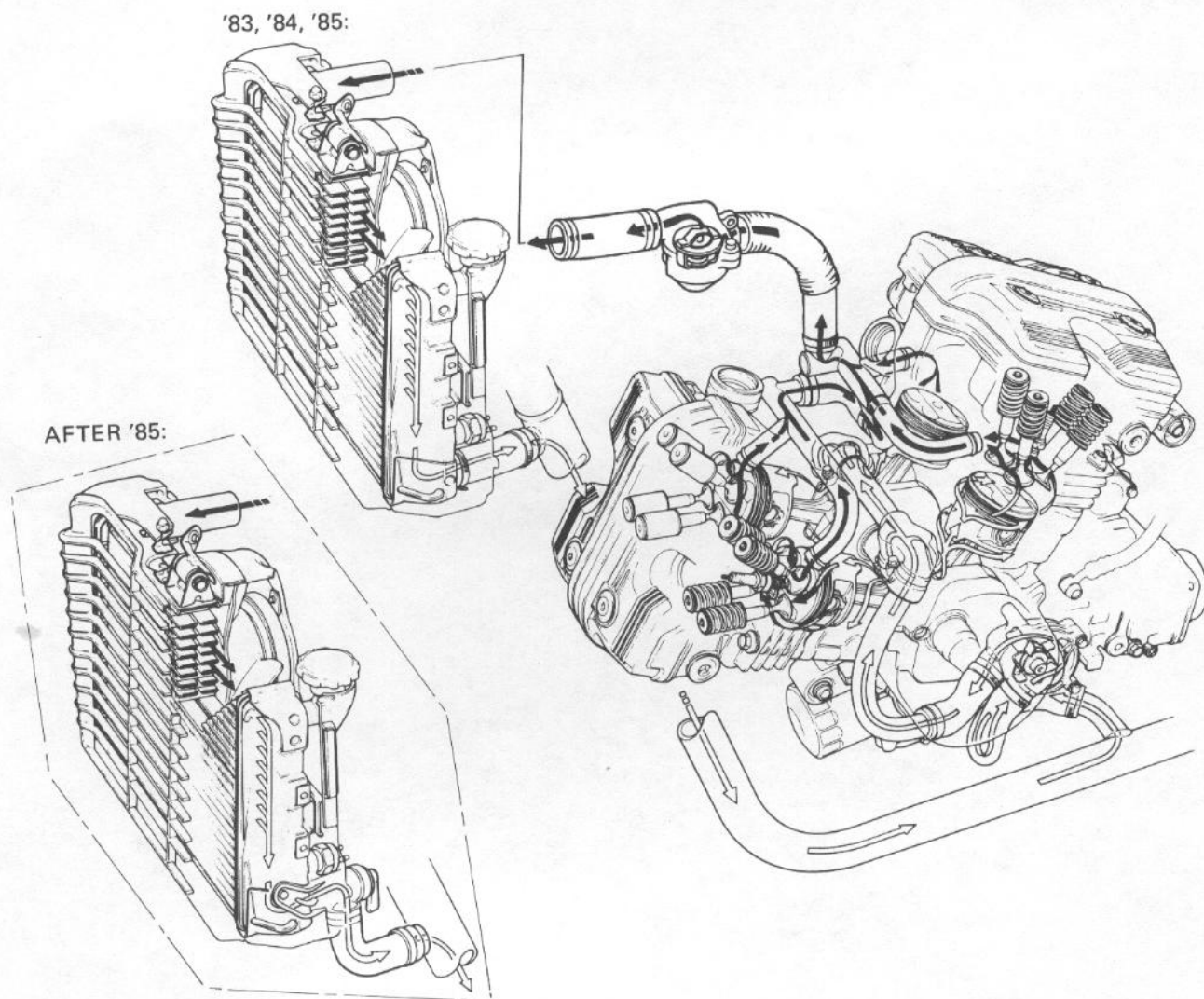
(1.8–2.8 kg-m, 13–20 ft-lb)

4. Tighten the exhaust pipe joint band bolts.

TORQUE: 18–28 N·m

(1.8–2.8 kg-m, 13–20 ft-lb)





6. COOLING SYSTEM

| | | | |
|---------------------|-----|----------------------|------|
| SERVICE INFORMATION | 6-1 | THERMOSTAT | 6-4 |
| TROUBLESHOOTING | 6-1 | RADIATOR/COOLING FAN | 6-6 |
| SYSTEM TESTING | 6-2 | WATER PUMP | 6-10 |
| COOLANT REPLACEMENT | 6-3 | | |

SERVICE INFORMATION

GENERAL

WARNING

Do not remove the radiator cap when the engine is hot. The coolant is under pressure and severe scalding could result. The engine must be cool before servicing the cooling system.

- Use only distilled water and ethylene glycol in the cooling system. A 50–50 mixture is recommended for maximum corrosion protection. Do not use alcohol-based antifreeze.
- Add coolant at the reserve tank. Do not remove the radiator cap except to refill or drain the system.
- All cooling system service can be made with the engine in the frame.
- Avoid spilling coolant on painted surfaces.
- After servicing the system, check for leaks with a cooling system tester.
- Refer to Section 21 for fan motor thermostatic switch and temperature sensor inspections.

SPECIFICATIONS

| | |
|--|--|
| Radiator cap relief pressure | 0.75–1.05 kg/cm ² (10.7–14.9 psi) |
| Freezing point | 55% Distilled water + 45% ethylene glycol: –32°C (–25°F) 50% Distilled water + 50% ethylene glycol: –37°C (–34°F) 45% Distilled water + 55% ethylene glycol: –44.5°C (–48°F) |
| Coolant capacity: Radiator and engine Reserve tank Total system | 3.0 liters (3.2 US qt) 0.45 liters (0.5 US qt) 3.45 liters (3.65 US qt) 3.2 liters (3.38 US qt) |
| | '83, '84, '85: After '85: |
| Thermostat | Begins to open: 80° to 84°C (176° to 183°F) Valve lift: Minimum of 8 mm at 95°C (0.315 in. at 203°F) |
| Boiling point (with 50–50 mixture): | Unpressurized: 107.7°C (226°F) Cap on, pressurized: 125.6°C (258°F) |

TOOLS

Special

Cooling system tester

Commercially available in U.S.A.

TROUBLESHOOTING

Engine temperature too high

1. Faulty temperature gauge or gauge sensor
2. Thermostat stuck closed
3. Faulty radiator cap
4. Insufficient coolant
5. Passages blocked in radiator, hoses, or water jacket
6. Fan blades bent
7. Faulty fan motor

Engine temperature too low

1. Faulty temperature gauge or gauge sensor
2. Thermostat stuck open

Coolant leaks

1. Faulty pump mechanical seal
2. Deteriorated O-rings

COOLING SYSTEM

SYSTEM TESTING

COOLANT

Test the coolant mixture with an antifreeze tester. For maximum corrosion protection, a 50–50% solution of ethylene glycol and distilled water is recommended.



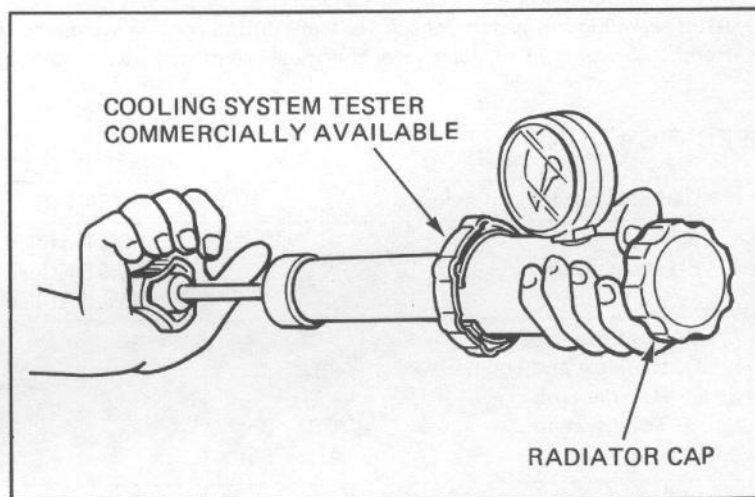
RADIATOR CAP INSPECTION

Pressure test the radiator cap. Replace the radiator cap if it does not hold pressure, or if relief pressure is too high or too low. It must hold specified pressure for at least six seconds.

NOTE

Before installing the cap on the tester, apply water to sealing surfaces.

RADIATOR CAP RELIEF PRESSURE:
0.75–1.05 kg/cm² (10.7–14.9 psi)

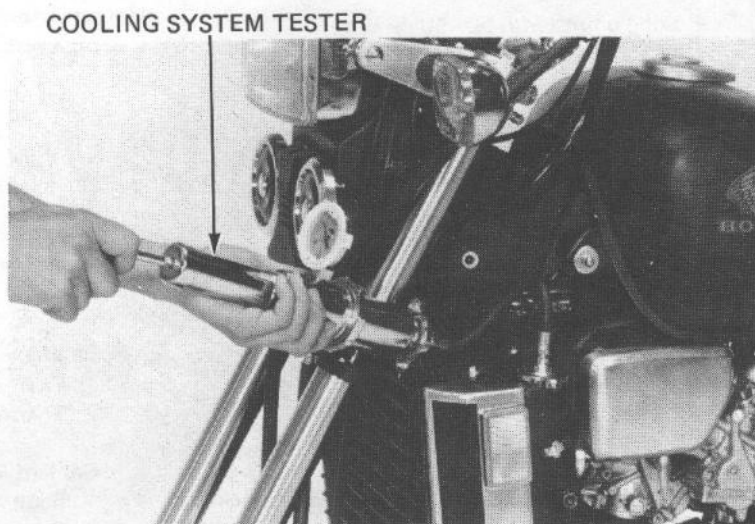


Pressurize the radiator, engine, and hoses, and check for leaks.

CAUTION:

*Excessive pressure can damage the radiator.
Do not exceed 1.05 kg/cm² (14.9 Psi)*

Repair or replace components if the system will not hold specified pressure for at least six seconds.

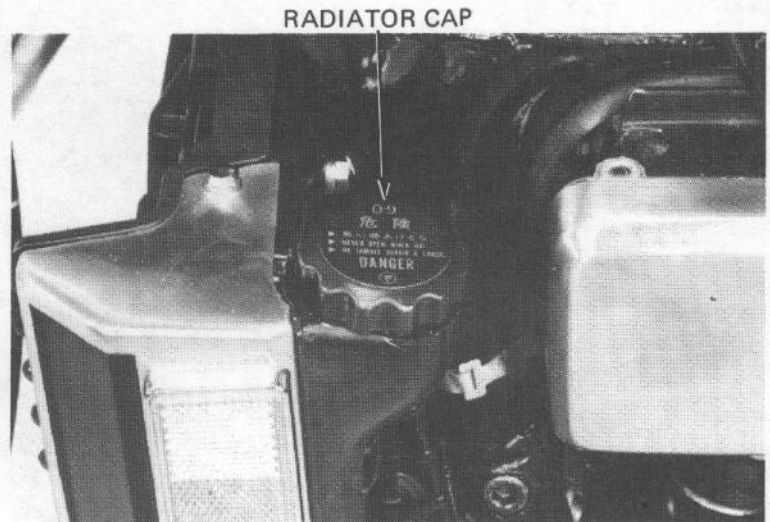


COOLANT REPLACEMENT

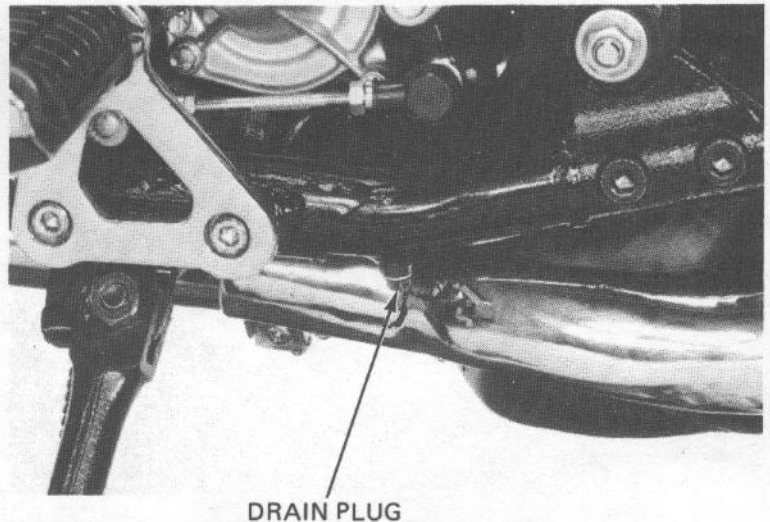
CAUTION:

The engine must be cool before servicing the cooling system, or severe scalding may result.

Remove the radiator cap.



Drain the coolant from the radiator by removing the drain plug located at the lower left sub-frame.



Drain the coolant from the engine by removing the drain bolts at the water pump cover and cylinder heads.

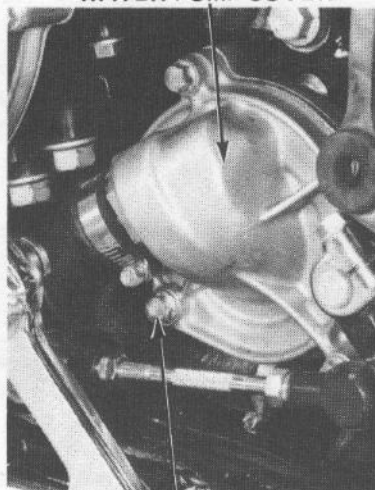
Replace the drain plug and bolts.

Fill the system with a 50–50 mixture of distilled water and ethylene glycol.

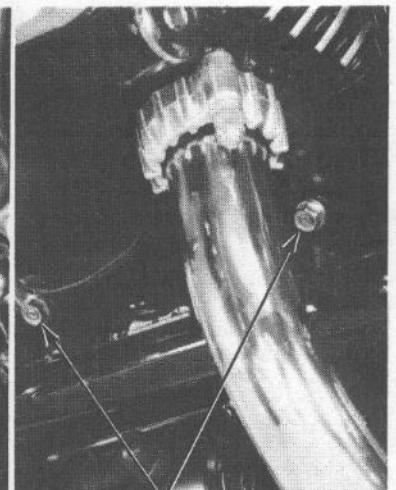
Bleed air from the radiator.

- Start the engine and run until there are no air bubbles in the coolant, and the level stabilizes.
- Stop the engine and add coolant up to the proper level if necessary.
- Reinstall the radiator cap.
- Check the level of coolant in the reserve tank and fill to the correct level if the level is low.

WATER PUMP COVER



DRAIN BOLT



DRAIN BOLTS

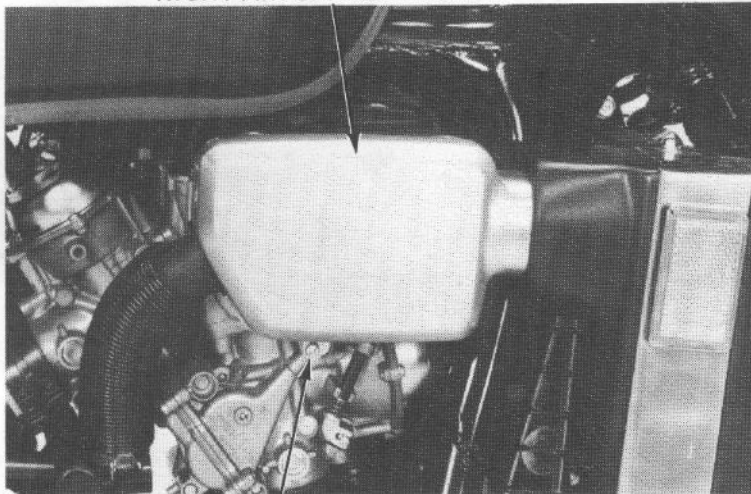
THERMOSTAT

REMOVAL

Remove the coolant drain plug and drain the coolant (page 6-3).

Remove the right air chamber cover attaching screw and the cover.

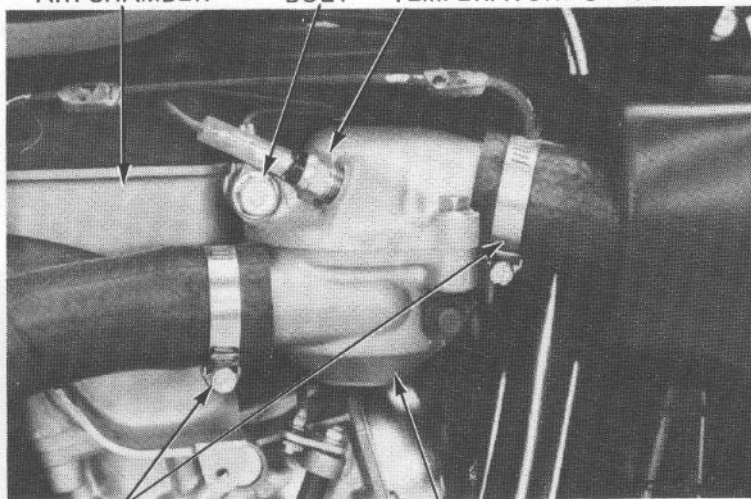
RIGHT AIR CHAMBER COVER



SCREW

Disconnect the wire from the temperature sensor. Remove the bolt that attaches the thermostat housing to the air chamber. Loosen the hose bands. Remove the thermostat housing.

AIR CHAMBER BOLT TEMPERATURE SENSOR

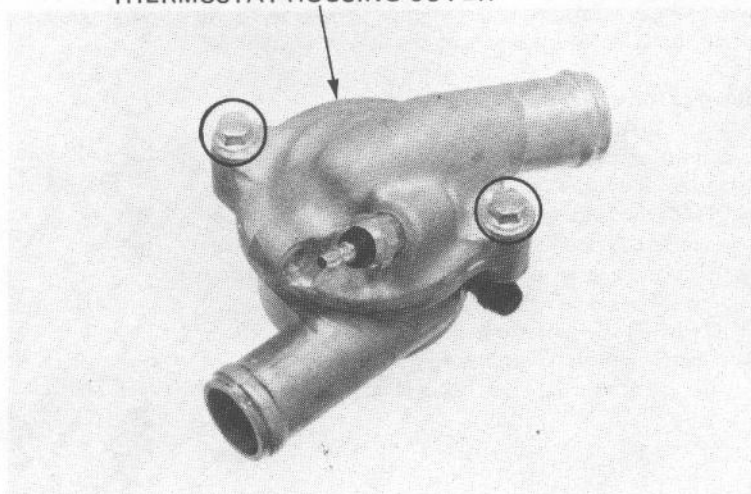


HOSE BANDS

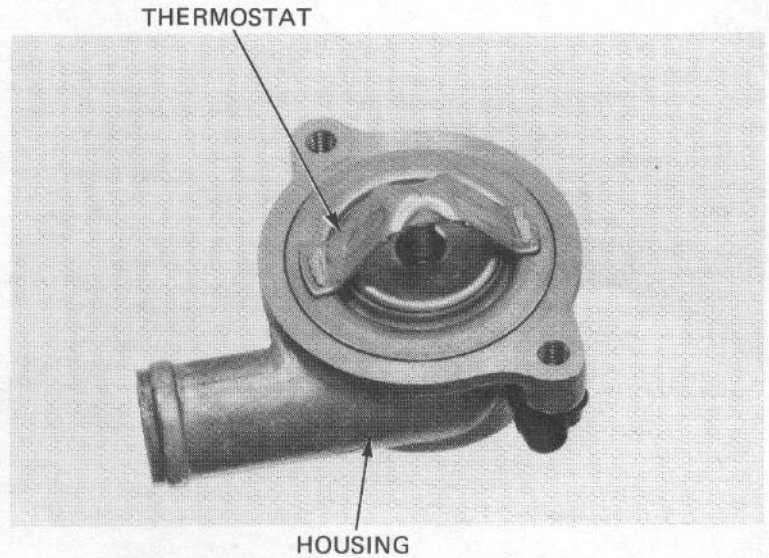
THERMOSTAT HOUSING

Remove the thermostat housing cover.

THERMOSTAT HOUSING COVER



Remove the thermostat from the housing.



INSPECTION

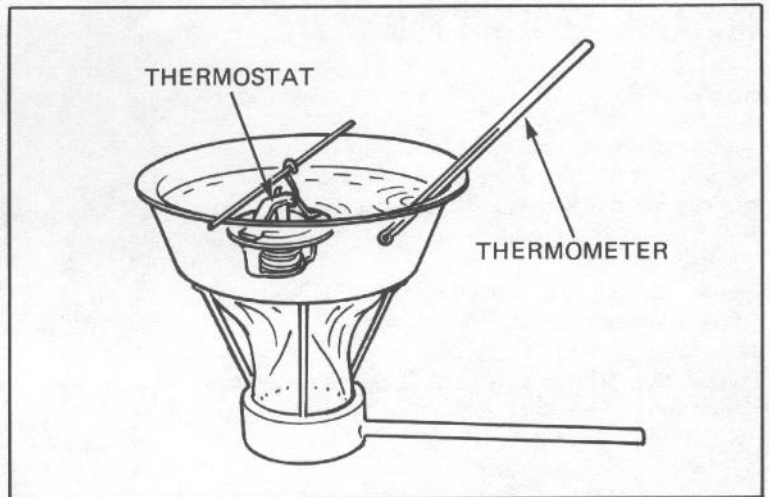
Inspect the thermostat visually for damage. Suspend the thermostat in heated water to check its operation.

Do not let the thermostat or thermometer touch the pan or false readings will result.

Replace thermostat if valve stays open at room temperature, or if it responds at temperatures other than those specified.

Technical Data

| | |
|---------------|--|
| Start to open | 80° to 84°C (176°–183°F) |
| Valve lift | 8 mm minimum (0.31 in) when heated to 95°C (203°F) for five minutes. |

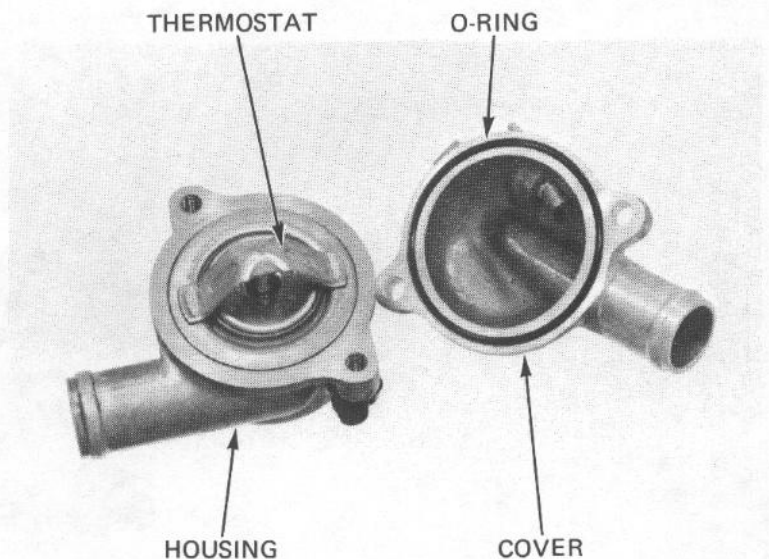


INSTALLATION

Insert the thermostat into the housing.

Install a new O-ring on the thermostat housing cover.

Install the thermostat housing cover and tighten the bolts.



COOLING SYSTEM

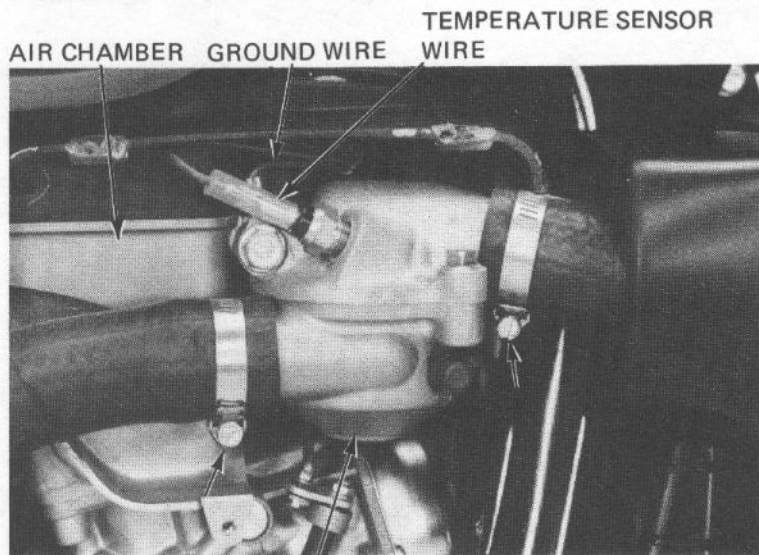
Connect the housing to the hoses and tighten the hose bands.

Secure the thermostat housing to the air chamber with the bolt attaching the ground wire terminal at the same time.

Connect the temperature sensor wire to the sensor.

Install the right air chamber cover.

Fill the cooling system (page 6-3).



THERMOSTAT HOUSING

RADIATOR/COOLING FAN

REMOVAL

Remove the seat and raise the fuel tank after making sure that the tank is less than half full.

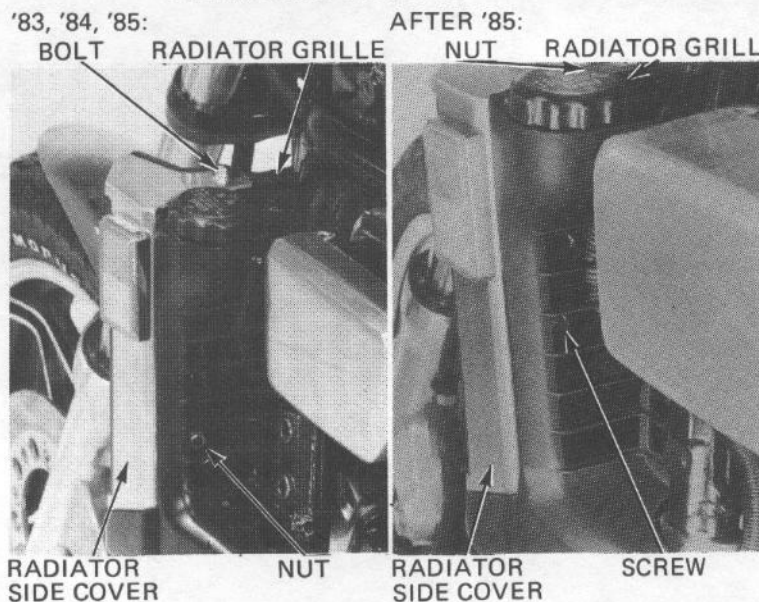
Remove the drain plug and drain the coolant (page 6-3).

'83, '84, '85:

Loosen the radiator side cover attaching bolts and nuts and remove the side covers and grill.

After '85:

Loosen the radiator side cover attaching nuts and screws and remove the side cover and grill.

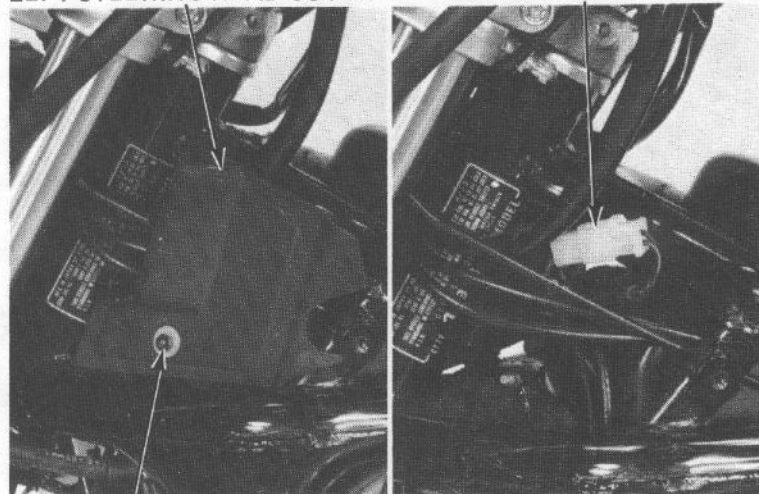


LEFT STEERING HEAD COVER

FAN MOTOR COUPLER

Remove the left steering head cover attaching nut and cover.

Disconnect the fan motor coupler.



NUT

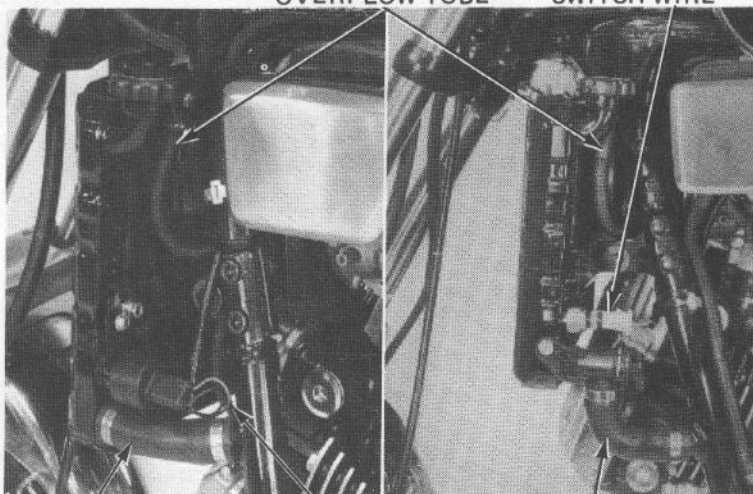
Disconnect the overflow tube at the radiator filler neck.

Disconnect the thermostatic switch wires from the switch.

Loosen the lower radiator hose band.

'83, '84, '85:

AFTER '85:



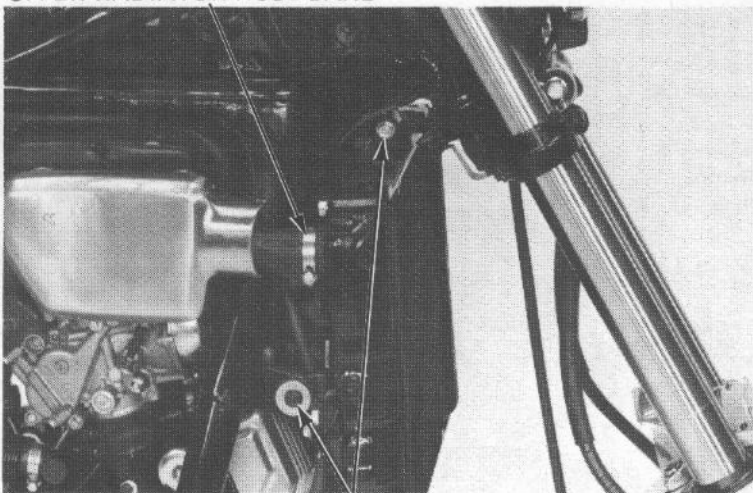
LOWER RADIATOR HOSE
THERMOSTATIC SWITCH WIRES
UPPER RADIATOR HOSE BAND

LOWER RADIATOR HOSE

Loosen the upper radiator hose band.

Remove the radiator mounting bolts.

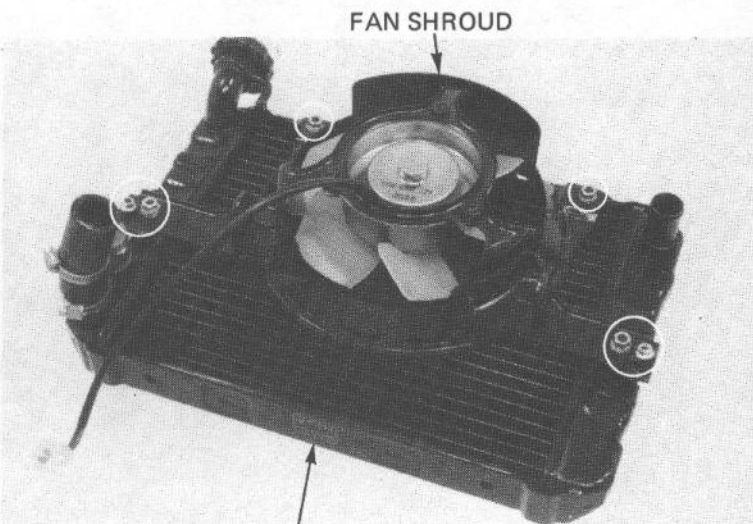
Remove the radiator while pulling the upper and lower hoses off.



RADIATOR MOUNTING BOLTS

DISASSEMBLY

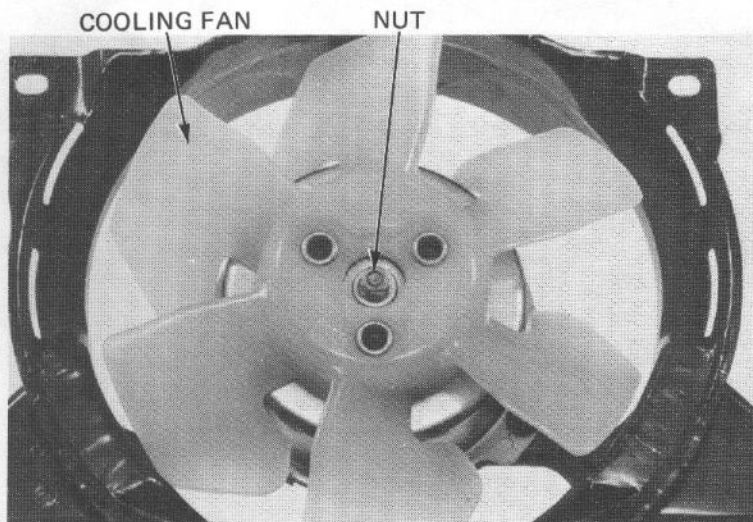
Remove the four nuts attaching the fan shroud to the radiator and remove the shroud.



RADIATOR

COOLING SYSTEM

Remove the fan attaching nut and pull the fan off the fan motor.



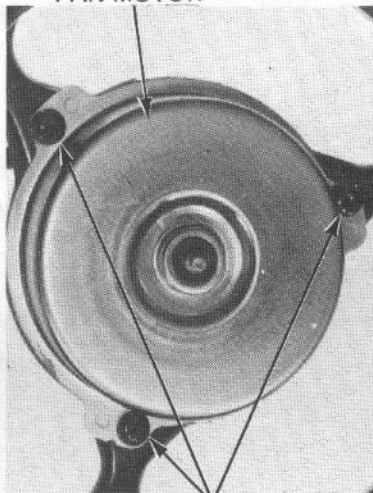
'83, '84, '85:

Remove the screws attaching the fan motor to the fan shroud.

After '85:

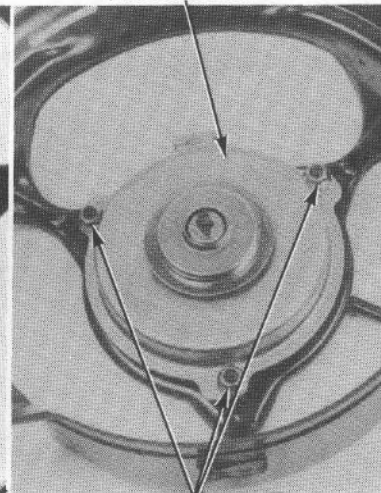
Remove the nuts attaching the fan motor to the fan shroud.

'83, '84, '85:
FAN MOTOR



SCREWS

AFTER '85:
FAN MOTOR



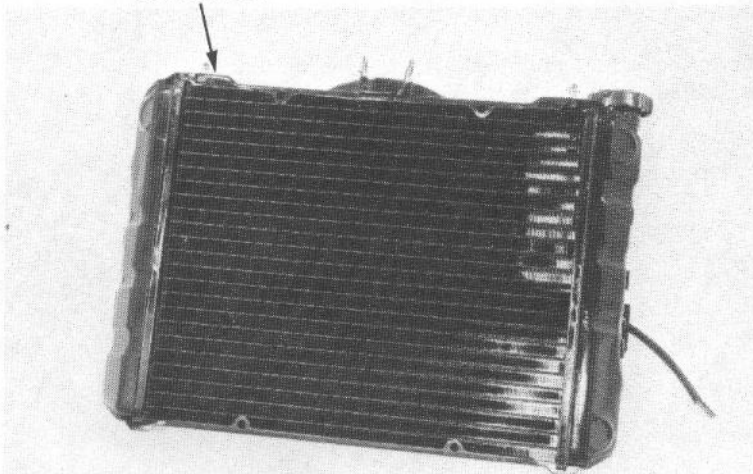
NUTS

RADIATOR INSPECTION

Inspect the radiator soldered joints and seams for leaks.

Blow dirt out from between core fins with compressed air. If insects, etc., are clogging the radiator, wash them off with low pressure water.

RADIATOR

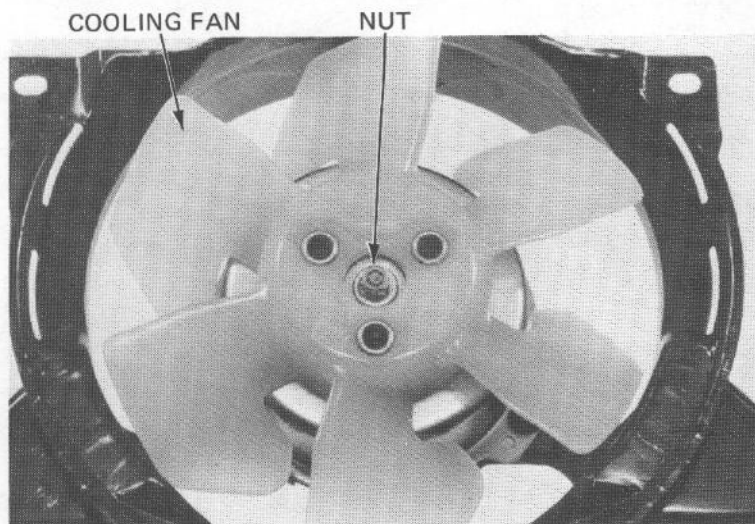


ASSEMBLY

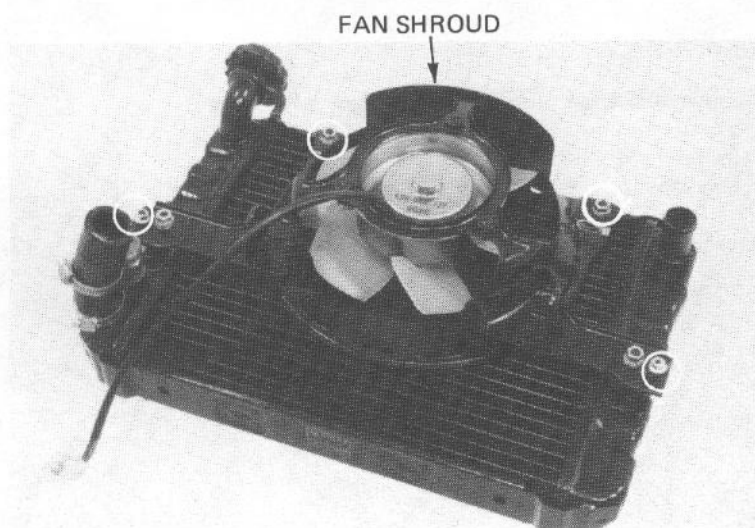
Install the fan motor onto the fan shroud and tighten the three screws.

Install the fan over the motor shaft.

Apply a locking agent to the fan motor shaft threads, install and torque the plain washer, lock washer and nut.



Install the fan shroud onto the radiator and tighten the four nuts.



INSTALLATION

Install the upper and lower hoses onto the radiator.

Install the radiator onto the frame and tighten the mounting bolts.

Connect the upper and lower hoses and tighten the hose bands.

Connect the wires to the thermostatic switch.

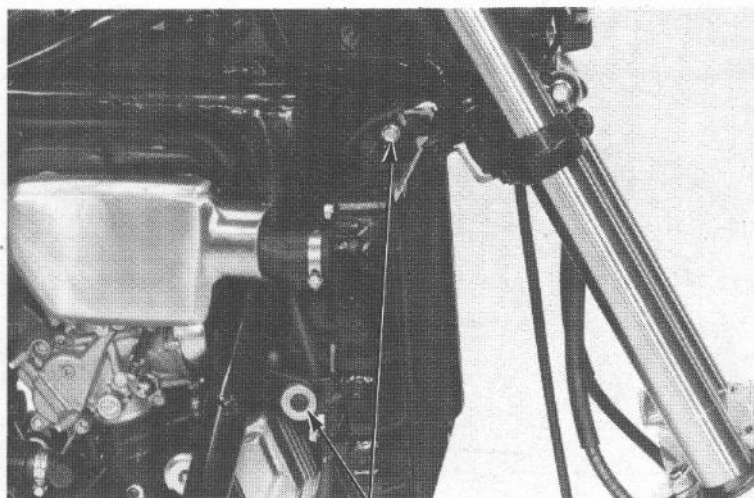
Connect the overflow tube to the filler neck.

Install the radiator grille and side covers.

Connect the fan motor coupler and install the left steering head cover.

Fill the cooling system (page 6-3).

Install the fuel tank and seat.



RADIATOR MOUNTING BOLTS

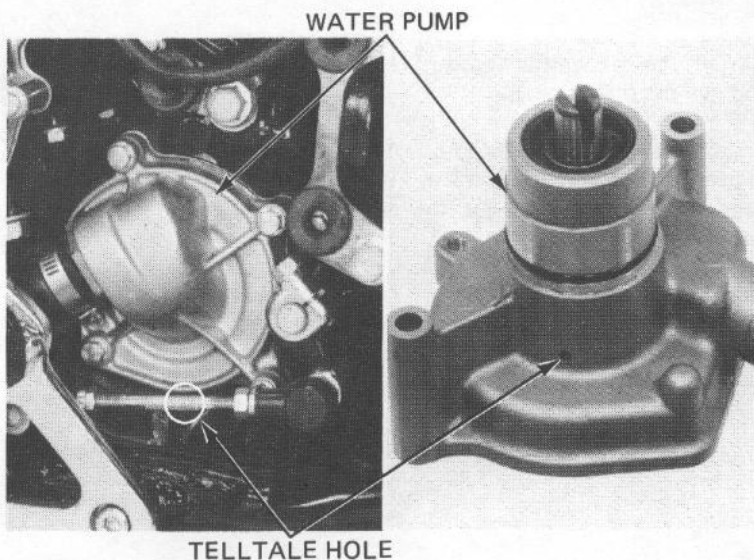
WATER PUMP

MECHANICAL SEAL INSPECTION

Remove the crankcase rear cover.

Inspect the telltale hole for signs of mechanical seal coolant leakage.

Replace the water pump as an assembly if the mechanical seal is leaking.

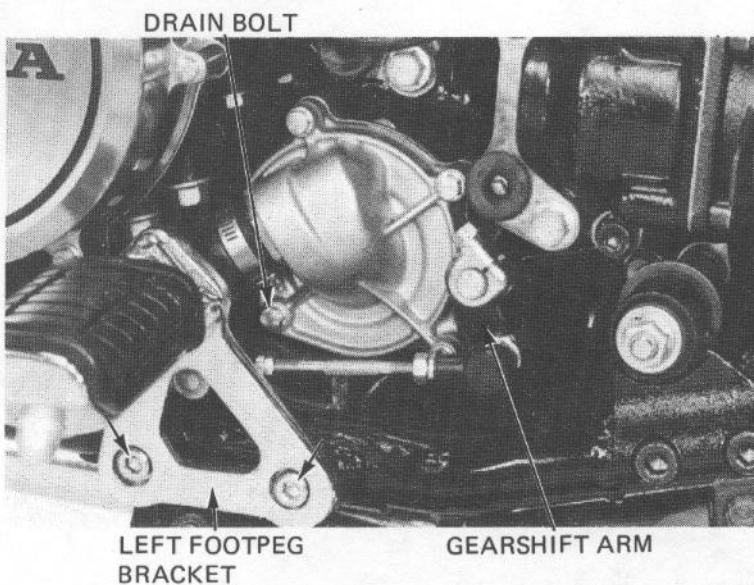


REMOVAL

Remove the drain plug from the lower left frame and drain the coolant.

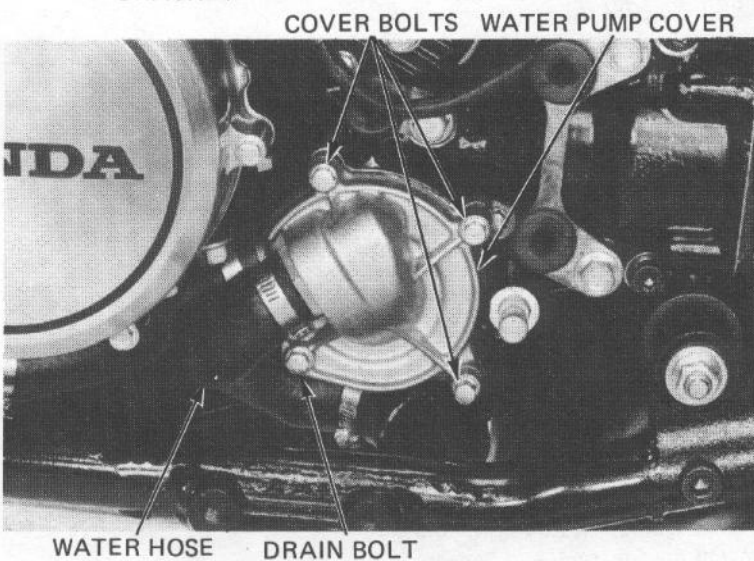
Remove the drain bolt at the water pump and drain the coolant from the cylinders.

Remove the gearshift arm and left footpeg bracket.

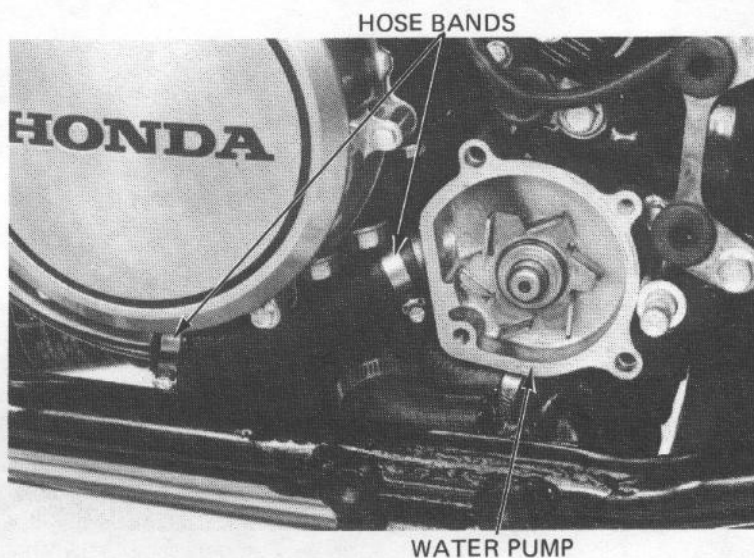


Disconnect the water hose from the water pump cover.

Remove the water pump cover bolts and cover.

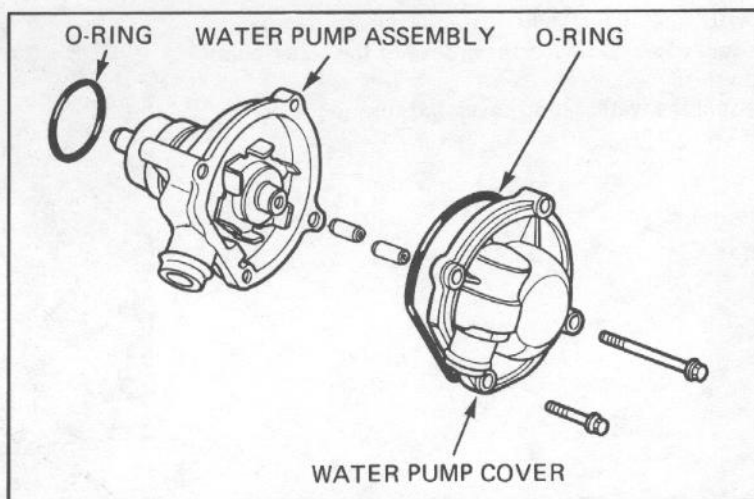


Loosen the water hose bands.
Remove the water pump from the crankcase.



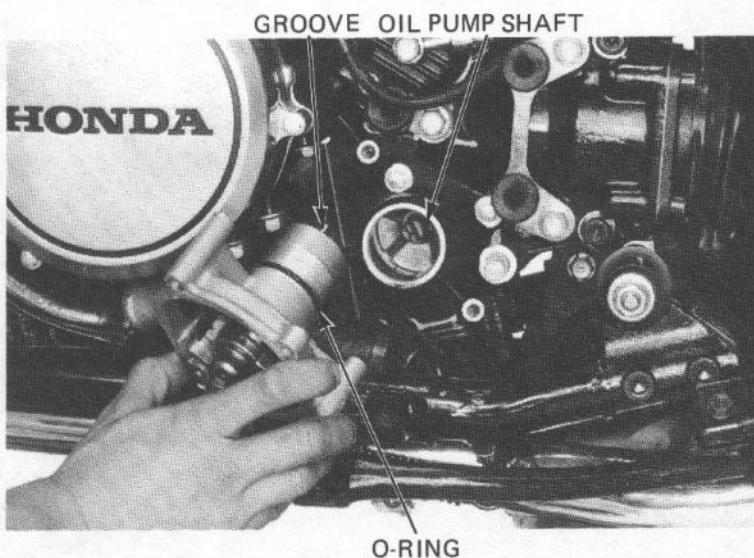
INSPECTION

Check the water pump for mechanical seal leakage and bearing deterioration.
Replace the water pump as an assembly if necessary.



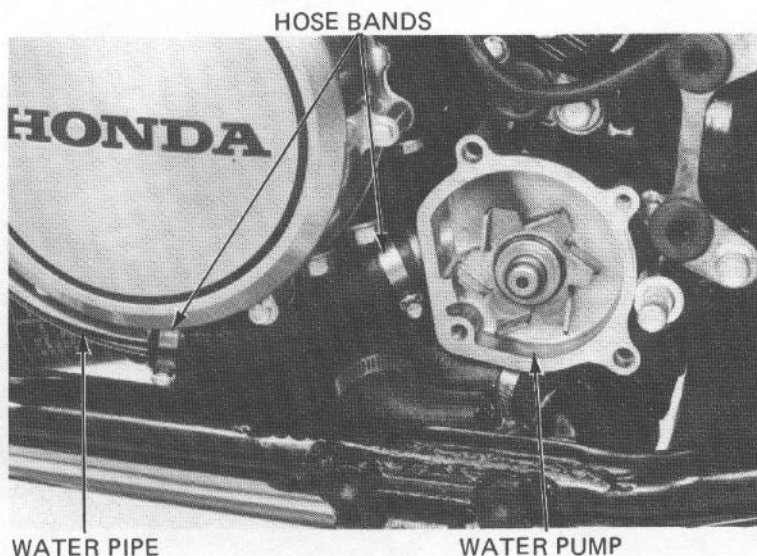
INSTALLATION

Apply a coat of clean engine oil to a new O-ring and install it in the water pump groove.
Align the water pump shaft groove with the oil pump shaft and insert the water pump into the crankcase.

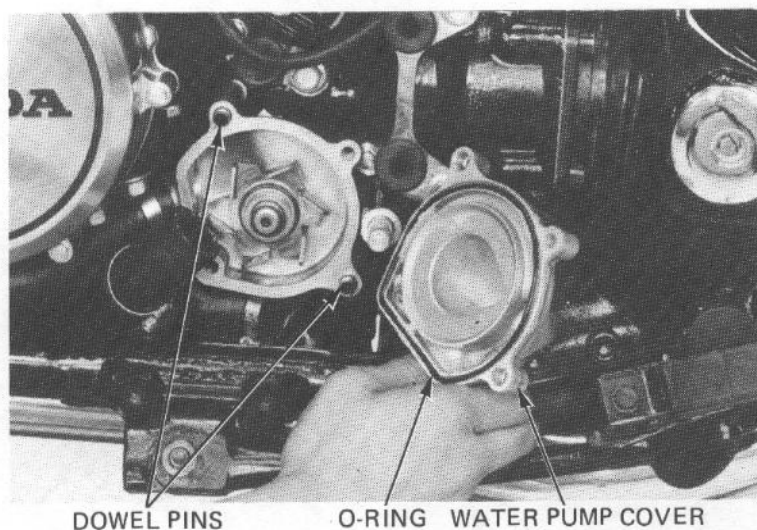


COOLING SYSTEM

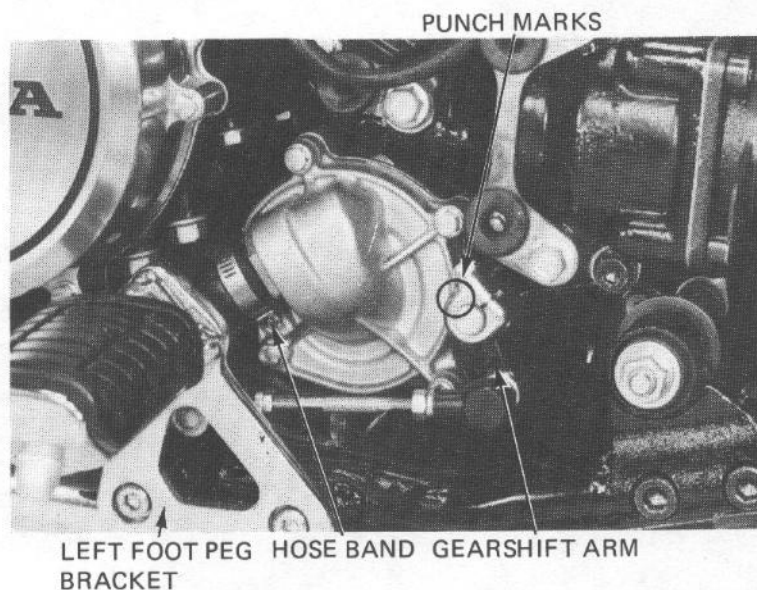
Connect the water hose to the water pipe and the water pump and tighten the hose bands.

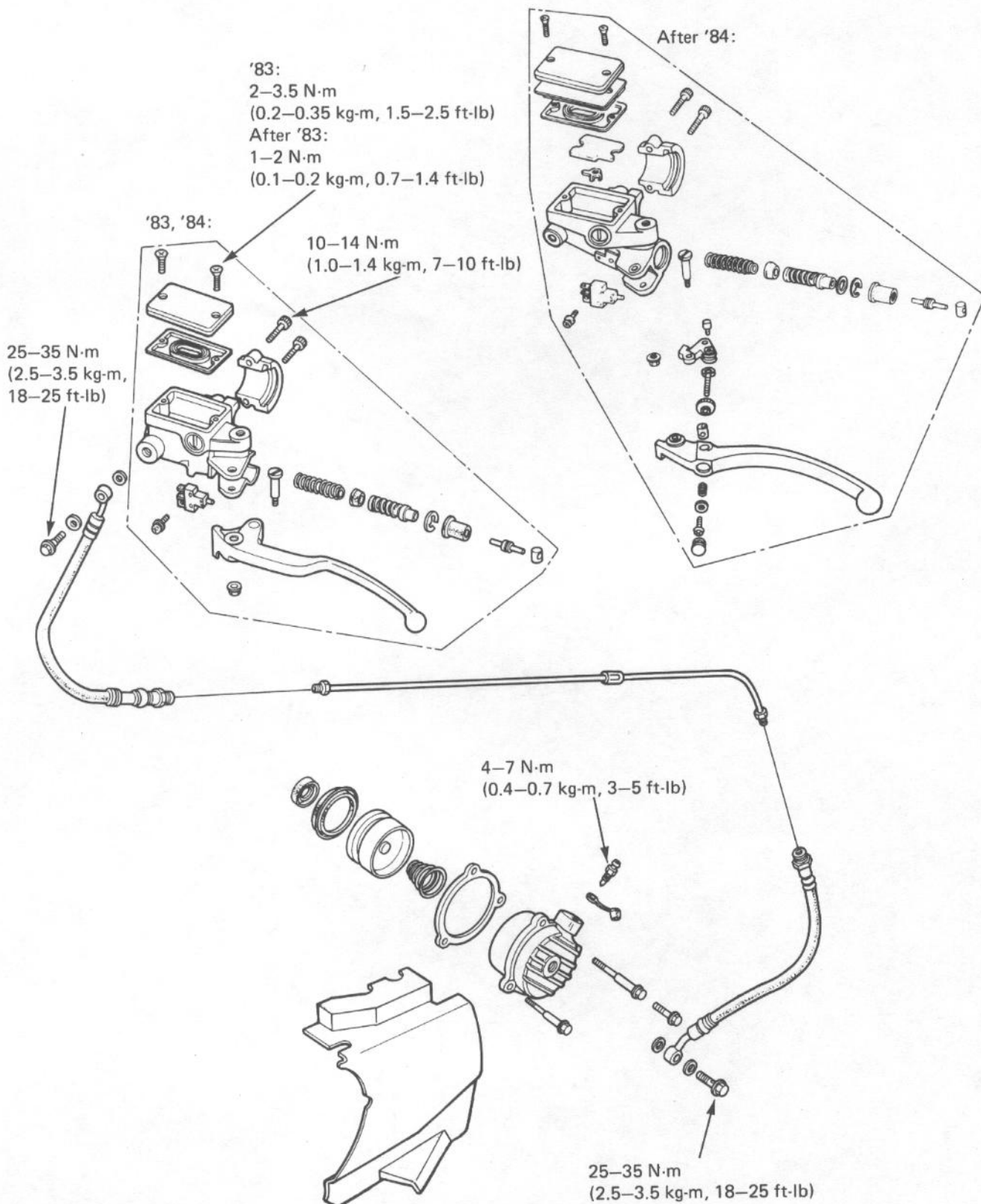


Insert the dowel pins into the water pump, and install a new O-ring in the groove of the water pump cover. Install the water pump cover and torque the bolts.



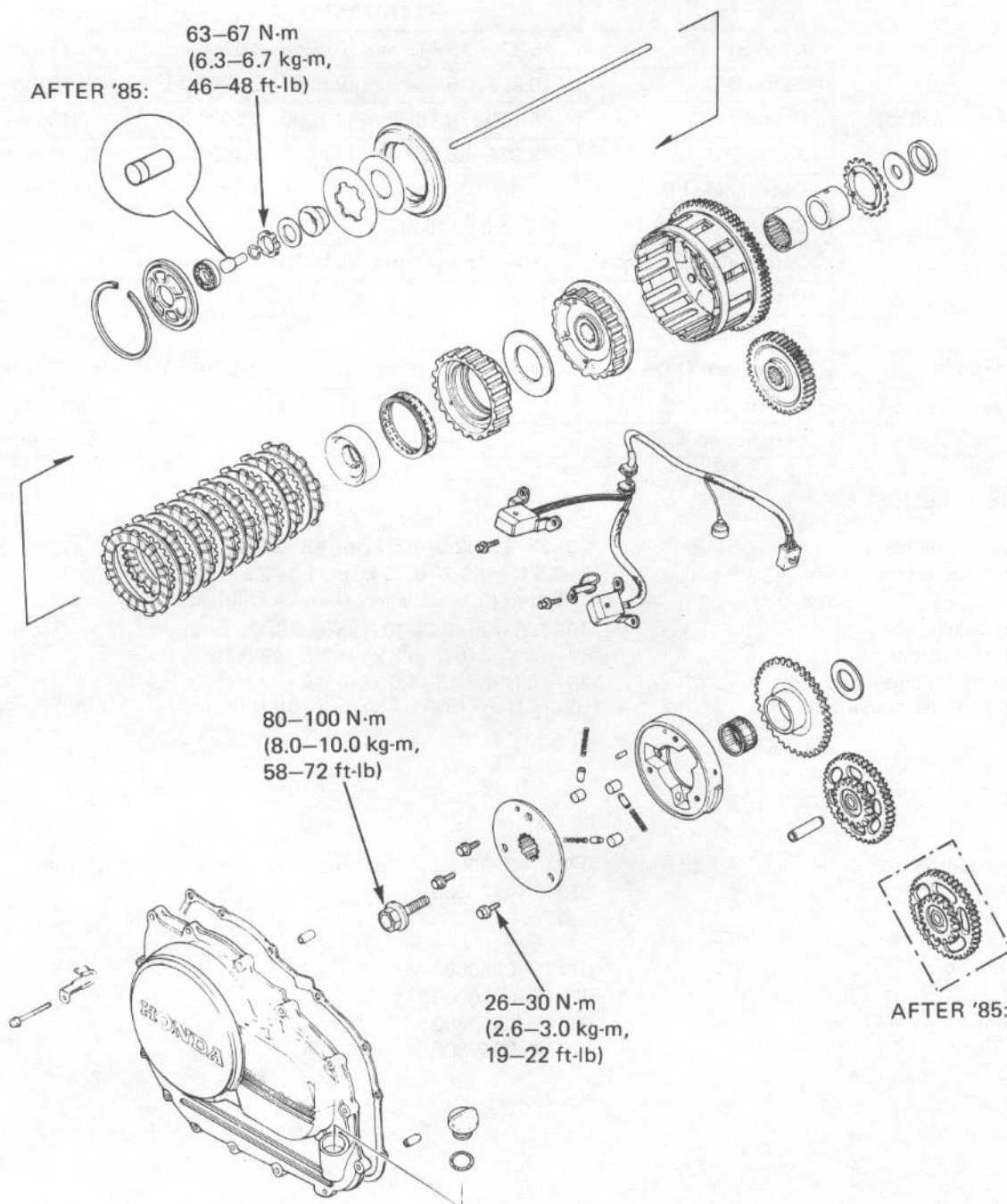
Install the left foot peg bracket. Align the punch marks on the gearshift arm and the spindle, and install the gearshift arm. Install the crankcase rear cover. Tighten the drain plug at the left sub-frame. Fill the system with a 50–50 mixture of distilled water and ethylene glycol (page 6-3).





7. CLUTCH

| | | | |
|---|-----|----------------------------|------|
| SERVICE INFORMATION | 7-2 | CLUTCH COVER REMOVAL | 7-11 |
| TROUBLESHOOTING | 7-3 | STARTER CLUTCH DISASSEMBLY | 7-11 |
| CLUTCH FLUID REPLACEMENT/ AIR BLEEDING | 7-4 | CLUTCH DISASSEMBLY | 7-13 |
| CLUTCH MASTER CYLINDER | 7-6 | CLUTCH ASSEMBLY | 7-18 |
| CLUTCH SLAVE CYLINDER | 7-8 | STARTER CLUTCH ASSEMBLY | 7-22 |
| | | CLUTCH COVER INSTALLATION | 7-24 |



SERVICE INFORMATION

GENERAL

- This section covers removal and installation of the clutch hydraulic system, clutch, and starter clutch.
- DOT-4 brake fluid is used for the hydraulic clutch and is referred to as clutch fluid in the section. Do not use other types of fluid as they are not compatible.
- Clutch maintenance can be done with the engine in the frame.

SPECIFICATIONS

| | | STANDARD | SERVICE LIMIT |
|------------------------|-----------------------|--------------------------------------|---------------------|
| Clutch master cylinder | Cylinder I.D. | 15.870–15.913 mm (0.6248–0.6265 in) | 15.93 mm (0.627 in) |
| | Piston O.D. | 15.827–15.854 mm (0.6231–0.6242 in) | 15.80 mm (0.622 in) |
| Clutch slave cylinder | Cylinder I.D. | 38.100–38.162 mm (1.5000–1.5024 in) | 38.18 mm (1.503 in) |
| | Piston O.D. | 38.036–38.075 mm (1.4975–1.4990 in) | 38.02 mm (1.497 in) |
| Clutch | Outer guide I.D. | 29.995–30.012 mm (1.1809–1.1816 in) | 30.08 mm (1.184 in) |
| | Spring free height | 4.6 mm (0.18 in) | 3.6 mm (0.14 in) |
| | Spring preload/length | 115–135 kg/2 mm (254–298 lb/0.08 in) | — |
| | Disc thickness | 3.72–3.88 mm (0.147–0.153 in) | 3.1 mm (0.12 in) |
| | Plate warpage | — | 0.30 mm (0.012 in) |
| Starter clutch | Driven gear O.D. | 54.170–54.200 mm (2.1327–2.1339 in) | 54.16 mm (2.132 in) |
| One way clutch | Clutch center B I.D. | | 74.50 mm (2.933 in) |
| | Clutch inner O.D. | | 57.70 mm (2.271 in) |

TORQUE VALUES

| | |
|-----------------------------------|--|
| Clutch hose oil bolts | 25–35 N·m (2.5–3.5 kg-m, 18–25 ft-lb) |
| Clutch fluid reservoir cover '83: | 2–3.5 N·m (0.2–0.35 kg-m, 1.4–2.5 ft-lb) |
| After '83: | 1–2 N·m (0.1–0.2 kg-m, 0.7–1.4 ft-lb) |
| Starter clutch bolt | 80–100 N·m (8.0–10.0 kg-m, 58–72 ft-lb) |
| Clutch center lock nut | 63–67 N·m (6.3–6.7 kg-m, 46–48 ft-lb) |
| Starter clutch cover bolt | 26–30 N·m (2.6–3.0 kg-m, 19–22 ft-lb) |
| Master cylinder holder bolt | 10–14 N·m (1.0–1.4 kg-m, 7–10 ft-lb) |

TOOLS

Special

| | |
|------------------|---|
| Snap ring pliers | 07914–3230001 — Equivalent tool commercially available. |
| Lock nut wrench | 07916–4220000 |

Common

| | |
|------------------------|---------------|
| Universal holder | 07725–0030000 |
| Driver | 07749–0010000 |
| Attachment, 42 x 47 mm | 07746–0010300 |
| Pilot, 35 mm | 07746–0040800 |

TROUBLESHOOTING

Clutch lever soft or spongy

1. Air bubbles in hydraulic system
2. Low fluid level
3. Hydraulic system leaking

Clutch lever too hard

1. Sticking piston(s)
2. Clogged hydraulic system

Clutch slips

1. Hydraulic system sticking
2. Discs worn
3. Springs weak

Clutch will not disengage

1. Air bubbles in hydraulic system
2. Low fluid level
3. Hydraulic system leaking
4. Hydraulic system sticking
5. Plates warped

Motocycle creeps with clutch disengaged

1. Air bubbles in hydraulic system
2. Low fluid level
3. Hydraulic system leaking
4. Hydraulic system sticking
5. Plates warped

Excessive lever pressure

1. Hydraulic system sticking
2. Lifter mechanism damaged

Clutch operation feels rough

1. Outer drum slots rough
2. Sticking piston(s)

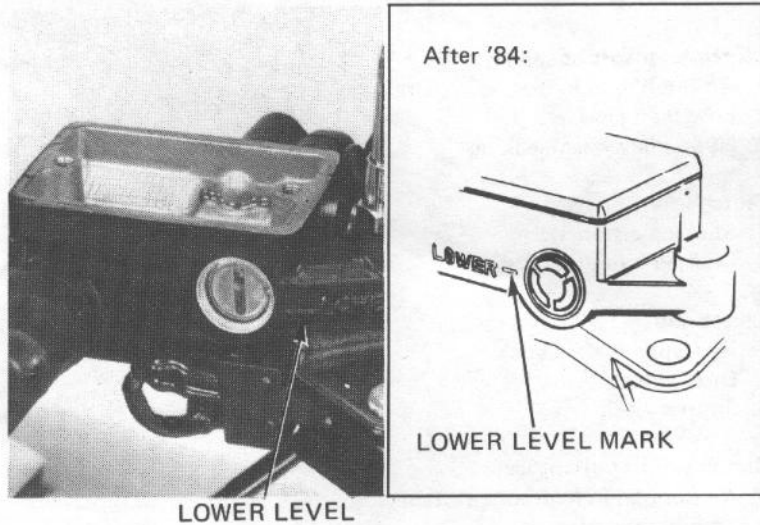
CLUTCH

CLUTCH FLUID REPLACEMENT/ AIR BLEEDING

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

CAUTION:

- Install the diaphragm on the reservoir when operating the clutch lever. Failure to do so will allow clutch fluid to squirt out of the reservoir during clutch operation.
- Avoid spilling fluid on painted surfaces. Place a rag over the fuel tank whenever the system is serviced.



CLUTCH FLUID DRAINING

Connect a bleed hose to the bleed valve. Loosen the slave cylinder bleed valve and pump the clutch lever. Stop operating the lever when no fluid flows out of the bleed valve.

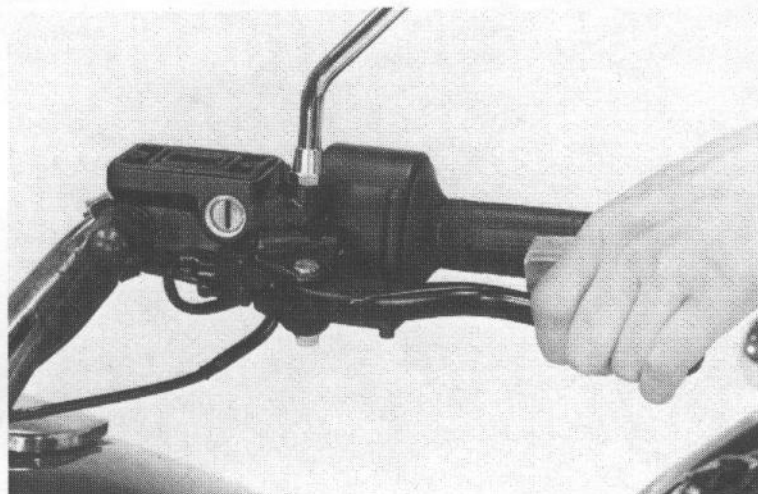
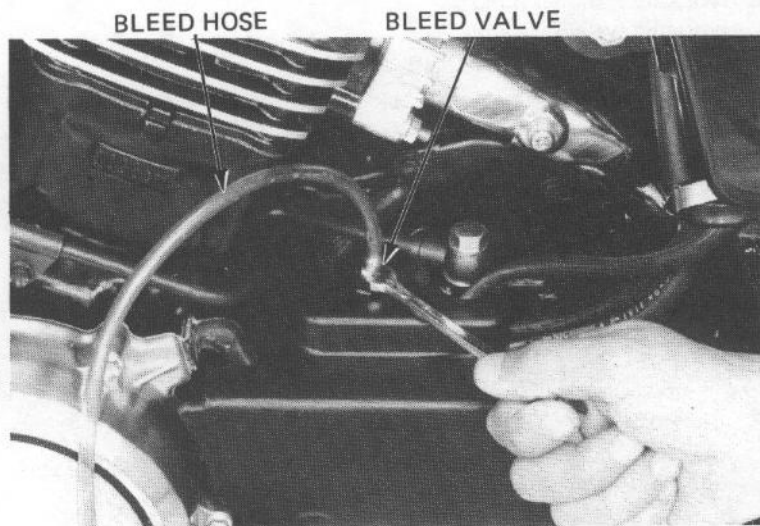
CLUTCH FLUID FILLING

NOTE:

Do not mix different types of fluid since they may not be compatible.

Close the bleed valve, fill the reservoir, and install the diaphragm.

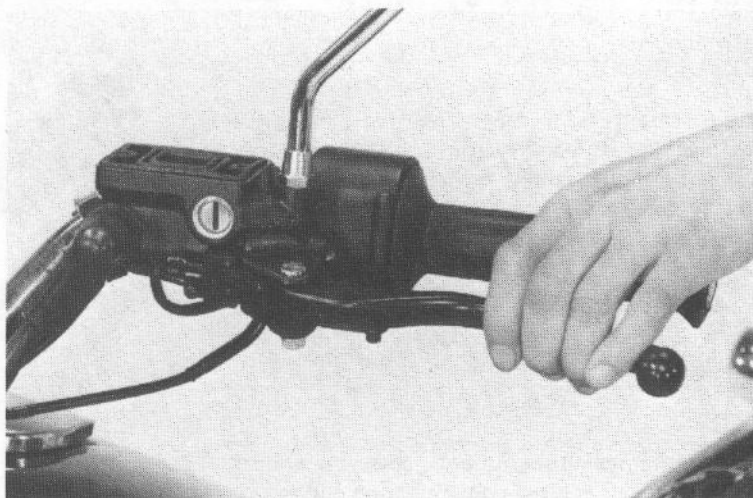
To prevent piston overtravel and clutch fluid seepage, keep a 20 mm (3/4 in) spacer between the handlebar grip and lever when bleeding the clutch system. Pump up the system pressure with the lever until there are no air bubbles in the fluid flowing out of the reservoir small hole and lever resistance is felt. Then bleed the system.



AIR BLEEDING

NOTE:

- Check the fluid level often while bleeding the clutch to prevent air from being pumped into the system.
- Use only DOT 4 brake fluid from a sealed container.
- Do not mix brake fluid types and never reuse the fluid which has been pumped out during bleeding, or the efficiency of the clutch system will be impaired.



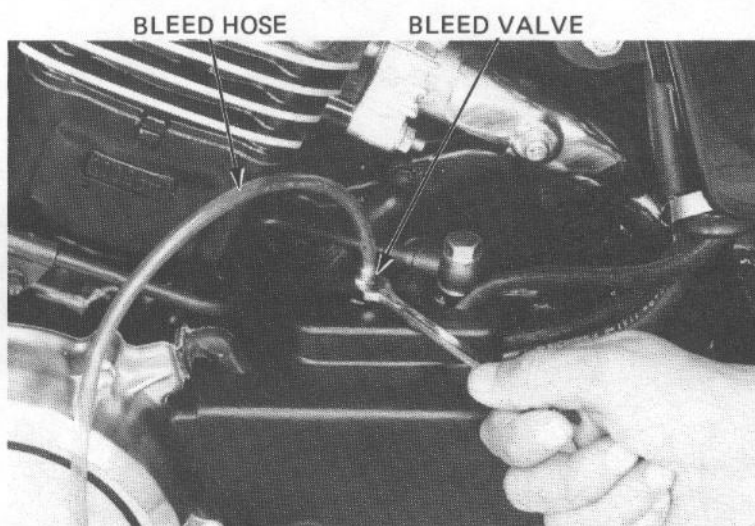
- 1) Squeeze the clutch lever, open the bleed valve 1/2 turn then close the valve.

NOTE:

Do not release the clutch lever until the bleed valve has been closed again.

- 2) Release the clutch lever slowly and wait several seconds after it reaches the end of its travel.

Repeat the above steps until bubbles cease to appear in the fluid coming out of the bleed valve.



Fill the fluid reservoir to a point somewhere between the upper and the lower levels.



CLUTCH MASTER CYLINDER

DISASSEMBLY

Drain clutch fluid from the hydraulic system. Remove the left rear view mirror and clutch lever. Disconnect the clutch switch wires and remove the clutch hose.

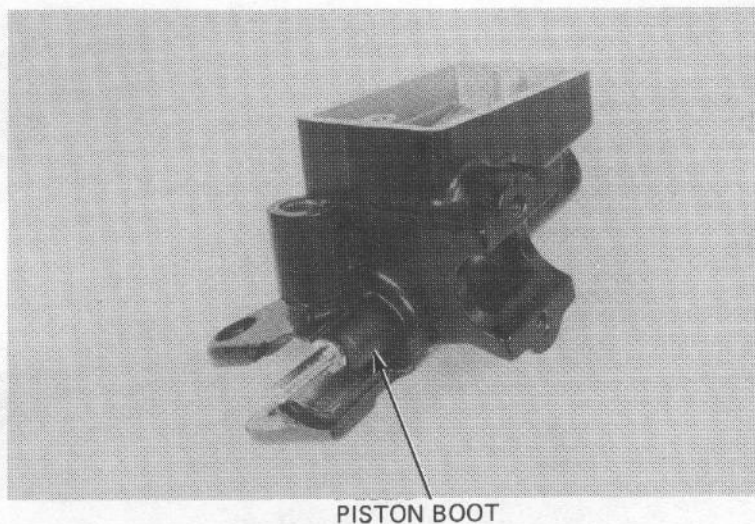
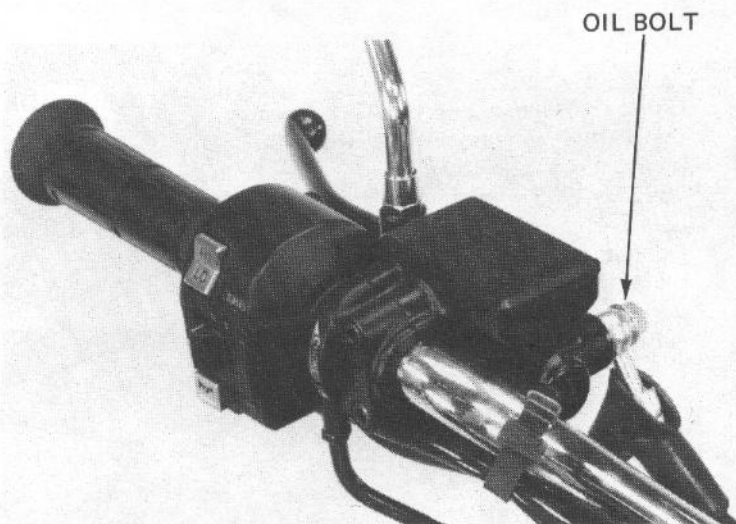
CAUTION:

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

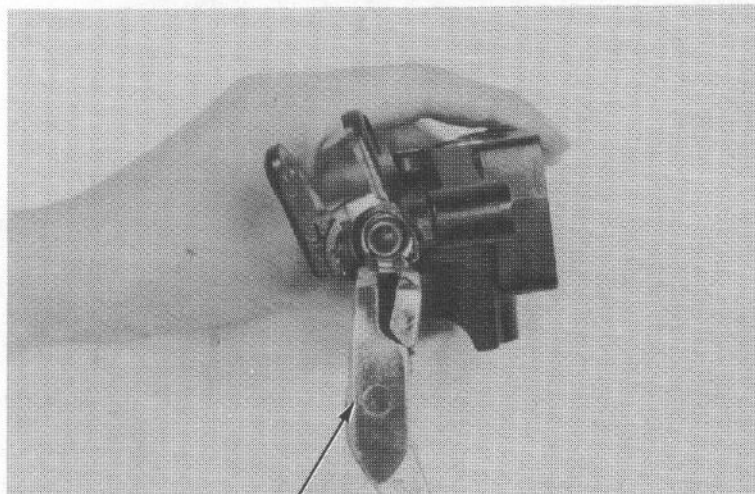
NOTE:

When removing the oil bolt, cover the end of the hose to prevent contamination and secure the hose.

Remove the master cylinder from the handlebar. Remove the piston boot from the master cylinder.



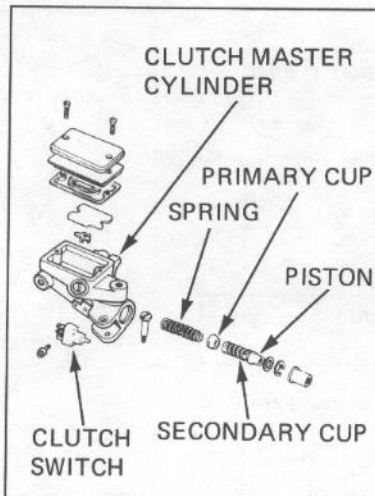
Remove the circlip from the master cylinder body.



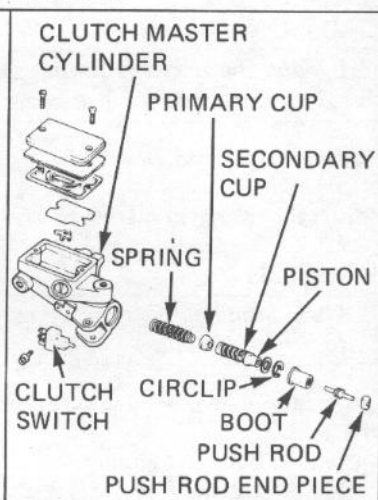
SNAP RING PLIERS
07940-3230001

Remove the piston and secondary cup.
 Remove the primary cup and spring.
 Remove the clutch switch, if necessary.

'83, '84:



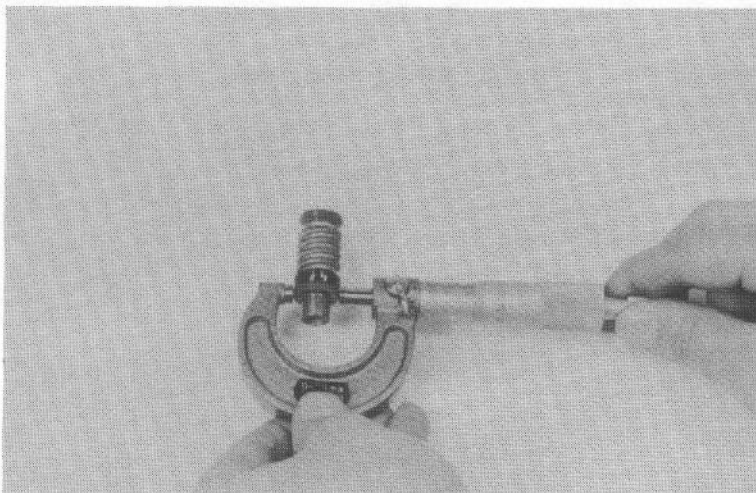
After '84:



MASTER CYLINDER I.D. INSPECTION

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

SERVICE LIMIT: 15.93 mm (0.627 in)

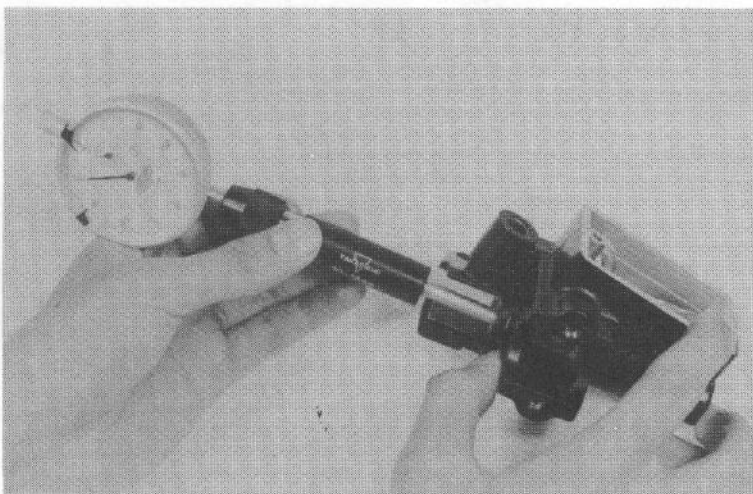


MASTER PISTON O.D. INSPECTION

Measure the master piston O.D.

SERVICE LIMIT: 15.80 mm (0.622 in)

Check the primary and secondary cups for damage before assembly.



CLUTCH

ASSEMBLY

CAUTION:

Handle the master piston, spring, primary cup, and secondary cup as a set.

Coat all parts with clean DOT-4 brake fluid before assembly.

Install the spring, primary cup, and piston.

CAUTION:

When installing the cups, do not allow the lips to turn inside out.

Install the circlip making sure it is seated firmly in the groove.

Install the boot and push rod.

Install the clutch switch, if it was removed.

Place the master cylinder on the handlebar and install the holder and the two mounting bolts. Align the end of the holder with the punch mark on the handlebar.

Tighten the top bolt first then the bottom bolt.

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

Install the oil hose with the bolt and its two sealing washers.

Install the push rod end piece into the clutch lever hole and install the clutch lever.

Connect the clutch switch wires to the switch terminals.

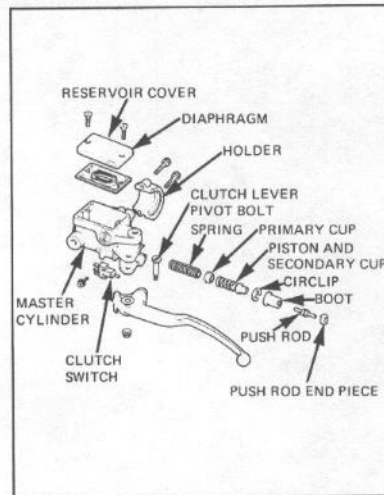
Fill the reservoir and bleed the clutch system (page 7-4).

CLUTCH SLAVE CYLINDER

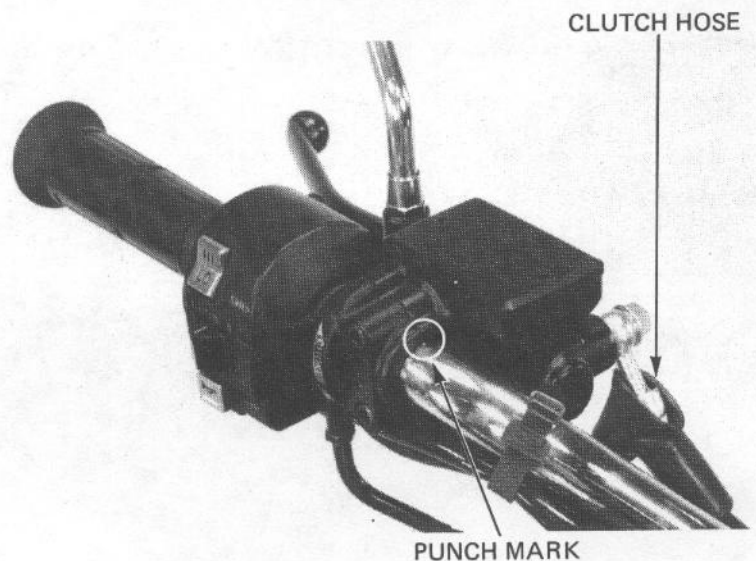
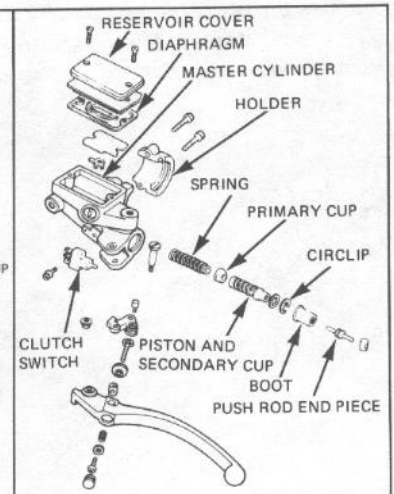
DISASSEMBLY

Remove the left crankcase rear cover.

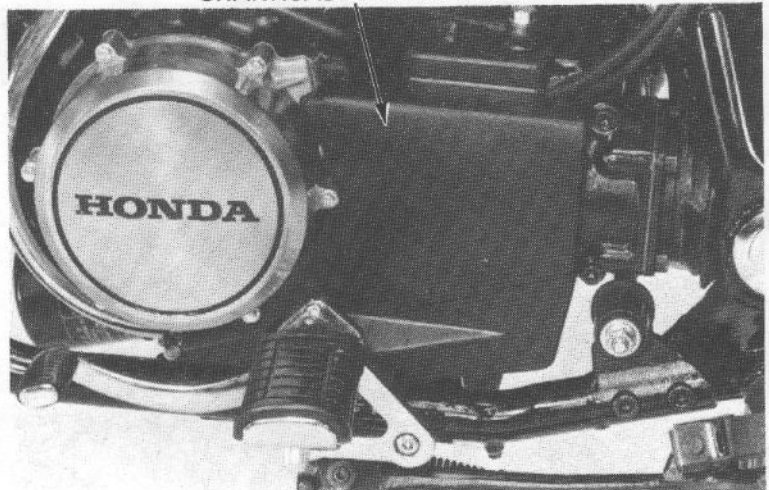
'83, '84:



After '84:



CRANKCASE REAR COVER



Remove the left crankcase rear cover bracket.

Place a container under the slave cylinder, remove the oil bolt, and disconnect the clutch hose.

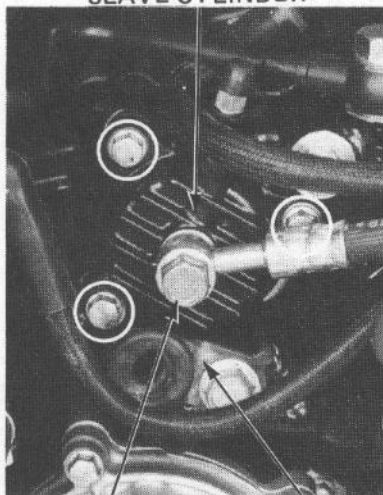
NOTE:

Avoid spilling clutch fluid on painted surfaces.

Remove the slave cylinder.

'83, '84, '85:

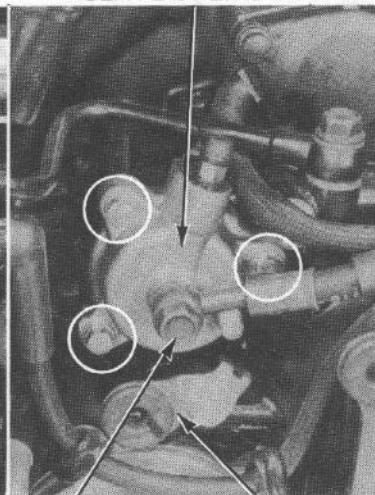
SLAVE CYLINDER



OIL BOLT CRANKCASE REAR
COVER BRACKET

AFTER '85:

SLAVE CYLINDER

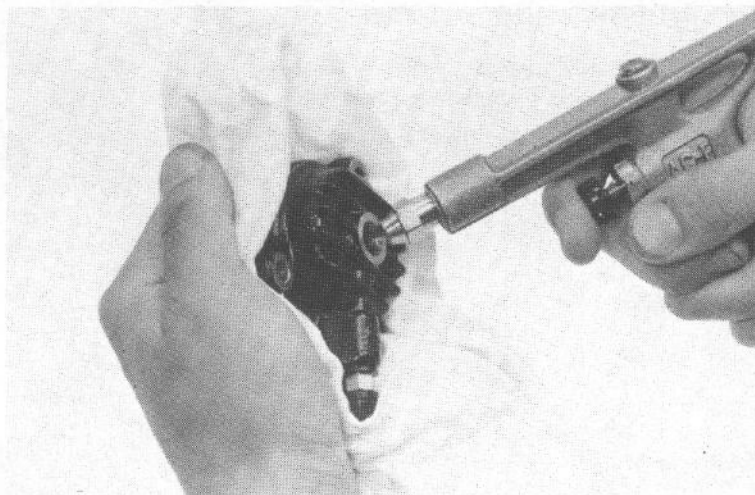


OIL BOLT CRANKCASE REAR
COVER BRACKET

Remove the piston from the cylinder.

If the piston removal is hard, place a shop towel over the piston to cushion the piston when it is expelled, and position the cylinder with the piston down.

Apply compressed air to the fluid inlet to remove the piston. Use the air in short spurts.

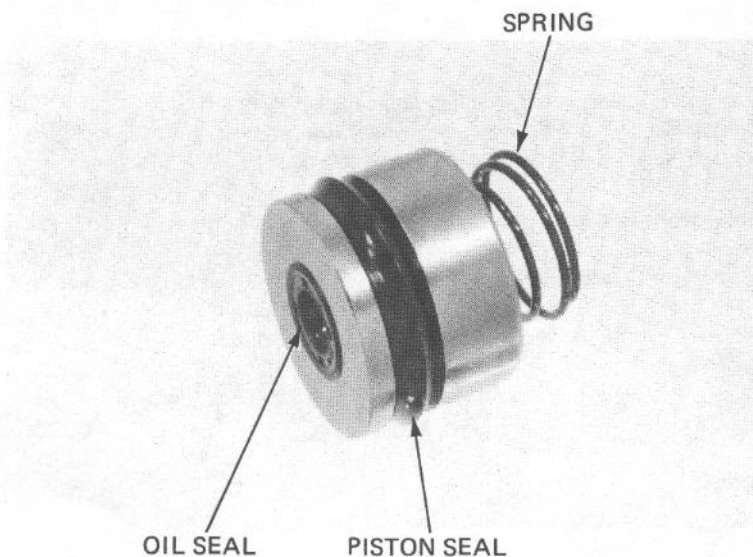


Remove the spring from the slave cylinder.

Remove the oil and piston seals.

Clean the piston groove with clutch fluid.

Check the piston spring for weakness or damage.

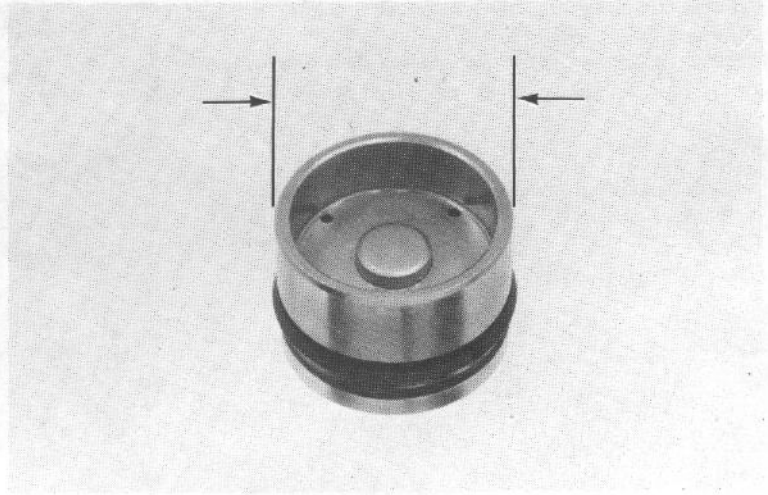


CLUTCH

PISTON O.D. INSPECTION

Check the piston for scoring or scratches.
Measure the outside diameter of the piston with a micrometer.

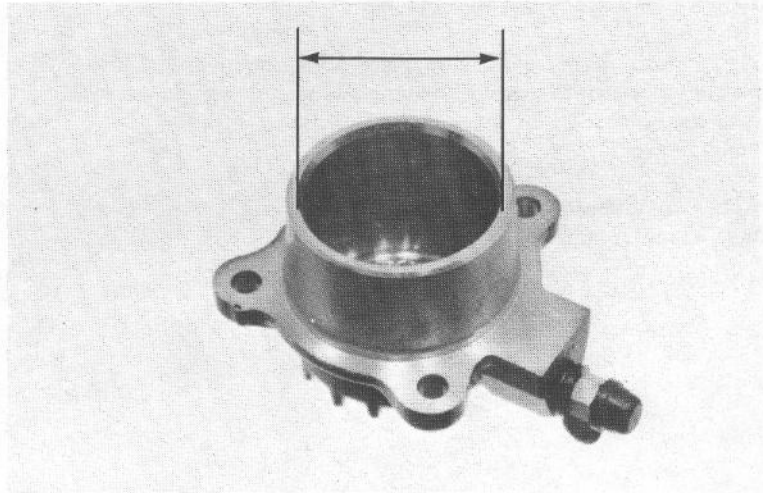
SERVICE LIMIT: 38.02 mm (1.497 in)



CYLINDER I.D. INSPECTION

Check the slave cylinder for scoring or scratches.
Measure the inside diameter of the cylinder bore.

SERVICE LIMIT: 38.18 mm (1.503 in)



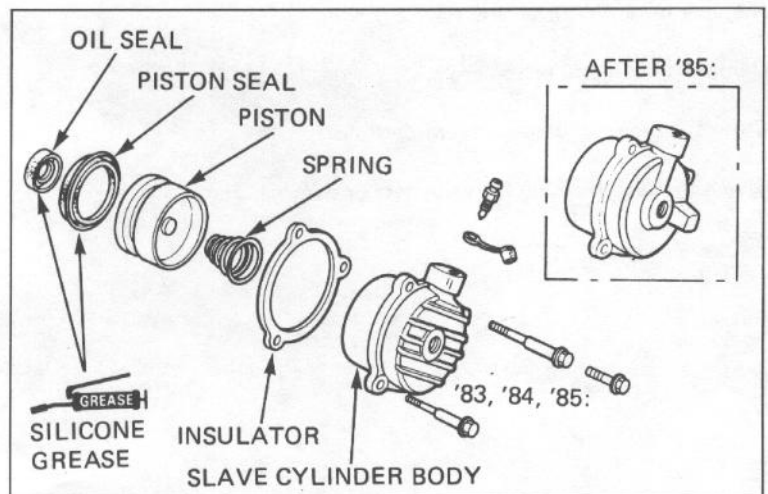
ASSEMBLY

Assemble the slave cylinder in the reverse order of disassembly. The oil seals must be replaced with new ones whenever they have been removed.

Lubricate the piston and piston seal with a medium grade of Hi-Temperature silicone grease or brake fluid before assembly.

Be certain the piston seal is seated in the piston groove.

Place the piston in the cylinder with the oil seal end facing out.

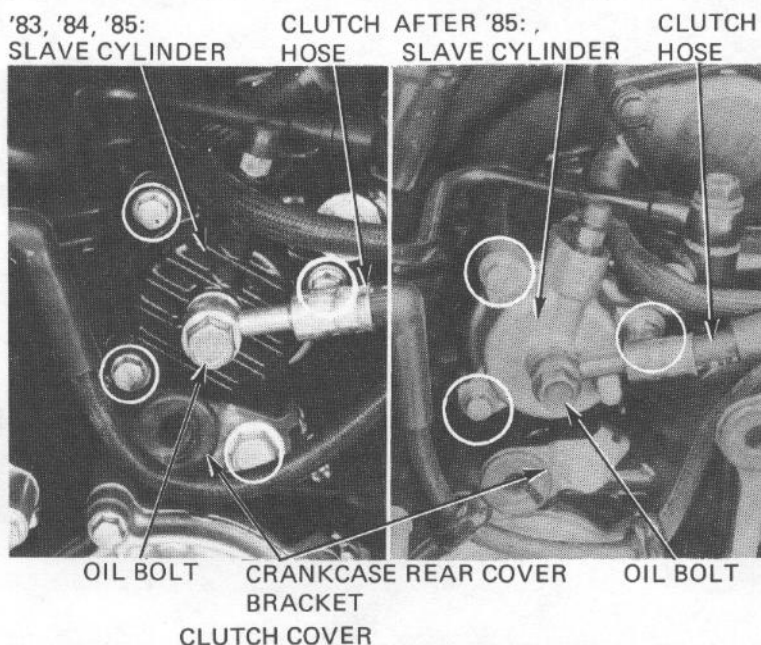


Install the insulator and slave cylinder.
Connect the clutch hose with the oil bolt and the two sealing washers.

Install the crankcase rear cover bracket.

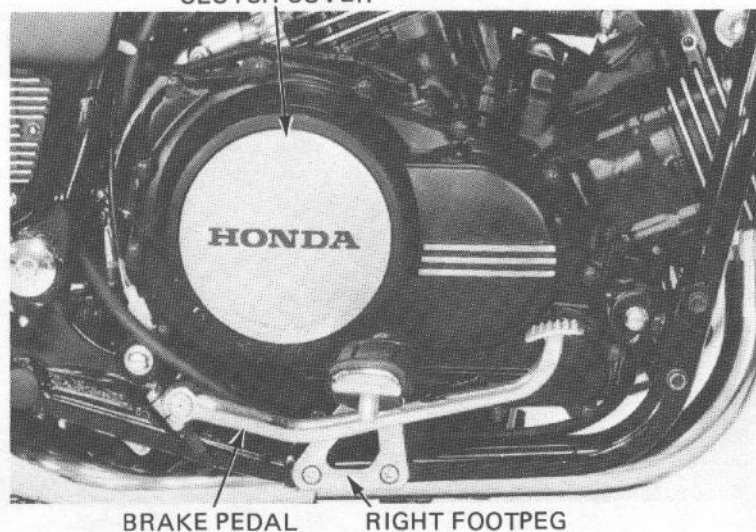
Install the left crankcase rear cover.

Fill the clutch fluid reservoir with DOT-4 brake fluid, and bleed the clutch system (page 7-4).



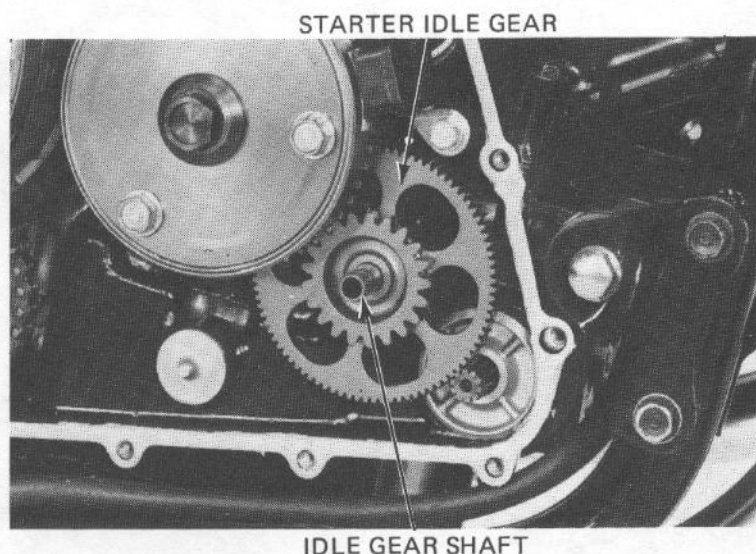
CLUTCH COVER REMOVAL

Drain the engine oil.
Remove the brake pedal and right footpeg.
Remove the clutch cover, gasket, and dowel pins.



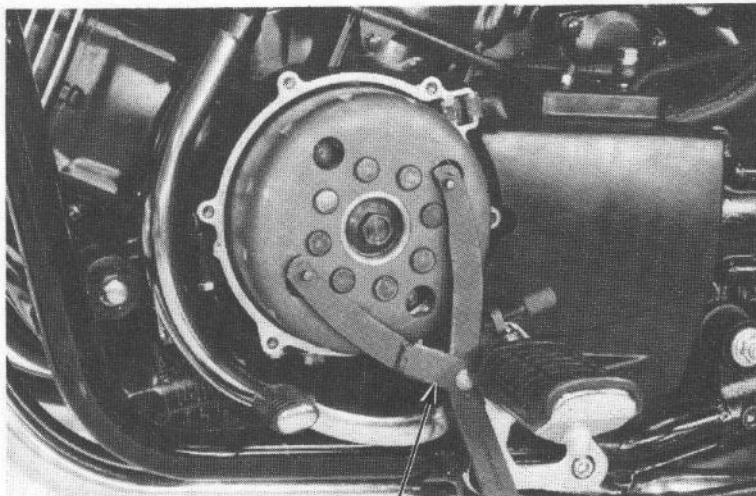
STARTER CLUTCH DISASSEMBLY

Remove the starter idle gear shaft and gear.



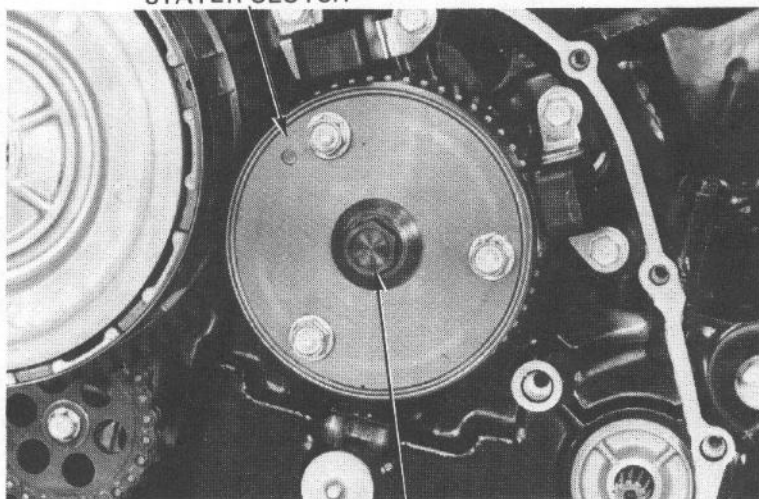
CLUTCH

Remove the alternator cover. Hold the flywheel with a universal holder.



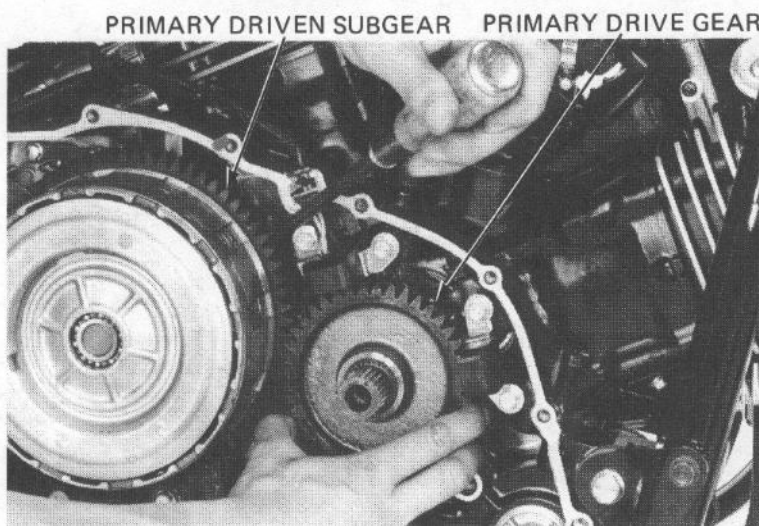
UNIVERSAL HOLDER OR FLYWHEEL HOLDER
07725-0030000 07725-0040000

Remove the starter clutch bolt.
Remove the starter clutch assembly and spacer.



STARTER CLUTCH BOLT

Shift the primary driven subgear with a screwdriver to take preload off the primary drive gear and remove the primary drive gear.

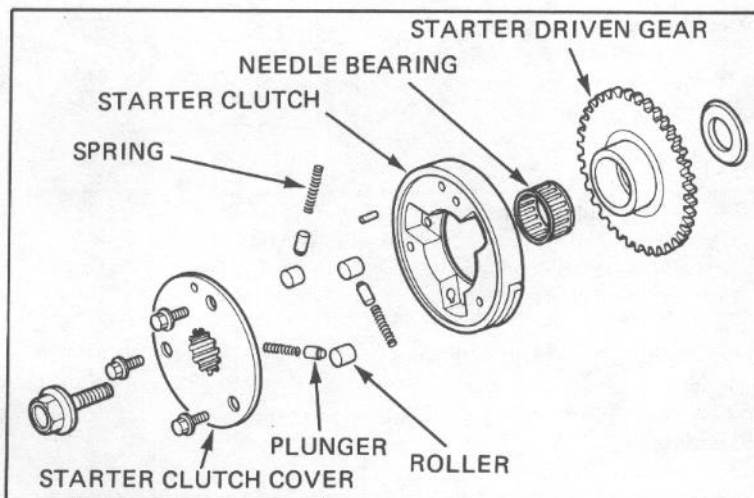


Remove the starter driven gear and needle bearing from the starter clutch.

Inspect the rollers for smooth operation.

Remove the starter clutch cover by removing the three bolts.

Remove the clutch rollers, plungers, and springs. Check the rollers for excessive wear.

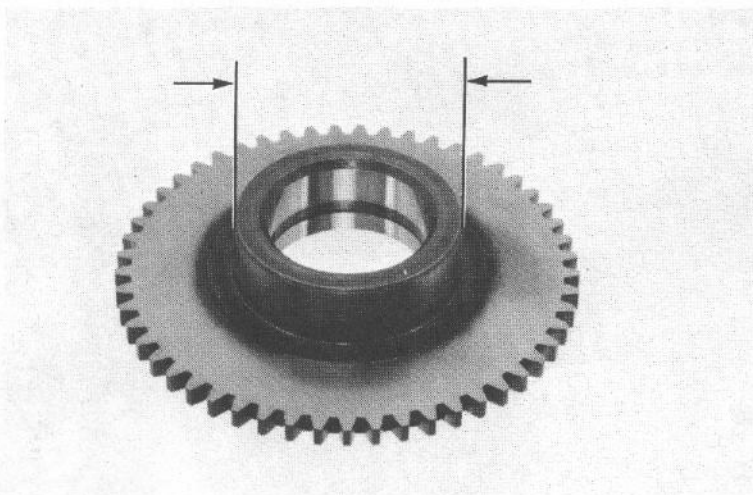


STARTER DRIVEN GEAR INSPECTION

Inspect the driven gear for damage or excessive wear.

Measure the driven gear O.D.

SERVICE LIMIT: 54.16 mm (2.132 in)

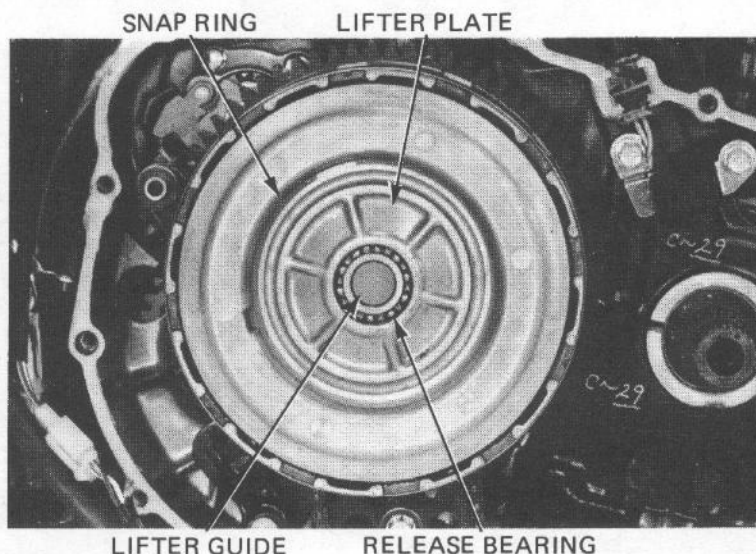


CLUTCH DISASSEMBLY

NOTE:

Do not operate the clutch lever after removing the clutch. To do so will cause difficulty in reassembling the clutch.

Remove the snap ring, lifter plate, lifter guide, release bearing, and lifter rod.



CLUTCH

Install the rear brake pedal.

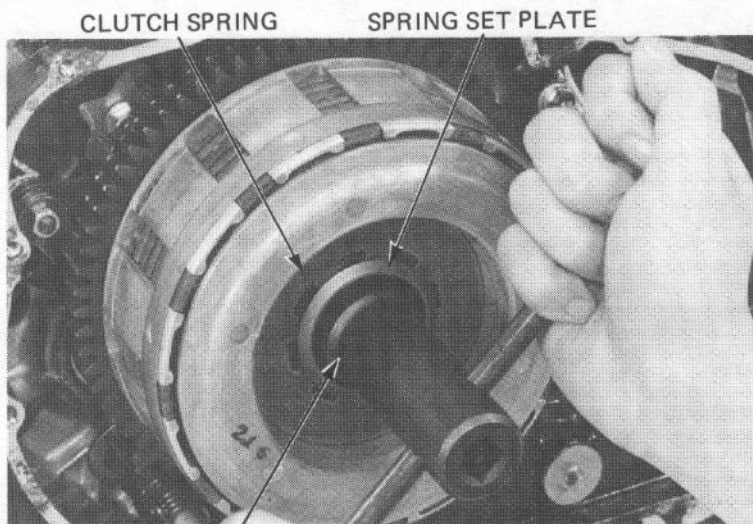
Shift the transmission into high gear and apply the rear brake.

NOTE:

When the engine is not in the frame, shift the transmission into gear and use the MAIN-SHAFT HOLDER, P/N 07923-6890100, to hold the final shaft.

Remove the lock nut and lock washer.

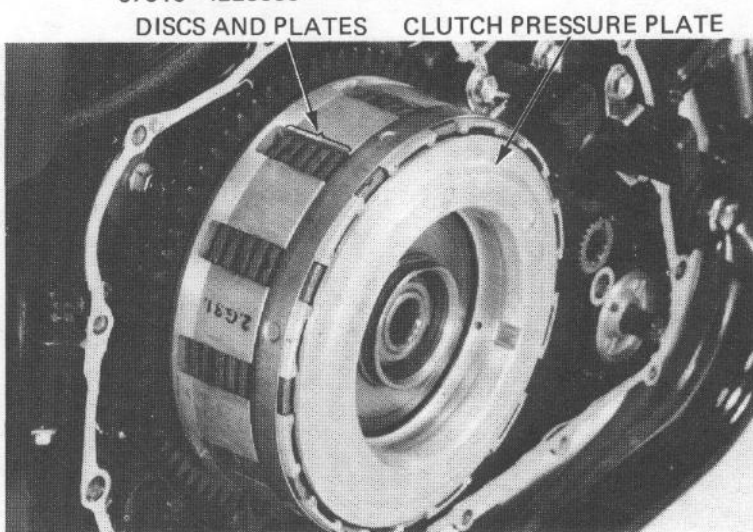
Remove the clutch spring set plate, clutch spring, and washer.



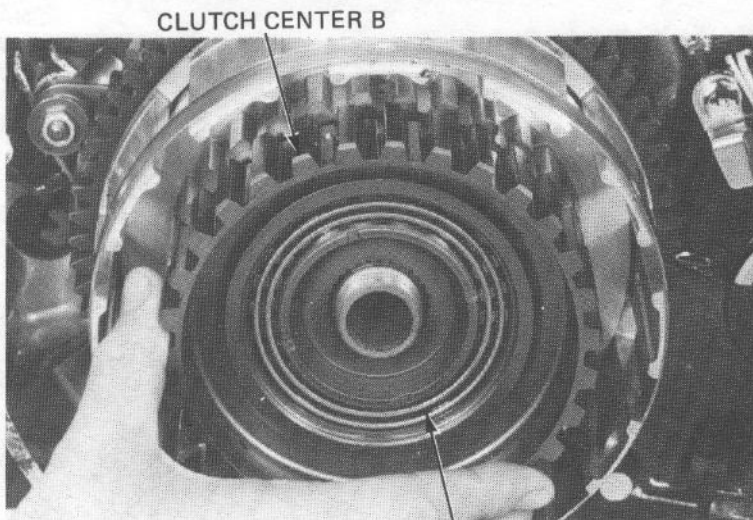
LOCK NUT WRENCH
07916-4220000

Remove the clutch pressure plate.

Remove the clutch plates and discs.

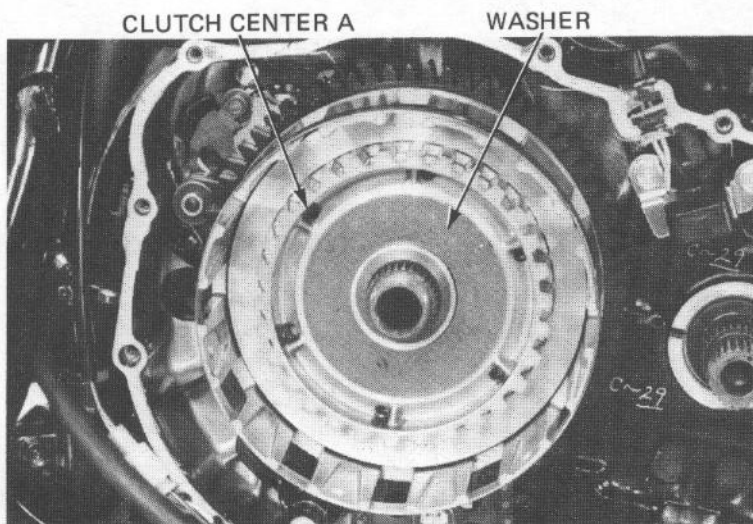


Remove clutch center B and the one-way clutch as an assembly.

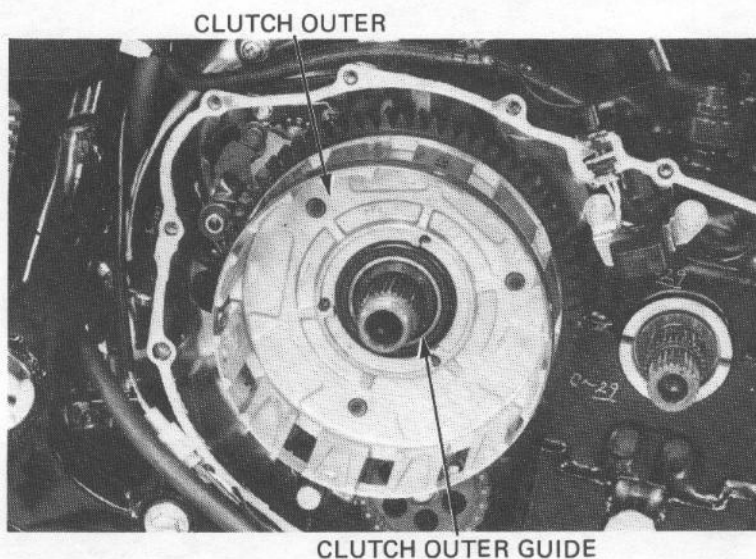


ONE WAY CLUTCH

Remove clutch center A and washer.



Remove the clutch outer and outer guide.



INSPECTION

CLUTCH OUTER

Check the slots in the clutch outer for nicks, cuts, or indentations made by the friction discs.

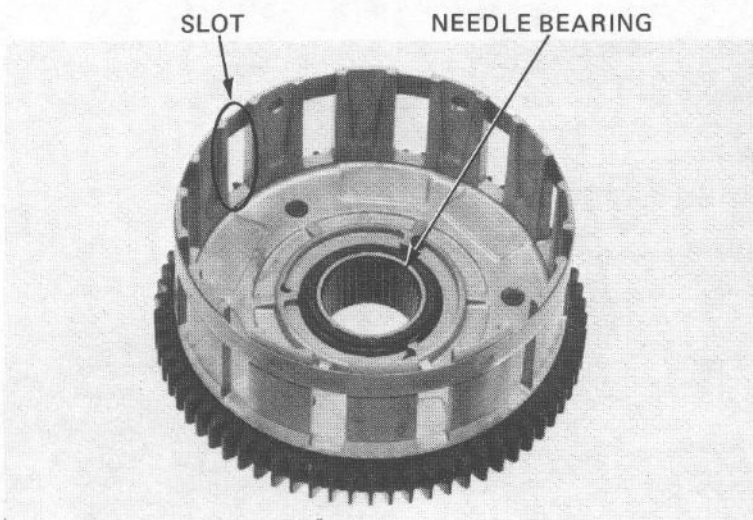
Check the clutch outer needle bearing for damage or excessive play.

If the needle bearing is difficult to remove from the clutch housing, use the following tools:

Driver: 07749-0010000

Attachment, 42 x 47 mm: 07746-0010300

Pilot, 35 mm: 07746-0040800

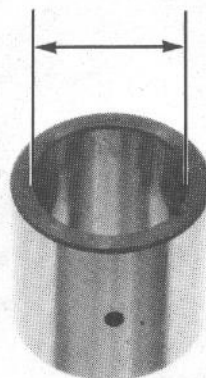


CLUTCH

CLUTCH OUTER GUIDE

Measure the I.D. of the clutch outer guide.

SERVICE LIMIT: 30.08 mm (1.184 in)

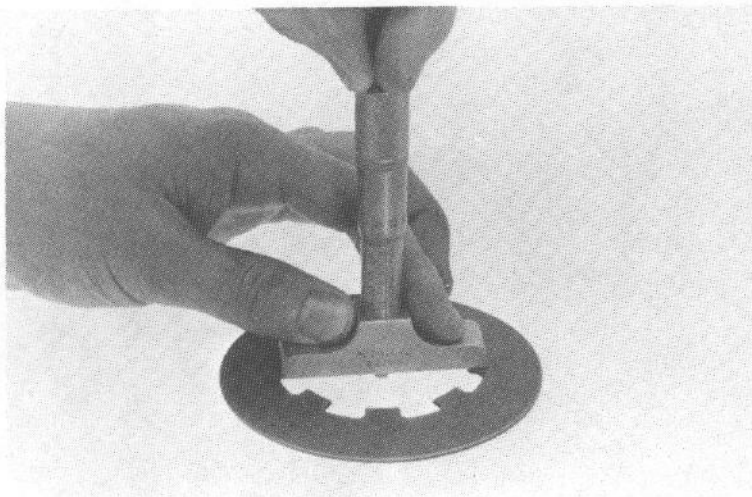


CLUTCH SPRING

Measure the height of the clutch spring as shown.

SERVICE LIMIT: 3.6 mm (0.14 in)

Replace the spring if its height is less than the service limit.

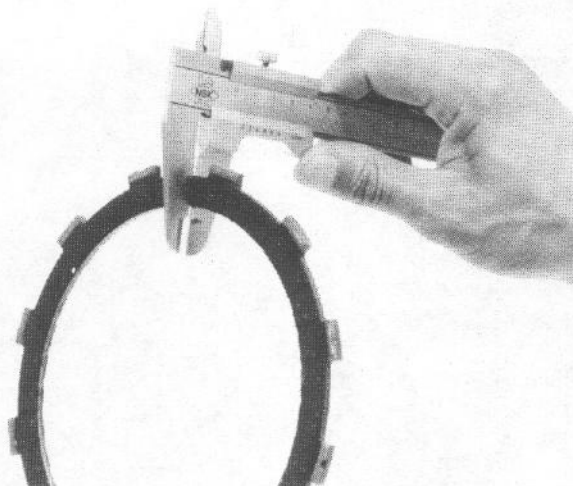


CLUTCH DISC

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

SERVICE LIMIT: 3.1 mm (0.12 in)

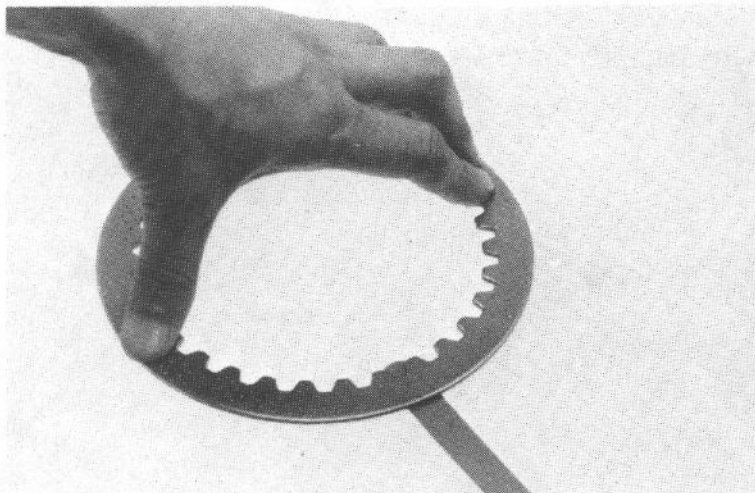
Replace any discs that are thinner than the service limit.



CLUTCH PLATE

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

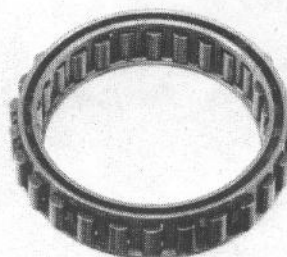
SERVICE LIMIT: 0.30 mm (0.012 in)



ONE WAY CLUTCH INSPECTION

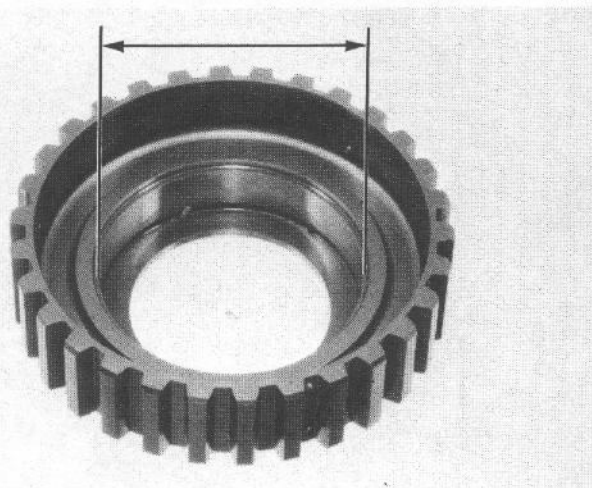
Inspect the one way clutch for smooth operation.

Check the rollers for excessive wear.



Measure the I.D. of clutch center B.

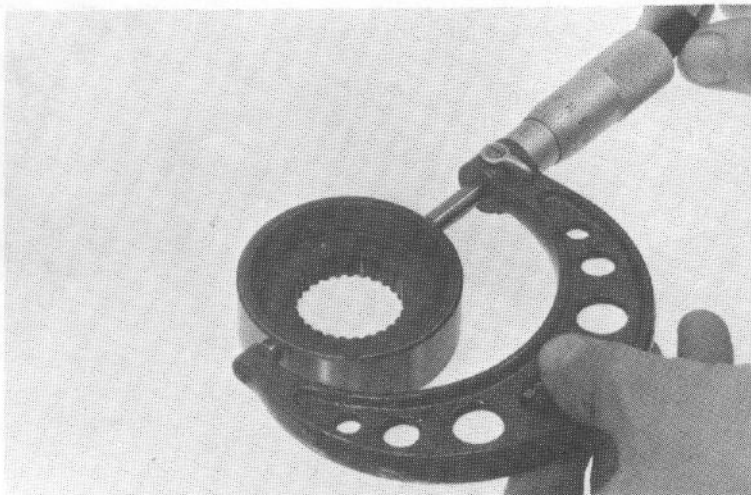
SERVICE LIMIT: 74.50 mm (2.933 in)



CLUTCH

Measure the O.D. of the one way clutch inner.

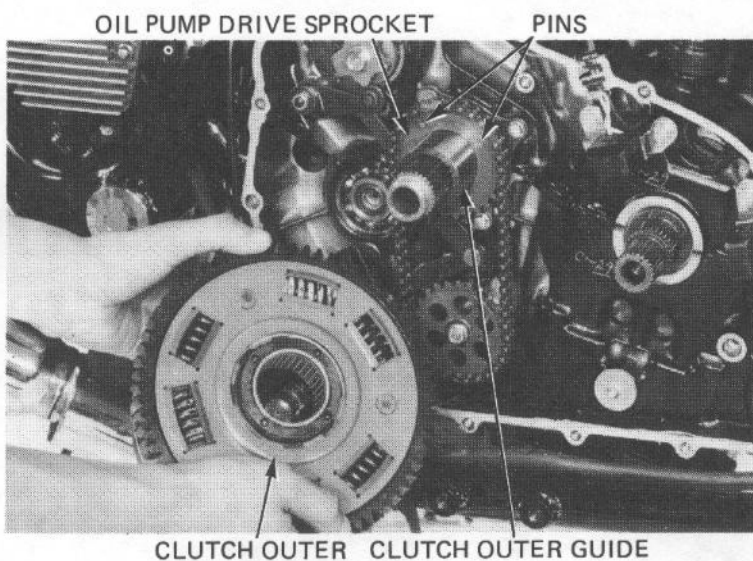
SERVICE LIMIT: 57.70 mm (2.271 in)



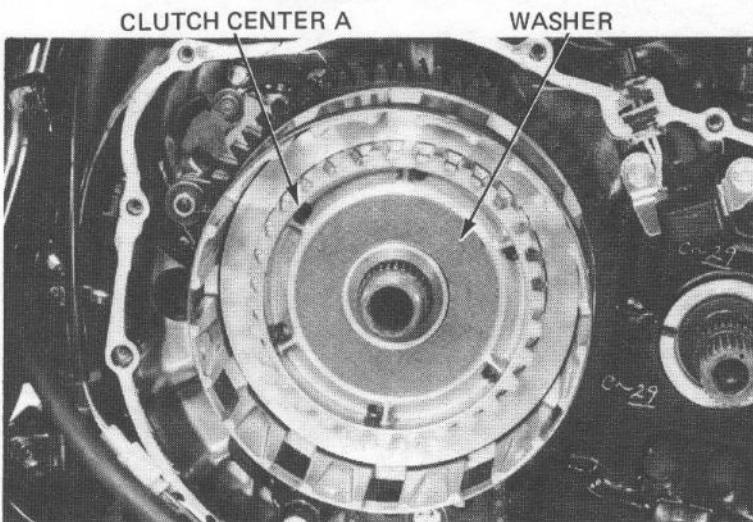
CLUTCH ASSEMBLY

Install the clutch outer guide over the mainshaft.
Install the needle bearing into the clutch outer.

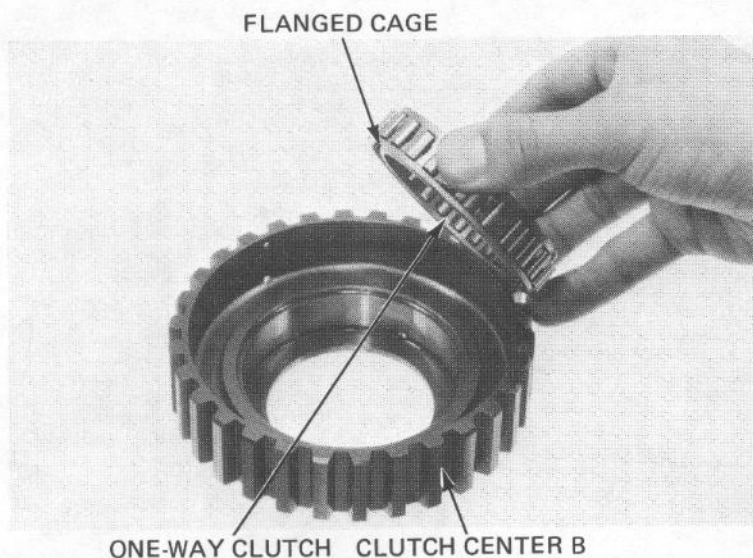
Align the holes in the clutch outer with the pins on the oil pump drive sprocket and install the clutch outer over the guide.



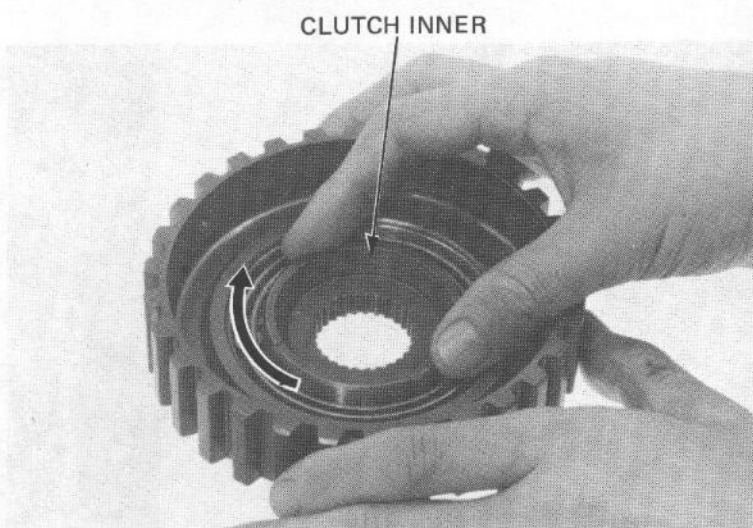
Install clutch center A and the washer.



Install the one-way clutch into clutch center B with its flanged cage facing in.



Install the clutch inner into the one-way clutch by turning it clockwise.



Install the one-way clutch/clutch center B assembly over the mainshaft.

NOTE:

Make sure the one way clutch assembly is installed correctly by turning the clutch center B. The clutch center should turn counterclockwise freely and should not turn clockwise.

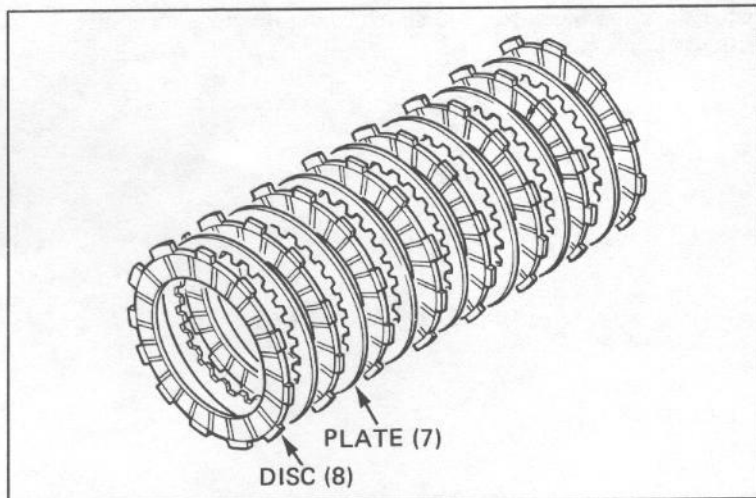


CLUTCH

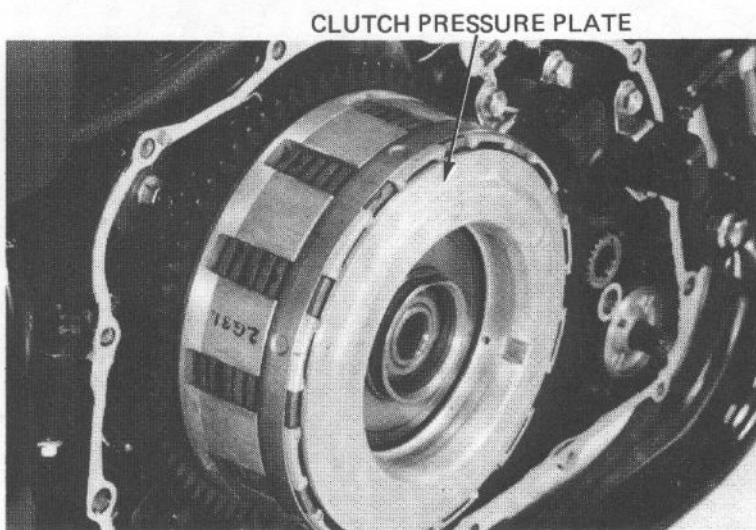
Coat the discs and plates with clean engine oil.
Install the clutch discs and plates as shown.

CAUTION:

*Do not pull clutch center B out after installing the discs and plates or a plate will fall between clutch centers A and B.
This will prevent the clutch from disengaging.*



Install the clutch pressure plate.



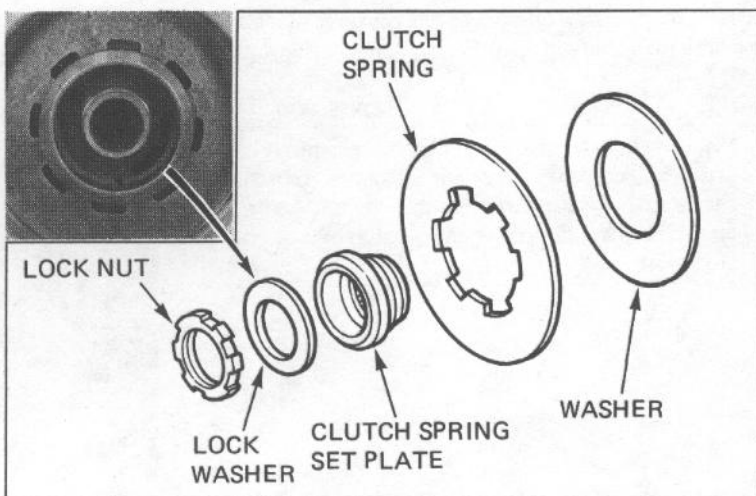
Install the clutch spring set plate, clutch spring, and washers.

NOTE:

Install the clutch spring with the dished face towards the inside.

Install the lock washer with its "OUTSIDE" mark facing out.

Install the lock nut.



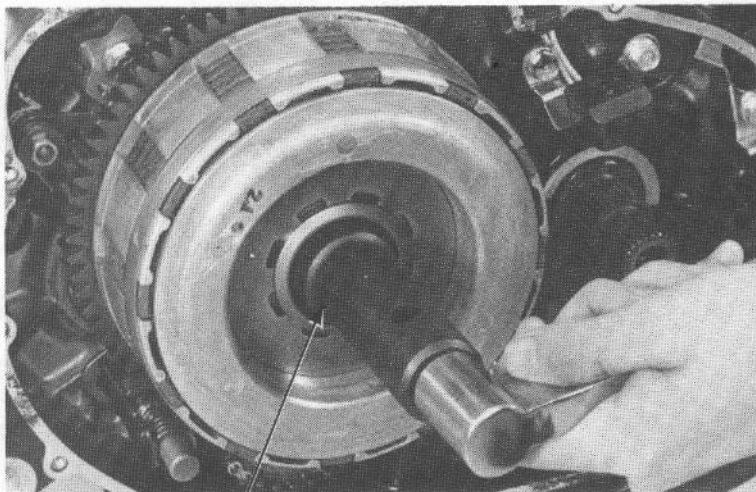
Place the transmission in 6th gear.

Apply the brake and tighten the lock nut.

NOTE:

When servicing the clutch with the engine out of the frame, shift the transmission into gear and hold the output shaft with the HOLDER 07923-6890101.

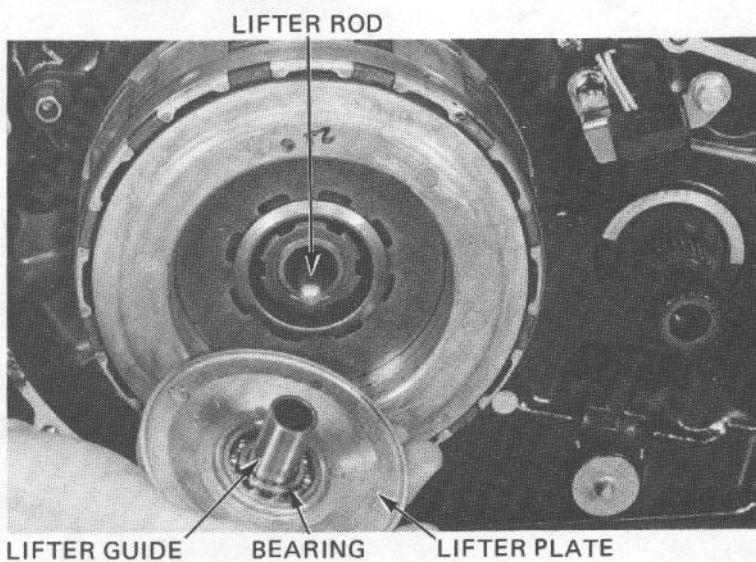
TORQUE: 63–67 N·m (6.3–6.7 kg·m, 46–48 ft·lb)



LOCK NUT WRENCH
07916-4220000

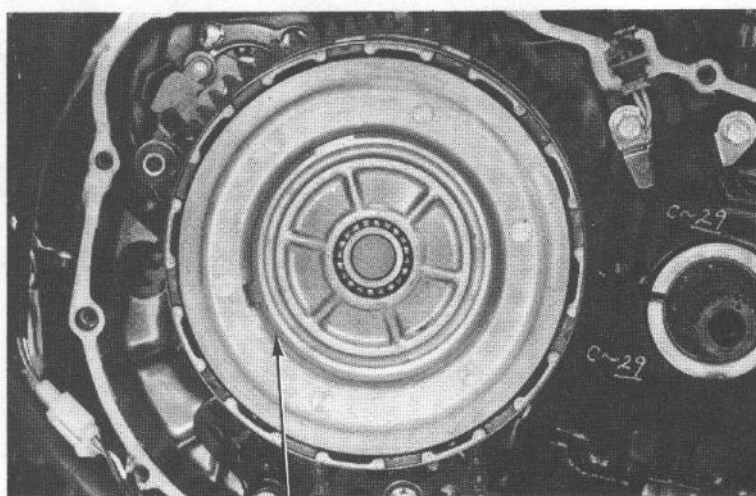
Install the clutch lifter rod.

Install the clutch filter plate, lifter guide, and bearing.



LIFTER GUIDE BEARING LIFTER PLATE

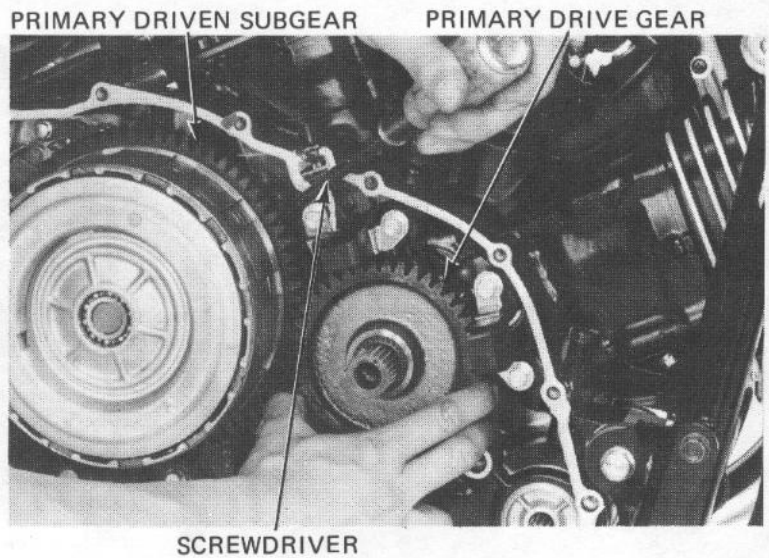
Install the snap ring.



SNAP RING

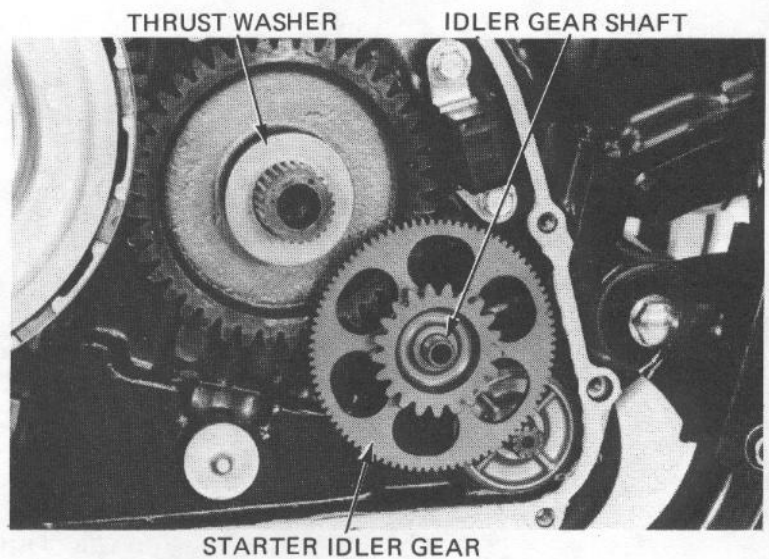
STARTER CLUTCH ASSEMBLY

Install the primary drive gear onto the crankshaft while moving the primary driven subgear with a screwdriver.



Install the thrust washer on the crankshaft.

Install the starter idler gear and shaft.



Install the springs, plungers, and rollers into the starter clutch.

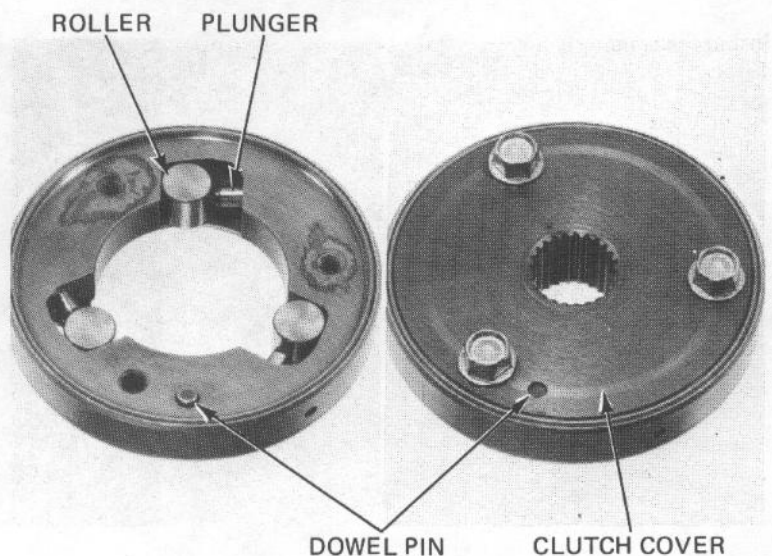
Install the dowel pin.

Install the starter clutch cover aligning the dowel pin hole with the dowel pin and tighten the bolts.

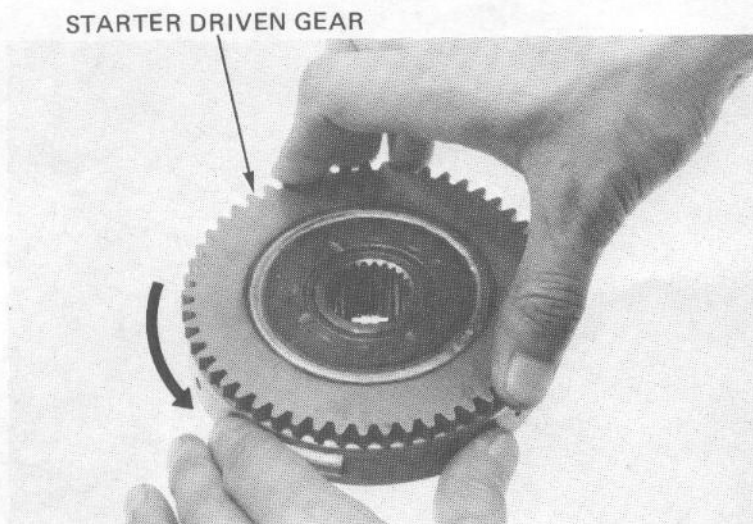
TORQUE: 26–30 N·m (2.6–3.0 kg-m, 19–22 ft-lb)

NOTE

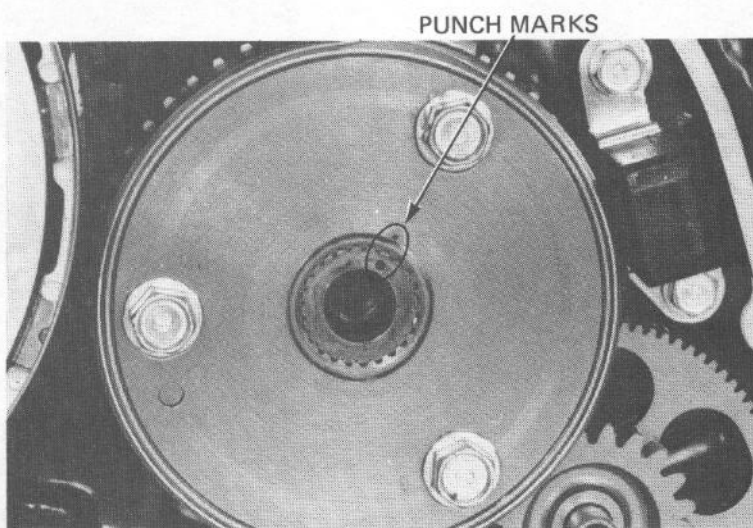
Apply a locking agent to the bolt threads.



Install the starter driven gear by turning it counter-clockwise.



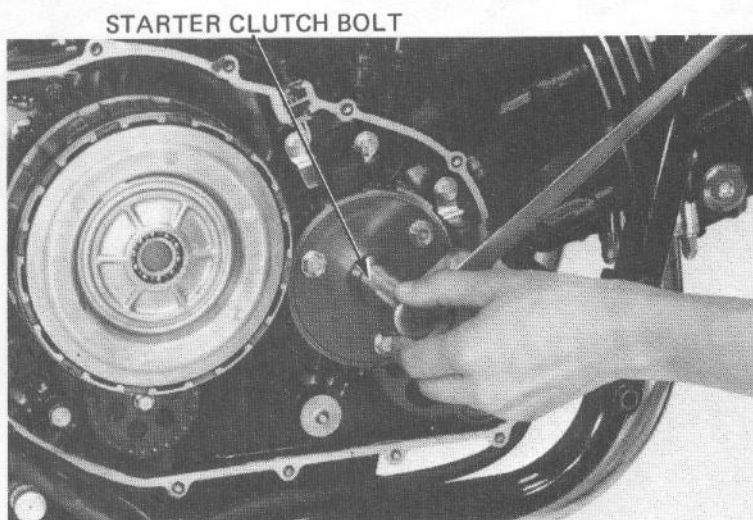
Align the punch marks on the starter clutch and crankshaft and install the starter clutch.



Hold the flywheel with a universal holder and tighten the starter clutch bolt to the specified torque.

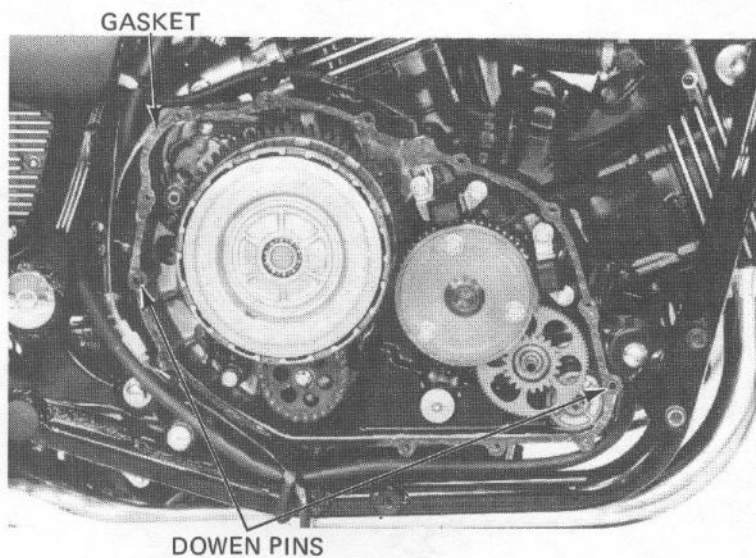
TORQUE: 80–100 N·m
(8.0–10.0 kg·m, 58–72 ft-lb)

Install the alternator cover.

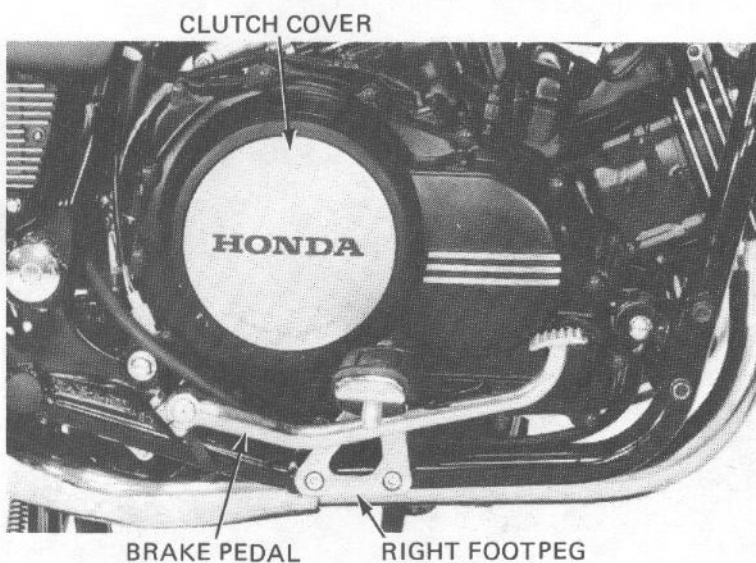


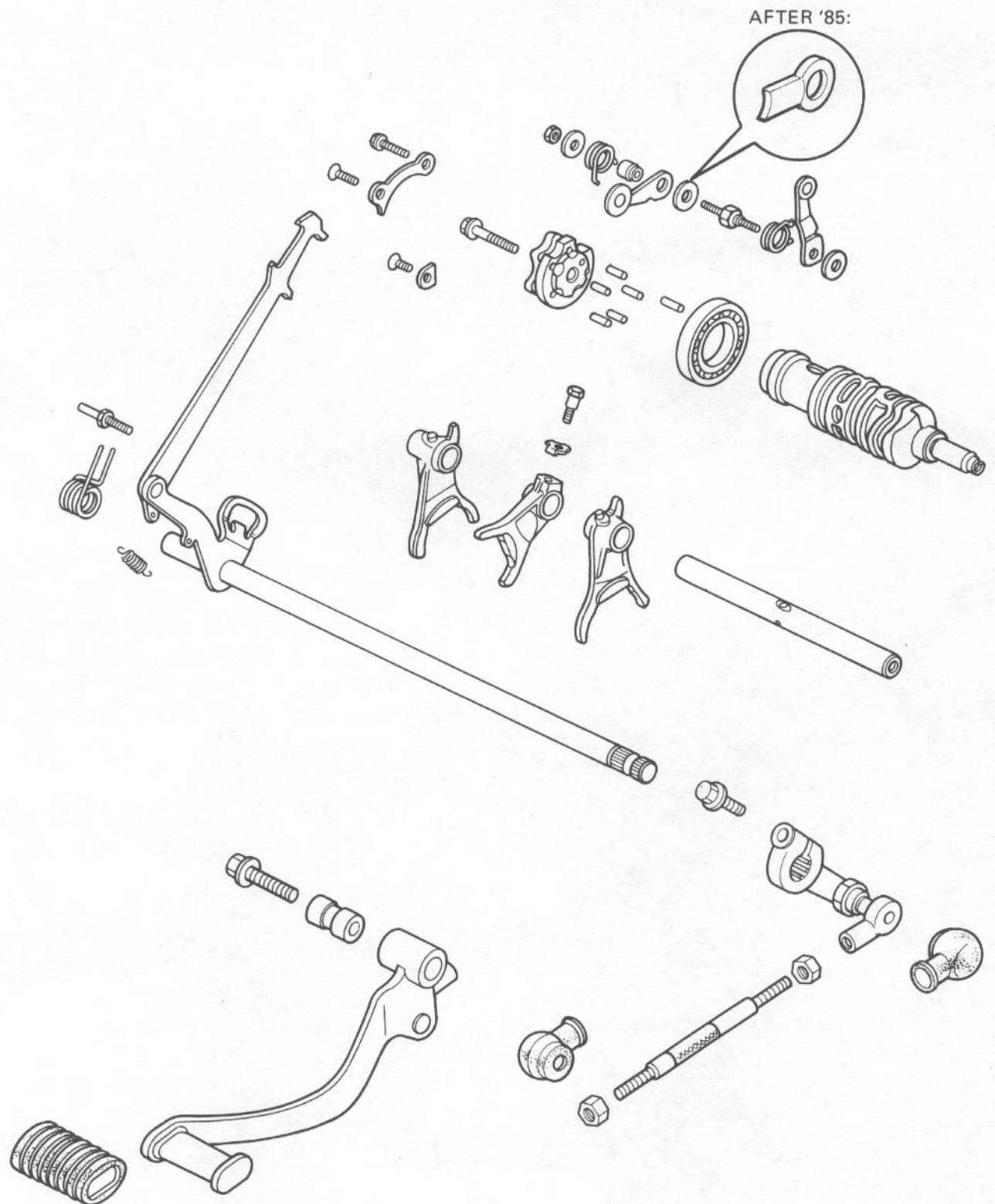
CLUTCH COVER INSTALLATION

Install the dowel pins and a new gasket.



Install the clutch cover.
Install the right footpeg and rear brake pedal.
Fill the crankcase with oil (page 2-3).





8. GEARSHIFT LINKAGE

| | |
|--------------------------------|-----|
| SERVICE INFORMATION | 8-1 |
| TROUBLESHOOTING | 8-1 |
| GEARSHIFT LINKAGE REMOVAL | 8-2 |
| GEARSHIFT LINKAGE INSTALLATION | 8-4 |

SERVICE INFORMATION

GENERAL

- The gearshift spindle and stopper arms can be serviced with the engine in the frame.
- If the shift forks, drum, and transmission require servicing, remove the engine and separate the crankcase.

TROUBLESHOOTING

Hard to shift

1. Air bubbles in the clutch hydraulic system.
2. Shift forks bent
3. Shift claw bent
4. Shift drum cam grooves damaged

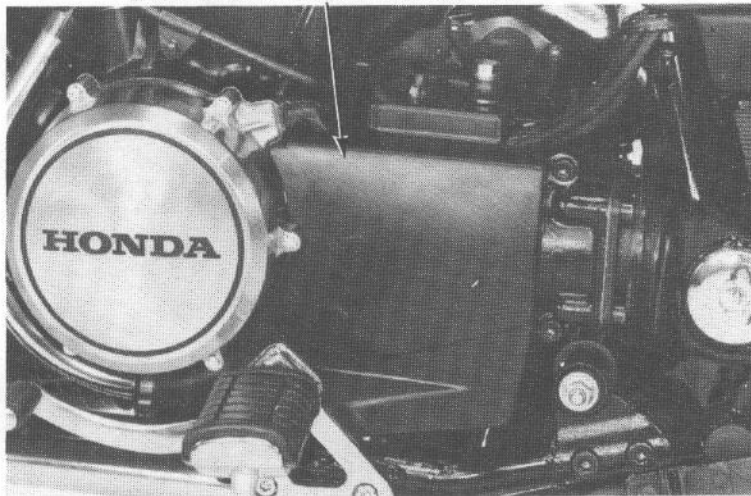
Transmission jumps out of gear

1. Gear dogs worn
2. Shift shaft bent
3. Shift drum stopper broken
4. Shift forks bent

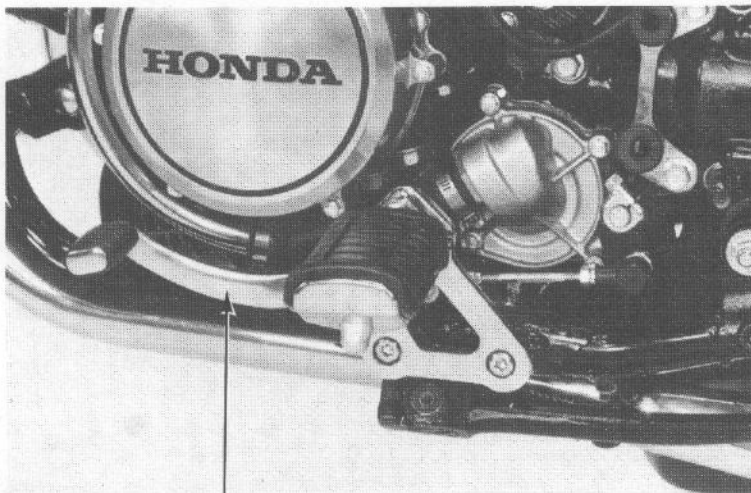
GEARSHIFT LINKAGE REMOVAL

Drain the engine oil.
Remove the left crankcase rear cover.

LEFT CRANKCASE REAR COVER



Remove the left footpeg and gearshift pedal.
Remove the clutch cover and clutch assembly (section 7).

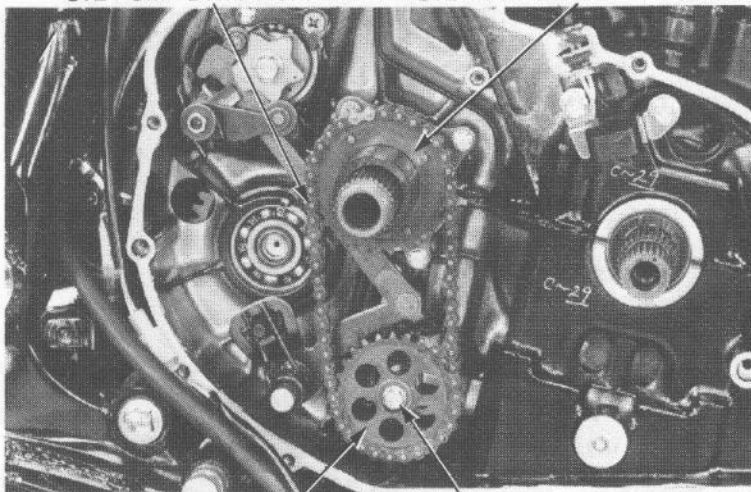


GEARSHIFT PEDAL

Remove the oil pump driven sprocket bolt.
Remove the oil pump drive chain, drive and driven sprockets.
Remove the oil pump drive sprocket washer.

OIL PUMP DRIVE CHAIN

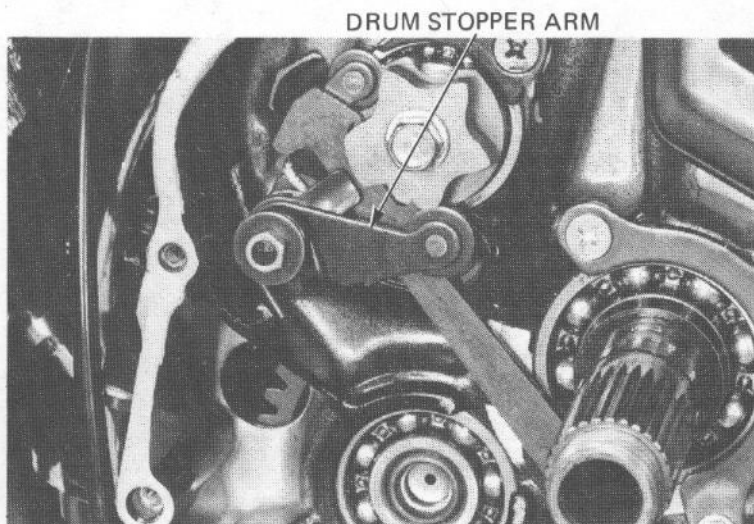
OIL PUMP DRIVE SPROCKET



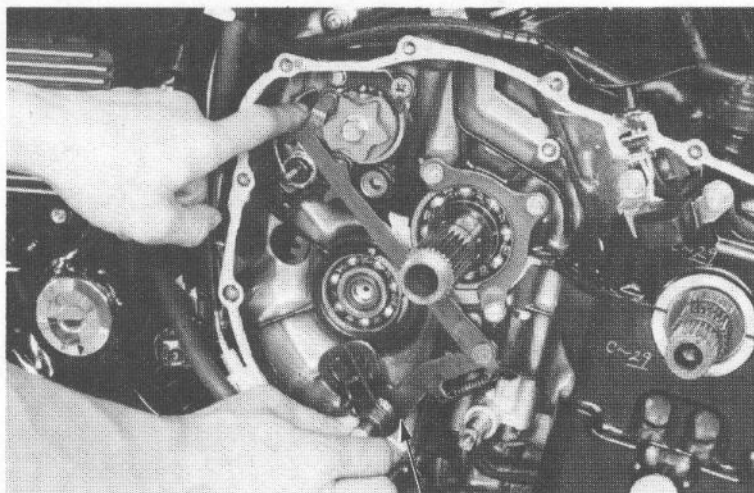
OIL PUMP DRIVEN SPROCKET

BOLT

Remove the drum stopper arm nut, arm, and spring.

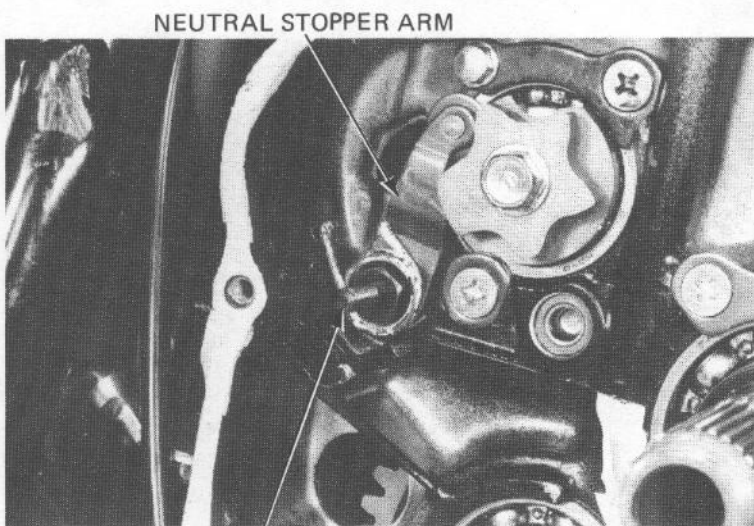


Pull the gearshift spindle assembly out of the crankcase.



GEARSHIFT SPINDLE

Remove the neutral stopper arm bolt, arm, and spring.

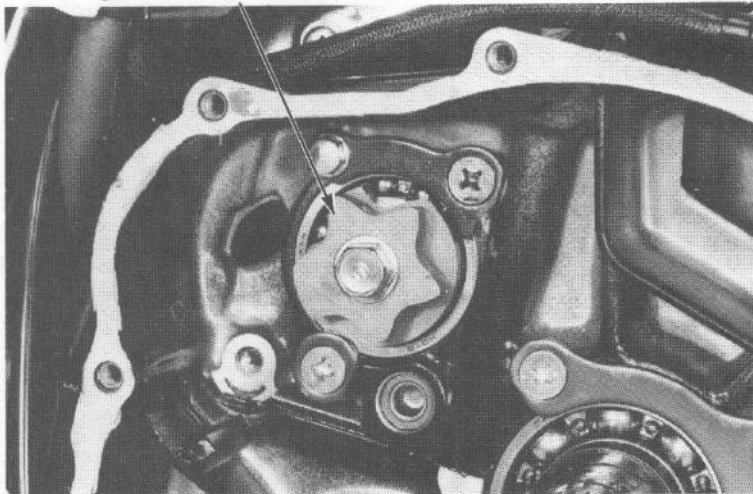


ARM BOLT

GEARSHIFT LINKAGE

Remove the shift drum cam plate bolt and cam plate.

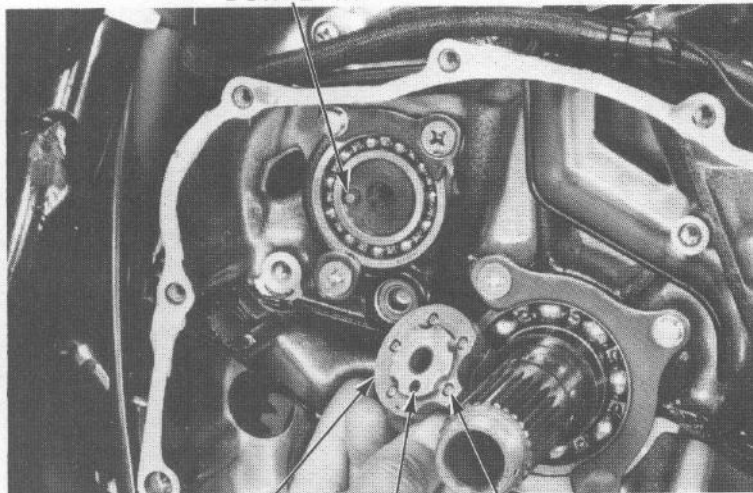
SHIFT DRUM CAM PLATE



GEARSHIFT LINKAGE INSTALLATION

Install the dowel pin in the hole of the shift drum. Insert the five pins in the holes of the cam plate. Align the cam plate hole with the dowel pin on the shift drum and install the cam plate. Tighten the bolt securely.

DOWEL PIN

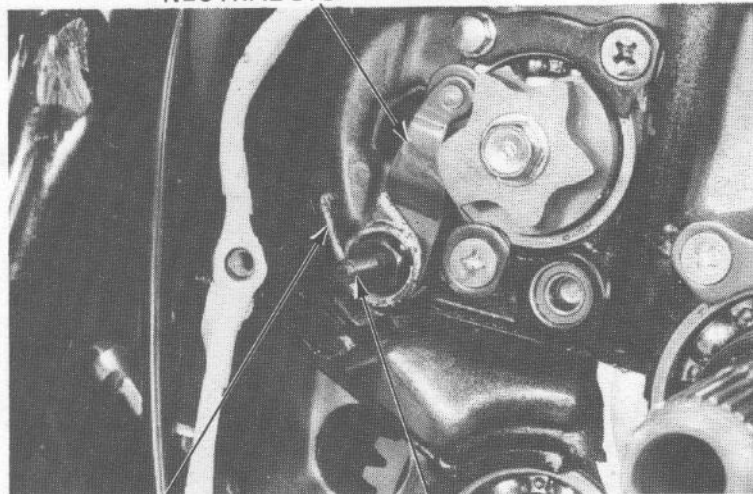


CAM PLATE HOLE PIN

Install the washer, neutral stopper arm, spring, and arm bolt.

Tighten the arm bolt securely.

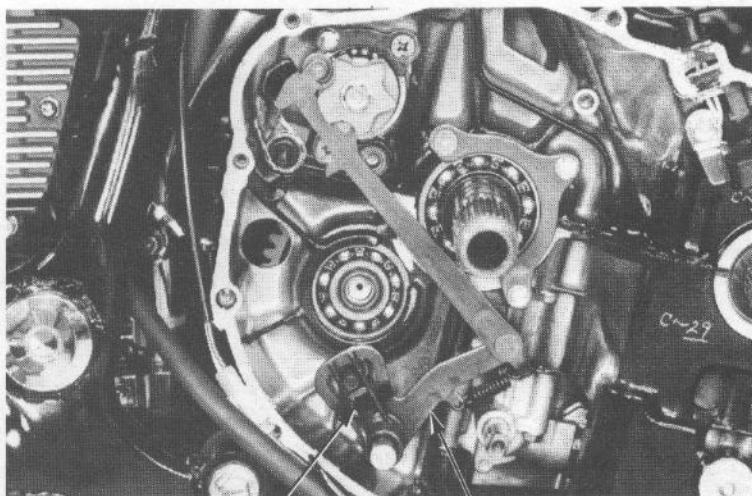
NEUTRAL STOPPER ARM



SPRING

ARM BOLT

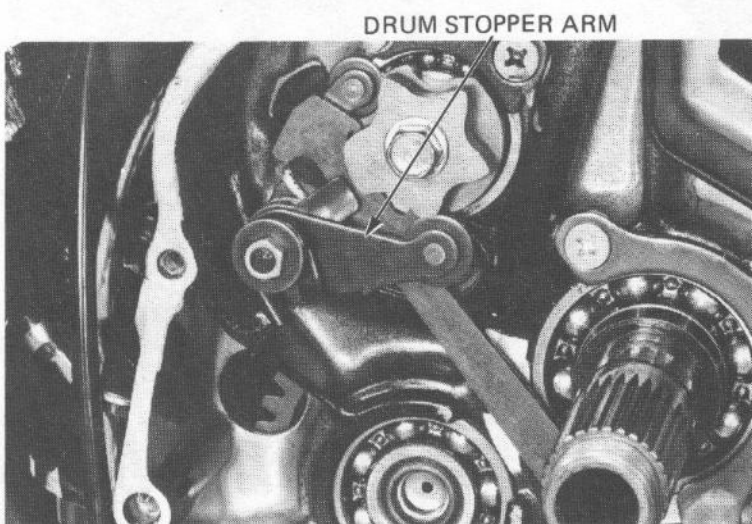
Assemble the gearshift spindle and return spring and install as shown.



RETURN SPRING

GEARSHIFT SPINDLE

Install the washer, drum stopper arm, collar, spring, washer, and nut over the arm bolt. Tighten the nut securely. Rotate the gearshift spindle and check the linkage for smooth operation.



DRUM STOPPER ARM

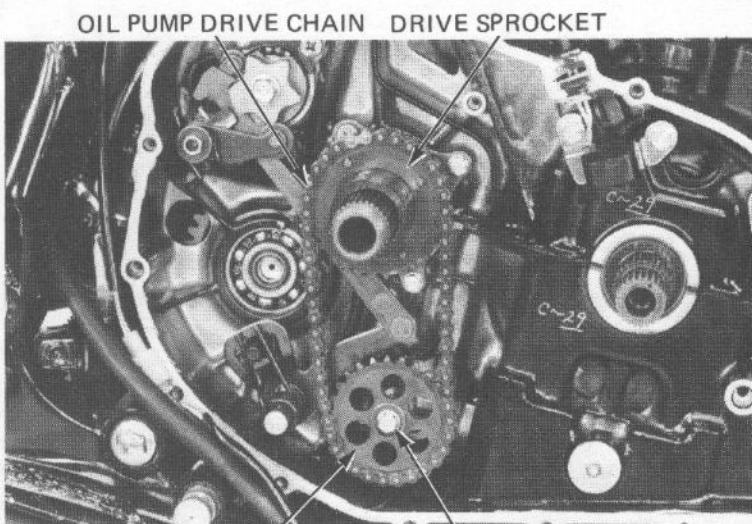
Install the oil pump drive sprocket washer on the shaft.

Install the oil pump drive and driven sprockets with drive chain and tighten the driven sprocket bolt securely.

NOTE:

The driven sprocket has an "IN" mark that must face the crankcase.

Install the clutch assembly and cover (section 7).



OIL PUMP DRIVE CHAIN DRIVE SPROCKET

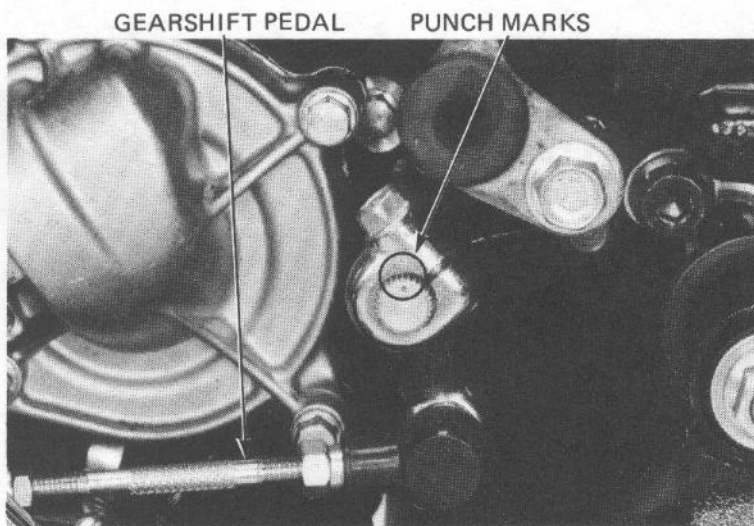
DRIVEN SPROCKET

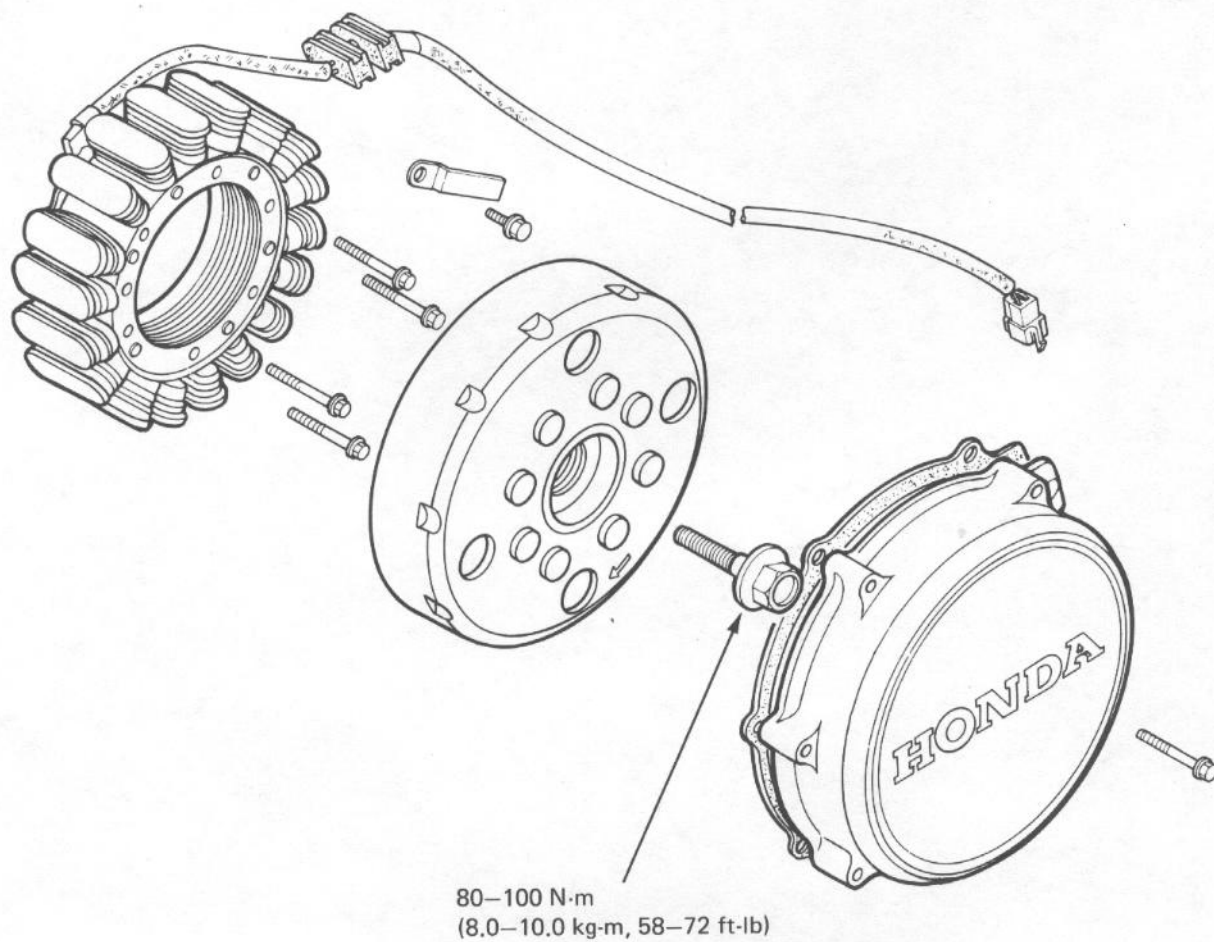
BOLT

GEARSHIFT LINKAGE

Align the punch marks on the gearshift pedal and gearshift spindle and install the gearshift pedal assembly and left footpeg.

Install the left crankcase rear cover and fill the crankcase with oil (page 2-3).





9. ALTERNATOR

| | |
|-----------------------|-----|
| SERVICE INFORMATION | 9-1 |
| FLYWHEEL REMOVAL | 9-2 |
| STATOR REMOVAL | 9-3 |
| STATOR INSTALLATION | 9-3 |
| FLYWHEEL INSTALLATION | 9-4 |

SERVICE INFORMATION

GENERAL

- This section covers removal and installation of the alternator.
- Refer to section 18 for inspecting and troubleshooting.

9

TORQUE VALUE

Alternator rotor/Flywheel bolt 80–100 N·m (8.0–10.0 kg·m, 58–72 ft·lb)

TOOLS

Common

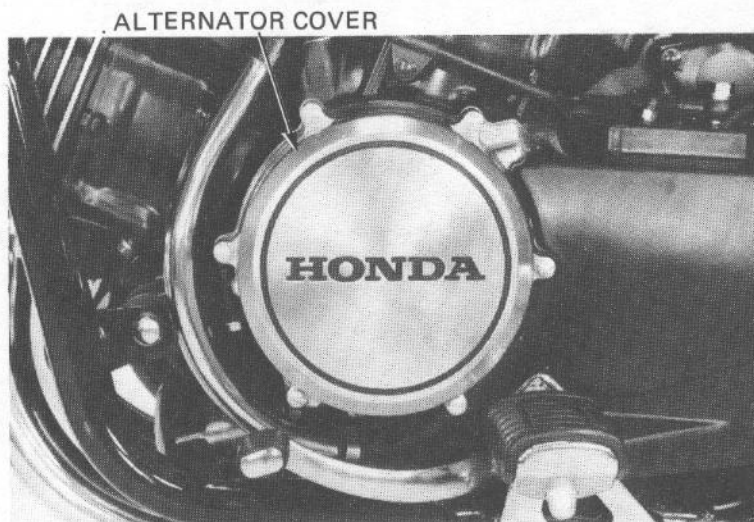
| | |
|------------------|--|
| Universal holder | 07725-0030000 |
| Rotor puller | 07733-0020001 or 07933-3290001 (U.S.A. only) |

ALTERNATOR

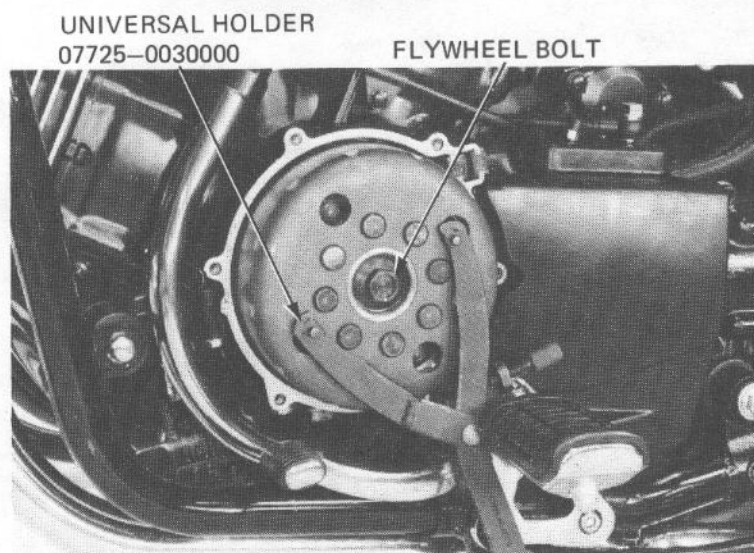
FLYWHEEL REMOVAL

Place a container under the alternator cover to catch engine oil.

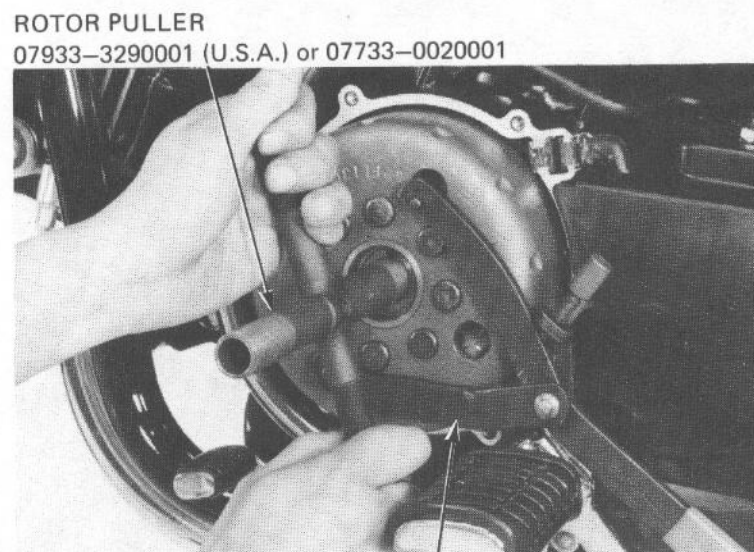
Remove the alternator cover.



Hold the flywheel with a universal holder and remove the flywheel bolt.



Remove the flywheel with the rotor puller.
Remove the woodruff key from the crankshaft.

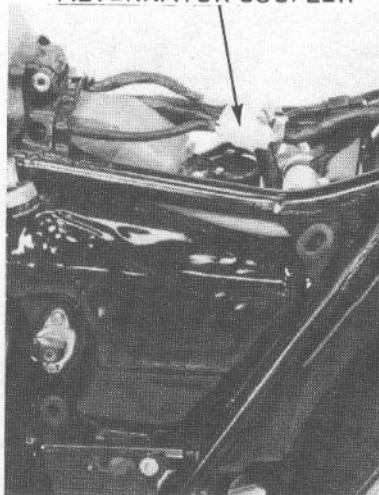


UNIVERSAL HOLDER
07725-0030000

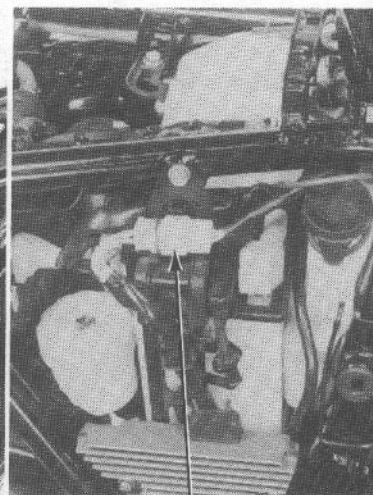
STATOR REMOVAL

Remove the seat and frame left side cover.
Disconnect the alternator coupler and remove the wire bands.

'83, '84:
ALTERNATOR COUPLER



AFTER '84:



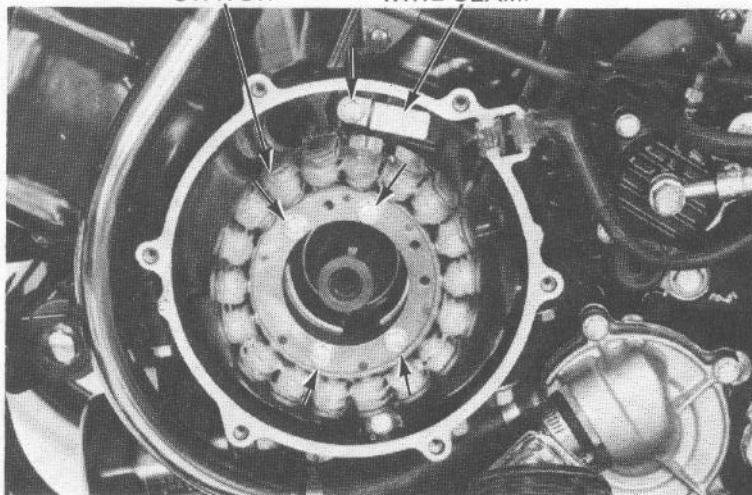
ALTERNATOR COUPLER

Remove the left crankcase rear cover.

Remove the stator by removing the bolts and wire clamp.

STATOR

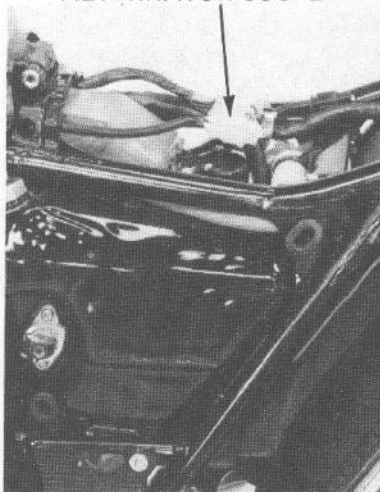
WIRE CLAMP



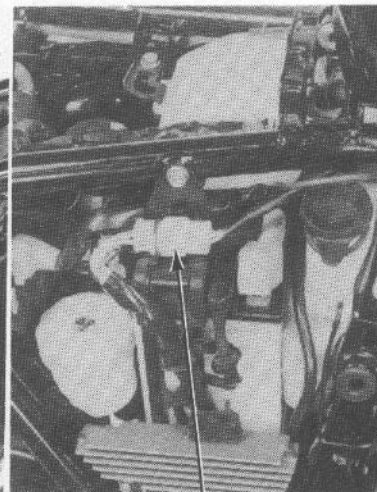
STATOR INSTALLATION

Install the stator and wire clamp.

'83, '84:
ALTERNATOR COUPLER



AFTER '84:



ALTERNATOR COUPLER

Install the left crankcase rear cover.

Route the alternator leads according to the diagram in Section 1 and connect the alternator wire coupler to the wire harness.

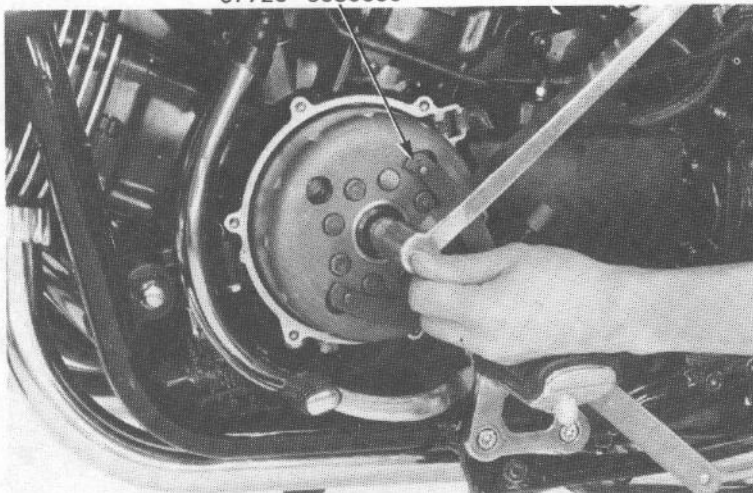
Secure the alternator leads with the wire bands.
Install the seat and frame left side cover.

FLYWHEEL INSTALLATION

Install the woodruff key into the crankshaft.
Install the flywheel by aligning its keyway with the key in the crankshaft.
Hold the flywheel with a universal holder and torque the flywheel bolt.

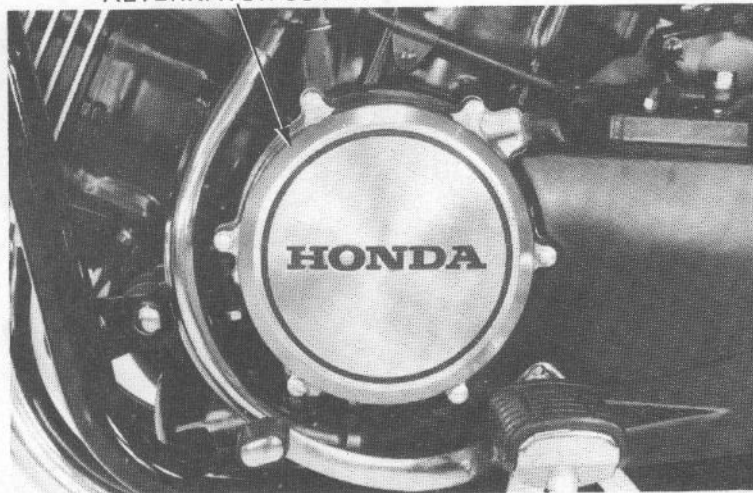
TORQUE: 80–100 N·m
(8.0–10.0 kg-m, 58–72 ft-lb)

UNIVERSAL HOLDER
07725-0030000



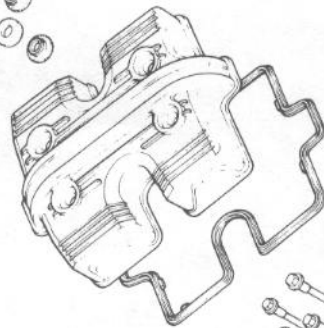
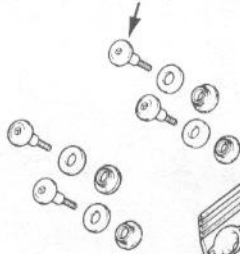
Install the alternator cover.
Check engine oil level and add oil if necessary (page 2-3).

ALTERNATOR COVER

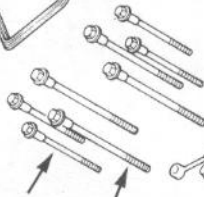


CYLINDER HEAD/VALVE

8–12 N·m
(0.8–1.2 kg-m, 6–9 ft-lb)

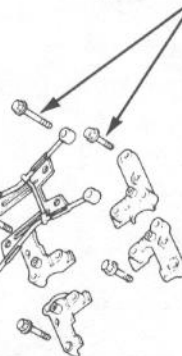


21–25 N·m
(2.1–2.5 kg-m, 15–18 ft-lb)

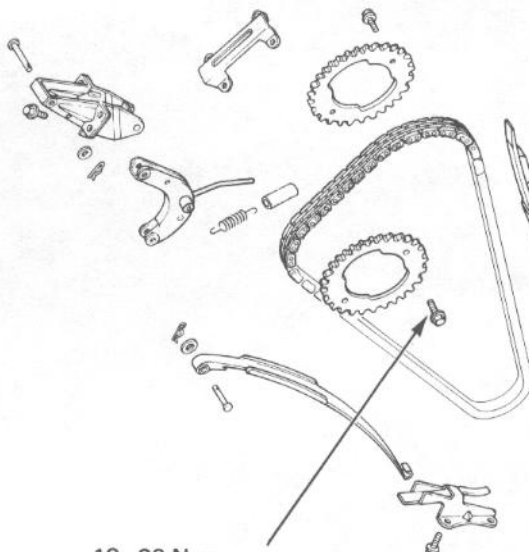
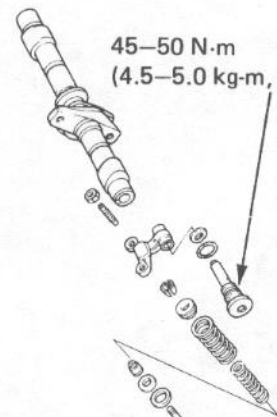


48–52 N·m
(4.8–5.2 kg-m, 35–38 ft-lb)

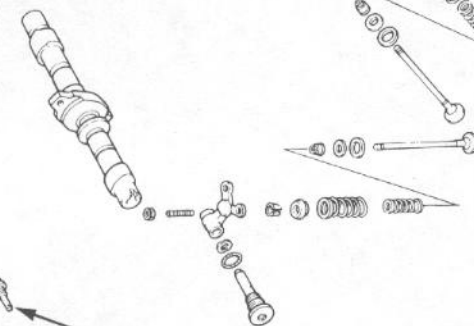
10–14 N·m
(1.0–1.4 kg-m, 7–10 ft-lb)



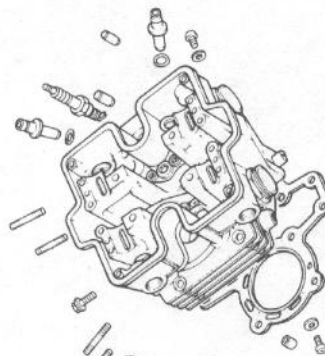
45–50 N·m
(4.5–5.0 kg-m, 33–36 ft-lb)



21–25 N·m
(2.1–2.5 kg-m, 15–18 ft-lb)



18–20 N·m
(1.8–2.0 kg-m, 13–14 ft-lb)



48–52 N·m
(4.8–5.2 kg-m, 35–38 ft-lb)

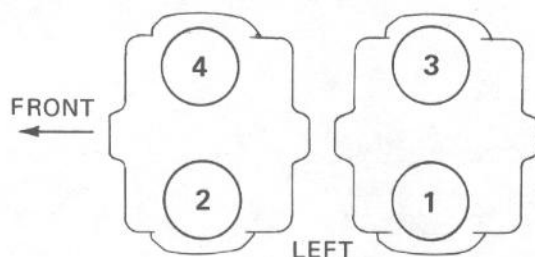
10. CYLINDER HEAD/VALVE

| | | | |
|---------------------------|------|------------------------------------|-------|
| SERVICE INFORMATION | 10-1 | VALVE GUIDE REPLACEMENT | 10-13 |
| TROUBLESHOOTING | 10-2 | VALVE SEAT INSPECTION/ REFACING | 10-14 |
| CAMSHAFT REMOVAL | 10-3 | CYLINDER HEAD ASSEMBLY | 10-15 |
| CYLINDER HEAD REMOVAL | 10-7 | CYLINDER HEAD INSTALLATION | 10-16 |
| CYLINDER HEAD DISASSEMBLY | 10-9 | CAMSHAFT INSTALLATION | 10-19 |

SERVICE INFORMATION

GENERAL

- The cylinder head can be removed with the engine in the frame.
- If the cam sprockets of either front or rear cylinder are removed, the valve timing of both cylinders must be checked during reinstallation.
- Camshaft lubricating oil is fed through an oil line. Be sure the hole in the oil line is not clogged.
- During assembly, apply molybdenum disulfide to the camshaft holder surfaces to provide initial lubrication.
- The cylinder numbering is given below:



SPECIFICATIONS

| | | | STANDARD | SERVICE LIMIT |
|----------------------|-------------------------|-------------------|--|----------------------|
| Compression pressure | | | 13 ± 2 kg/cm ² (184 ± 28 psi) | — |
| Camshaft | Cam height | IN | 35.335–35.495 mm (1.3911–1.3974 in) | 35.3 mm (1.39 in) |
| | | EX | 35.335–35.495 mm (1.3911–1.3974 in) | 35.3 mm (1.39 in) |
| | Runout | | — | 0.10 mm (0.004 in) |
| | End clearance | | 0.05–0.25 mm (0.002–0.010 in) | 0.30 mm (0.012 in) |
| | Oil clearance | Center | 0.030–0.091 mm (0.0012–0.0036 in) | 0.095 mm (0.0037 in) |
| | | Both ends | 0.030–0.091 mm (0.0012–0.0036 in) | 0.095 mm (0.0037 in) |
| Rocker arm | Rocker arm I.D. | | 12.000–12.018 mm (0.4724–0.4731 in) | 12.05 mm (0.474 in) |
| | Shaft O.D. | | 11.966–11.984 mm (0.4711–0.4718 in) | 11.93 mm (0.470 in) |
| Valve | Valve stem O.D. | IN | 5.475–5.490 mm (0.2156–0.2161 in) | 5.47 mm (0.215 in) |
| | | EX | 5.455–5.470 mm (0.2148–0.2154 in) | 5.45 mm (0.214 in) |
| | Valve guide I.D. | | 5.500–5.515 mm (0.2165–0.2171 in) | 5.55 mm (0.219 in) |
| | Stem-to-guide clearance | IN | 0.010–0.040 mm (0.0004–0.0016 in) | 0.08 mm (0.003 in) |
| | | EX | 0.030–0.060 mm (0.0012–0.0024 in) | 0.10 mm (0.004 in) |
| | Valve stem runout | | — | 0.05 mm (0.002 in) |
| | Valve length | IN | 87.05 mm (3.427 in) | 86.55 mm (3.407 in) |
| | | EX | 86.85 mm (3.419 in) | 86.35 mm (3.400 in) |
| Valve seat width | | 1.2 mm (0.047 in) | 1.5 mm (0.06 in) | |

CYLINDER HEAD/VALVE

| | | | | |
|---------------|----------------|-------|---|------------------------------------|
| Valve spring | Free length | Inner | 40.85 mm (1.608 in) | 39.45 mm (1.553 in) |
| | | Outer | 44.5 mm (1.752 in) | 43.1 mm (1.70 in) |
| | Preload/length | Inner | 6.67–7.83 kg/34.2 mm (14.70–17.26 lb/1.35 in) | 6.37 kg/34.2 mm (14.04 lb/1.35 in) |
| | | Outer | 13.7–16.1 kg/37.7 mm (30.20–35.49 lb/1.48 in) | 3.0 kg/37.7 mm (6.6 lb/1.48 in) |
| Cylinder head | Warpage | | — | 0.05 mm (0.002 in) |

TORQUE VALUES

| | |
|------------------------|--|
| Cylinder head cover | 8–12 N·m (0.8–1.2 kg-m, 5.8–9.0 ft-lb) |
| Camshaft holder (6 mm) | 10–14 N·m (1.0–1.4 kg-m, 7–10 ft-lb) |
| Cam chain guide A | 21–25 N·m (2.1–2.5 kg-m, 15–18 ft-lb) |
| Cylinder head (10 mm) | 48–52 N·m (4.8–5.2 kg-m, 35–38 ft-lb) |
| Cylinder head (8 mm) | 21–25 N·m (2.1–2.5 kg-m, 15–18 ft-lb) |
| Rocker arm shaft | 45–50 N·m (4.5–5.0 kg-m, 33–36 ft-lb) Apply LOCKTITE® 271 to the threads |
| Cam sprocket | 18–20 N·m (1.8–2.0 kg-m, 13–14 ft-lb) |

TOOLS

Special

| | |
|-------------------------------|---------------|
| Valve guide reamer, 5.5 mm | 07984–2000000 |
| Valve guide driver | 07942–3290100 |
| Valve guide driver attachment | 07943–MB40000 |

Common

| | |
|-------------------------|---------------|
| Valve spring compressor | 07757–0010000 |
|-------------------------|---------------|

TROUBLESHOOTING

Engine top-end problems usually affect engine performance. These can be diagnosed by a compression test, or by tracing noises with a sounding rod or stethoscope.

Low compression

1. Valves

- 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 12)

Compression too high

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

Excessive noise

1. Incorrect valve adjustment
2. Sticking valve or broken valve spring
3. Damaged or worn camshaft
4. Loose or worn cam chain
5. Worn or damaged cam chain tensioner
6. Worn cam sprocket teeth
7. Worn rocker arm and/or shaft

CAMSHAFT REMOVAL

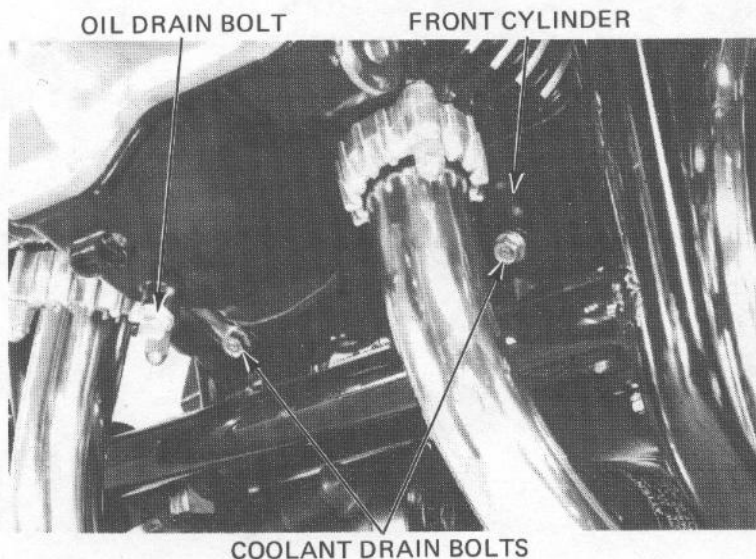
Drain the coolant (page 6-3) and engine oil from the front cylinder head by removing the bolts and washers.

'83~'85:

Remove the radiator (page 6-6).

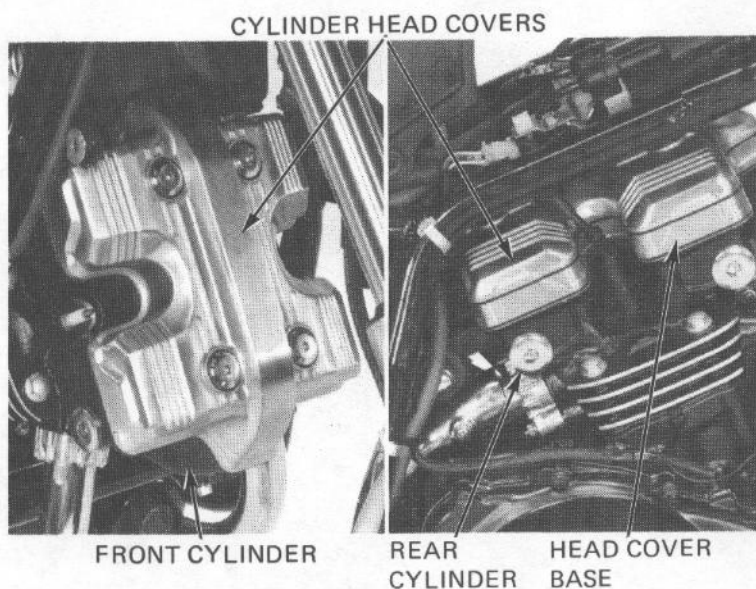
After '85:

Remove the radiator (section 3).



Remove the cylinder head cover from the front cylinder head.

Remove the cylinder head cover and cover base from the rear cylinder head.



Remove the oil pipe and cam chain guide mounting bolts and remove the cam chain guide.

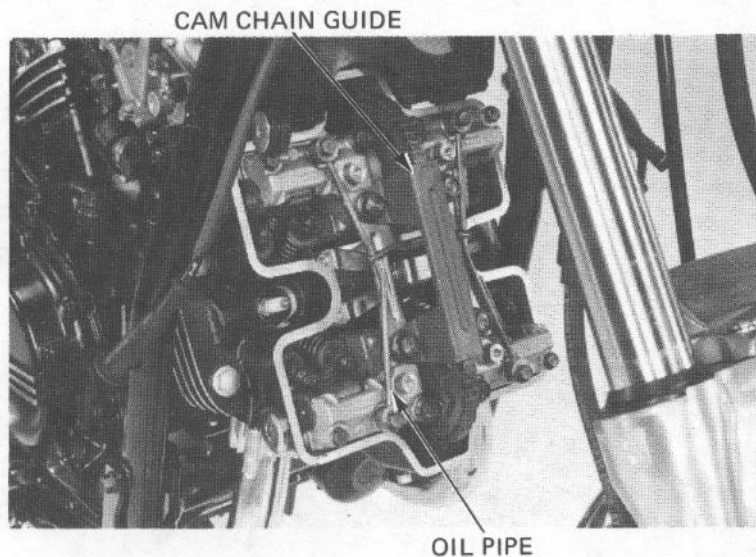
Remove the alternator cover and rotate the crankshaft clockwise until the cam chain has free play.

Remove the oil pipe while pulling up on the middle of the chain.

Remove the exhaust pipes (section 5).

Remove the carburetor (section 4).

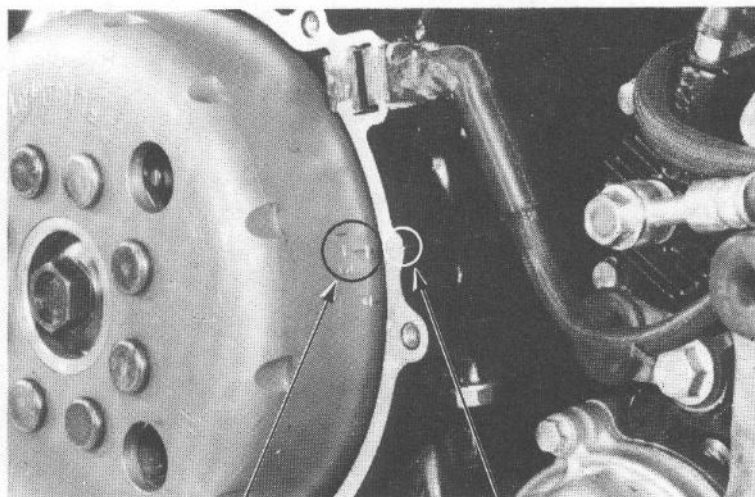
Remove the engine mounting bolt on rear cylinder head.



CYLINDER HEAD/VALVE

Turn the crankshaft clockwise until the T1.3 mark aligns with the rear crankcase mating surfaces.

Place rags or shop towels over the rear cylinder head to prevent parts from being dropped into the crankcase.



T1.3 MARK

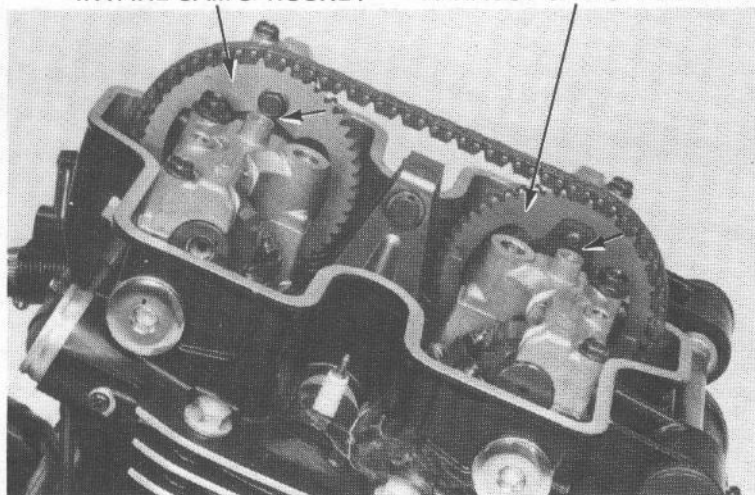
MATING SURFACE

Remove the intake and exhaust cam sprocket bolts.

Turn the crankshaft clockwise one turn (360°) and remove the other cam sprocket bolts.

INTAKE CAM SPROCKET

EXHAUST CAM SPROCKET

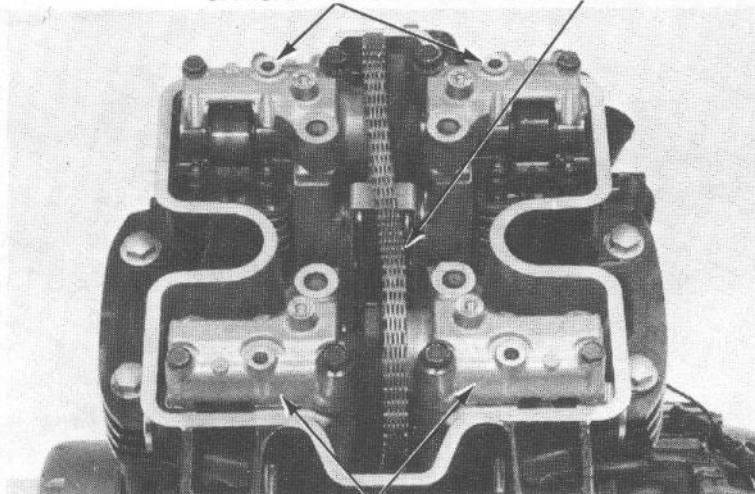


Slide the cam sprockets with the cam chain off the camshaft sprocket flanges.

Remove the cam chain from the sprockets and remove the camshaft holders. Mark the camshaft holders so that they can be reinstalled in their original locations.

CAMSHAFT HOLDERS

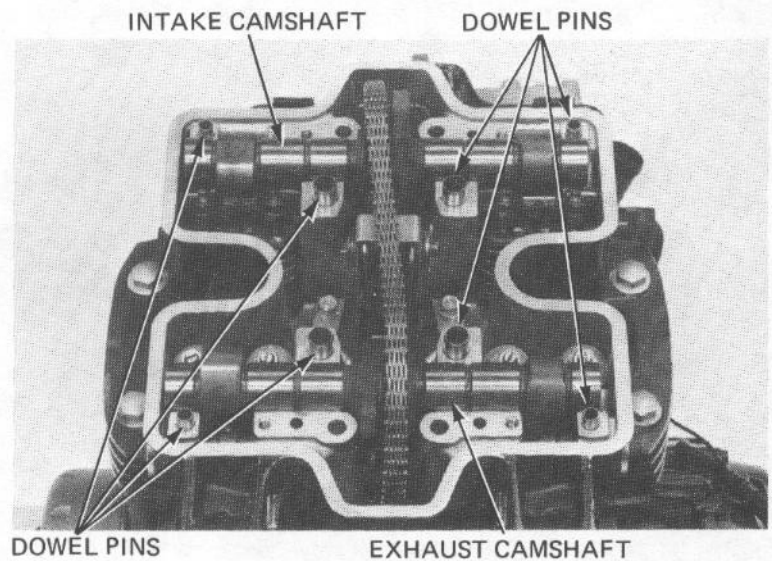
CAM CHAIN



CAMSHAFT HOLDERS

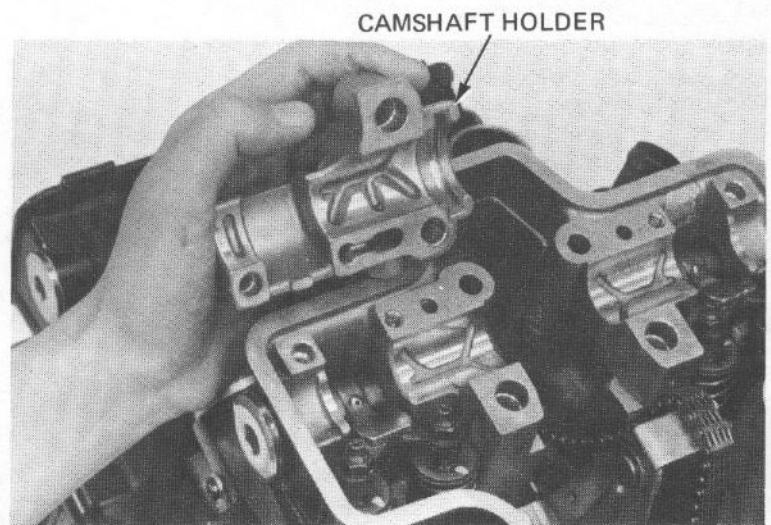
Remove the camshaft holder dowel pins and the intake and exhaust camshafts.

Remove the cam sprockets from the camshafts.



CAMSHAFT/CAM HOLDER INSPECTION

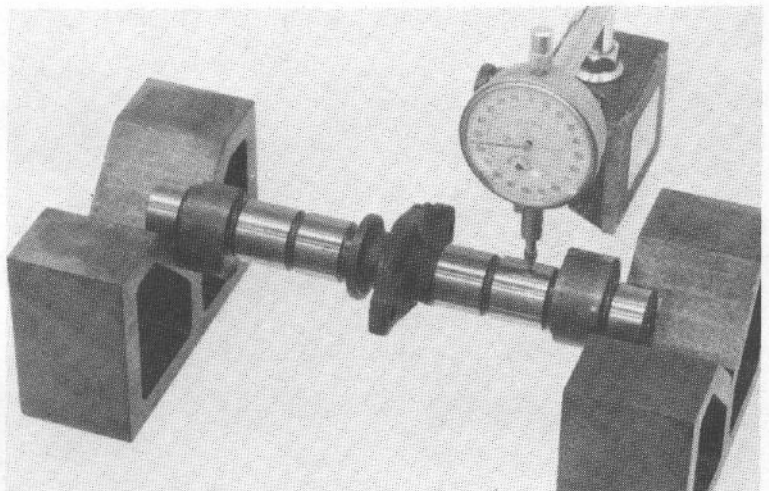
Inspect the camshaft and holder journal surfaces for scoring, scratches, or evidence of insufficient lubrication.



CAMSHAFT RUNOUT

Check camshaft runout with a dial indicator. Support both ends of the camshaft with V-blocks.

SERVICE LIMIT: 0.10 mm (0.004 in)

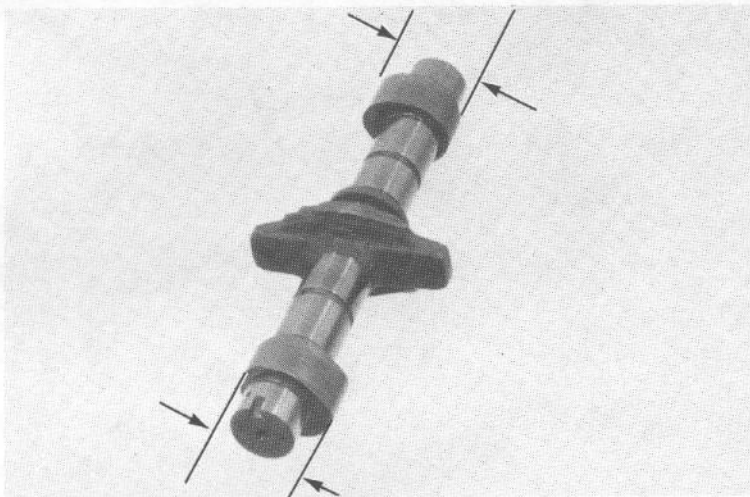


CAM INSPECTION

Using a micrometer, measure each cam lobe.

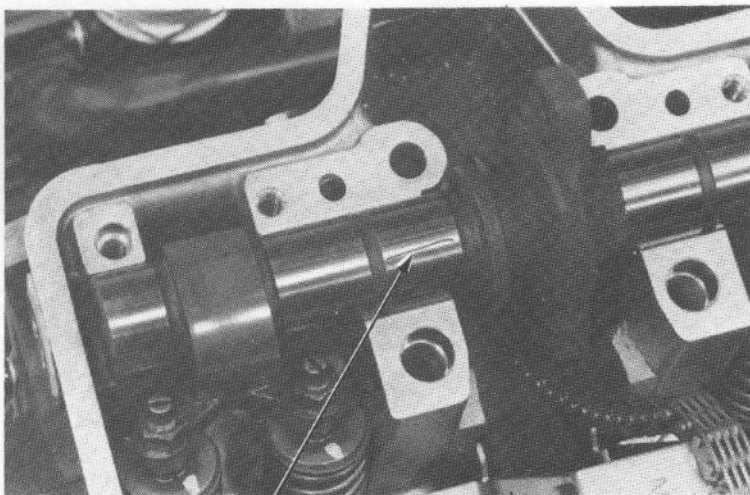
SERVICE LIMITS: IN, EX: 35.3 mm (1.39 in)

Check for wear or damage.



Wipe any oil from the journals.

Lay a strip of plastigauge lengthwise on top of each camshaft journal.



PLASTIGAUGE

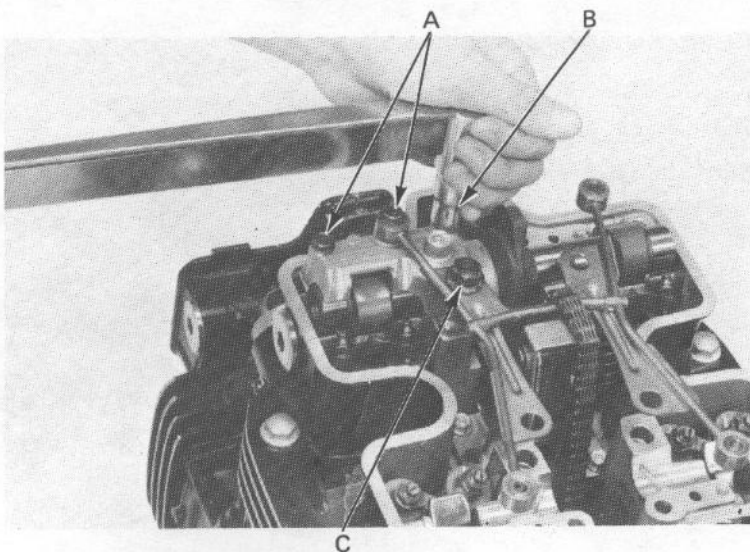
Install the camshaft holders and tighten in a crisscross pattern.

NOTE:

Do not rotate the camshaft when using plastigauge.

TORQUE:

- A: 6 mm BOLT: 10–14 N·m
(1.0–1.4 kg-m, 7–10 ft-lb)
- B: 8 mm BOLT: 21–25 N·m
(2.1–2.5 kg-m, 15–18 ft-lb)
- C: 10 mm BOLT: 48–52 N·m
(4.8–5.2 kg-m, 35–38 ft-lb)



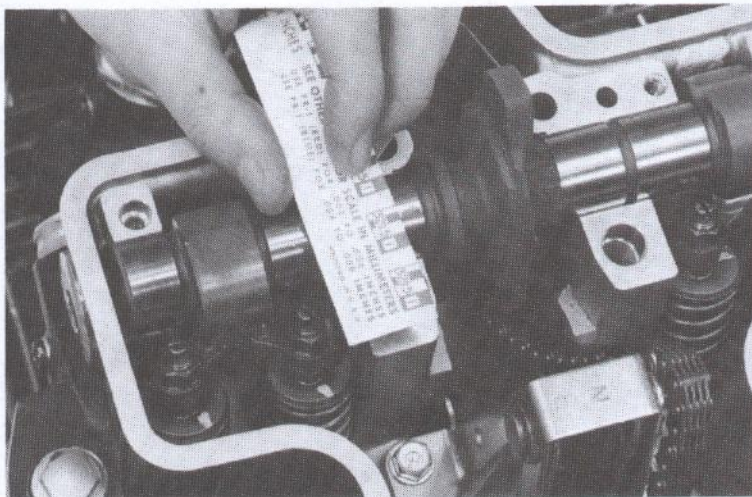
Remove the camshaft holders and measure the width of each plastigauge. The widest thickness determines the oil clearance.

SERVICE LIMITS:

CENTER: 0.095 mm (0.0037 in)

BOTH ENDS: 0.095 mm (0.0037 in)

When the service limits are exceeded, replace the camshaft and recheck the oil clearance. Replace the cylinder head and camshaft holders if the clearance still exceeds service limits.

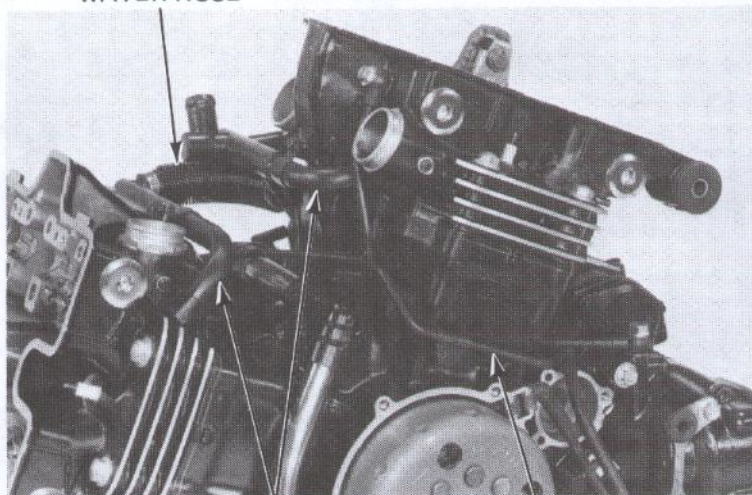


CYLINDER HEAD REMOVAL

Loosen the water hose clamp.
Remove the water pipes and hose.
Remove the water pipe O-rings.

Remove the oil pipe and sealing washers.

WATER HOSE



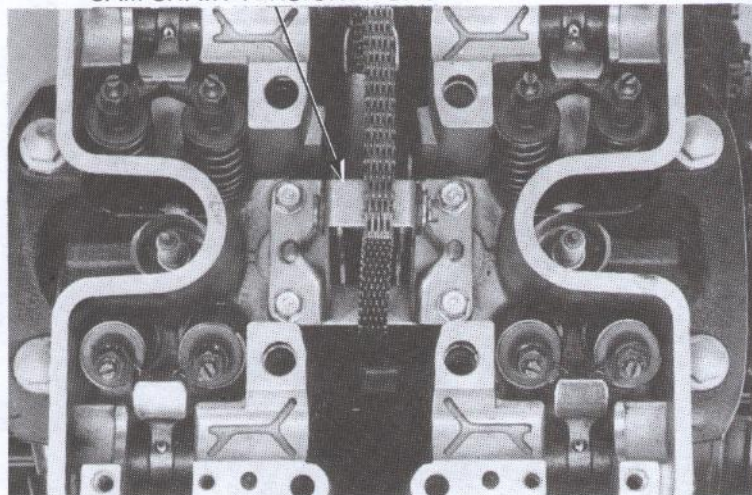
PIPES

OIL PIPE

Remove the front and rear cam chain tensioner base mounting bolts.

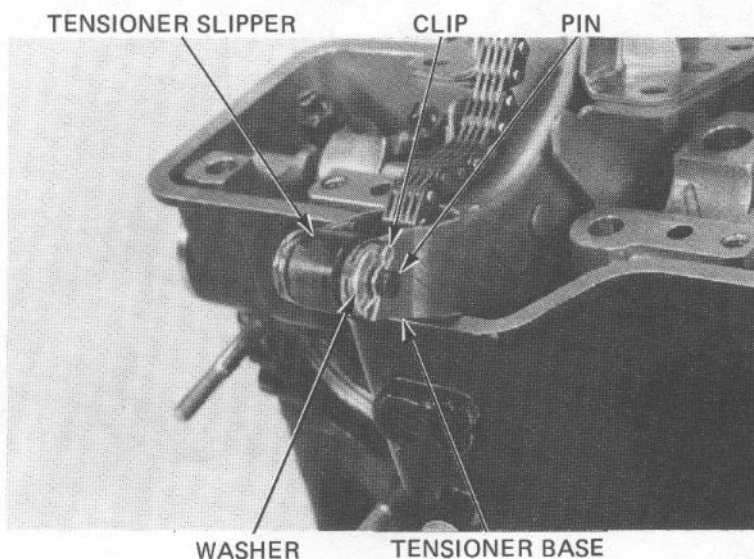
Pull the cam chain tensioner base up.

CAM CHAIN TENSIONER BASE



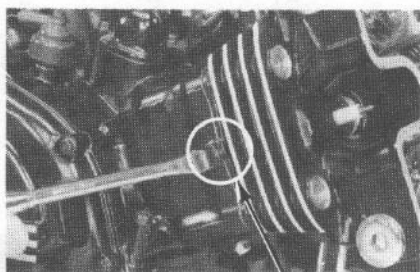
CYLINDER HEAD/VALVE

Remove the slipper clip, washer, and pin and remove the tensioner slipper base.

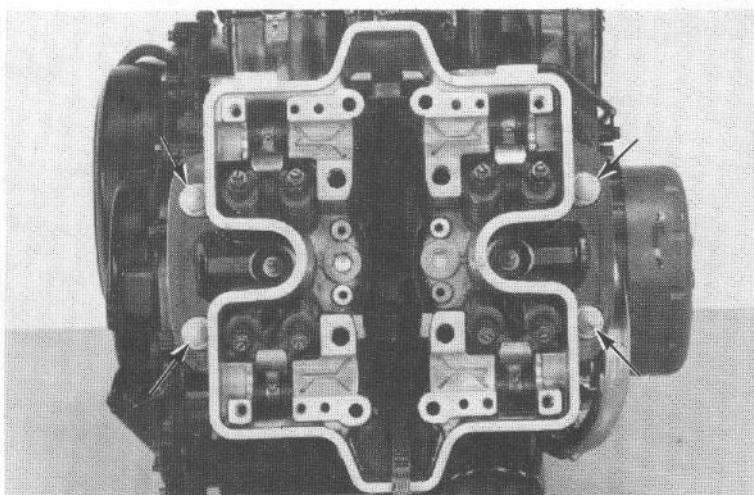


Remove the cylinder head bolts

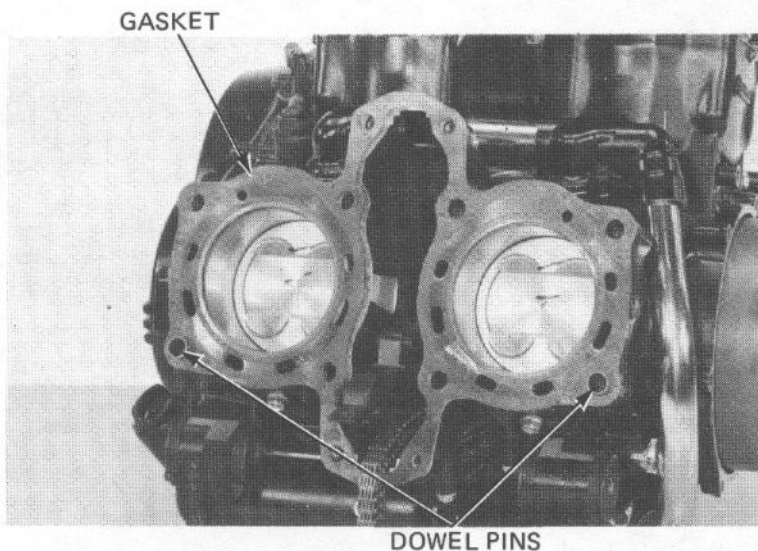
Remove the cylinder heads using a screw driver at the pry points.



PRY POINT



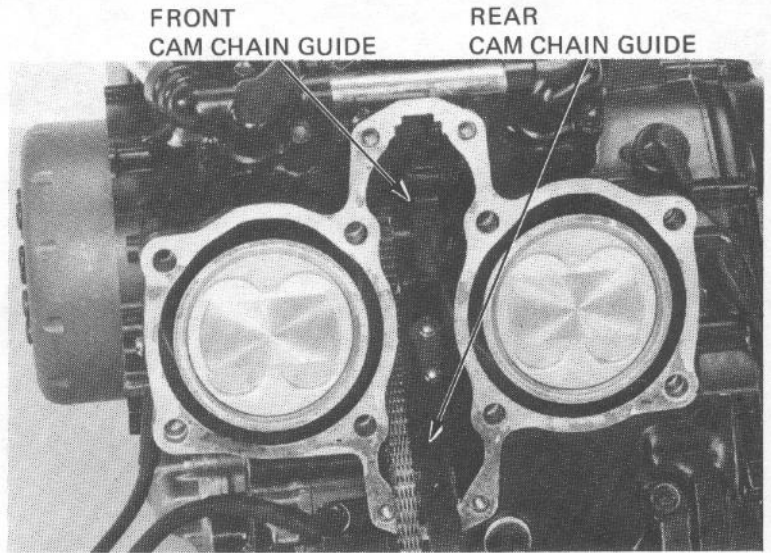
Remove the front and rear cylinder head gaskets and dowel pins.



Remove the rear cylinder cam chain guide bolts and guide.

NOTE:

When removing the front cylinder cam chain guide, the crankcase must be separated.

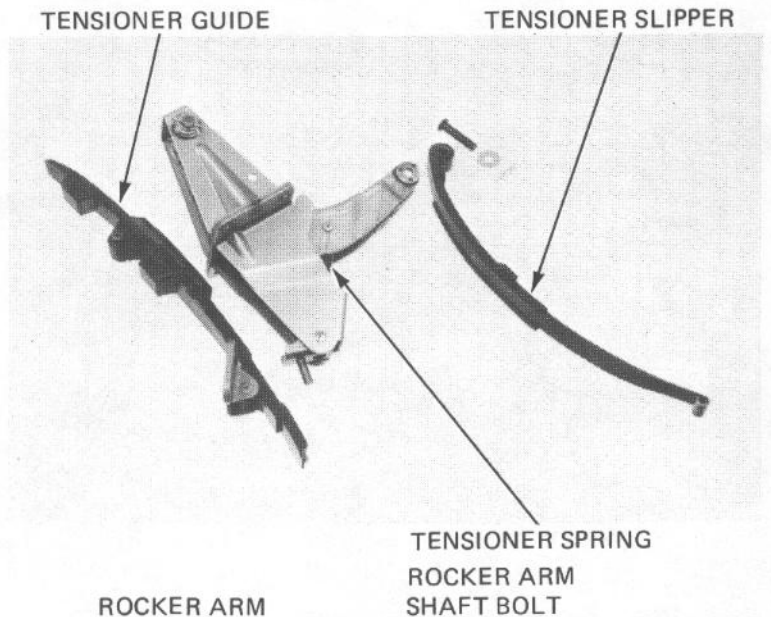


CAM CHAIN GUIDE AND CAM CHAIN TENSIONER INSPECTION

Inspect the cam chain guide and tensioner for damage or excessive wear.

Inspect the cam chain tensioner slipper for damage or excessive wear.

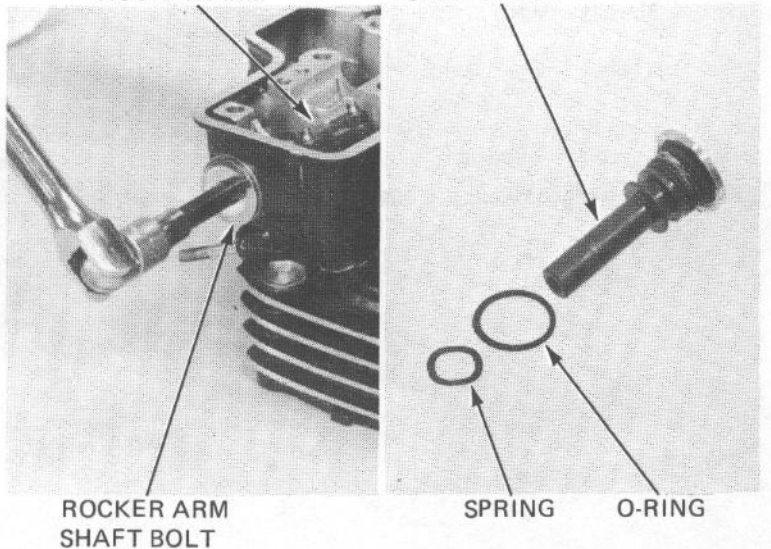
Inspect the spring for good tension, and replace if necessary.



CYLINDER HEAD DISASSEMBLY

Remove the rocker arm shaft and rocker arms.

Remove the rocker arm spring and O-ring from the shaft bolt.



CYLINDER HEAD/VALVE

Remove the valve spring cotters, retainers, springs and valves.

CAUTION:

- *To prevent loss of tension, do not compress the valve springs more than necessary to remove the cotters.*
- *Position the large retainer on the compressor attachment, so the compressor will not touch the cylinder head.*

NOTE:

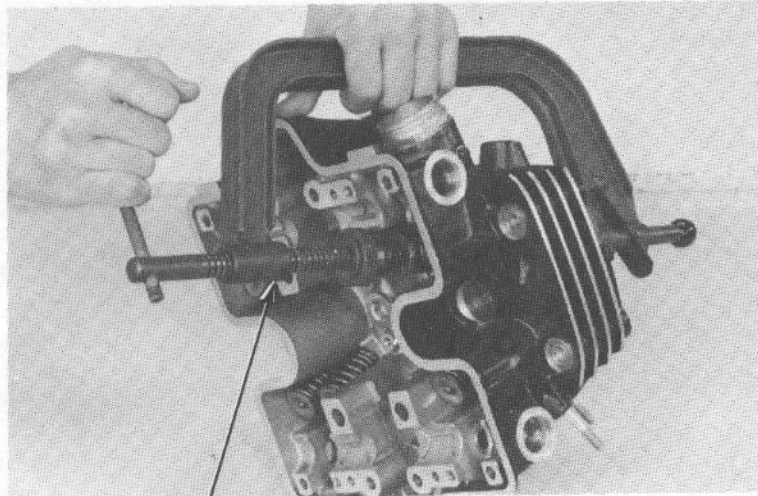
Mark all disassembled parts to ensure correct reassembly.

Remove the valve stem seals.

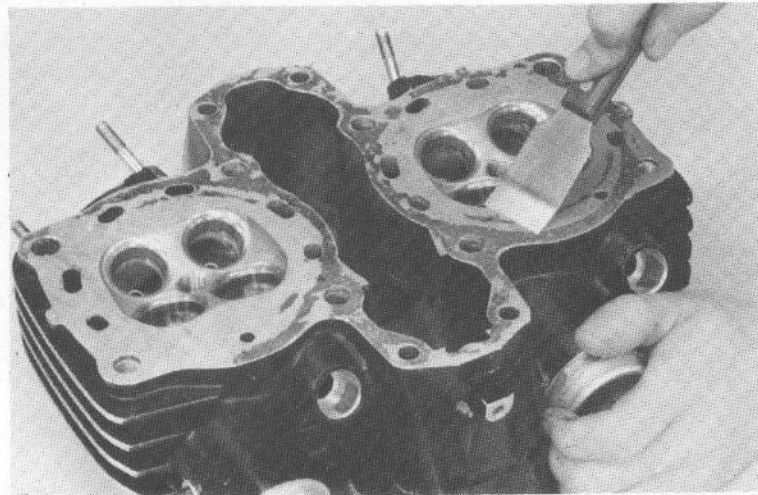
Remove carbon deposits from the combustion chamber and clean off the head gasket surfaces.

NOTE:

- Avoid damaging the gasket surfaces.
- Gaskets will come off easier if soaked in solvent.



VALVE SPRING COMPRESSOR
07757-0010000

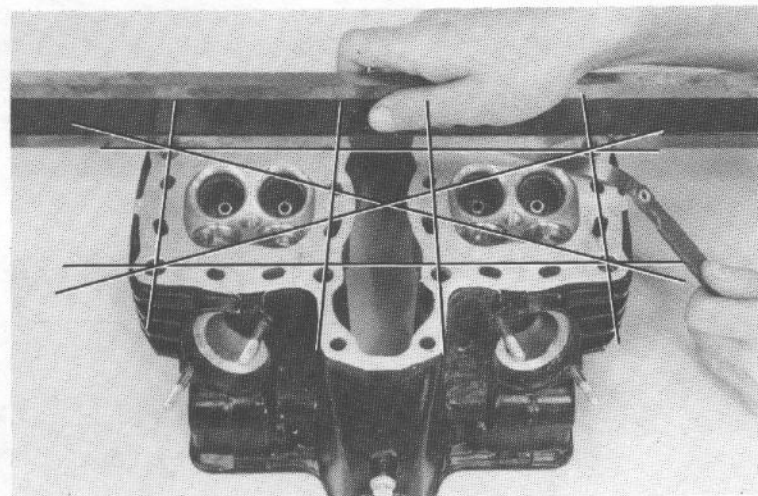


CYLINDER HEAD INSPECTION

Check the spark plug hole and valve areas for cracks.

Check the cylinder head for warpage with a straight edge and feeler gauge.

SERVICE LIMIT: 0.05 mm (0.002 in)

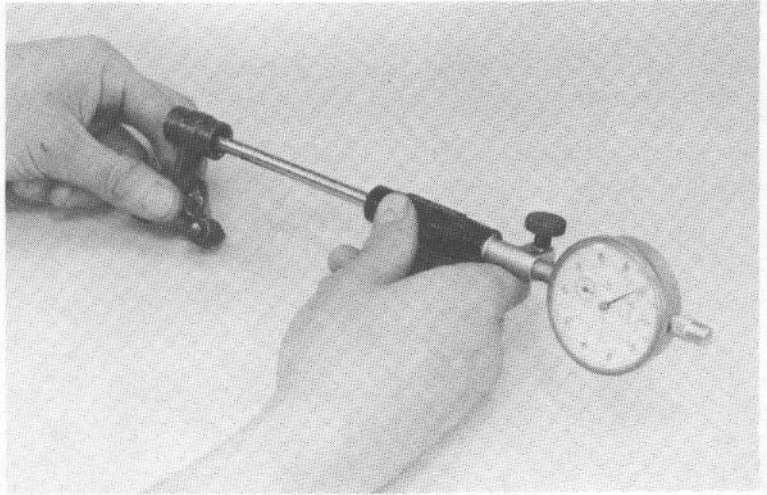


ROCKER ARM INSPECTION

Inspect the rocker arms for wear or damage to the camshaft contact surface or for a clogged oil hole.

Measure the I.D. of each rocker arm.

SERVICE LIMIT: 12.05 mm (0.474 in)



ROCKER ARM SHAFT AND SPRING INSPECTION

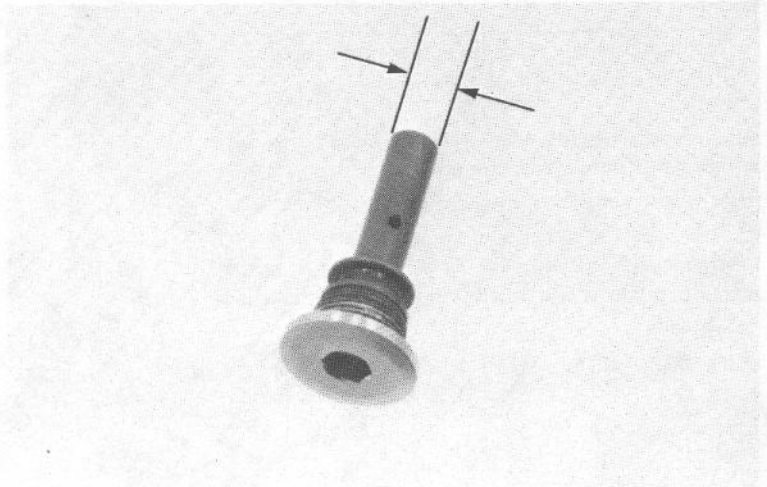
Measure each rocker arm shaft O.D.

SERVICE LIMIT: 11.93 mm (0.470 in)

Inspect the shaft for wear or damage and calculate the shaft to rocker arm clearance.

SERVICE LIMIT: 0.12 mm (0.005 in)

Inspect the rocker arm shaft spring for wear or damage.

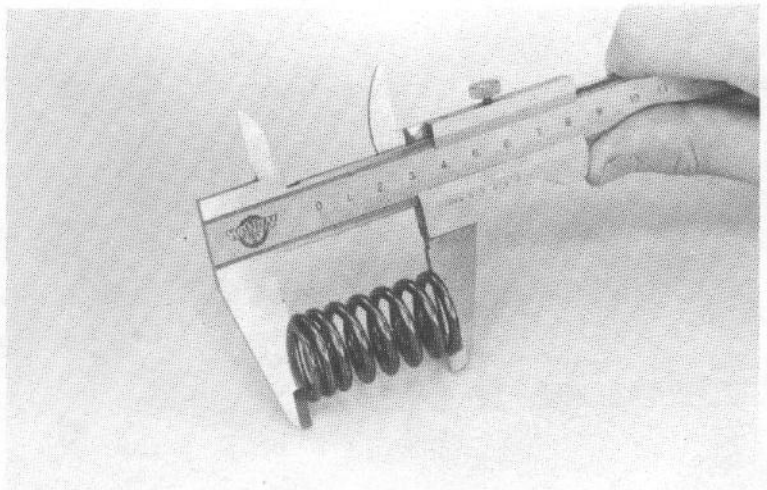


Measure the free length of the inner and outer valve springs.

SERVICE LIMITS:

INNER (IN, EX): 39.45 mm (1.553 in)

OUTER (IN, EX): 43.1 mm (1.70 in)



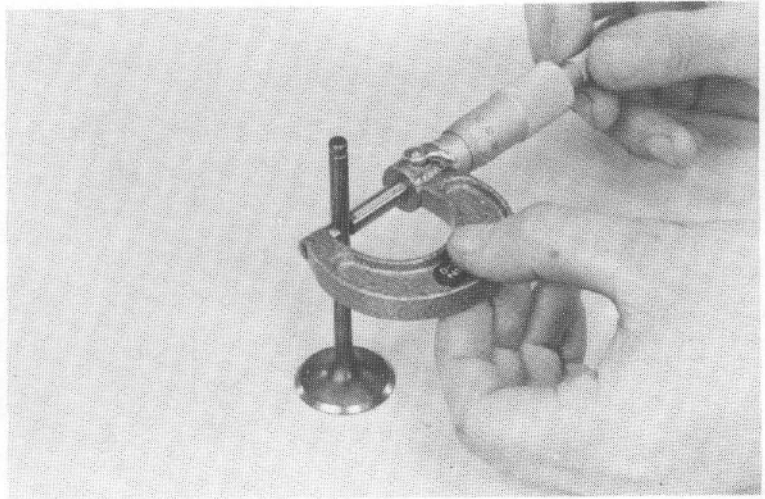
VALVE STEM-TO-GUIDE CLEARANCE

Inspect each valve for bending, burning, scratches, or abnormal stem wear.

Check valve movement in the guide and measure and record each valve stem O.D.

SERVICE LIMITS: IN: 5.47 mm (0.215 in)

EX: 5.45 mm (0.214 in)



NOTE:

Ream the guides to remove any carbon build-up before checking clearances.

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

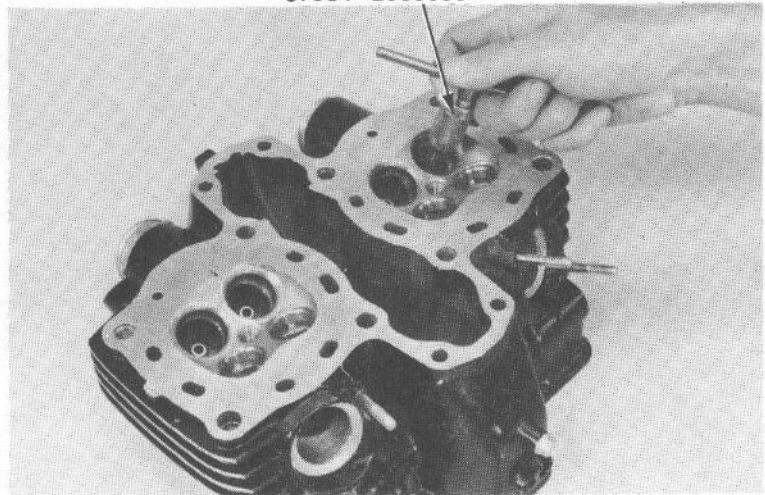
SERVICE LIMIT: 5.55 mm (0.219 in)

Subtract each valve stem O.D. from the corresponding guide I.D. to obtain the stem to guide clearance.

SERVICE LIMITS: IN: 0.08 mm (0.003 in)

EX: 0.10 mm (0.004 in)

VALVE GUIDE REAMER
07984-2000000



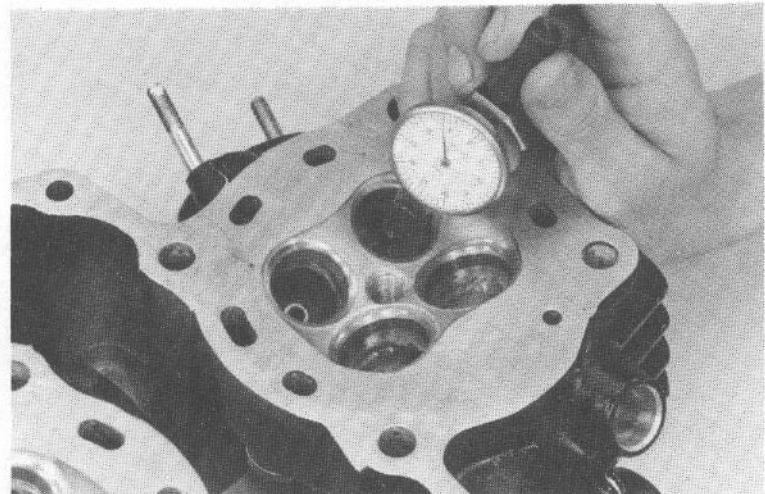
NOTE:

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

If the stem-to-guide clearance exceeds the service limits with new guides, replace the valves also.

NOTE:

Reface the valve seats whenever the valve guides are replaced (page 10-13).



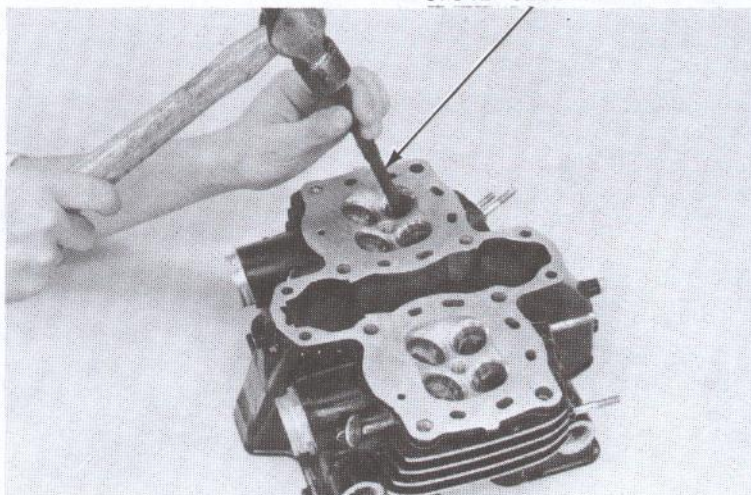
VALVE GUIDE REPLACEMENT

Heat the cylinder head to 100°C (212°F) with a hot plate or oven.

CAUTION:

- Do not use a torch to heat the cylinder; it may cause warping.
- To avoid burns, wear heavy gloves when handling the heated cylinder head.

Support the cylinder head and drive out the old guides from the combustion chamber side of the cylinder head.



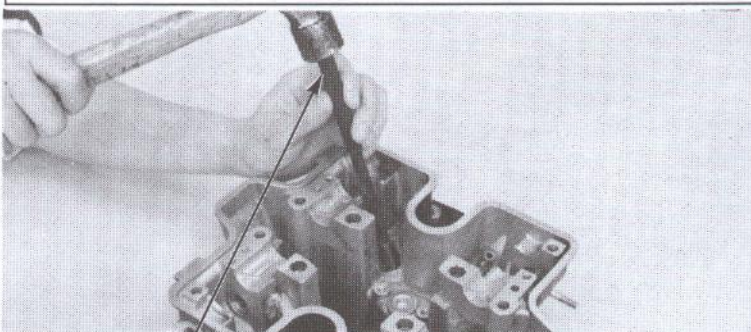
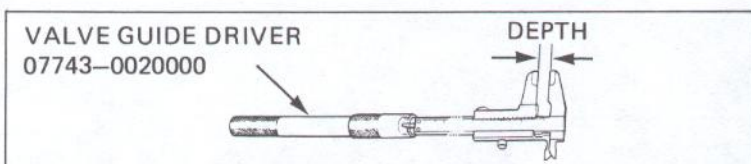
Adjust the tool setting depth by a pair of vernier calipers.

DEPTH: 20.5 mm (0.81 in)

Drive new guides in from the rocker arm side of the cylinder head.

NOTE:

Cylinder head heat should still be at 100°C (212°F) for installation of the new guides.



VALVE GUIDE DRIVER
07743-0020000

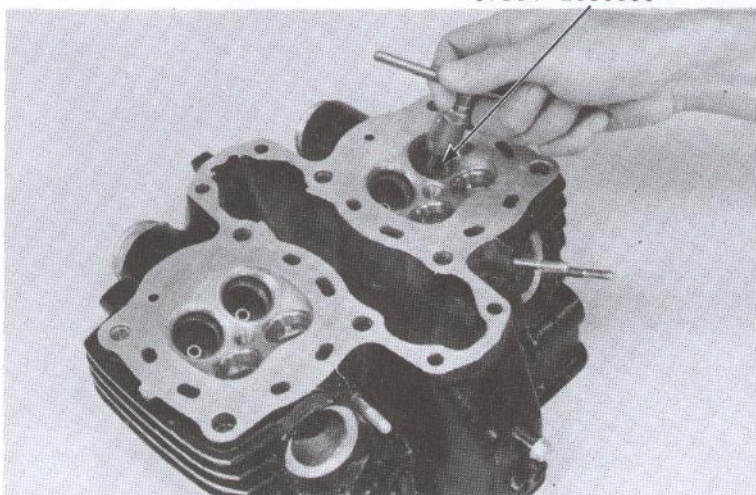
VALVE GUIDE REAMER
07984-2000000

Let the cylinder head cool to room temperature and ream the new valve guides.

NOTE:

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

Reface the valve seat (page 10-14) and clean the cylinder head thoroughly to remove any metal particles.



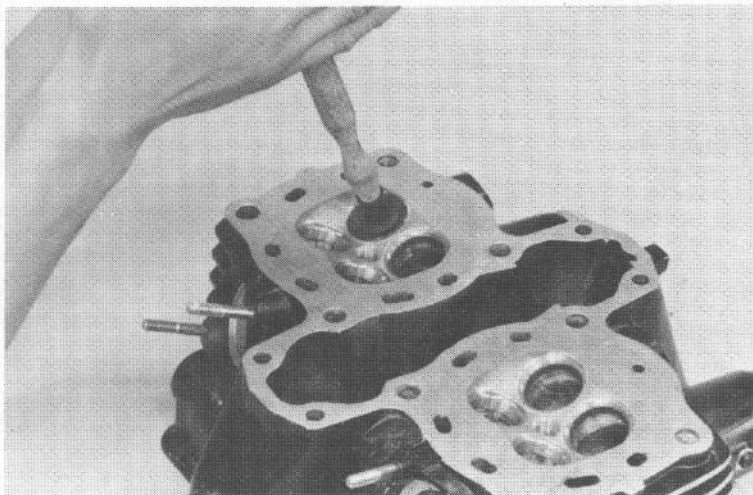
VALVE SEAT INSPECTION / REFACING

Clean all intake and exhaust valves thoroughly to remove carbon deposits.

Apply a light coating of valve lapping compound to each valve face. Lap each valve and seat using a rubber hose or other hand-lapping tool.

NOTE:

Take care not to allow the compound to enter between the valve stem and guide. After lapping, wash out the compound completely and apply a coat of engine oil to the valve face and seat.



Remove the valve and inspect the face.

CAUTION:

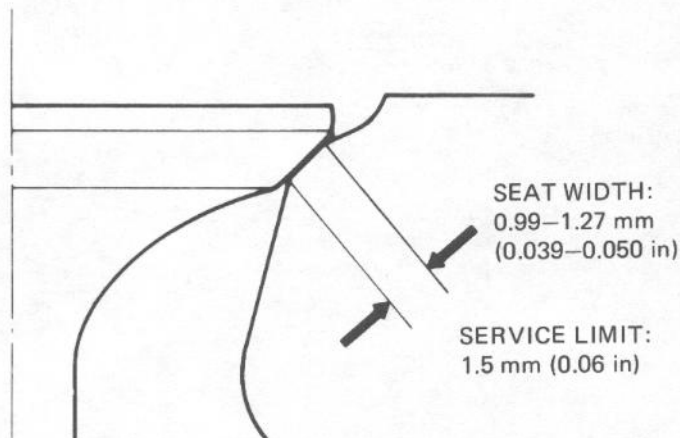
The valves cannot be ground. If the valve face is rough, worn unevenly, or contacts the seat improperly, the valve must be replaced.

Inspect the valve seat.

If the seat is too wide, too narrow, or has low spots, the seat must be ground.

NOTE:

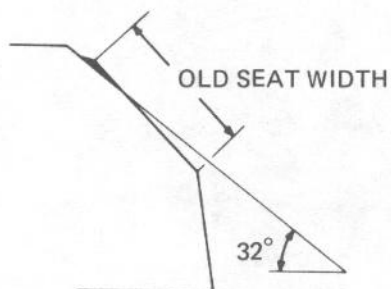
Follow the refacer manufacturer's operating instructions.



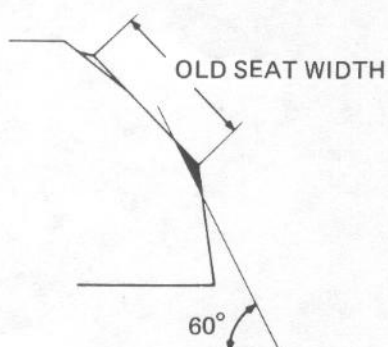
After cutting the seat, apply lapping compound to the valve face, and lap the valve using light pressure.

After lapping, wash any residual compound off the cylinder head and valve.

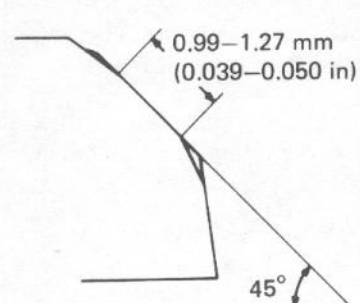
IN: CUTTER (30 mm ϕ)
EX: CUTTER (25 mm ϕ)



IN, EX: CUTTER (30 mm ϕ)



IN: CUTTER (29 mm ϕ)
EX: CUTTER (24.5 mm ϕ)



CYLINDER HEAD ASSEMBLY

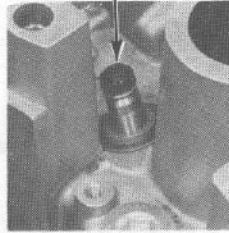
NOTE:

Install new valve stem seals when assembling.
Use valve guide driver 07742-0010100.

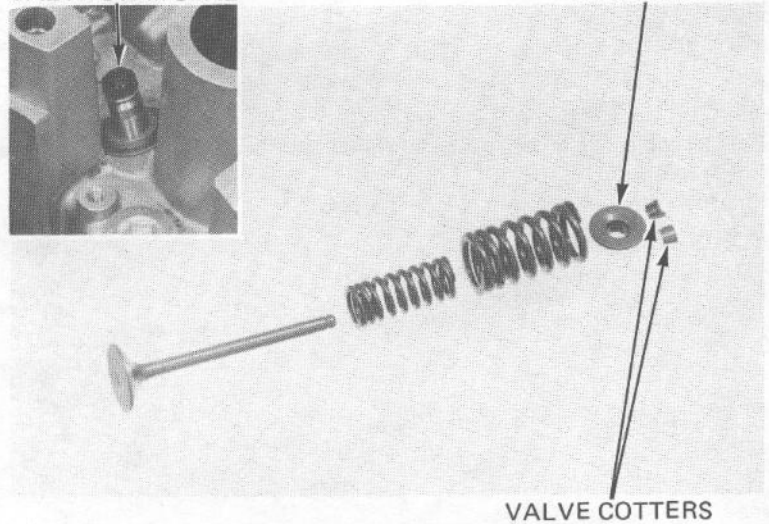
Lubricate each valve stem with molybdenum disulfide grease and insert the valve into the valve guide. To avoid damage to the stem seal, turn the valve slowly when inserting.

Install the valve springs and retainers. The springs tightly wound coils should face toward the head.

VALVE STEM SEAL



RETAINER

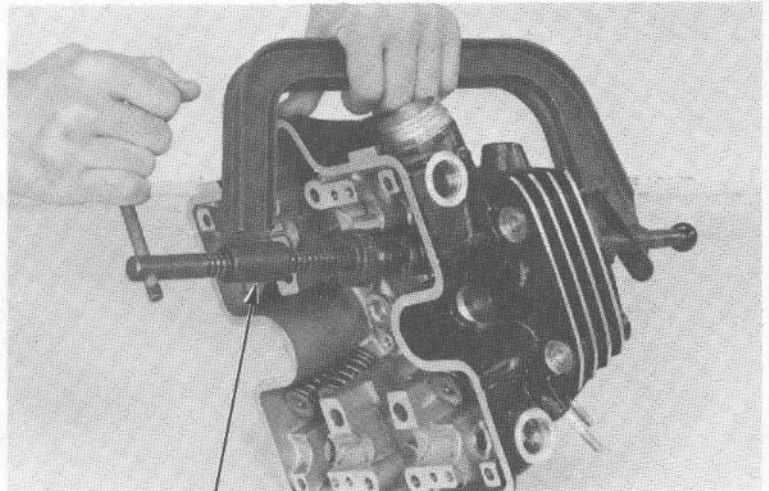


VALVE COTTERS

Install the valve cotter.

CAUTION:

- To prevent loss of tension, do not compress the valve spring more than necessary to install the valve keepers.
- Position the large retainer on the compressor attachment, so the compressor will not touch the cylinder head.

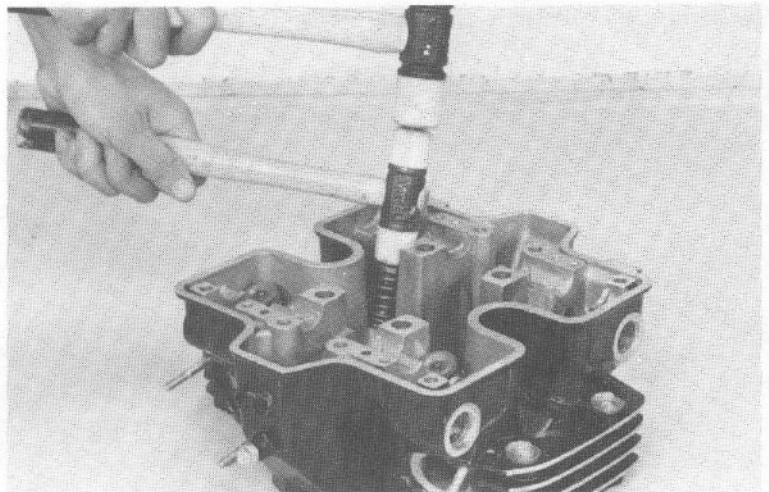


VALVE SPRING COMPRESSOR
07757-0010000

Tap the valve stems gently with a soft hammer to firmly seat the cotter.

NOTE:

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



CYLINDER HEAD/VALVE

Install the O-ring and spring onto the rocker arm shaft.

Apply LOCKTITE® 271 to the rocker arm bolt threads.

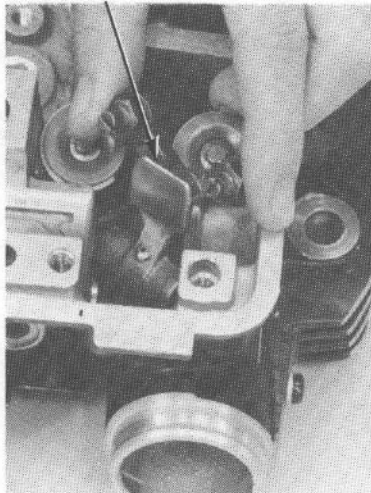
Apply engine oil to the rocker arm shaft and install the rocker arm.

Install and tighten the rocker arm shaft bolt.

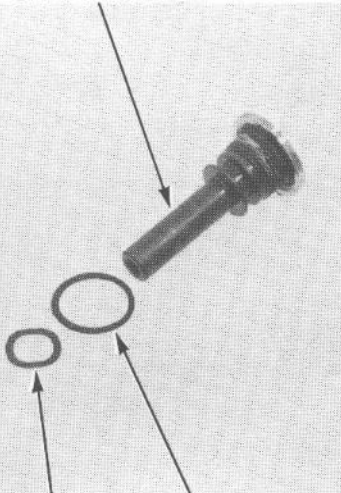
TORQUE: 45–50 N·m

(4.5–5.0 kg-m, 33–36 ft-lb)

ROCKER ARM



ROCKER ARM
SHAFT BOLT

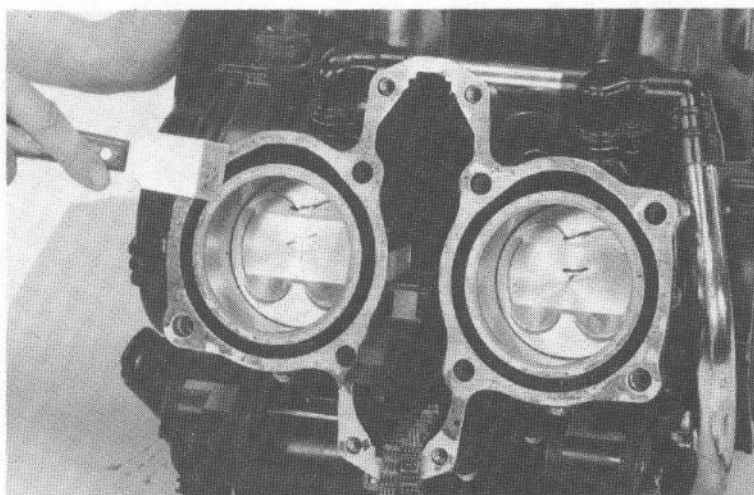


SPRING

O-RING

CYLINDER HEAD INSTALLATION

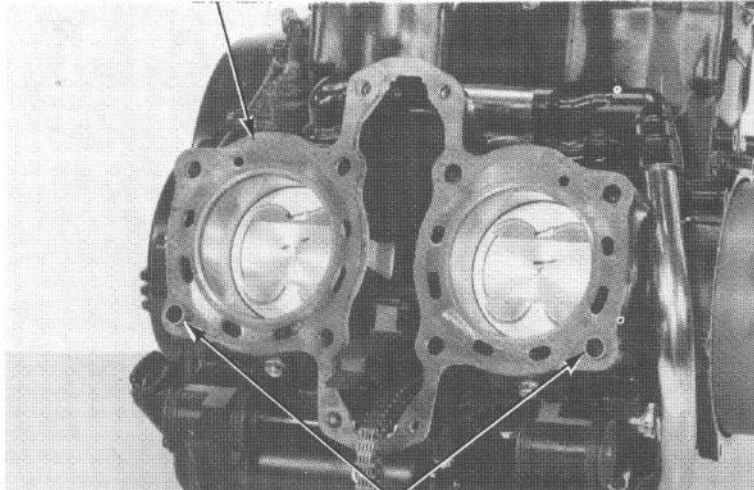
Clean the cylinder head surface of any gasket material.



Install the dowel pins and new head gaskets.

Install the rear cylinder cam chain guide.

GASKET

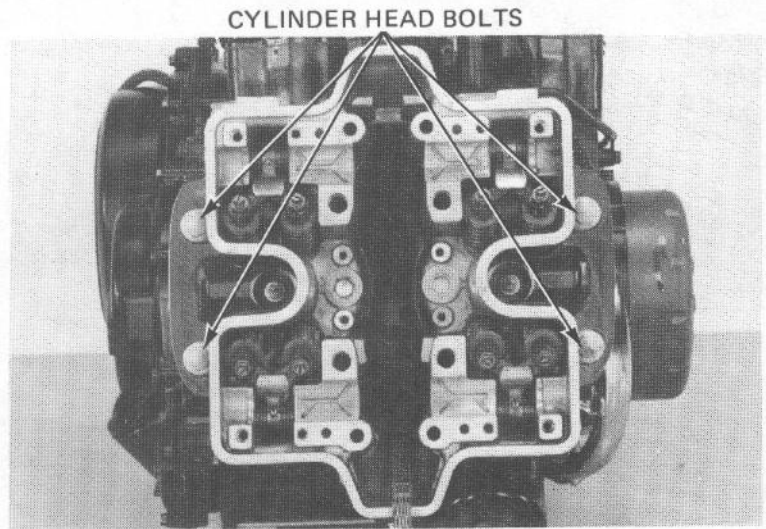


DOWEL PINS

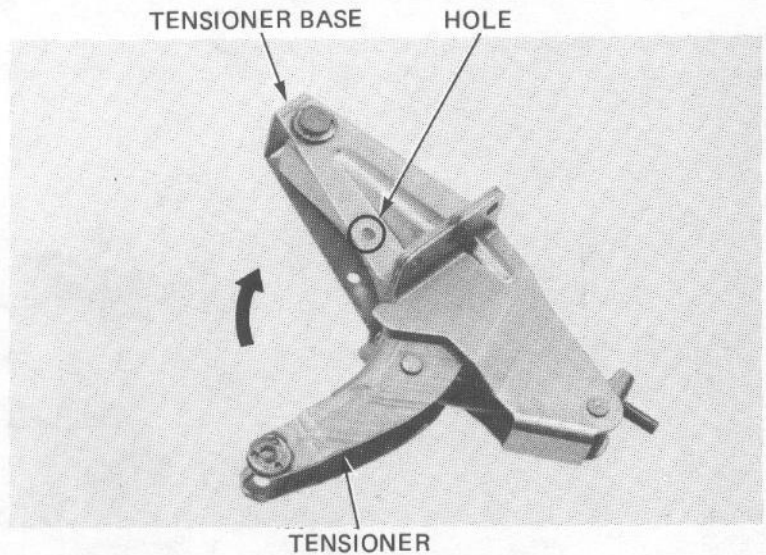
Install the cylinder head and temporarily install the cylinder head bolts.

NOTE:

Do not tighten the cylinder head bolts at this time.



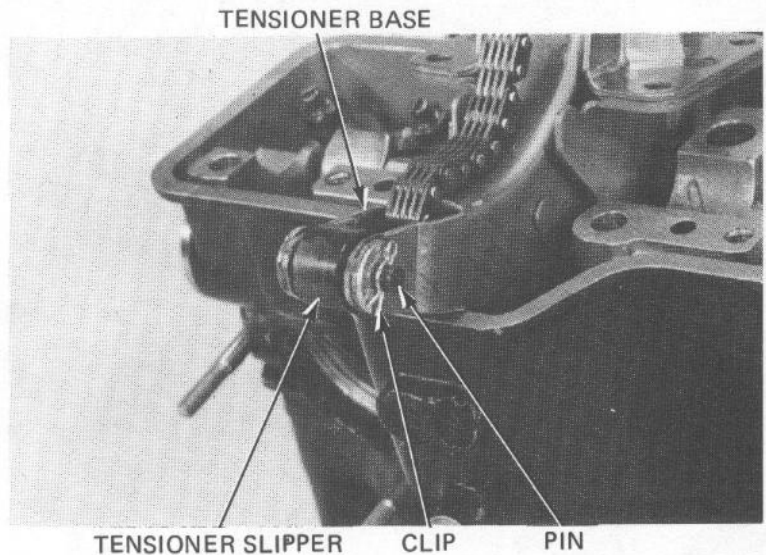
With the cam chain tensioner raised in the direction of the arrow, insert a pin or piece of wire through the hole in the tensioner base and tensioner.



Pass the cam chain through the cam chain tensioner and install the tensioner slipper as shown.

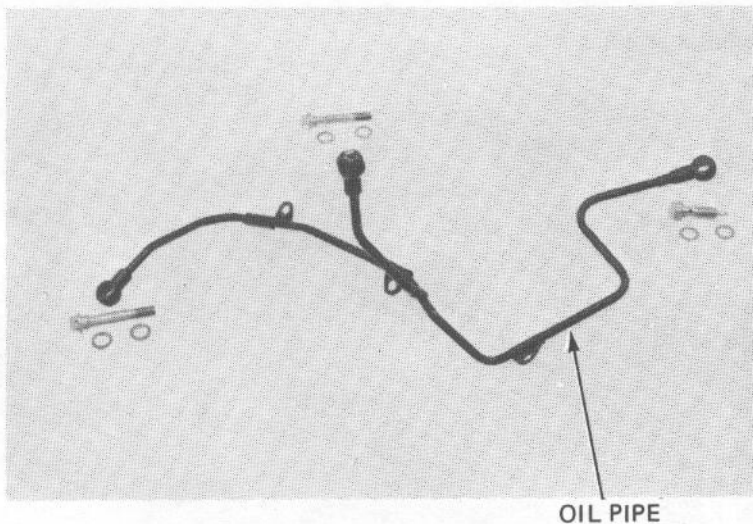
NOTE:

Check that the lower end of the slipper fits in the slipper base correctly.

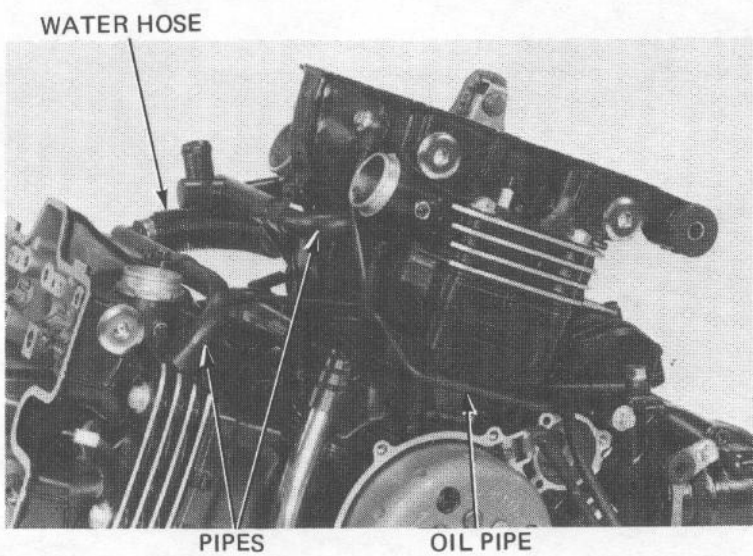


CYLINDER HEAD/VALVE

Install the exterior oil pipe with washers onto the cylinder and cylinder head.



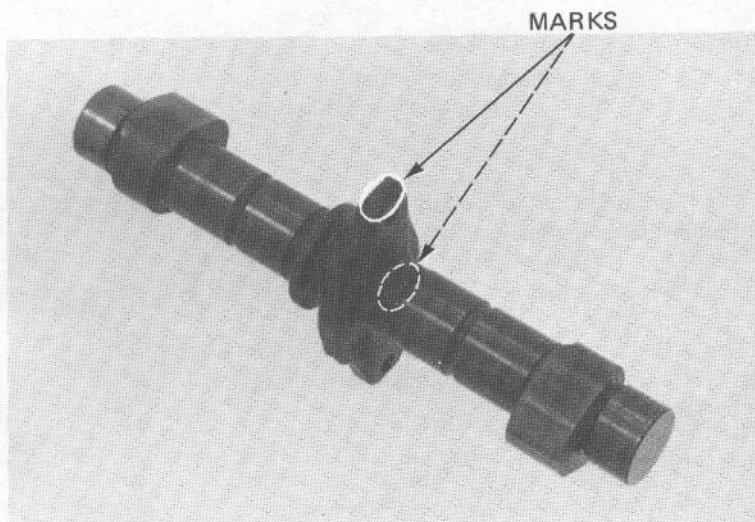
Install the water pipes and hose and tighten the hose bands securely.



CAMSHAFT INSTALLATION

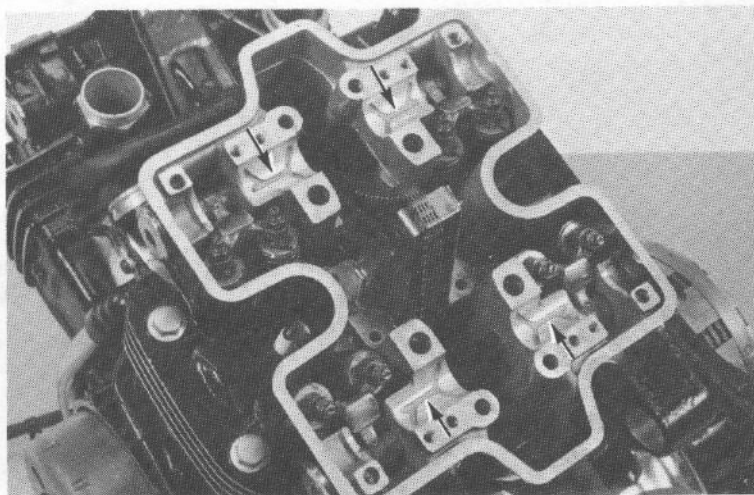
NOTE:

- Follow this procedure from beginning to end, even if you are only servicing one cylinder head.
- Check the camshaft marks so that you install each camshaft in its correct location.
- The marks on the camshaft mean:
EX RR (ER): Rear cylinder exhaust
IN RR (IR): Rear cylinder intake
EX FR (EF): Front cylinder exhaust
IN FR (IF): Front cylinder intake
- The camshaft sprockets are interchangeable.



Rear Cylinder Head

Lubricate the cylinder head cam bearing surfaces with molybdenum disulfide grease.



Turn the crankshaft clockwise until the T1-3 mark on the flywheel rotor aligns with the rear crankcase mating surfaces.

CAUTION:

When turning the crankshaft, make sure the cam chains don't jam at the cam chain tensioners or at the crankshaft.



REAR CRANKCASE MATING SURFACE

CYLINDER HEAD/VALVE

Install the intake and exhaust camshafts and sprockets through the rear cylinder cam chain as shown. Turn the camshafts so the camshaft marks face up.

NOTE:

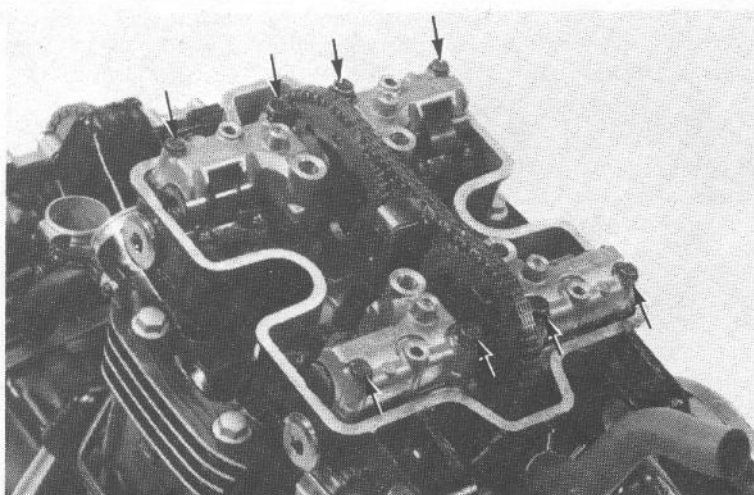
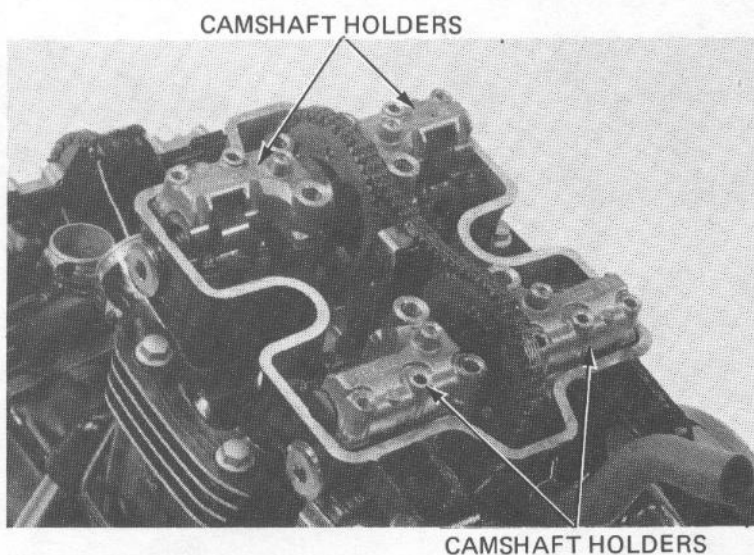
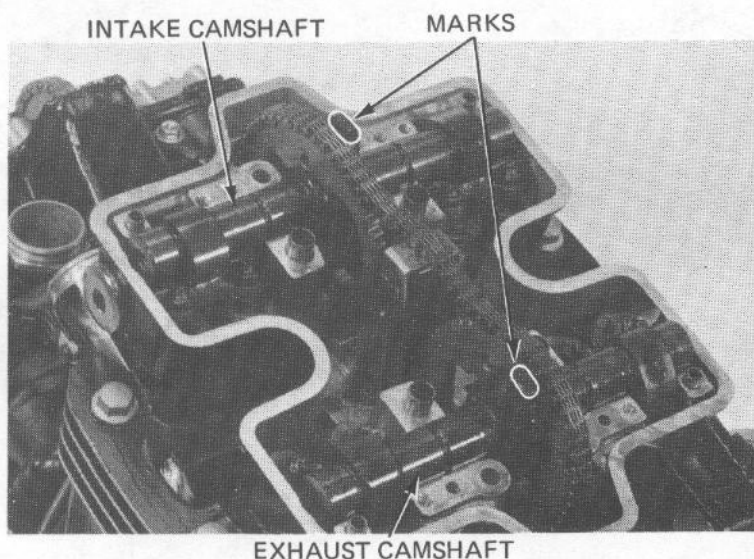
If the front cylinder camshafts were not removed, check that the front camshaft marks face up. If not, turn the crankshaft clockwise 360 degrees (one turn).

If a valve clearance adjuster keeps the camshaft from seating fully in the cylinder head, back the adjuster out all the way.

CAUTION:

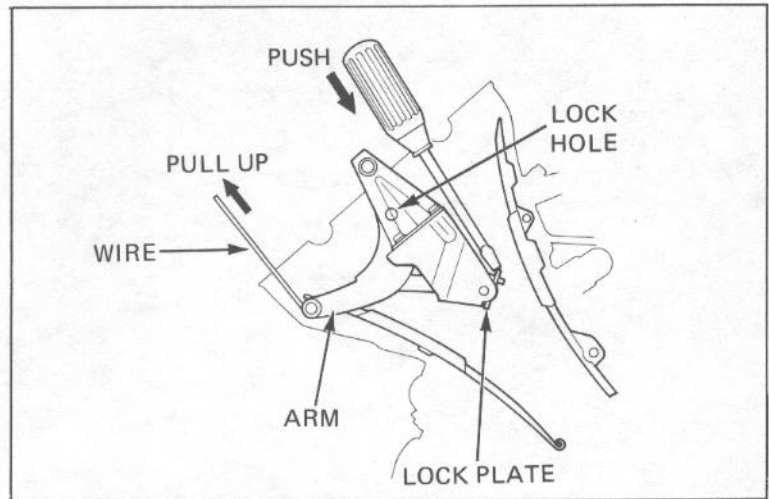
If you force a valve open while installing the camshaft holders, you may damage the holders or the camshaft bearing surfaces.

Place the camshaft holders in the same locations noted during removal. The groove in the bottom of the holder must align with the camshaft locating ridge.

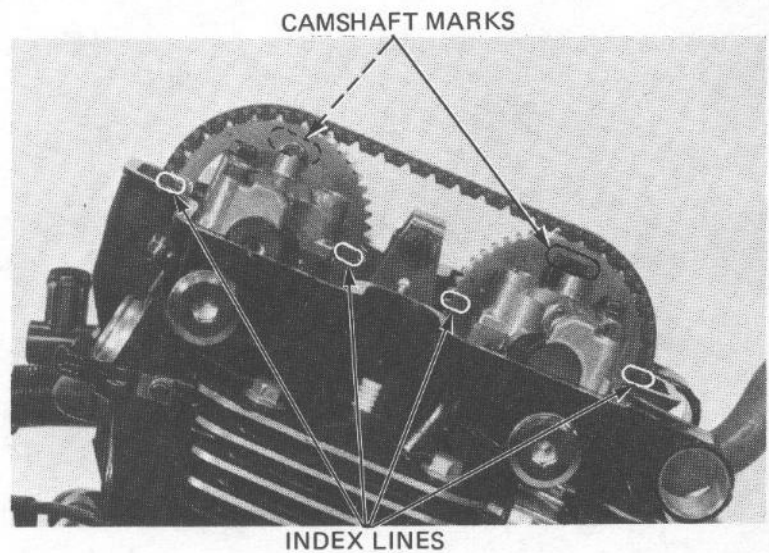


Install the camshaft holder bolts, but do not tighten them yet.

If the cylinders were not removed, lock the cam chain tensioner for minimum tension: push the lock plate down while pulling or prying the tension arm up; hold the arm up while you insert a pin or wire through the lock holes.



Check that the camshaft marks are still facing up, then align the sprocket index lines with the top of the rear cylinder head. Place the cam chain on the sprockets.



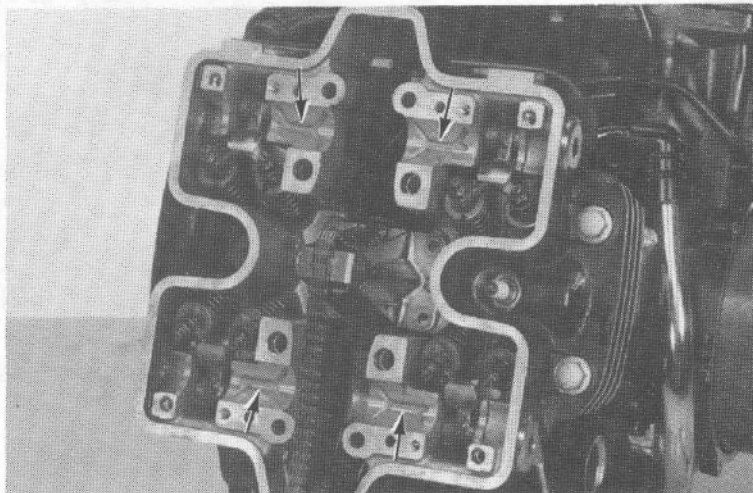
Slide the sprockets onto the camshaft flanges, and install the sprocket bolts in the exposed holes. Check that the sprocket index lines align at T1-3. Unlock the cam chain tensioner.

Front Cylinder Head

NOTE:

Install the rear cylinder head camshafts before you install the front camshafts.

Lubricate the cylinder head cam bearing surfaces with molybdenum disulfide grease.



Rotate the crankshaft counterclockwise 90 degrees (1/4 turn), until the T2-4 mark aligns with the rear crankcase mating surfaces.

CAUTION:

When turning the crankshaft, make sure the cam chain doesn't jam at the cam chain tensioner or at the crankshaft.

Install the intake and exhaust camshafts and sprockets through the front cylinder cam chain as shown.

Turn the camshafts so the camshaft marks face up.

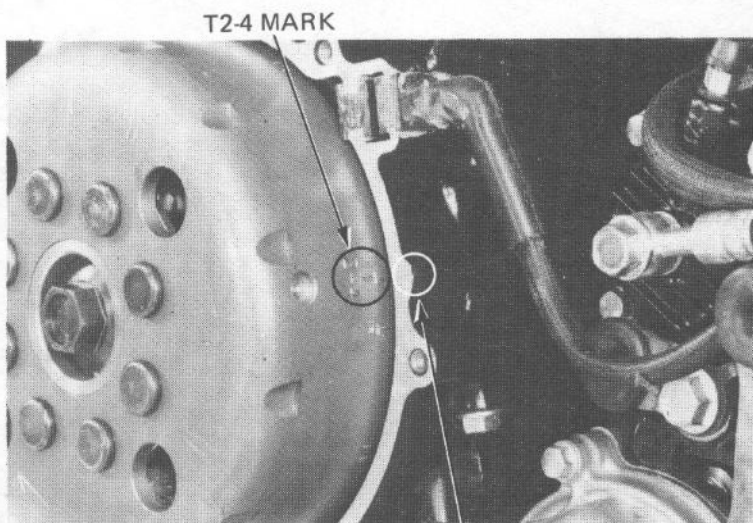
Rotate each front camshaft counterclockwise 45 degrees (1/8 turn) to seat the cam fully in the cylinder head.

If a valve adjuster keeps the camshaft from seating fully in the cylinder head, back out the adjuster all the way.

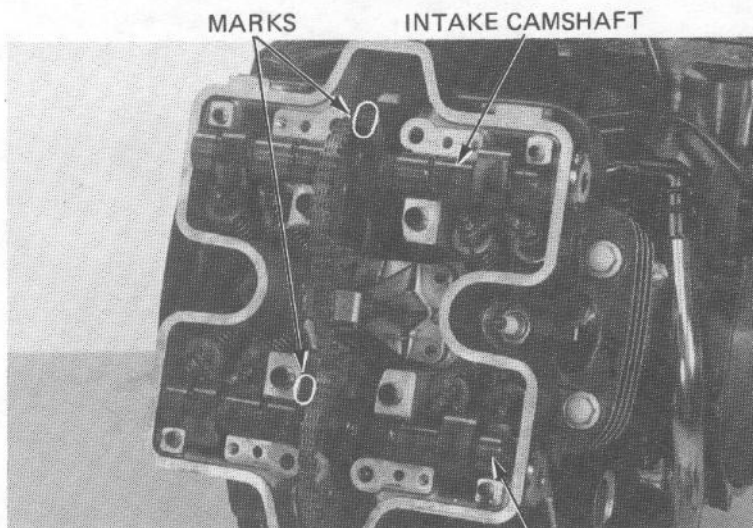
Install the front cylinder camshaft holders and bolts, as described for the rear cylinder head.

Do not tighten at this time.

Lock the cam chain tensioner for minimum tension.



REAR CRANKCASE MATING SURFACE



EXHAUST CAMSHAFT

Align the index dots on the front cylinder cam sprockets with the top of the cylinder head (viewed from the left side of the engine).
Place the cam chain on the sprockets.

Slide the sprockets onto the camshaft flanges, and install the sprocket bolts in the exposed holes (rotate the crankshaft clockwise a little if necessary).

Check that the sprocket index dots align at T2-4.

Unlock the cam chain tensioner.

Front/Rear Cylinders

Check the front-to-rear cylinder camshaft timing as follows.

NOTE:

- When the T1-3 mark aligns with the rear crankcase mating surface, the index lines on all cam sprockets should align with the top of the cylinder heads.
- All camshaft marks will either face up or down.

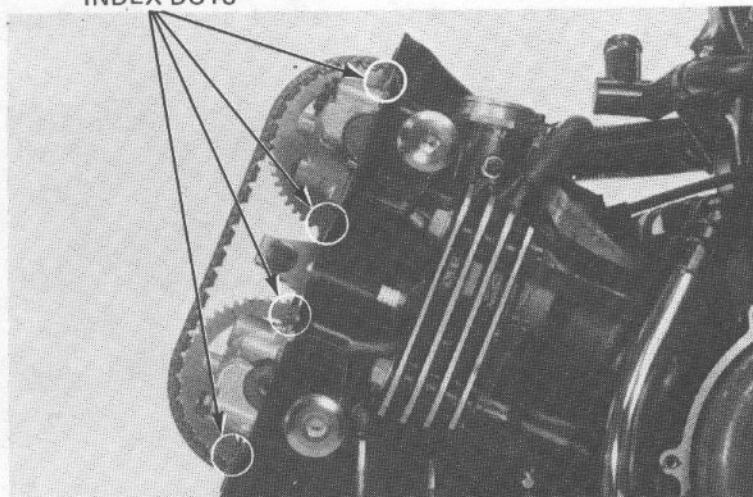
Turn the crankshaft as required to install the remaining sprocket bolts at all four camshafts.

Tighten the camshaft sprocket bolts to the specified torque.

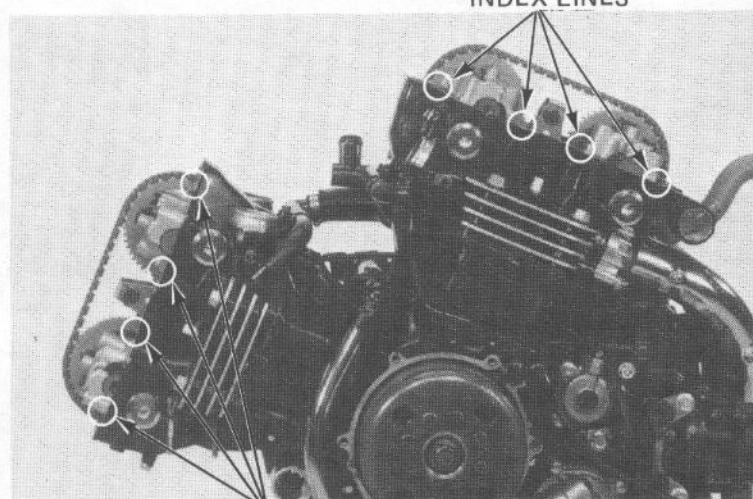
TORQUE: 18–20 N·m (1.8–2.0 kg·m, 13–14 ft·lb)

Tighten the tensioner base bolts securely.

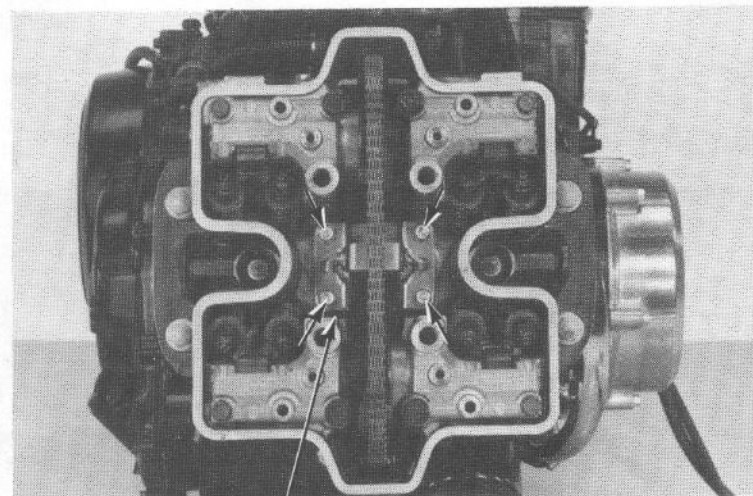
INDEX DOTS



INDEX LINES



INDEX LINES



TENSIONER BASE

CYLINDER HEAD/VALVE

Turn the crankshaft until there is maximum cam chain free play, then install the oil pipes under the cam chain.

Install the cam chain guide on the oil pipe base plate.

Tighten the cylinder head 10 mm bolts in a criss-cross pattern in 2–3 steps.

TORQUE: 48–52 N·m (4.8–5.2 kg·m, 35–38 ft·lb)

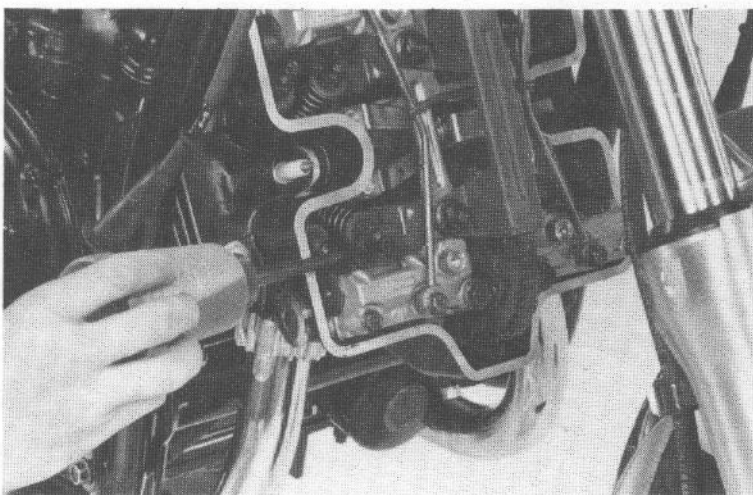
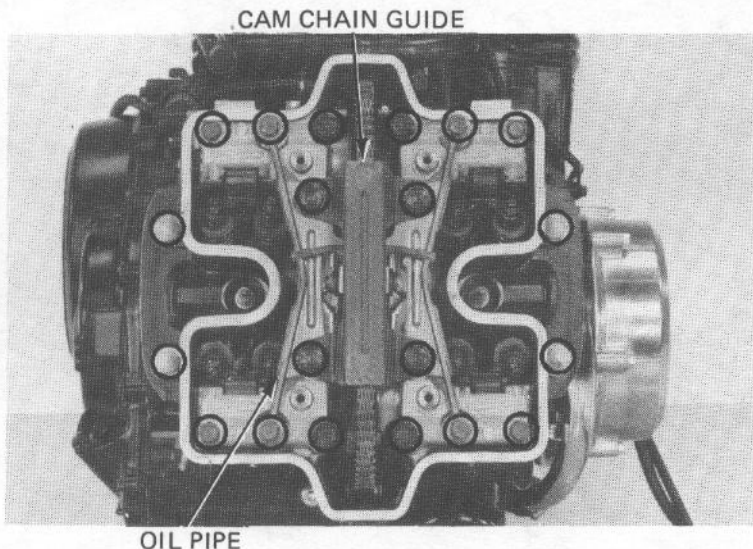
Tighten the cylinder head 8 mm bolts in a crisscross pattern in 2–3 steps.

TORQUE: 21–25 N·m (2.1–2.5 kg·m, 15–18 ft·lb)

Tighten the cam shaft holder 6 mm bolts.

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

Lubricate the cam lobes with oil.



Adjust the valve clearance (page 3-9).

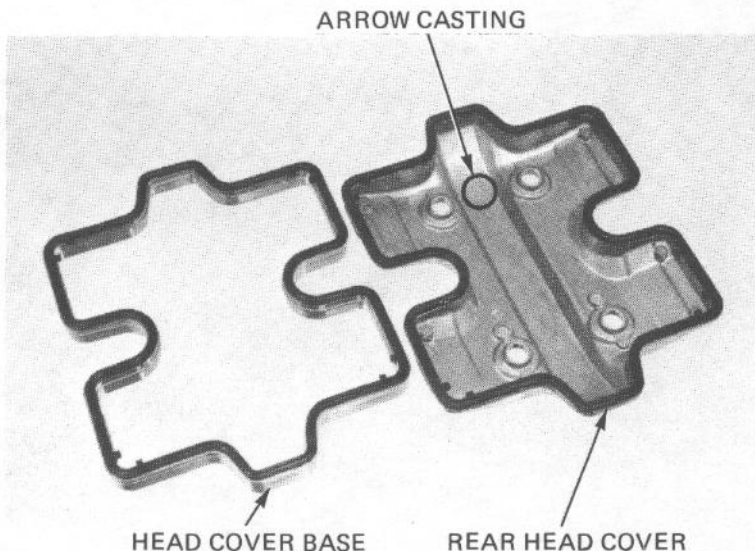
Inspect the cylinder head cover gasket for damage or deterioration.

NOTE:

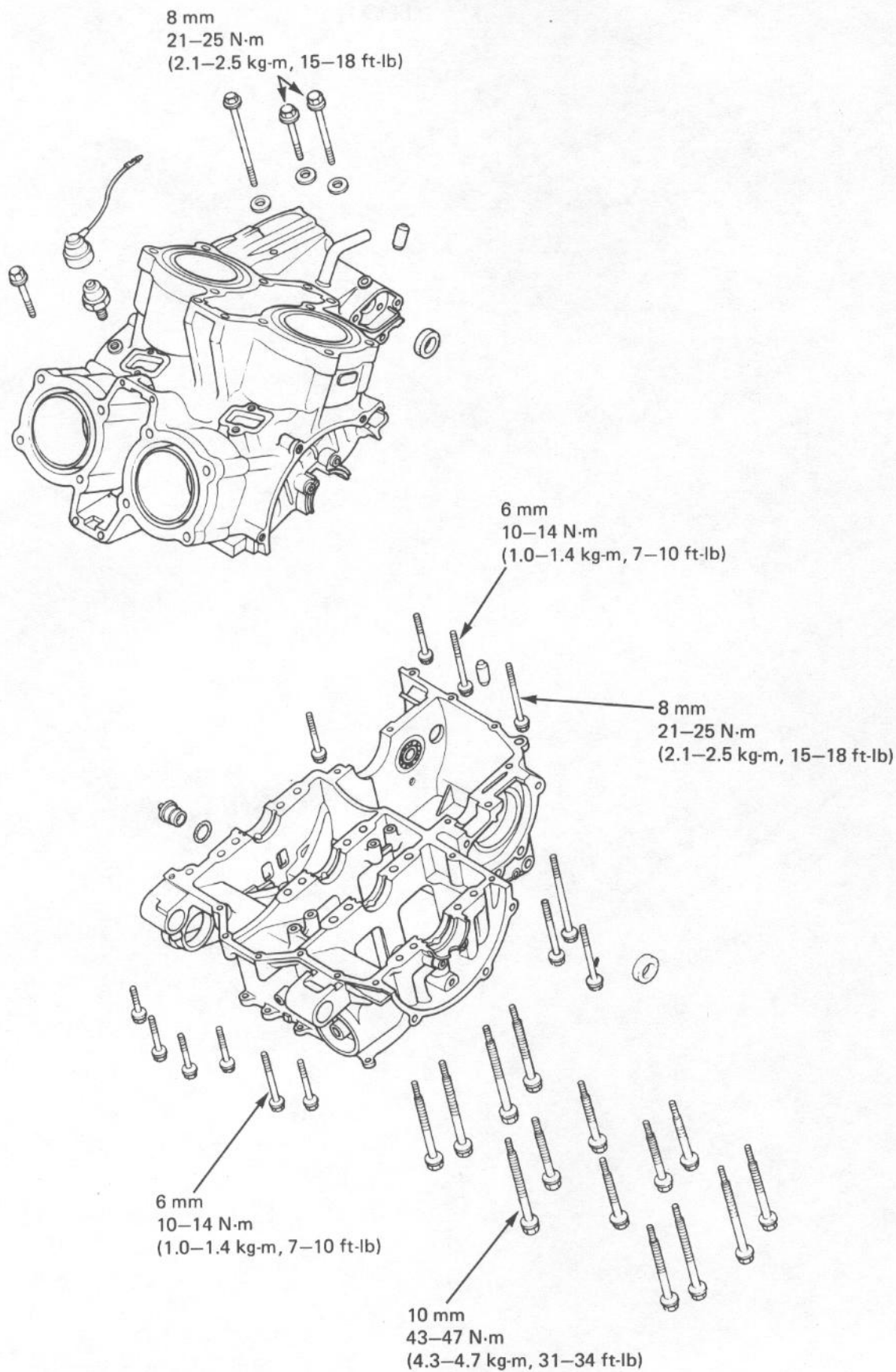
Clean the gasket before applying sealant.

Apply sealant of the head cover gasket. Install the front cylinder head cover and gasket. Install the rear cylinder head cover base cover, and gaskets. Be sure that the arrow casting on the rear head cover faces the front of the engine.

Install the remaining parts in the reverse order of removal.



CRANKCASE



11. CRANKCASE

| | |
|-----------------------|------|
| SERVICE INFORMATION | 11-1 |
| CRANKCASE DISASSEMBLY | 11-2 |
| CRANKCASE ASSEMBLY | 11-3 |

SERVICE INFORMATION

GENERAL

- To service the piston, crankshaft, connecting rod, and transmission, the crankcase halves must be separated.
- If a new crankcase is installed, perform countershaft shim selection procedures (page 13-17).
- The following parts must be removed before disassembling the crankcase.
 - Oil pan Refer to section 2
 - Oil pump Refer to section 2
 - Water pump Refer to section 6
 - Clutch/starter clutch Refer to section 7
 - Gear shift linkage Refer to section 8
 - Alternator Refer to section 9
 - Cylinder heads Refer to section 10
 - Starter motor Refer to section 21

11

TORQUE VALUES

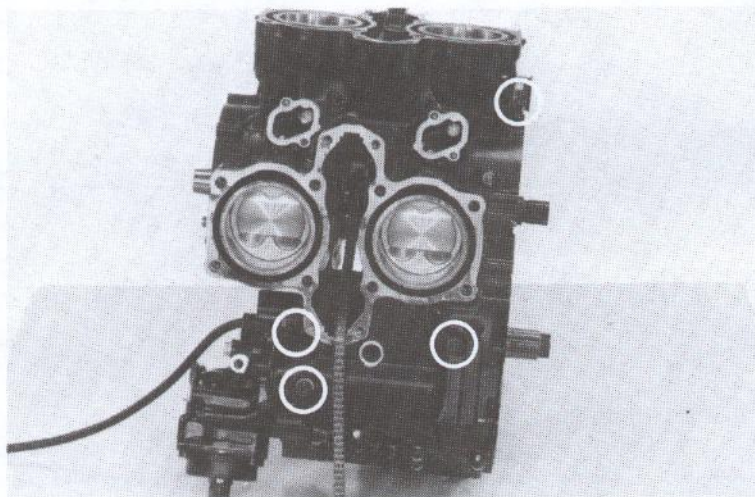
| | |
|-------------|---------------------------------------|
| 10 mm bolt: | 43–47 N·m (4.3–4.7 kg·m, 31–34 ft·lb) |
| 8 mm bolt: | 21–25 N·m (2.1–2.5 kg·m, 15–18 ft·lb) |
| 6 mm bolt: | 10–14 N·m (1.0–1.4 kg·m, 7–10 ft·lb) |

TOOLS

| | |
|------------|---------------|
| Special | |
| Driver | 07949–3710000 |
| Attachment | 07946–3710200 |

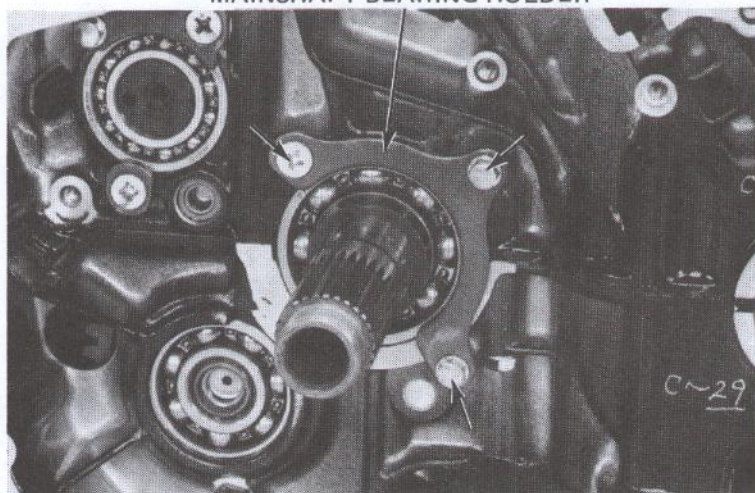
CRANKCASE DISASSEMBLY

Remove the upper crankcase bolts. Refer to Service Information General (page 11-1) for removal of necessary parts before disassembling crankcase.



Remove the mainshaft bearing holder by removing the screw and bolts.

MAINSHAFT BEARING HOLDER



Remove the output gear case mounting bolts and output gear case.

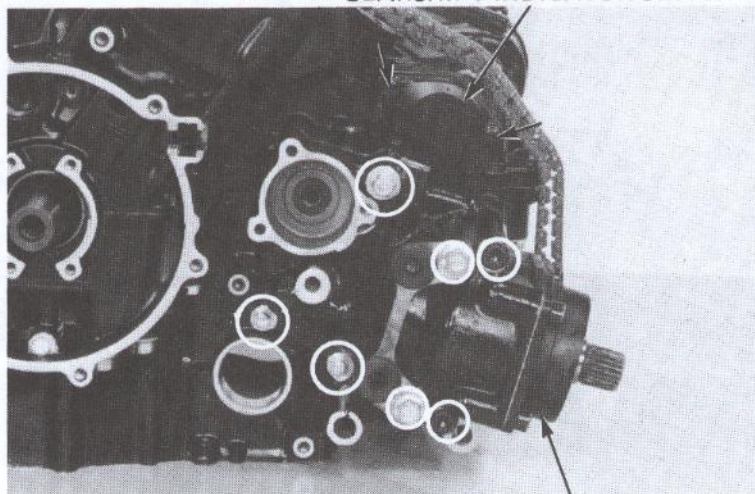
Measure the thickness of the output gear case gasket and note it.

NOTE:

- Whenever removing the output gear case, perform output gear case gasket selection, if not measured right away.
- Index the bearing holder to the case for ease of reinstallation.

Remove the gearshift indicator switch.

GEARSHIFT INDICATOR SWITCH



SIDE GEAR CASE

Turn the engine over and remove the lower crankcase bolts.

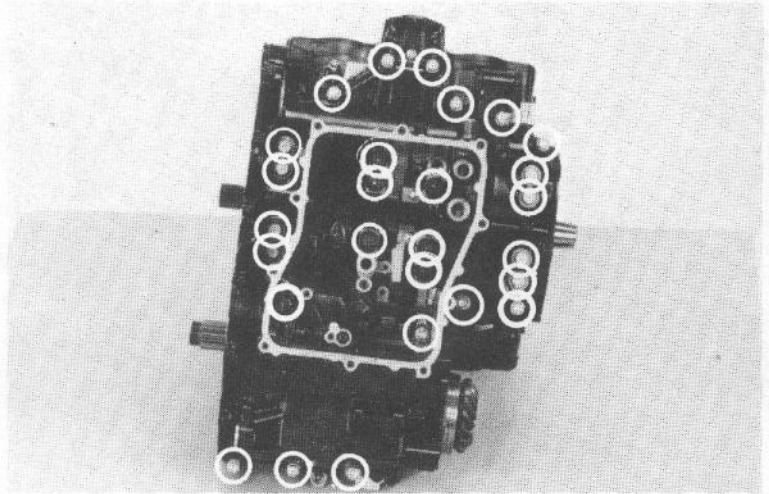
NOTE:

Remove the bolts in two or more steps and in a crisscross pattern to prevent damage to the crankcase.

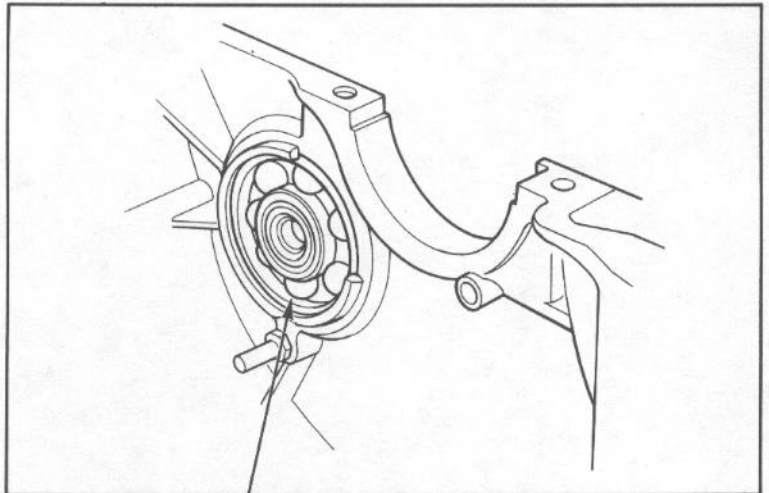
Separate the crankcase.

Remove the following parts:

- Piston and connecting rods (Section 12).
- Crankshaft (Section 12).
- Shift fork and shift drum (Section 13).
- Transmission (Section 13).



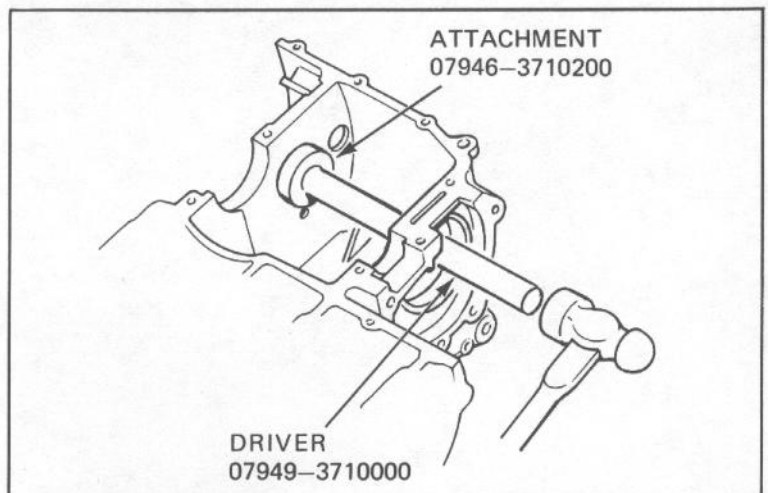
Drive the countershaft bearing out of the case.



COUNTERSHAFT BEARING

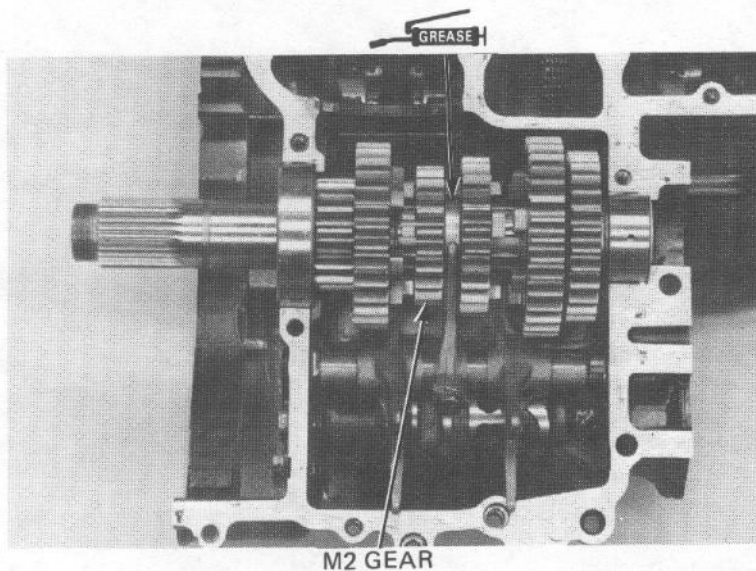
CRANKCASE ASSEMBLY

Drive the countershaft bearing into the crankcase.

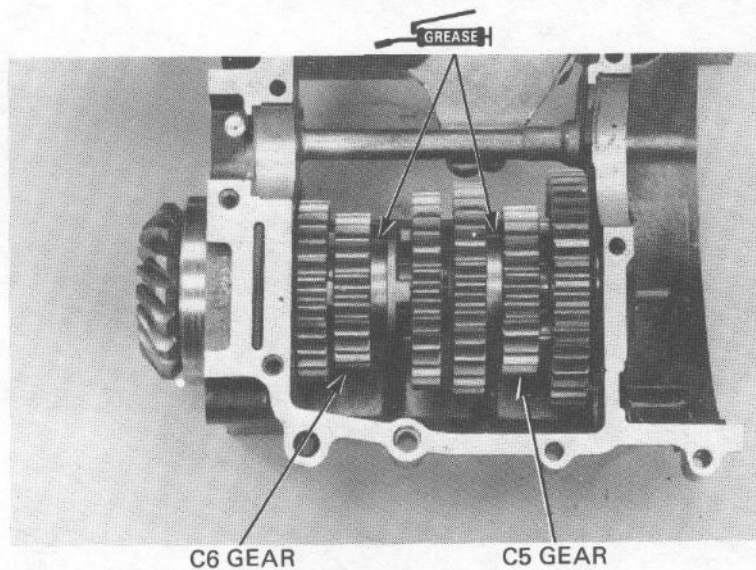


Install the following parts:

- Shift fork and shift drum (Section 13).
- Transmission (Section 13).
- Crankshaft (Section 12).
- Piston and connecting rods (Section 12).



Apply molybdenum disulfide grease to the shift fork grooves of the M2, C5, and C6 gears.



Clean the crankcase mating surfaces.
Apply liquid sealant to the mating surface of the lower and upper crankcase.

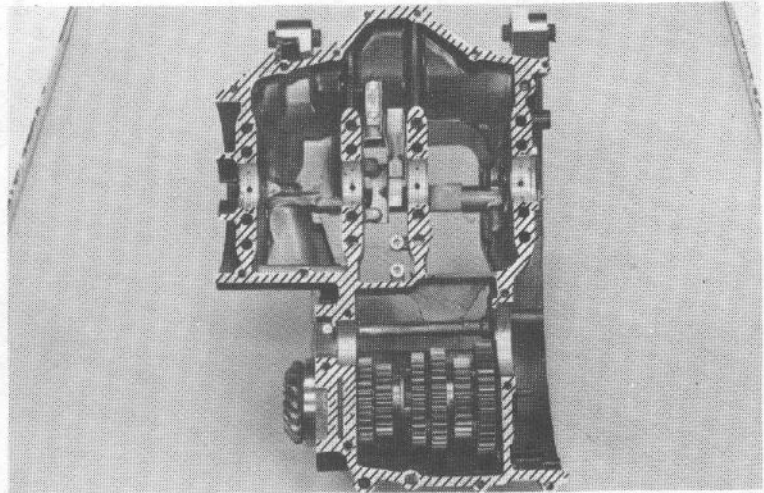
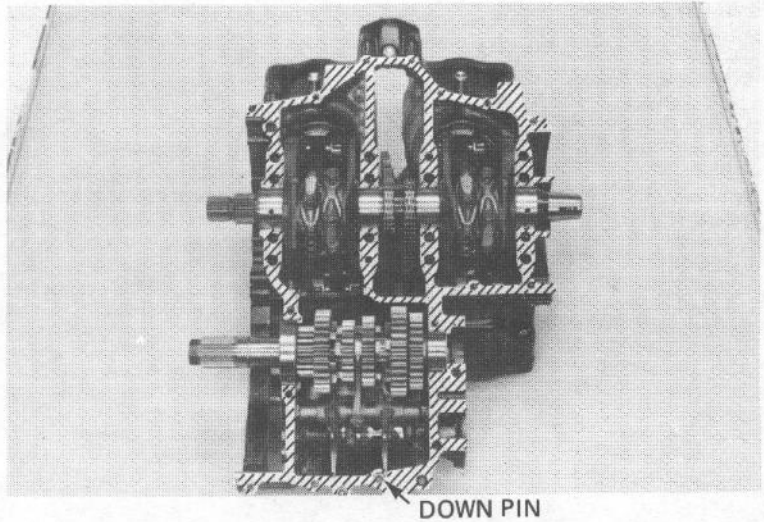
CAUTION:

Do not apply sealant to the area near the main bearings.

DO NOT COAT THESE AREAS.



Install the dowel pin.

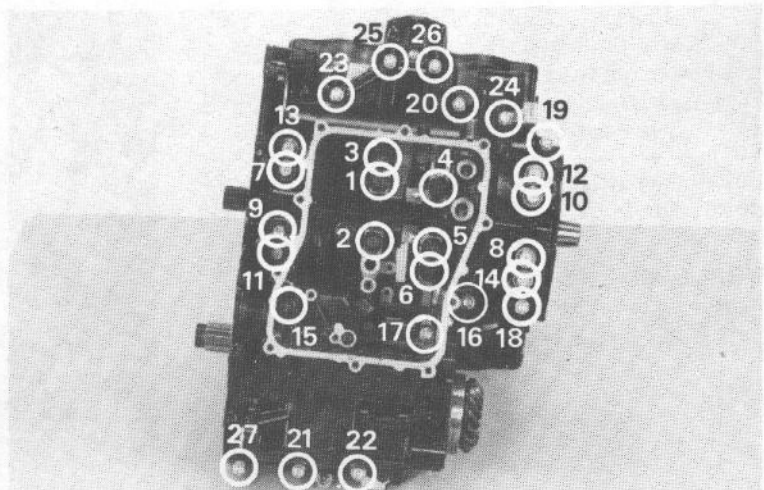


Assemble the crankcase halves, aligning the shift fork claws with the gears.
Tighten the bolts to the specified torque values in the sequence shown.

TORQUE VALVES:

- 10 mm bolt: 43–47 N·m
(4.3–4.7 kg·m, 31–34 ft·lb)
- 8 mm bolt: 21–25 N·m
(2.1–2.5 kg·m, 15–18 ft·lb)
- 6 mm bolt: 10–14 N·m
(1.0–1.4 kg·m, 7–10 ft·lb)

Tighten the bolts in a crisscross pattern and in 2–3 steps.

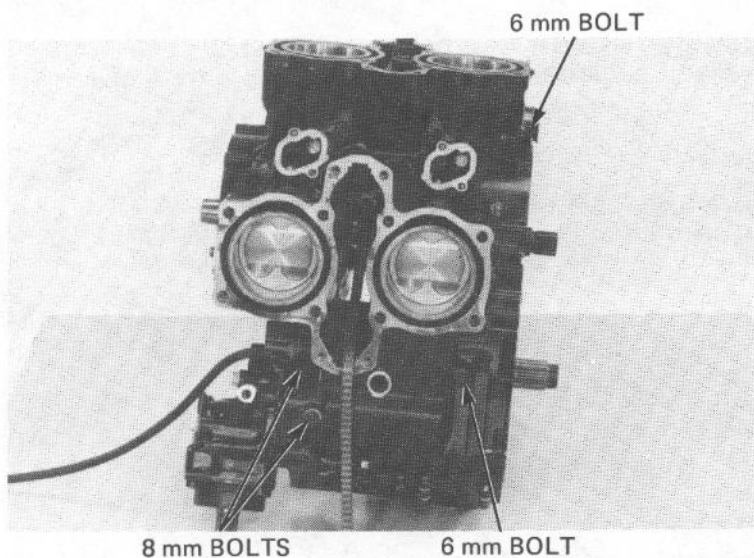


CRANKCASE

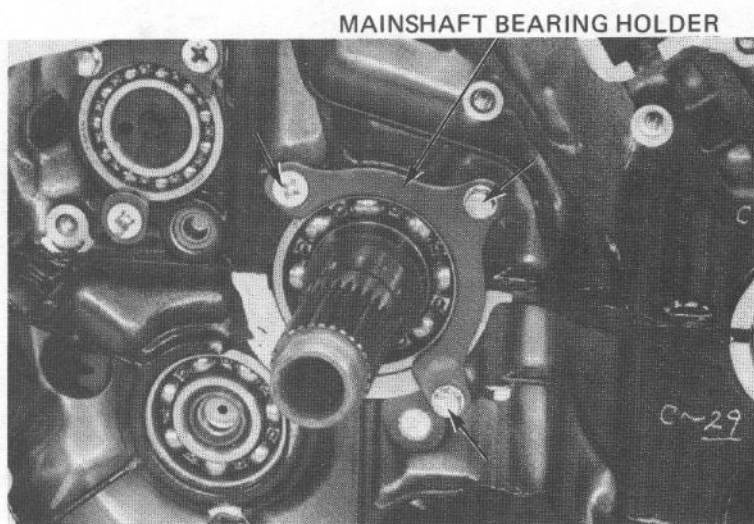
Tighten the upper crankcase bolts to the specified torque in a crisscross pattern and in 2–3 steps.

TORQUE: 8 mm: 21–25 N·m
(2.1–2.5 kg·m, 15–18 ft·lb)
6 mm: 10–14 N·m
(1.0–1.4 kg·m, 7–10 ft·lb)

Install the gearshift indicator switch.



Install the mainshaft bearing holder and tighten the screw and bolts.



Install a new output gear case gasket with one of the same thickness as removed.

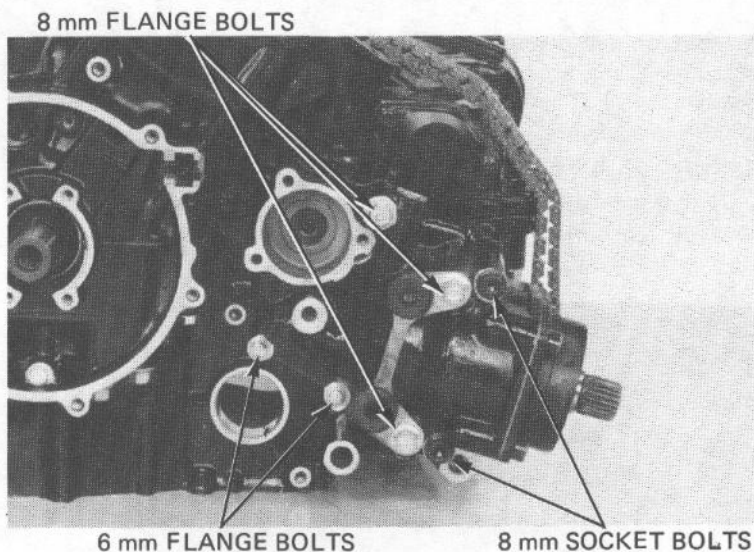
NOTE:

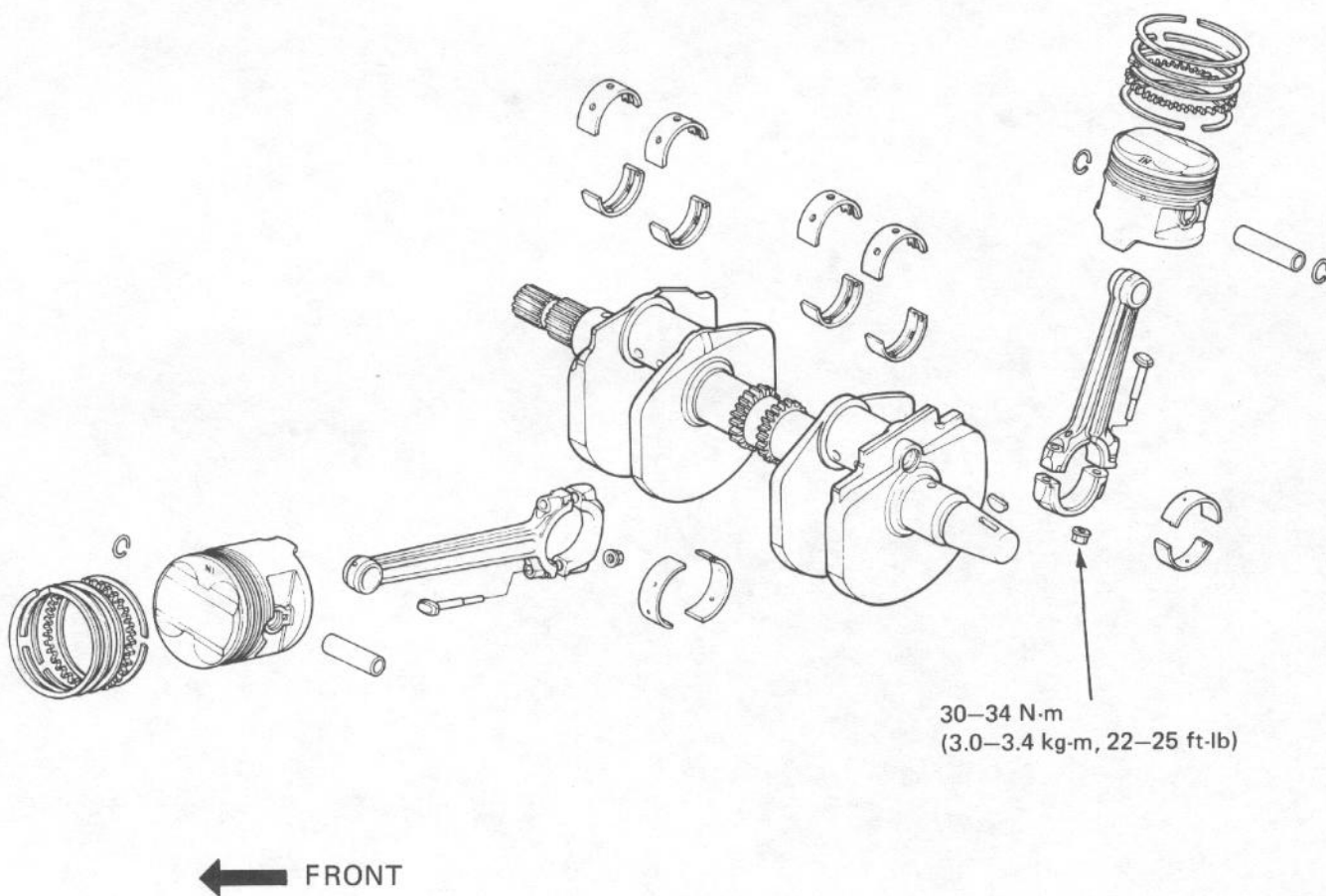
- Early production engines had gaskets that were not marked.
- The gasket is crushed 0.05 mm when the output gear case is installed.

Install the output gear case with a new gasket. Install the bolts and then tighten to the specified torque.

TORQUES:

8 mm socket bolts:
21–25 N·m (2.1–2.5 kg·m, 15–18 ft·lb)





12. CRANKSHAFT/PISTON

| | | | |
|------------------------|------|-----------------------------|-------|
| SERVICE INFORMATION | 12-1 | BEARING INSPECTION | 12-8 |
| TROUBLESHOOTING | 12-2 | BEARING SELECTION | 12-10 |
| CONNECTING ROD REMOVAL | 12-3 | CRANKSHAFT INSTALLATION | 12-12 |
| PISTON REMOVAL | 12-4 | PISTON AND ROD INSTALLATION | 12-12 |
| CRANKSHAFT REMOVAL | 12-7 | | |

SERVICE INFORMATION

GENERAL

- All bearing inserts are select fit and are identified by color code. Select replacement bearings from the code tables. After installing new bearings, recheck them with plastigauge to verify clearance.
- Apply molybdenum disulfide grease to the main journals and crankpins during assembly.
- Before removing the piston and connecting rod assemblies, clean the top of the cylinder off any carbon deposits.
- For servicing the piston, connecting rod, and crankshaft, the crankcase assembly must be separated (Section 11).

SPECIFICATIONS

| | ITEM | | STANDARD | SERVICE LIMIT |
|------------|--|-----------------|-------------------------------------|----------------------|
| Crankshaft | Connecting rod big end side clearance | | 0.10–0.30 mm (0.004–0.012 in) | 0.4 mm (0.02 in) |
| | Runout | | — | 0.03 mm (0.001 in) |
| | Crankpin oil clearance | | 0.028–0.052 mm (0.0011–0.0020 in) | 0.07 mm (0.003 in) |
| | Main journal oil clearance | | 0.028–0.052 mm (0.0011–0.0020 in) | 0.07 mm (0.003 in) |
| Cylinder | I.D. | | 79.500–79.515 mm (3.1299–3.1305 in) | 79.60 mm (3.134 in) |
| | Warpage | | — | 0.05 mm (0.002 in) |
| Piston | Ring-to-groove clearance | Top | 0.015–0.045 mm (0.0006–0.0018 in) | 0.10 mm (0.004 in) |
| | | Second | 0.015–0.045 mm (0.0006–0.0018 in) | 0.10 mm (0.004 in) |
| | Ring end gap | Top | 0.20–0.35 mm (0.008–0.014 in) | 0.5 mm (0.02 in) |
| | | Second | 0.20–0.35 mm (0.008–0.014 in) | 0.5 mm (0.02 in) |
| | | Oil (Side rail) | 0.20–0.70 mm (0.008–0.028 in) | 0.9 mm (0.04 in) |
| | Piston O.D. | | 79.460–79.490 mm (3.1283–3.1295 in) | 79.35 mm (3.124 in) |
| | Piston-to-cylinder clearance | | 0.01–0.055 mm (0.0004–0.002 in) | 0.10 mm (0.004 in) |
| | Piston pin bore | | 20.002–20.008 mm (0.7875–0.7877 in) | 20.06 mm (0.790 in) |
| | Piston pin O.D. | | 19.994–20.000 mm (0.7872–0.7874 in) | 19.98 mm (0.787 in) |
| | Piston-to-piston pin clearance | | 0.002–0.014 mm (0.0001–0.0006 in) | 0.04 mm (0.002 in) |
| | Connecting rod small end I.D. | | 20.016–20.034 mm (0.7880–0.7887 in) | 20.08 mm (0.791 in) |
| | Piston pin-to-connecting rod clearance | | 0.016–0.040 mm (0.0006–0.0016 in) | 0.060 mm (0.0024 in) |
| Cam chain | Length at 13 kg (29 lb) tension | | 361.95–362.40 mm (14.250–14.269 in) | 364.9 mm (14.37 in) |

TORQUE:

| | |
|---------------------|---|
| Connecting rod nut: | 30–34 N·m (3.0–3.4 kg·m, 22–25 ft·lb) |
| Crankcase | 6 mm bolt: 10–14 N·m (1.0–1.4 kg·m, 7–10 ft·lb) |
| | 8 mm bolt: 21–25 N·m (2.1–2.5 kg·m, 15–18 ft·lb) |
| | 10 mm bolt: 43–47 N·m (4.3–4.7 kg·m, 31–34 ft·lb) |

TOOL

| | |
|------------------------|--|
| Special | |
| Piston Ring Compressor | Commercially available compressor (Automotive style) |

TROUBLESHOOTING

Excessive noise

1. Crankshaft
 - Worn main bearing
 - Worn rod bearing
2. Piston and Connecting Rod
 - Worn piston or cylinder
 - Worn piston pin or pin hole
 - Worn rod small end

Low compression or uneven compression

1. Worn cylinder or piston ring

Excessive smoke

1. Worn cylinder, piston, or piston rings
2. Improperly installed piston rings
3. Damaged piston or cylinder

Overheating

1. Excessive carbon build-up on piston head
2. Blocked or restricted flow of coolant
3. Sticking thermostat

Knocking or abnormal noise

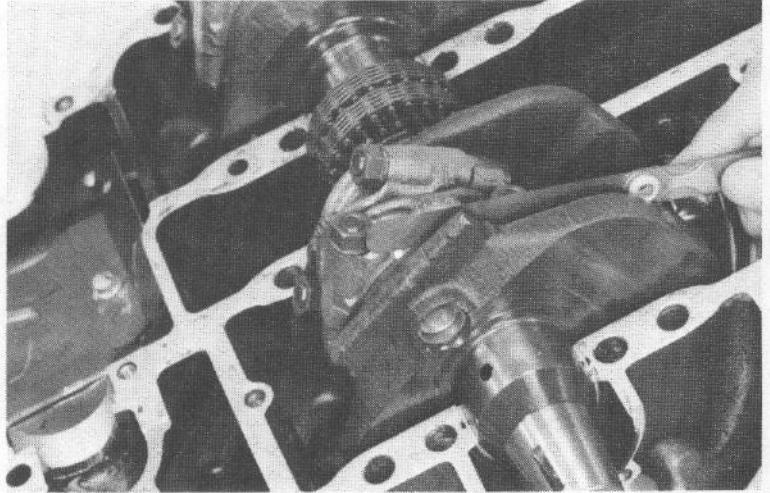
1. Worn pistons and cylinders
2. Excessive carbon build-up on piston head.

CONNECTING ROD REMOVAL

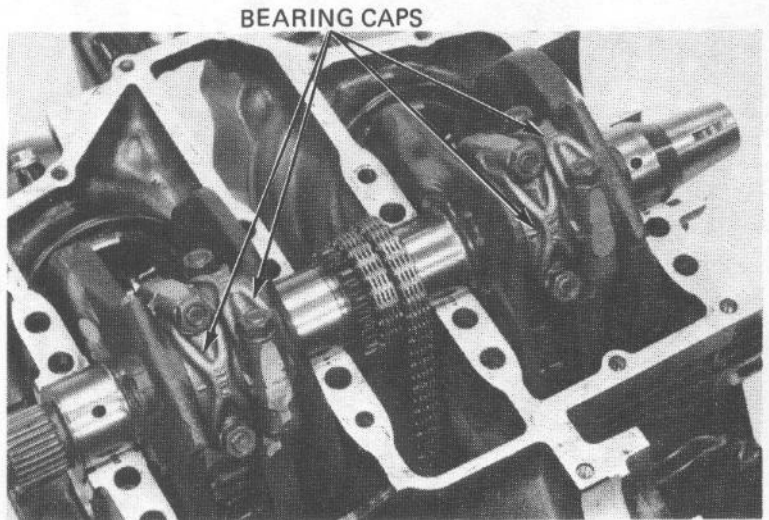
Separate the crankcase assembly (Section 11).

Check the connecting rod side clearance.

SERVICE LIMIT: 0.40 mm (0.016 in)



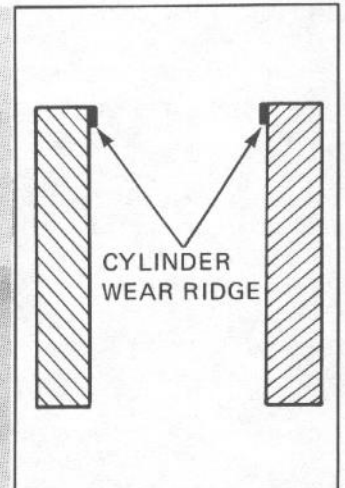
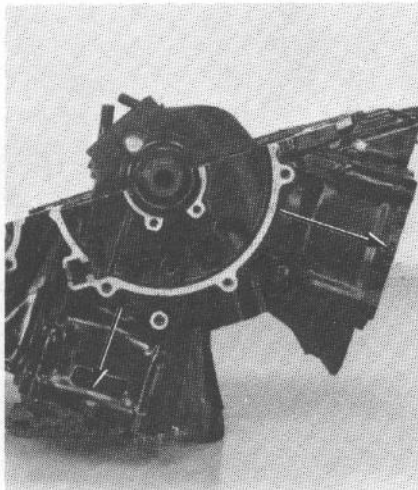
Remove the connecting rod bearing caps and note their locations.



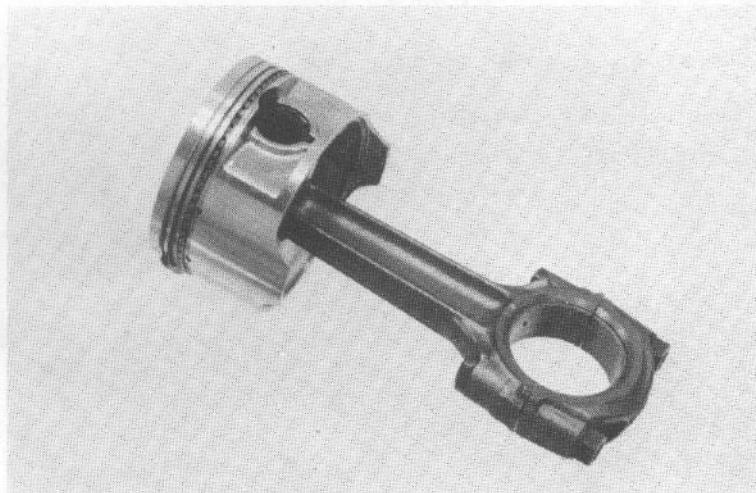
Push the connecting rods and pistons out through the top of the cylinder bores.

CAUTION:

On engines with high mileage, inspect the cylinders for a ridge just above the highest point of ring travel. Any ridge must be removed with an automotive type ridge reamer before removing the pistons to allow the pistons and rings to pass through the cylinder.



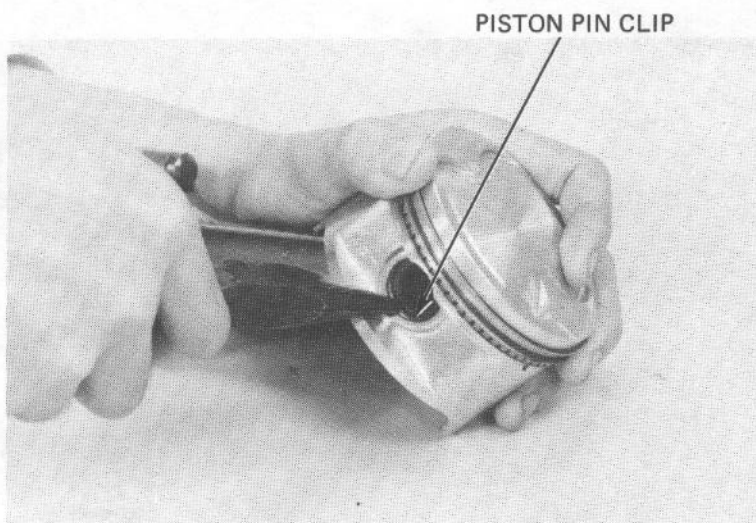
Mark the rods, pistons, bearings, and caps as you remove them to indicate the correct cylinder and position on the crankpins.



PISTON REMOVAL

Remove the piston pin clips. Push the piston pin out and remove the piston.

Mark the piston pins to indicate their correct piston position.



PISTON/PISTON RING INSPECTION

Measure the piston ring-to-groove clearance.

SERVICE LIMIT: 0.10 mm (0.004 in)
(TOP/SECOND)

Remove the piston rings and mark them to indicate the correct cylinder and piston position.

Clean the piston crown, removing all carbon deposits.

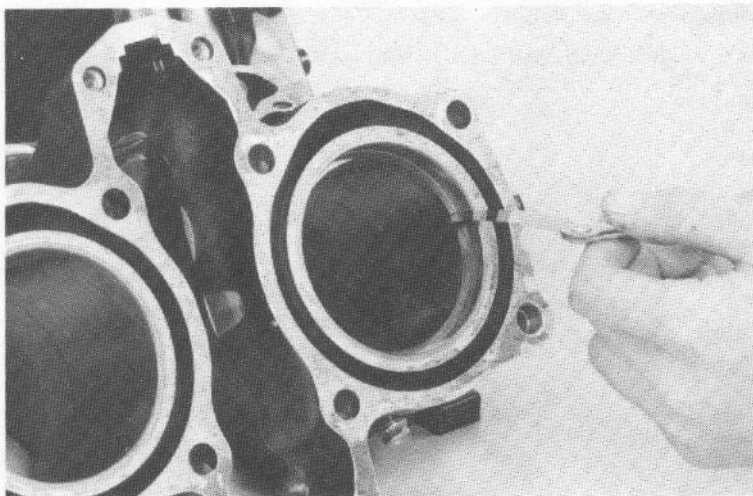
Inspect the piston for cracks or other damage and the ring grooves for excessive wear and carbon build-up.



Using a piston, push the ring into the cylinder squarely and measure the end gap.

SERVICE LIMITS:

| | |
|-------------------------|-------------------------|
| TOP: | 0.5 mm (0.02 in) |
| SECOND: | 0.5 mm (0.02 in) |
| OIL (Side rail): | 0.9 mm (0.04 in) |

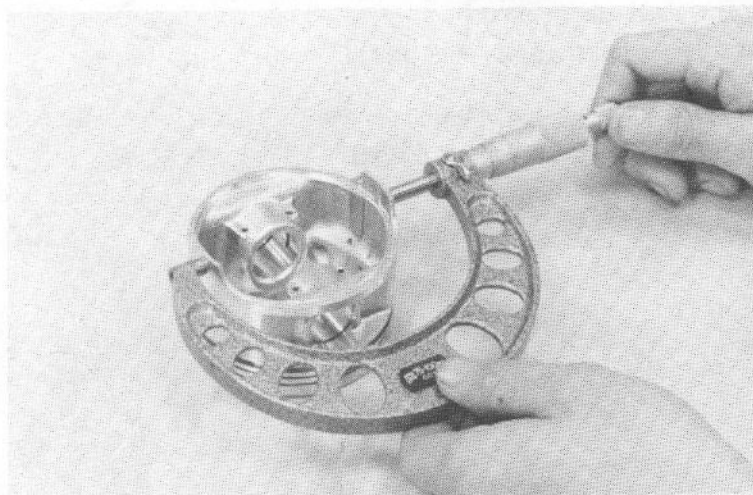


Measure the piston O.D.

NOTE:

Take measurements 10 mm (0.4 in) from the bottom, and 90° to the piston pin hole.

SERVICE LIMIT: 79.35 mm (3.124 in)



Inspect the cylinder bores for wear or damage. Measure the cylinder I.D. at three levels in X and Y axis.

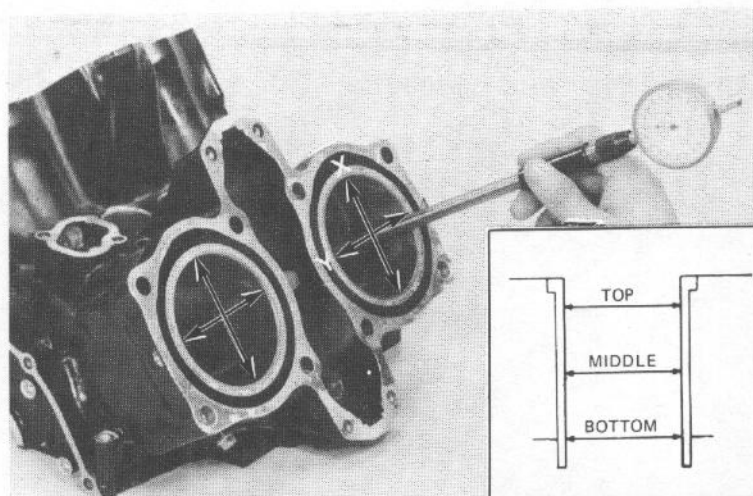
SERVICE LIMIT: 79.60 mm (3.134 in)

Calculate the piston-to-cylinder clearance.

SERVICE LIMIT: 0.10 mm (0.004 in)

Oversize pistons are available in the following sizes:

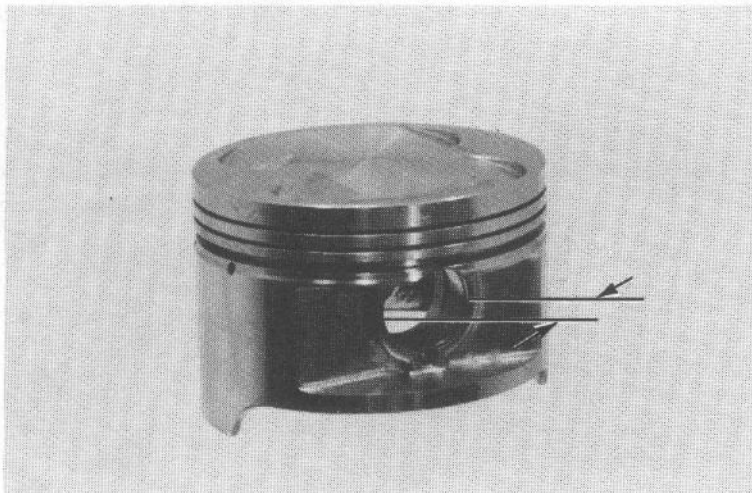
0.25, 0.50, 0.75 and 1.00 mm.



CRANKSHAFT/PISTON

Measure each piston pin hole I.D.

SERVICE LIMIT: 20.06 mm (0.790 in)

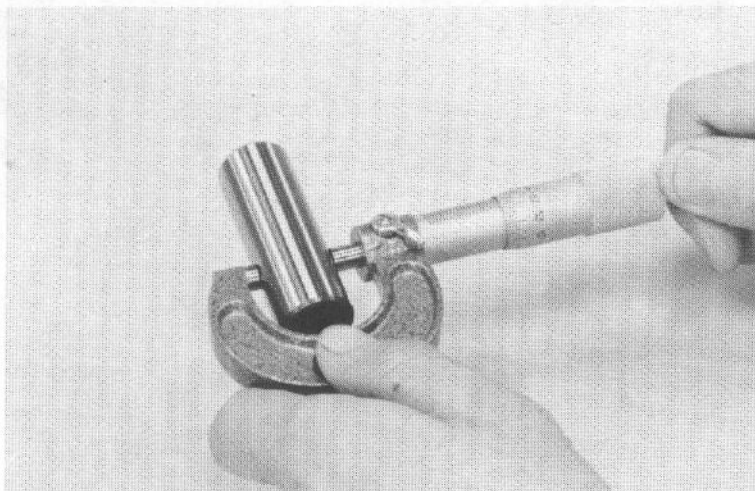


Measure each piston pin O.D.

SERVICE LIMIT: 19.98 mm (0.787 in)

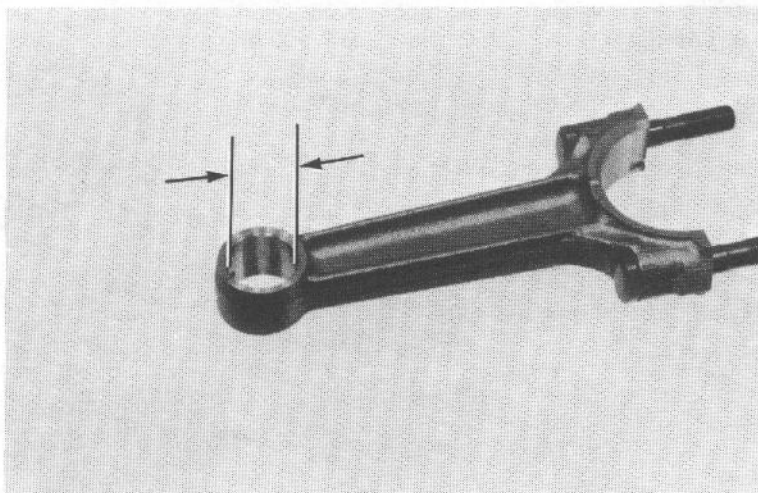
Calculate the piston pin to piston clearance.

SERVICE LIMIT: 0.04 mm (0.002 in)



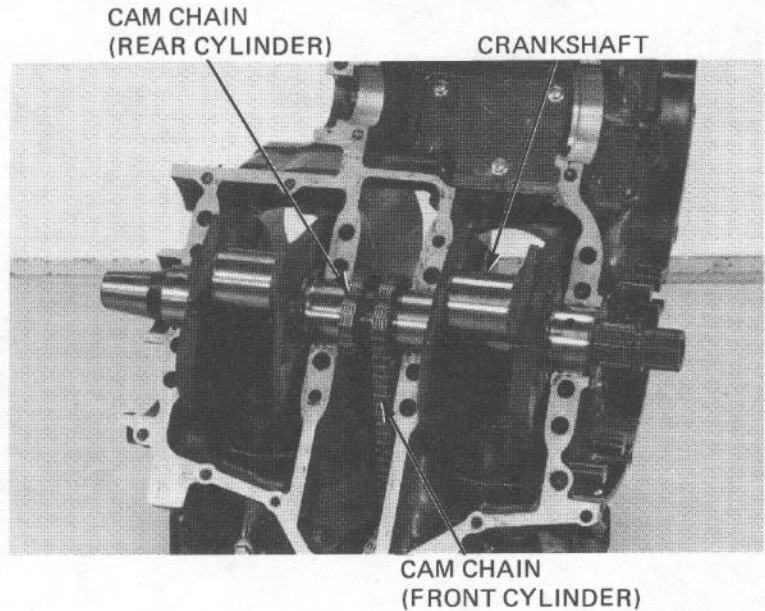
Measure the connecting rod small end I.D. If the reading exceeds the service limit, replace the rod.

SERVICE LIMIT: 20.08 mm (0.791 in)



CRANKSHAFT REMOVAL

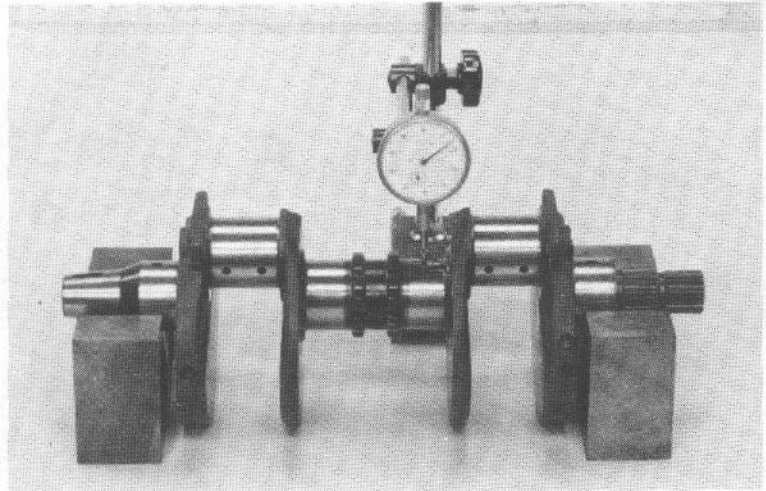
Remove the crankshaft.
Remove the cam chain.



CRANKSHAFT INSPECTION

Set the crankshaft on a stand or blocks.
Set a dial indicator on the center main bearing journal. Rotate the crankshaft two revolutions and read the runout.

SERVICE LIMIT: 0.03 mm (0.001 in)



CAM CHAIN LENGTH MEASUREMENT

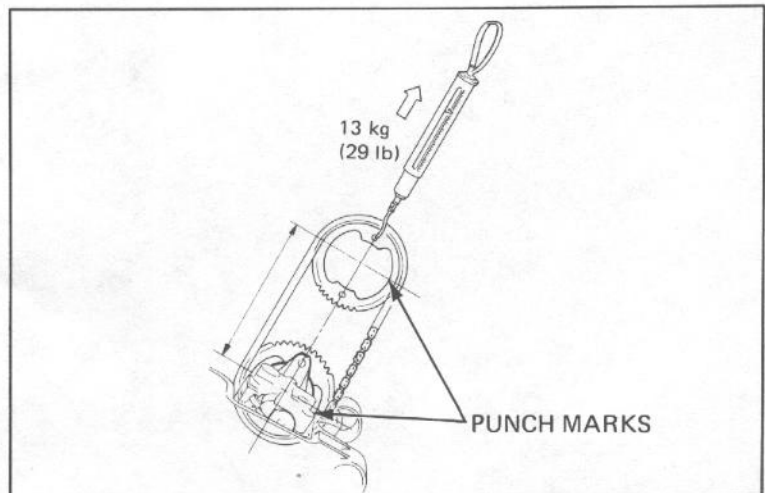
Place the cam chain on the camshaft sprockets with the punch marks positioned as indicated.
Secure one camshaft sprocket and apply 13 kg (29 lbs) of tension to the other.
Then measure the distance between the punch marks as shown.

SERVICE LIMIT: 364.9 mm (14.37 in)

NOTE:

The punch marks should be parallel to each other.

Replace the cam chain if it is longer than the service limit.



BEARING INSPECTION

CONNECTING RODS

Inspect the bearing inserts for damage or separation. Clean all oil from the bearing inserts and crankpins. Put a piece of plastigauge on each crankpin avoiding the oil hole.

CAUTION:

The bearing tabs should face toward the exhaust ports. Remember the front and rear cylinder exhaust ports face opposite directions.

Install the bearing caps and rods on the correct crankpins, and tighten them evenly.

TORQUE: 30–34 N·m (3.0–3.4 kg·m, 22–25 ft·lb)

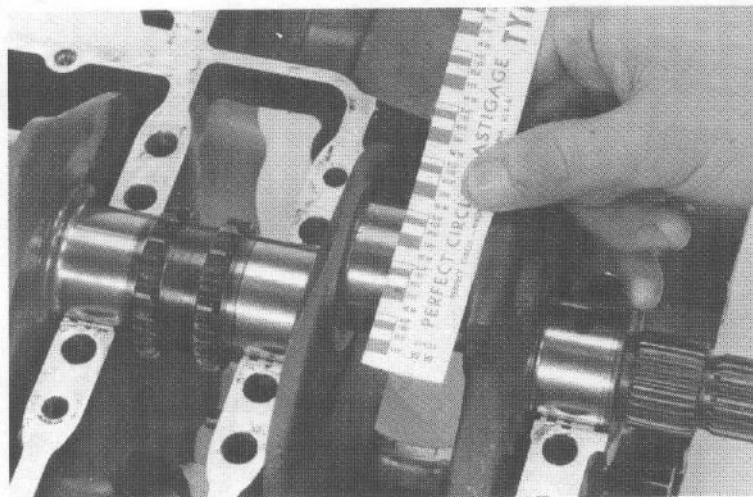
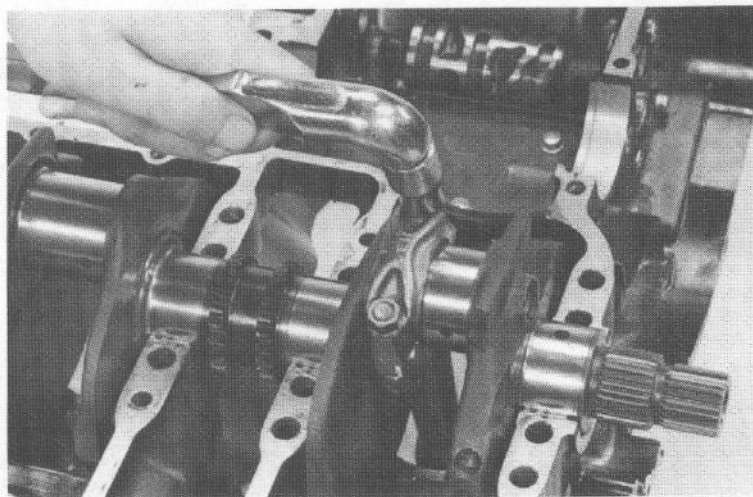
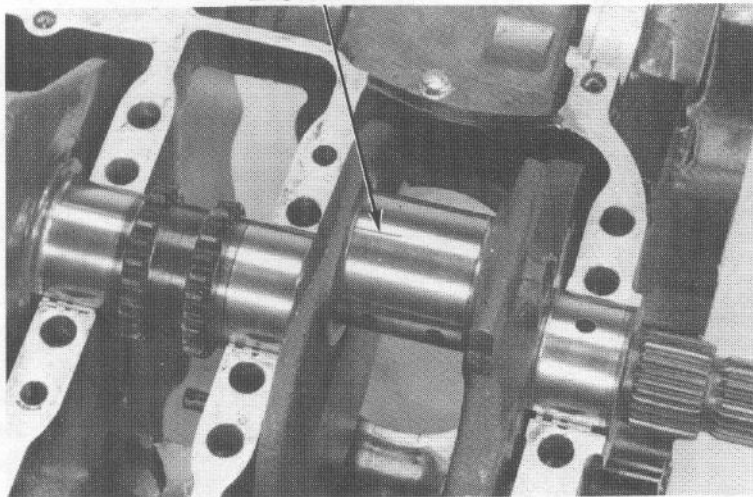
NOTE:

Do not rotate the crankshaft during inspection.

Remove the caps and measure the compressed plastigauge on each crankpin.

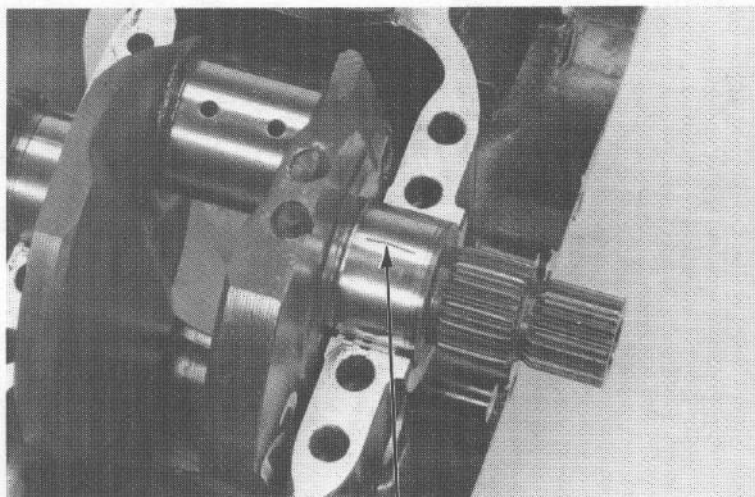
OIL CLEARANCE SERVICE LIMIT:
0.07 mm (0.003 in)

PLASTIGAUGE



MAIN BEARINGS

Inspect the bearing inserts for damage or separation. Clean all oil from the bearing inserts and journals. Put a piece of plastigauge on each journal, avoiding the oil holes.



PLASTIGAUGE

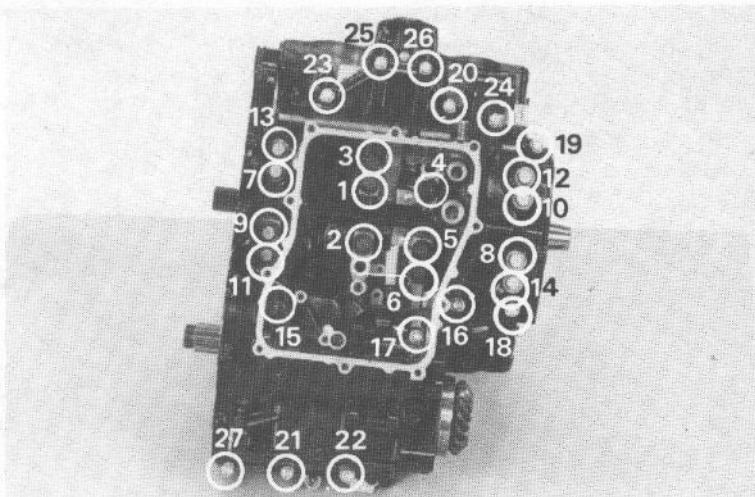
Install the main bearings on the correct journals on the lower crankcase and tighten them evenly in 2–3 steps in the sequence shown.

TORQUE VALUES:

- 6 mm bolt: 10–14 N·m
(1.0–1.4 kg·m, 7–10 ft·lb)
- 8 mm bolt: 21–25 N·m
(2.1–2.5 kg·m, 15–18 ft·lb)
- 10 mm bolt: 43–47 N·m
(4.3–4.7 kg·m, 31–34 ft·lb)

NOTE:

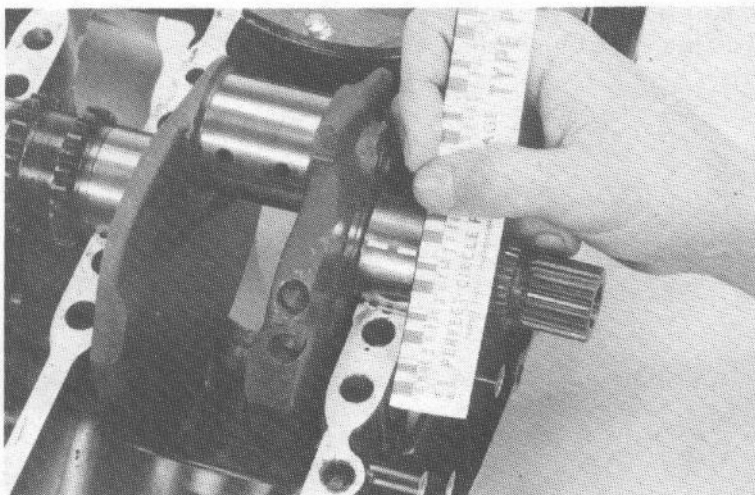
Do not rotate the crankshaft during inspection.



Remove the lower crankcase and measure the compressed plastigauge on each journal.

OIL CLEARANCE SERVICE LIMIT:

0.07 mm (0.003 in)



BEARING SELECTION

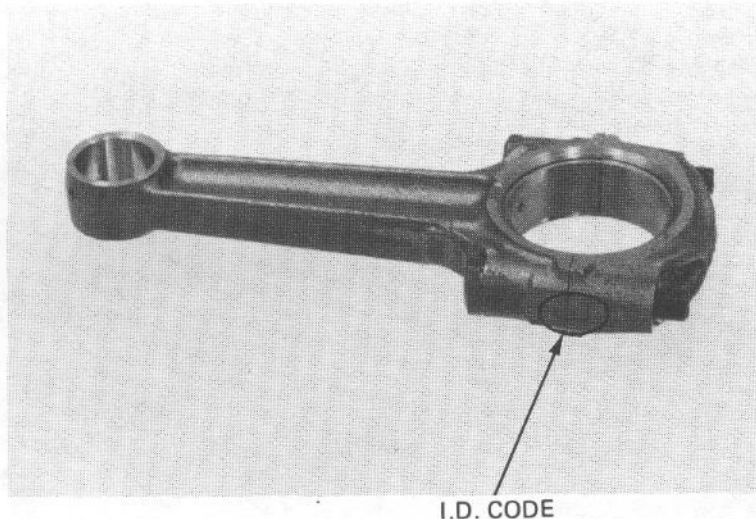
If rod bearing clearance is beyond tolerance, select replacement bearings as follows:

CONNECTING ROD BEARING INSERTS

Determine and record the corresponding rod I.D. code number.

NOTE:

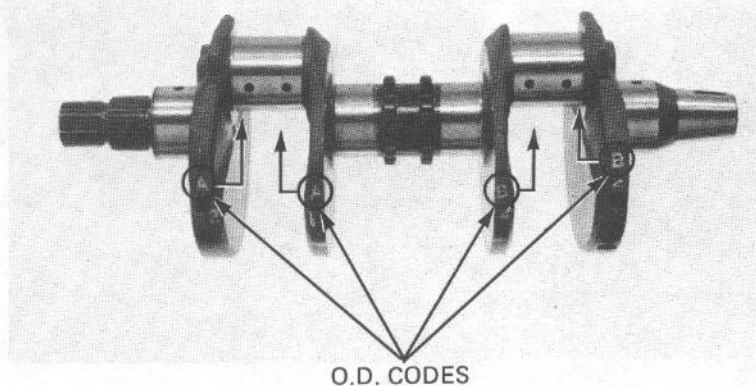
The number 1 or 2 on each connecting rod is the code for each connecting rod I.D.



Determine and record the corresponding crankpin O.D. code number (or measure the crankpin O.D.).

NOTE:

The letters A or B on each crank weight is the code for each crankpin O.D.



Cross reference the crankpin and rod codes to determine the replacement bearing color.

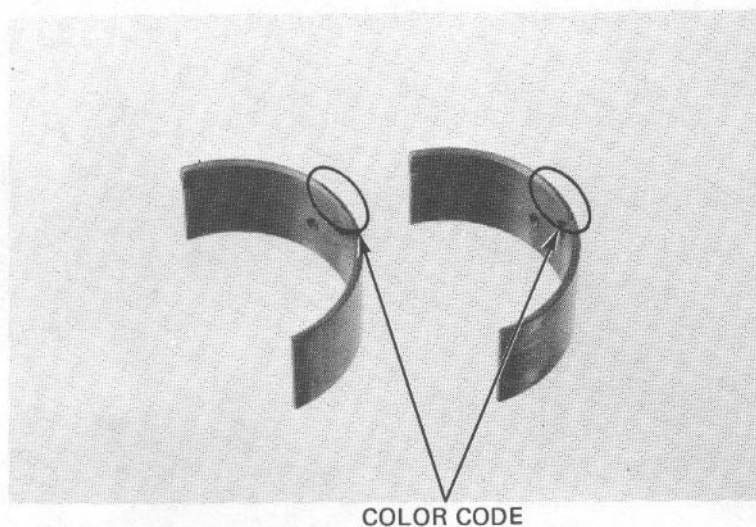
| | | CRANKPIN O.D. CODE NO. | |
|------------------------------|---|------------------------|------------------|
| | | A | B |
| | | 39.992—40.000 mm | 39.984—39.992 mm |
| CONNECTING ROD I.D. CODE NO. | 1 | 43.000—43.008 mm | C (Yellow) |
| | 2 | 43.008—43.016 mm | B (Green) |
| | | | A (Brown) |

BEARING INSERT THICKNESS:

A (Brown): 1.494—1.498 mm (0.0588—0.0590 in)

B (Green): 1.490—1.494 mm (0.0587—0.0588 in)

C (Yellow): 1.486—1.490 mm (0.0585—0.0587 in)

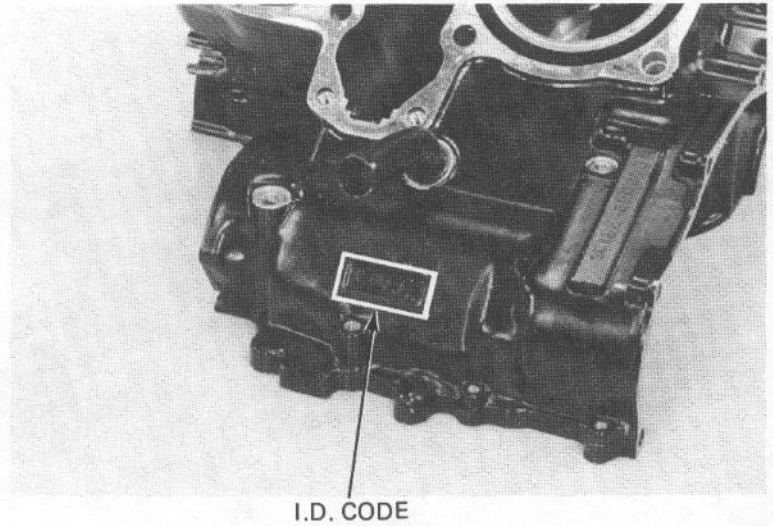


MAIN BEARING

Determine and record crankcase I.D. code numbers.

NOTE:

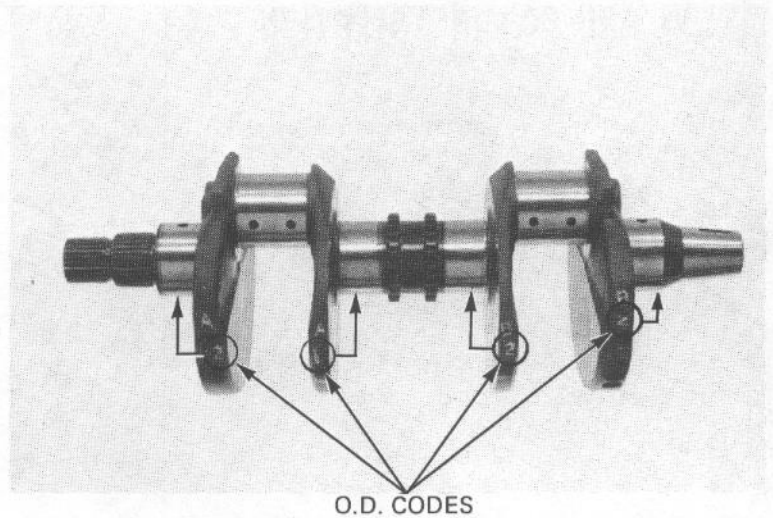
The letters (I or II) on the upper rear crankcase shown are the codes for the main journal I.D. from left to right.



Determine and record the corresponding main journal O.D. code numbers (or measure the main journal O.D.).

NOTE:

A number 1 or 2 on each crank weight is the code for the adjacent main journal O.D.



Cross reference the case and journal codes to determine the replacement bearing.

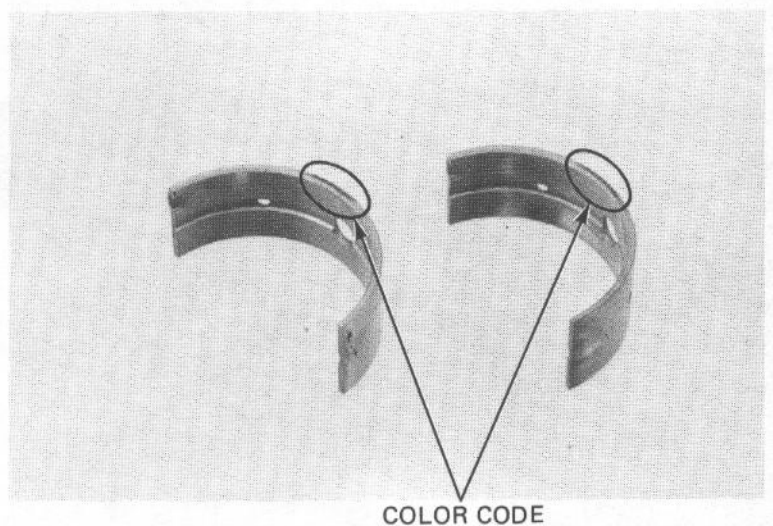
| | | | MAIN JOURNAL O.D. CODE NO. | |
|-----------------------|----|----------------------|-------------------------------|----------------------|
| | | | 1 | 2 |
| | | | 39.992— 40.000 mm | 39.984— 39.992 mm |
| CASE I.D. CODE NO. | I | 43.000— 43.008 mm | C (Yellow) | B (Green) |
| | II | 43.008— 43.016 mm | B (Green) | A (Brown) |

MAIN BEARING INSERT THICKNESS:

A (Brown): 1.498—1.502 mm (0.0590—0.0591 in)

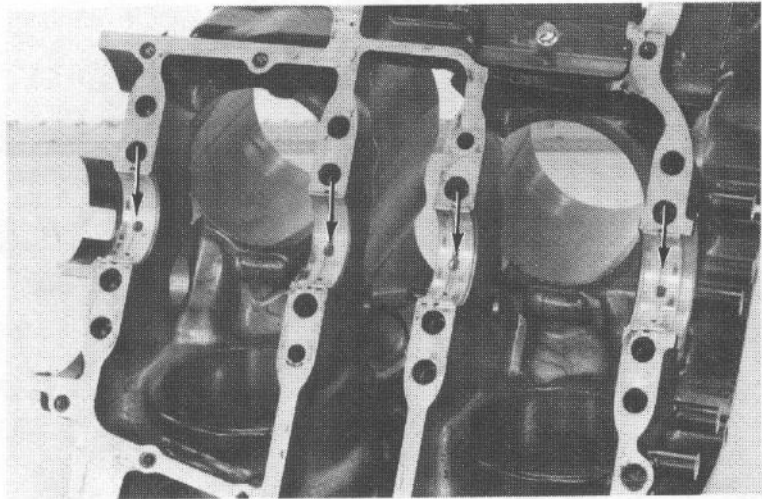
B (Green): 1.494—1.498 mm (0.0588—0.0590 in)

C (Yellow): 1.490—1.494 mm (0.0587—0.0588 in)



CRANKSHAFT INSTALLATION

Install the main bearings into the upper crankcase.
Apply molybdenum disulfide grease to the upper and lower main bearings.
Install the crankshaft with the cam chain.

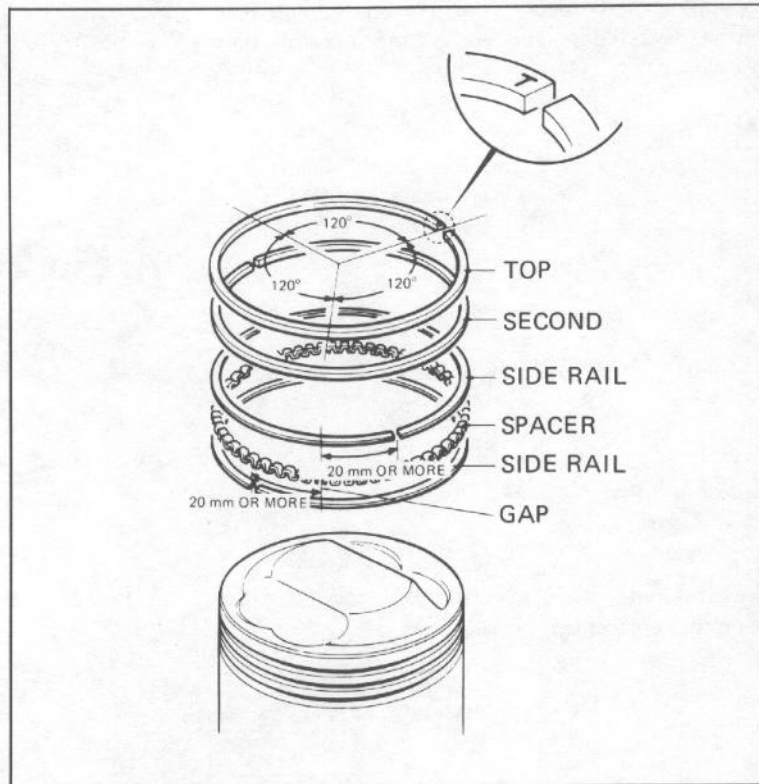


PISTON AND ROD INSTALLATION

Clean the piston domes, ring lands, and skirts.
Carefully install the piston rings onto the piston.
Stagger the ring end gaps as shown.

NOTE:

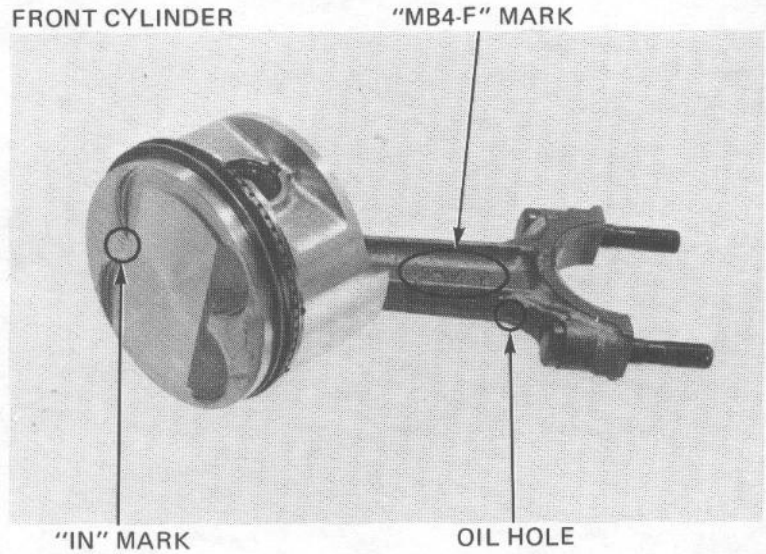
- Be careful not to damage the piston and piston rings during assembly.
- All rings should be installed with the markings facing up.
- After installing the rings they should rotate freely, without sticking.



Coat the rod small end with molybdenum disulfide grease.
Assemble the pistons and connecting rods with the pistons and piston clips as follows.

Front cylinder connecting rod and piston assembly.

Note that the front cylinder connecting rods are marked MB4-F.
Install the pistons on the front connecting rods so that the intake "IN" mark is facing opposite the oil hole in the rod.

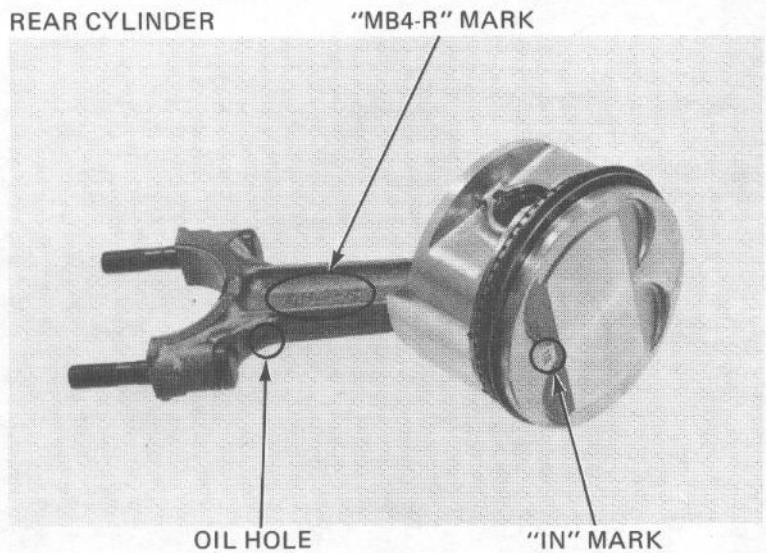


Rear cylinder connecting rod and piston assembly.

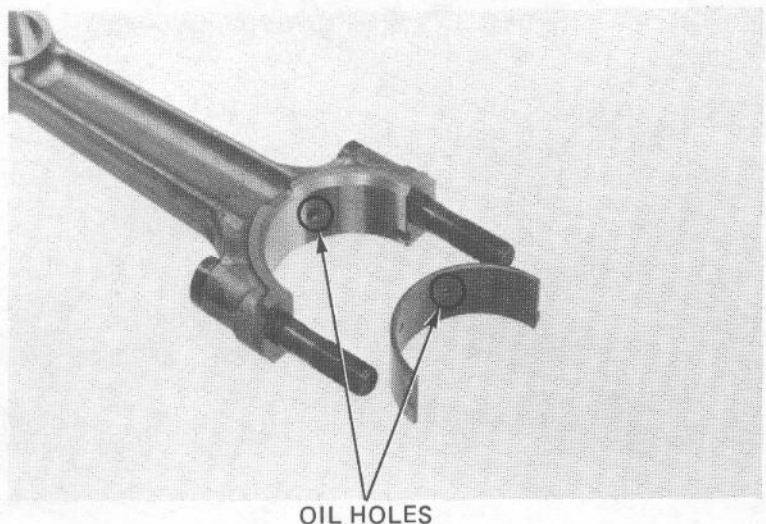
Note that the rear cylinder connecting rods are marked MB4-R.
Install the pistons on the rear rods so that the intake "IN" mark is facing the same direction as the oil hole in the rod.

NOTE:

- Do not interchange the pistons, piston pins, or connecting rods.
- Make sure that the piston pin clips are properly seated.

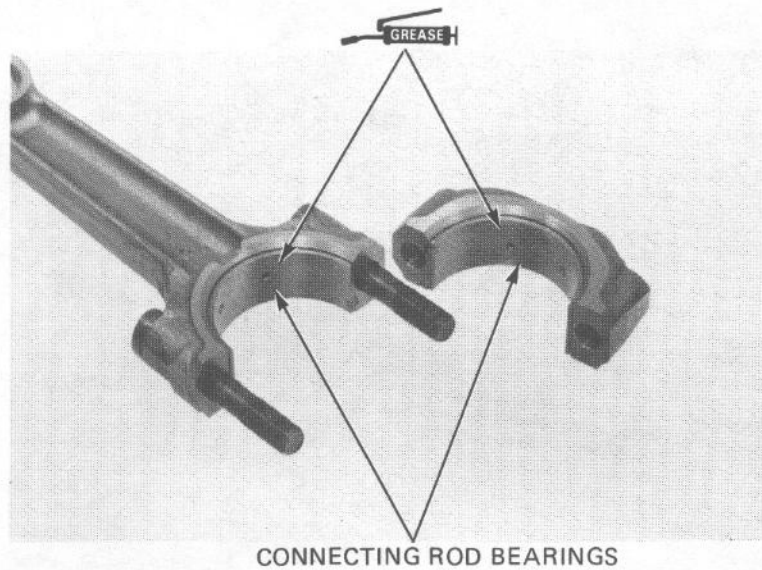


Align the hole in the connecting rod bearing insert with the hole in the connecting rod and install the insert.



CRANKSHAFT/PISTON

Install the connecting rod cap bearing insert.
Apply molybdenum disulfide grease to the connecting rod bearings.

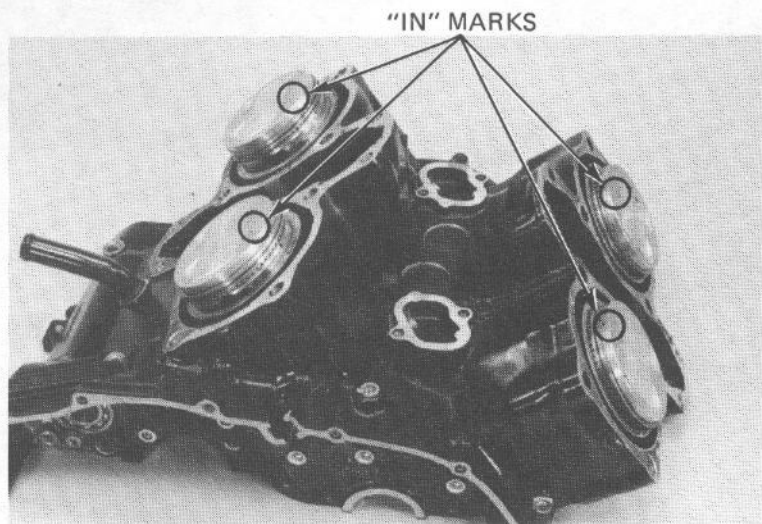


Coat the cylinders, piston rings/grooves, and pistons with oil.

Install the rod and piston assemblies into the cylinders from the top of the crankcase. Be sure each assembly is returned to its original position as noted during removal.

NOTE:

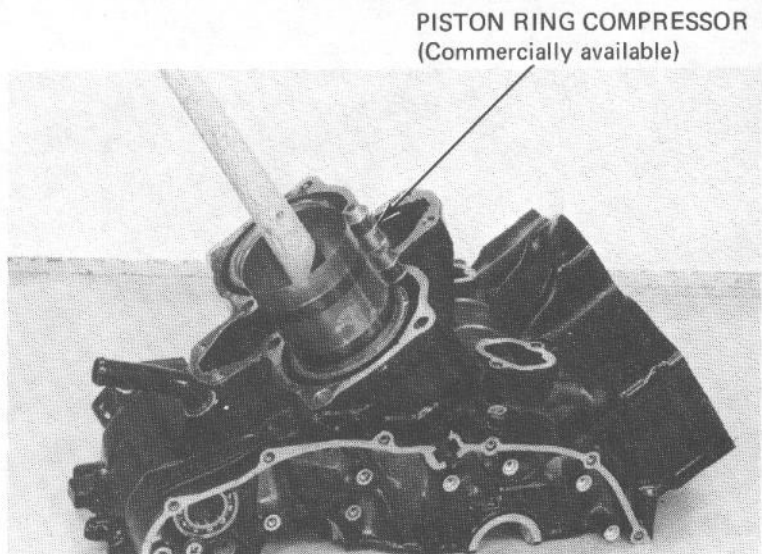
The piston intake "IN" marks should be facing each other as shown.



Compress the piston rings with a ring compressor and insert the piston and rod into the cylinder.

NOTE:

- Be careful not to damage the pistons or rings during assembly.
- To prevent damage to the crankpin journals, slip short sections of rubber hose over the rod bolts before installation.



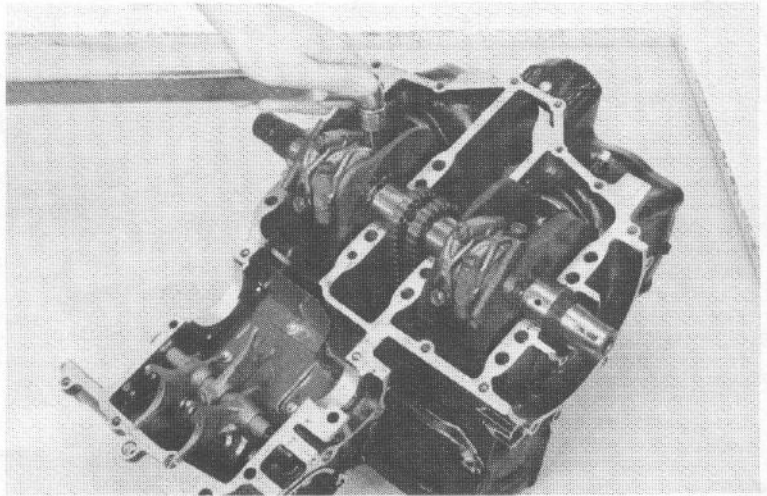
Install and torque the connecting rod nuts.

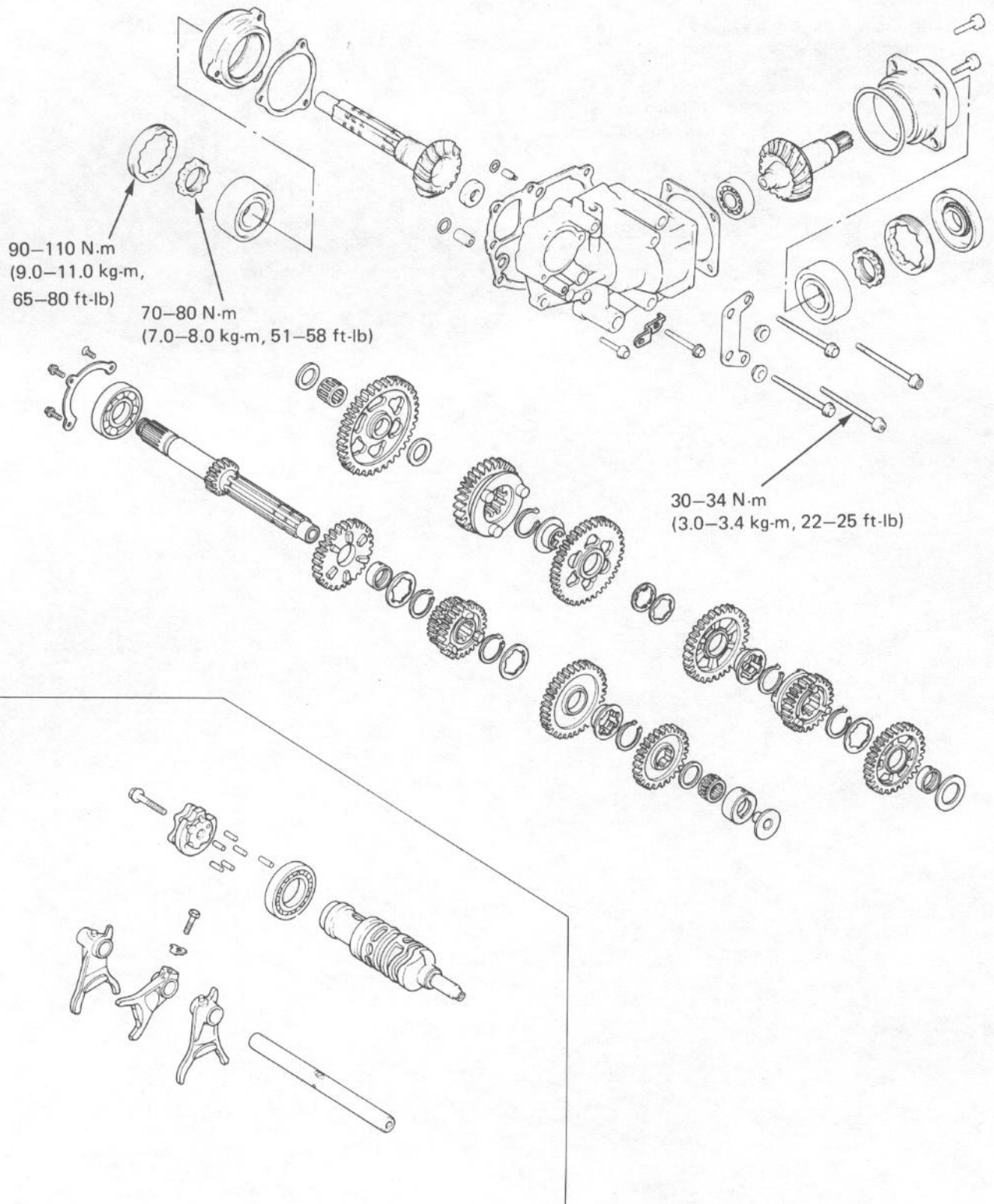
TORQUE: 30–34 N·m (3.0–3.4 kg-m, 22–25 ft-lb)

NOTE:

- Be sure the bearing caps are installed in their correct location as marked during removal.
- Tighten the nuts in two or more steps.
- After tightening the bolts, check that the rods move freely without binding.

Assemble the crankcase (See page 11-3).





13. TRANSMISSION

| | | | |
|-------------------------------------|-------|---------------------------|-------|
| SERVICE INFORMATION | 13-1 | COUNTERSHAFT INSPECTION | 13-17 |
| TROUBLESHOOTING | 13-2 | SHIFT FORK AND SHIFT DRUM | 13-18 |
| TRANSMISSION DISASSEMBLY | 13-3 | TRANSMISSION ASSEMBLY | 13-21 |
| OUTPUT DRIVEN GEAR REMOVAL | 13-9 | COUNTERSHAFT | 13-22 |
| GEAR TOOTH CONTACT PATTERN CHECK | 13-14 | | |

SERVICE INFORMATION

GENERAL

- The gearshaft linkage can be serviced with the engine in the frame (Section 8).
- For internal transmission repairs, the crankcase must be separated (Section 11).
- Replace the countershaft and output driven gear as a set.
- When using the lock nut wrench, use a deflecting beam type torque wrench 14-20 inches long. The lock nut wrench increases the torque wrench's leverage, so the torque wrench reading will be less than the torque actually applied to the lock nut. The specification given is the actual torque applied to the lock nut, not the reading on the torque wrench when used with the lock nut wrench. The torque wrench scale reading is given with the actual torque specification.

13

SPECIFICATIONS

| | | | STANDARD | SERVICE LIMIT |
|--------------|------------------------------------|------------------------------------|-------------------------------------|---------------------|
| Transmission | Backlash | low | 0.089-0.179 mm (0.0035-0.0070 in) | 0.24 mm (0.009 in) |
| | | 2nd, 3rd, 4th, 5th, 6th | 0.068-0.136 mm (0.0027-0.0054 in) | 0.18 mm (0.007 in) |
| | Gear I.D. | M5, M6, C2, C3, C4 | 31.000-31.016 mm (1.2205-1.2211 in) | 31.18 mm (1.228 in) |
| | Gear bushing O.D. | M5, M6, C2, C3, C4 | 30.950-30.975 mm (1.2185-1.2195 in) | 30.93 mm (1.218 in) |
| | Gear bushing I.D. | M5, C4 | 27.995-28.016 mm (1.1022-1.1030 in) | 28.05 mm (1.104 in) |
| | Mainshaft O.D. | at M5 | 27.977-27.990 mm (1.1015-1.1020 in) | 27.92 mm (1.099 in) |
| | Countershaft O.D. | at C4 | 27.977-27.990 mm (1.1015-1.1020 in) | 27.92 mm (1.099 in) |
| | Gear-to-bushing or shaft clearance | M5, M6, C2, C3, C4 gear-to-bushing | 0.025-0.066 mm (0.0010-0.0026 in) | 0.10 mm (0.004 in) |
| | | M5, C4 bushing-to-shaft | 0.005-0.039 mm (0.0002-0.0015 in) | 0.05 mm (0.002 in) |
| Shift fork | Claw thickness | | 6.43-6.50 mm (0.253-0.256 in) | 6.1 mm (0.24 in) |
| | I.D. | '83~'85: Left and right | 14.000-14.018 mm (0.5511-0.5519 in) | 14.05 mm (0.553 in) |
| | | After '85: Left and right | 14.016-14.034 mm (0.5511-0.5525 in) | 14.07 mm (0.554 in) |
| Fork shaft | O.D. | | 13.966-13.984 mm (0.549-0.550 in) | 13.90 mm (0.547 in) |

TRANSMISSION

TORQUE VALUES:

| | |
|--------------------------------------|---|
| Output gear case bearing holder | 30–34 N·m (3.0–3.4 kg-m, 22–25 ft-lb) |
| Output gear case 8 mm socket bolt | 21–25 N·m (2.1–2.5 kg-m, 15–18 ft-lb) |
| Output gear bearing lock nut (outer) | 90–110 N·m (9.0–11.0 kg-m, 65–80 ft-lb) |
| (inner) | 70–80 N·m (7.0–8.0 kg-m, 51–58 ft-lb) |
| Shift fork center | 16–20 N·m (1.6–2.0 kg-m, 12–14 ft-lb) |

TOOLS:

Special

| | |
|---------------------------|---------------|
| Lock nut wrench, 30/64 mm | 07916–MB00000 |
| Lock nut wrench, 42/56 mm | 07916–MB40000 |
| Shaft holder | 07923–6890101 |
| Bearing remover, 17 mm | 07936–3710300 |
| Remover handle | 07936–3710100 |
| Remover weight | 07936–3710200 |

or Bearing remover set 07936–3710000

Common

| | | |
|------------------------|---------------|-------------------------|
| Driver | 07749–0010000 | or Driver 07949–6110000 |
| Pilot, 30 mm | 07746–0040700 | |
| Pilot, 35 mm | 07746–0040800 | |
| Attachment, 62 x 68 mm | 07746–0010500 | |
| Attachment, 52 x 55 mm | 07746–0010400 | |
| Attachment, 42 x 47 mm | 07746–0010300 | |
| Pilot, 17 mm | 07746–0040400 | |
| Driver | 07742–0030100 | |
| Attachment, 30 mm | 07746–0030300 | |

TROUBLESHOOTING

Hard to shift

1. Clutch slave cylinder sticking
2. Shift fork bent
3. Shift shaft bent
4. Shift claw bent
5. Shift drum cam grooves damaged

Transmission jumps out of gear

1. Gear dogs worn
2. Shift shaft bent
3. Shift drum stopper broken
4. Shift forks bent

For servicing of the gearshift linkage, see Section 8.

TRANSMISSION DISASSEMBLY

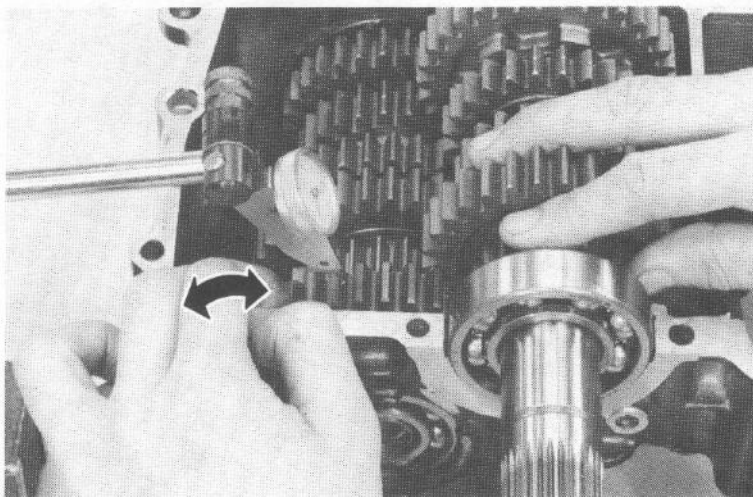
Separate the crankcase (Section 11).
Remove the dowel pin from the crankcase.
Inspect the backlash of each gear.

SERVICE LIMITS:

Low: 0.24 mm (0.009 in)
2nd, 3rd, 4th, 5th, 6th: 0.18 mm (0.007 in)

Remove the mainshaft and countershaft.

Remove the output gear case.

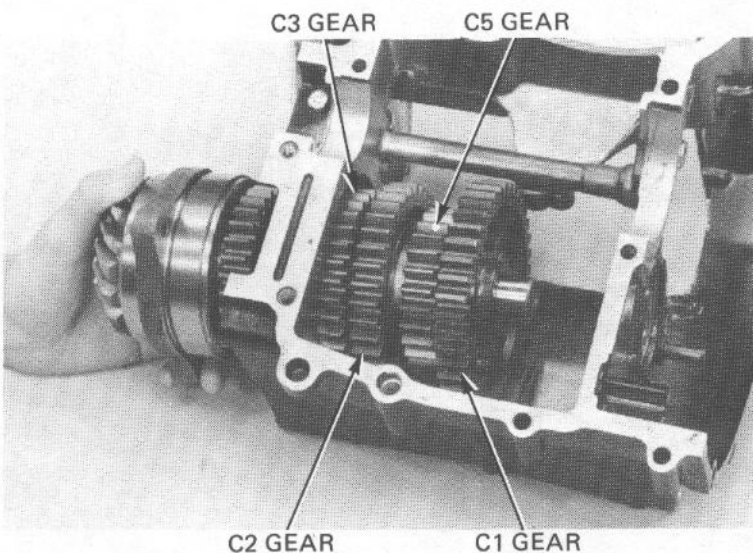
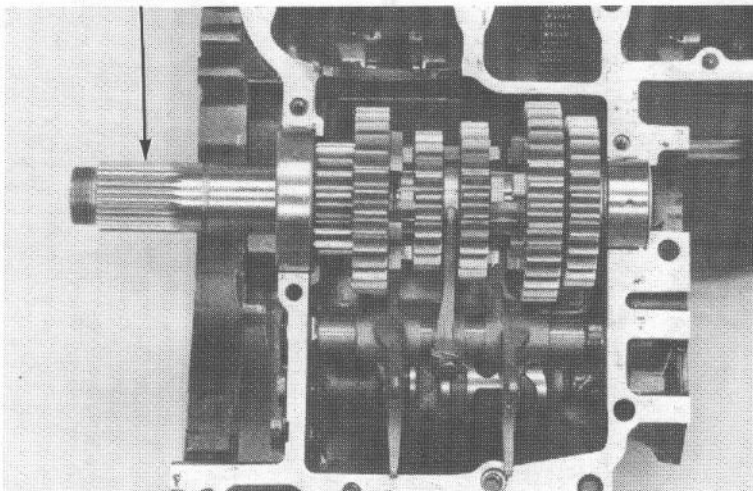


Index the countershaft bearing holder to the output gear case, for ease of reassembly.

NOTE:

When removing the countershaft, pull the countershaft with remaining gears out of crankcase after removing the C1, C5, C2, C3 gears, spline washer, plain washers, and bushings in the crankcase.

MAINSHAFT



TRANSMISSION

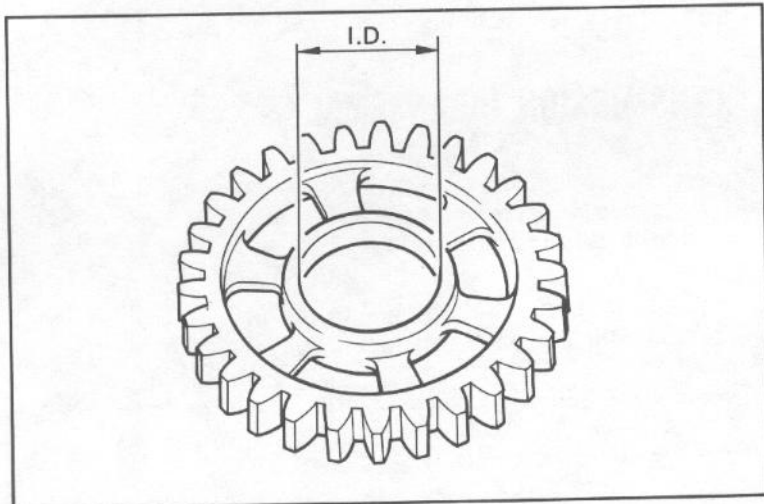
TRANSMISSION INSPECTION

Check gear dogs, dog holes, and teeth for excessive or abnormal wear, or evidence of insufficient lubrication.

Measure the I.D. of each gear.

SERVICE LIMITS:

M5, M6, C2, C3, C4 gear: 31.18 mm (1.228 in)



Measure the I.D. and O.D. of the gear bushings.

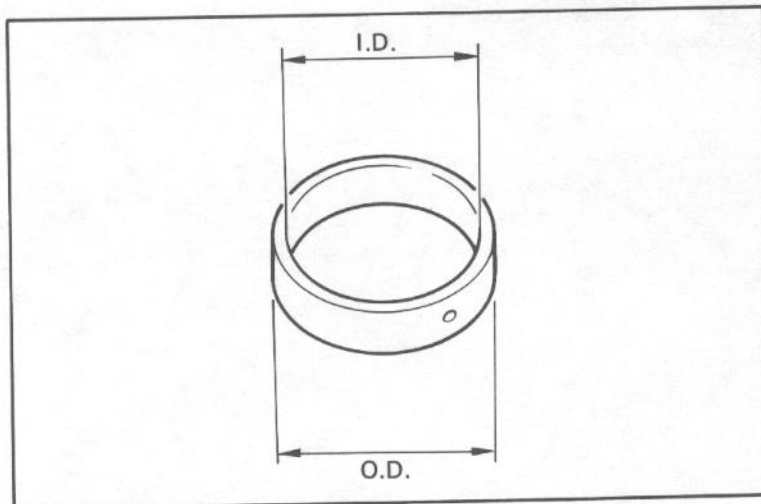
SERVICE LIMITS:

M5, M6, C2, C3, C4 gear bushing O.D.:

30.93 mm (1.218 in)

M5, C4 gear bushing I.D.:

28.05 mm (1.104 in)



Measure the O.D. of the mainshaft and countershaft.

SERVICE LIMITS:

A (at M5 bushing): 27.92 mm (1.099 in)

B (at C4 bushing): 27.92 mm (1.099 in)

Calculate the clearance between the gear and gear shaft or bushing.

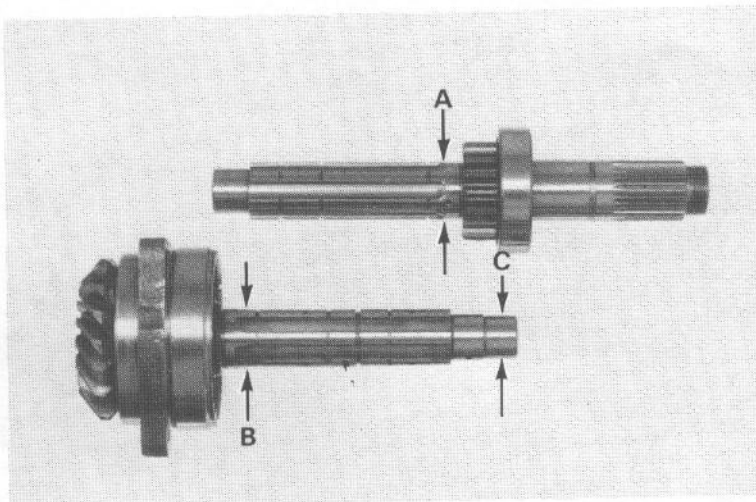
SERVICE LIMITS:

M5, M6, C2, C3, C4 gear-to-bushing:

0.10 mm (0.004 in)

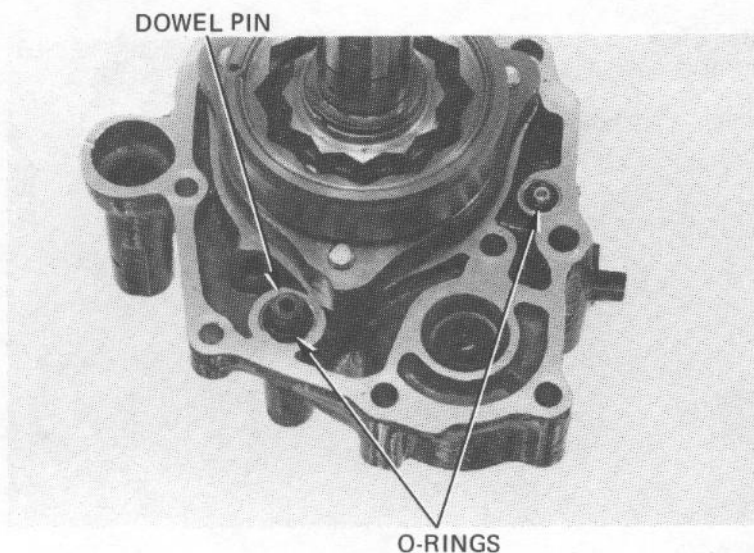
M5, C4 gear bushing-to-shaft:

0.05 mm (0.002 in)



DRIVE GEAR REMOVAL

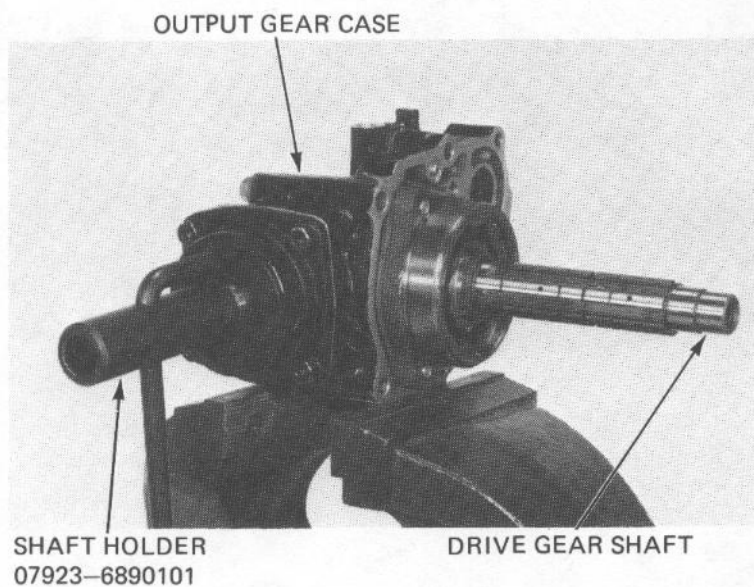
Remove the dowel pin and O-rings.



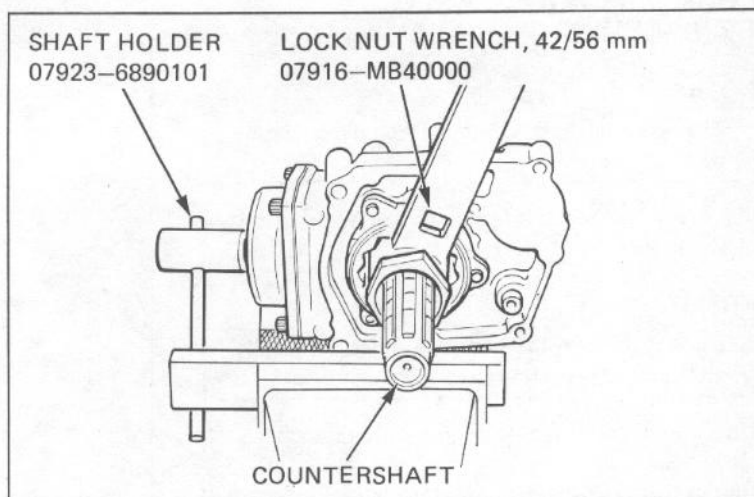
Place the output gear case in a vise with soft jaws, being careful not to distort the case.

Place the shaft holder tool on the output driven gear shaft, wedging it against the vise to lock the shaft.

Unstake the inner bearing race lock nut with a drill or grinder. Be careful that metal particles do not enter the bearing and that the threads on the shaft are not damaged.



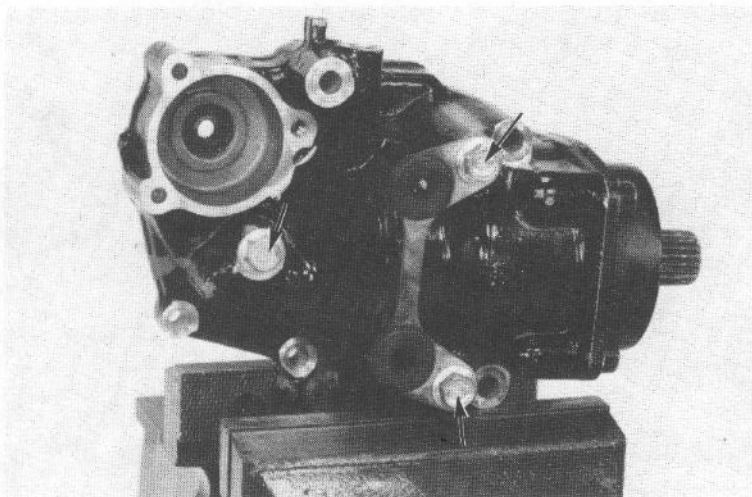
Remove the inner bearing race lock nut. Discard the nuts.



TRANSMISSION

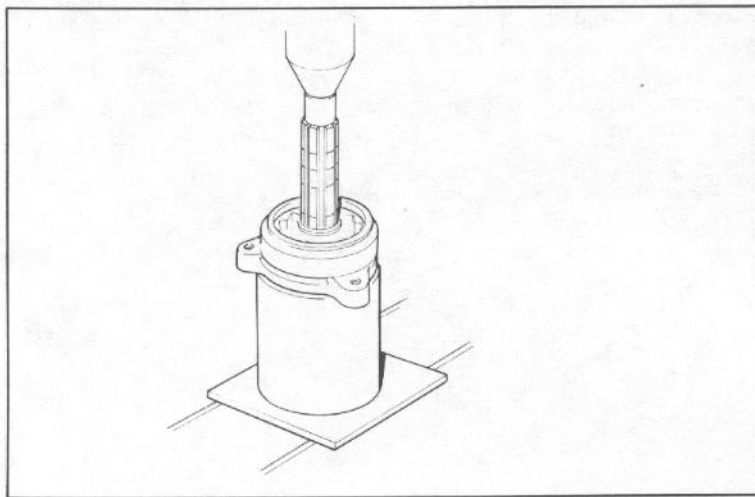
Remove the countershaft bearing holder bolts and holder from the case.

Remove the output drive gear and shim.



Place the countershaft/holder in a press.

Press the countershaft out of the bearing holder.



COUNTERSHAFT BEARING REPLACEMENT

NOTE:

The countershaft must be removed before replacing bearing.

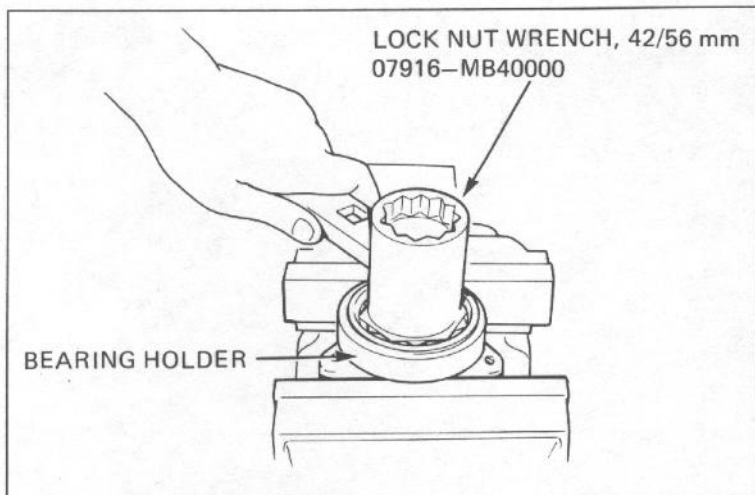
Place the bearing holder in a vise with soft jaws or shop towel.

NOTE:

Do not damage the bearing holder, especially the crankcase mating surface.

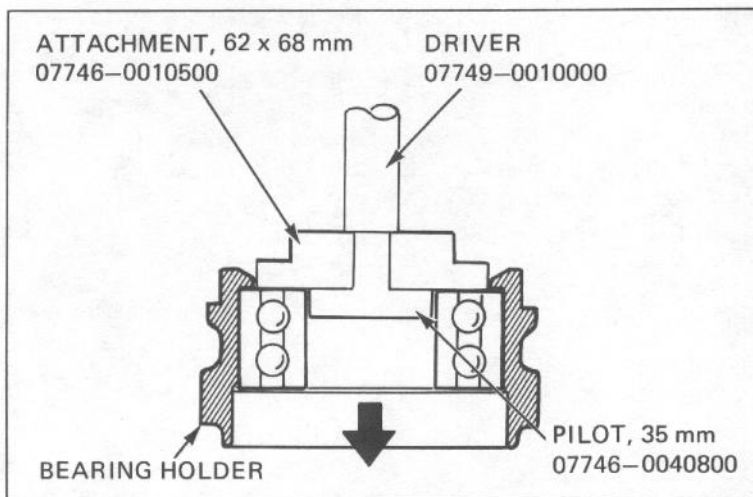
Unstake the outer race lock nut with a punch.

Remove the bearing outer race lock nut with a special tool. Discard the lock nut.



Place the bearing holder in a press and remove the bearing.

Press in a new bearing.

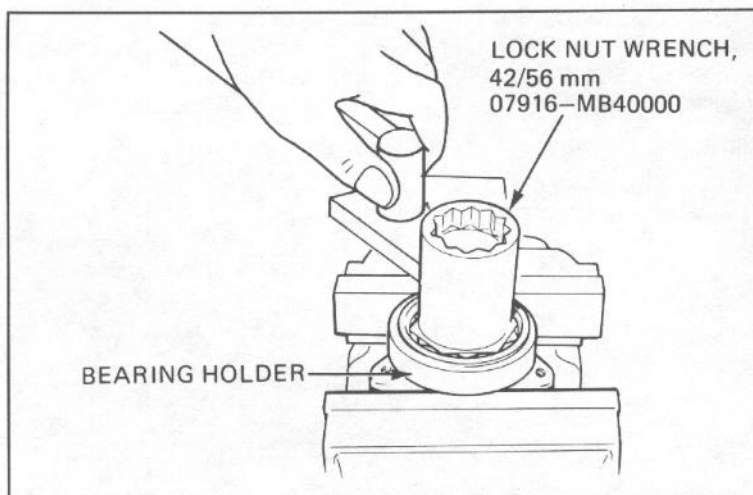


Place the bearing holder in a vise with soft jaws and install and tighten a new outer race lock nut to the specified torque value.

TORQUE: 90–110 N·m
(9.0–11.0 kg·m, 65–80 ft·lb)

Torque wrench scale reading:
80–100 N·m (8.0–10.0 kg·m, 58–73 ft·lb)

Stake the new lock nut.



COUNTERSHAFT INSTALLATION

NOTE:

The countershaft and driven gear must be replaced as a set if they or the gear case or the bearing require replacement.

Place the countershaft and countershaft bearing holder into a press. Press the countershaft into the bearing.

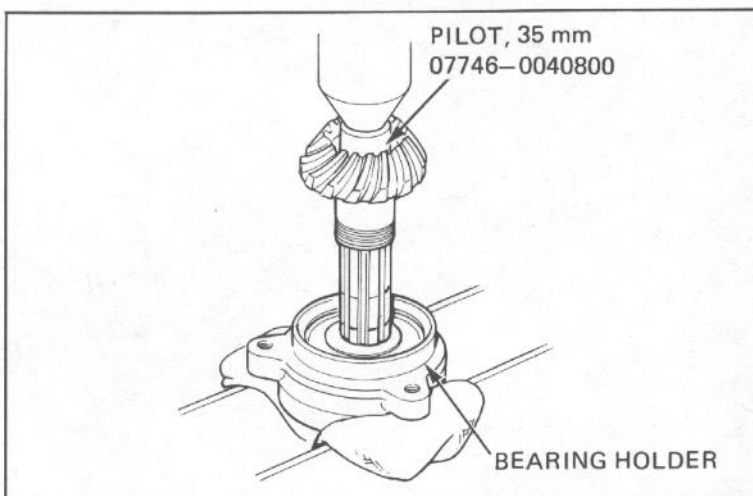
NOTE:

Place the threaded end of the pilot into the countershaft.

Place the adjustment shim over the bearing holder.

NOTE:

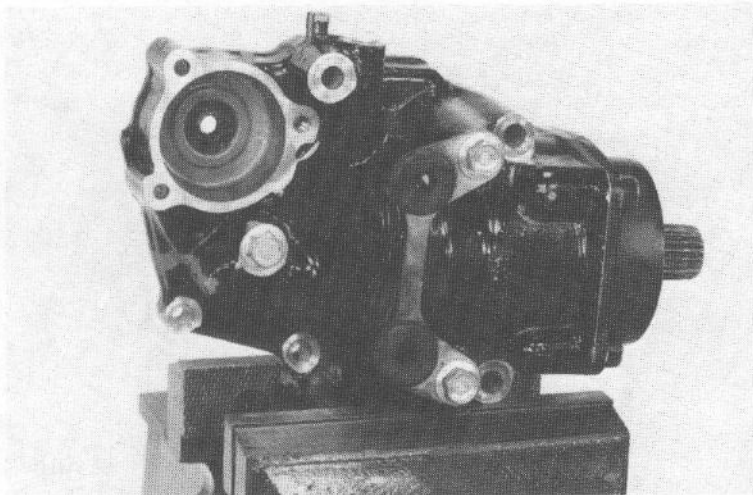
If the countershaft/driven gear, bearing or gear case are replaced, a new adjustment shim must be selected (page 13-15, Backlash Inspection).



Place the countershaft/bearing holder and correct adjusting shim into the output gear case. Install the bolts and sealing washers with the cover bracket.

Tighten the bolts in a crisscross pattern until the drive gear bearing holder seats against the case. Then tighten to the specified torque.

TORQUE: 30–34 N·m (3.0–3.4 kg-m, 22–25 ft-lb)



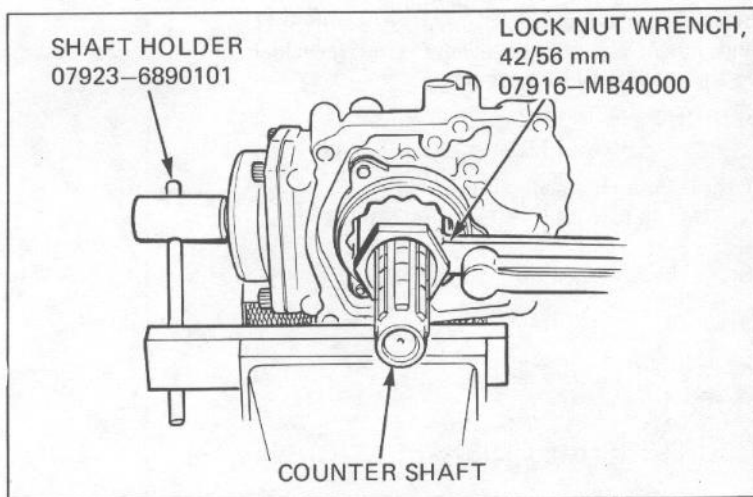
Place the case into a vise with soft jaws.

Install and tighten a new countershaft nut to the specified torque.

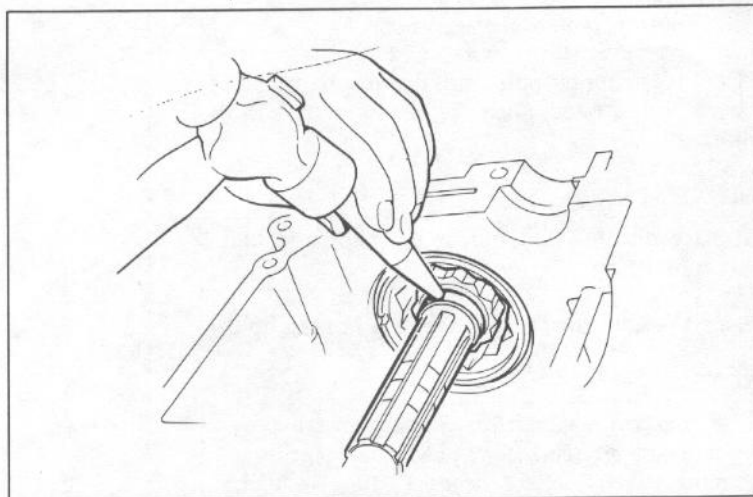
TORQUE: 70–80 N·m (7.0–8.0 kg-m, 51–58 ft-lb)

Torque wrench scale reading:

64–73 N·m (6.4–7.3 kg-m, 46–53 ft-lb)



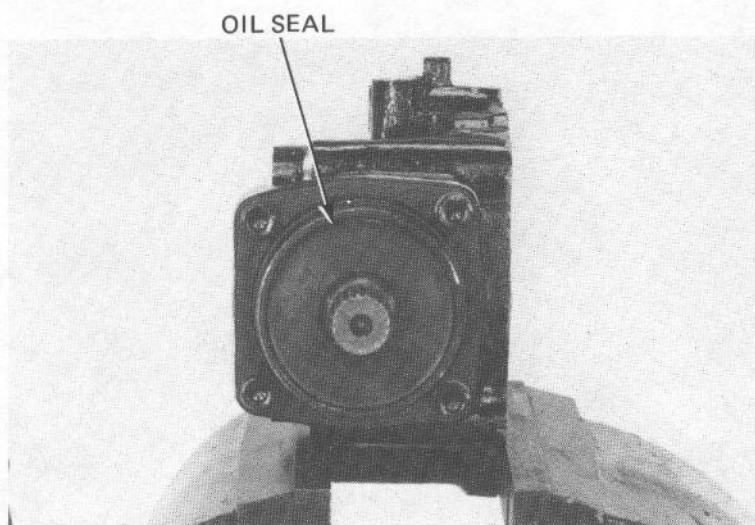
Stake the lock nut.



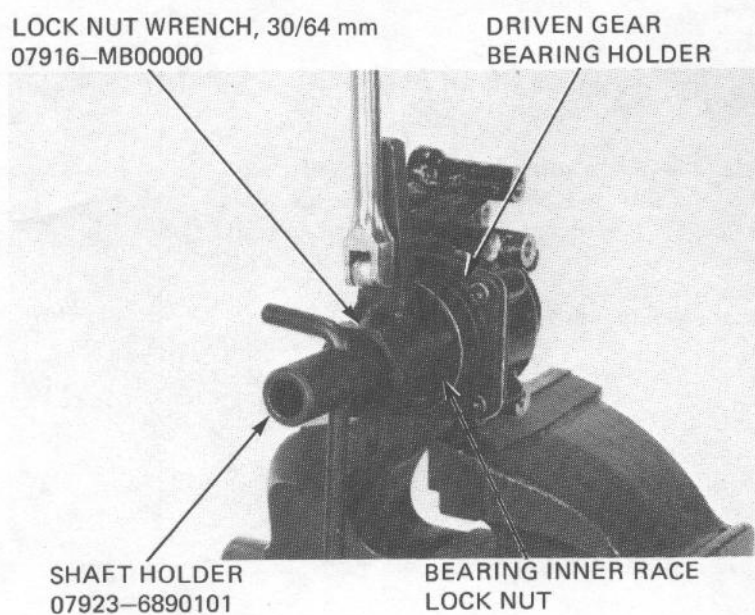
OUTPUT DRIVEN GEAR REMOVAL

Remove the output driven gear oil seal from the output gear case.

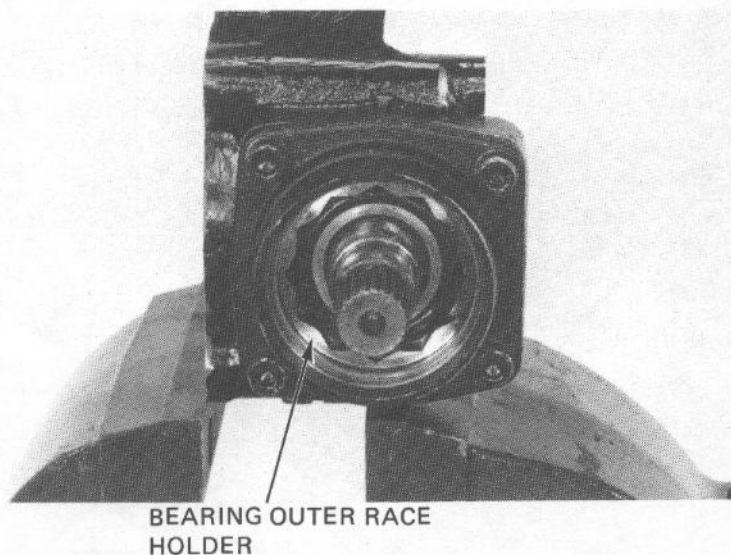
Place the output gear case into a vise, clamping it at the shift shaft spindle boss.



Unstake and loosen the output driven gear bearing inner race lock nut using a special lock nut wrench and shaft holder.

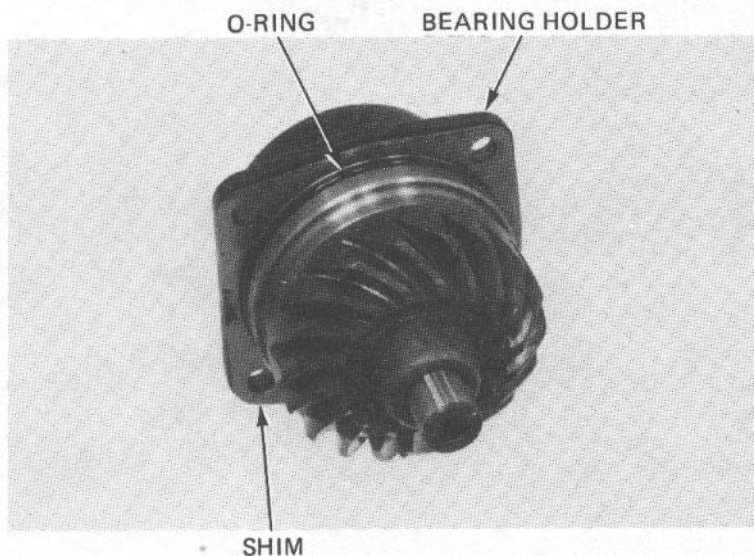


Remove the driven gear bearing holder mounting bolts and remove the gear and holder from the case.



TRANSMISSION

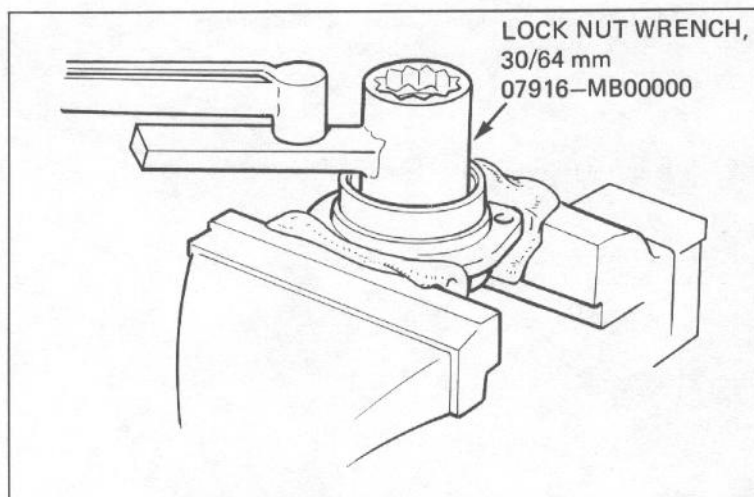
Remove the shim and O-ring from the bearing holder.



OUTPUT DRIVEN GEAR BEARING REPLACEMENT

Place the output driven gear bearing holder into a vise with soft jaws. Unstake and remove the output driven gear bearing outer race lock nut from the holder.

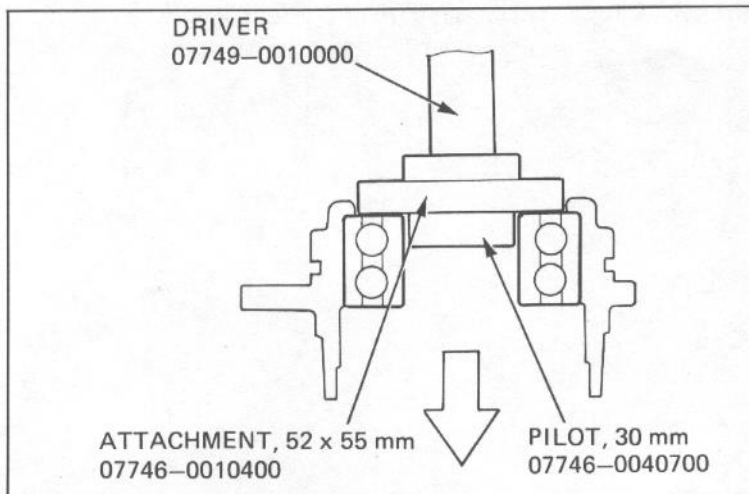
Press the output driven gear from the holder.



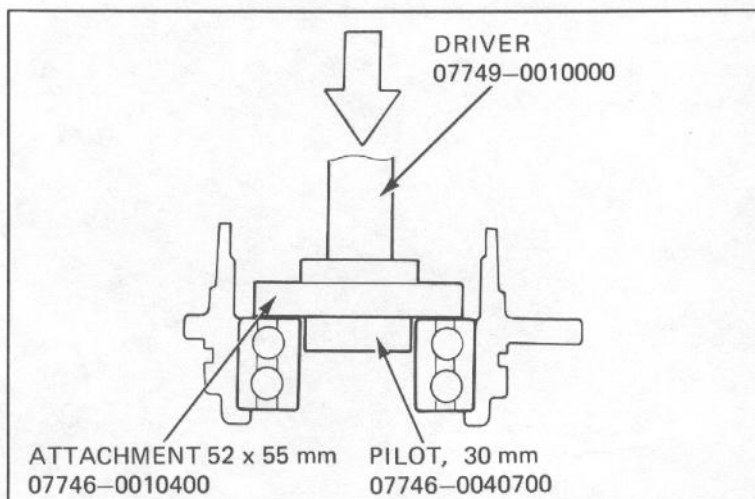
Place the bearing holder in a press and press the bearing out.

NOTE:

Be careful not to damage the bearing holder gear case mating surface.



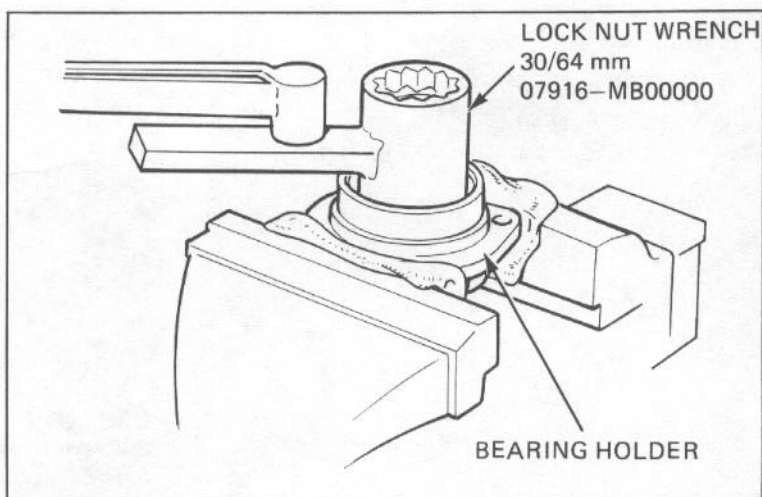
Press in a new bearing and make sure it rotates freely.



Place the bearing holder into a vise with soft jaws. Install and tighten a new bearing outer race lock nut to the specified torque value.

TORQUE: 90–110 N·m
(9.0–11.0 kg-m, 65–80 ft-lb)

Torque wrench scale reading:
80–100 N·m (8.0–10.0 kg-m, 58–72 ft-lb)



OUTPUT DRIVEN GEAR INSTALLATION

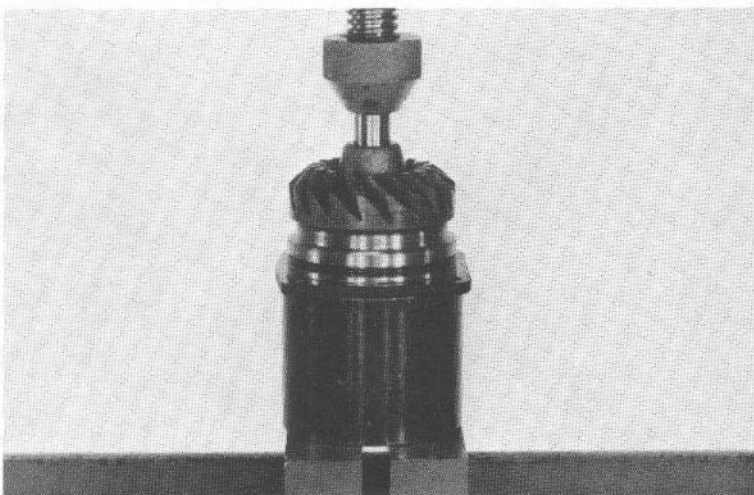
NOTE:

- When the gear set, driven gear bearing and/or gear case have been replaced, use a shim 0.30 mm (0.012 in) thick for initial reference.

Place the output driven gear bearing holder into a press.

Then press in the output driven gear.

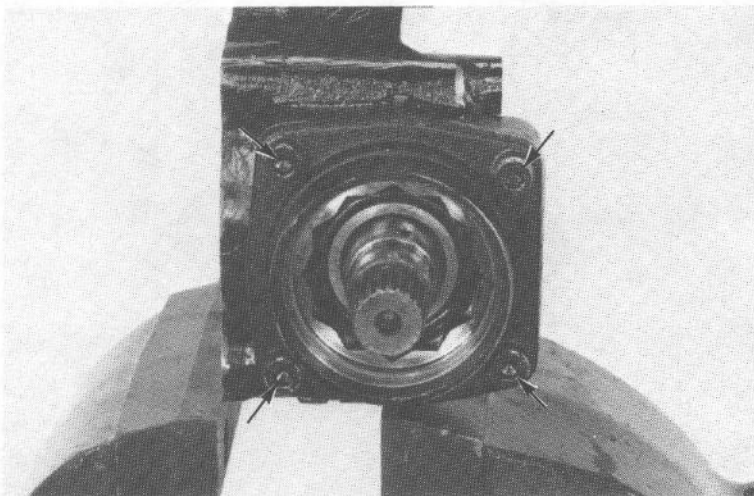
Install the O-ring and correct shim. See page 13-14 for shim selection procedure.



TRANSMISSION

Attach the bearing holder onto the gear case with the four hex bolts. Tighten the bolts in a crisscross pattern in two or more steps.

TORQUE: 30–34 N·m (3.0–3.4 kg·m, 22–25 ft·lb)

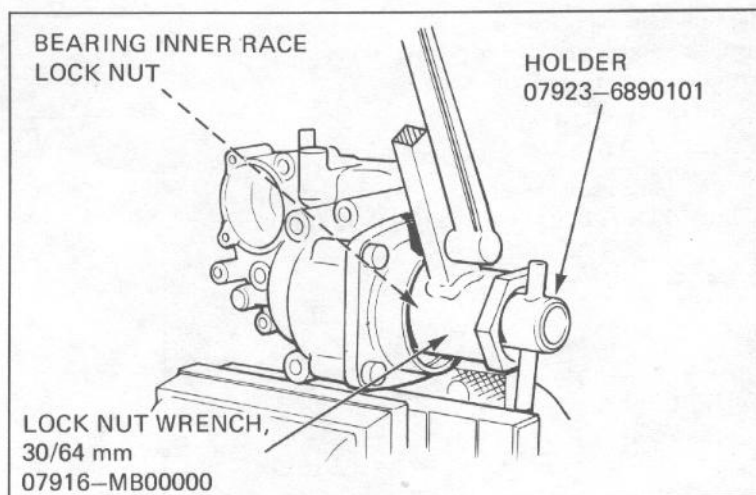


Install a new bearing inner race lock nut and tighten it to the specified torque.

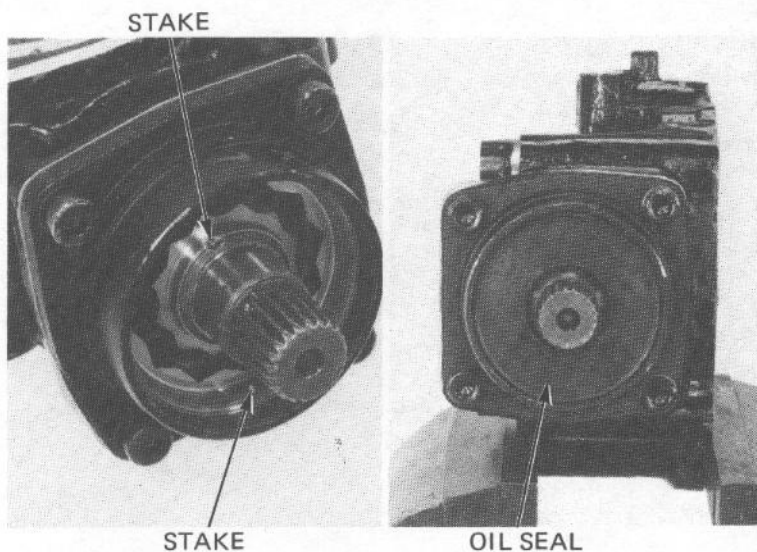
TORQUE: 70–80 N·m (7.0–8.0 kg·m, 51–58 ft·lb)

Torque wrench scale reading:

64–73 N·m (6.4–7.3 kg·m, 46–53 ft·lb)



Stake both new lock nuts and install a new oil seal.

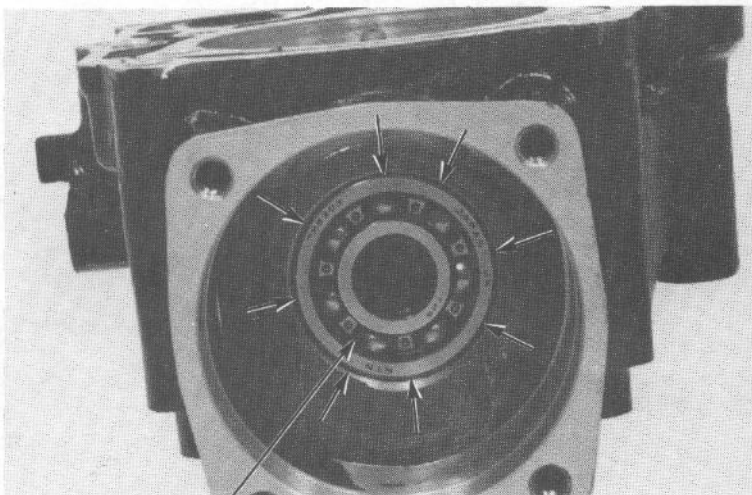


OUTPUT DRIVEN GEAR CASE BEARING REPLACEMENT

Heat the output gear case around the bearing to 80°C (176°F).

CAUTION:

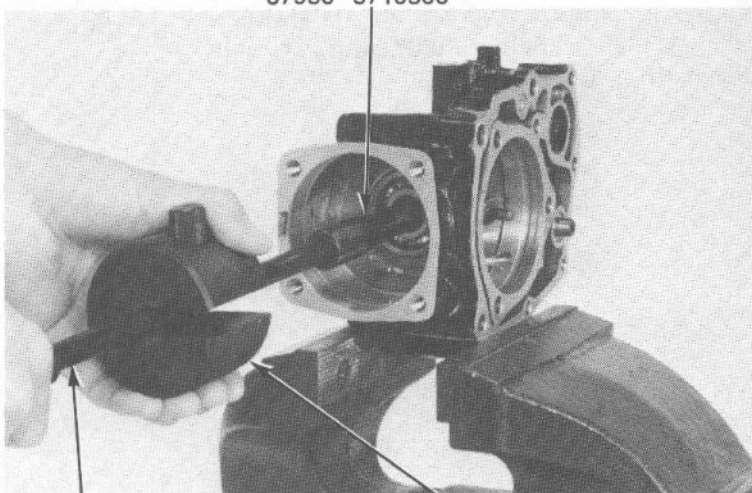
Always wear gloves when handling a heated gear case.



BEARING

BEARING REMOVER, 17 mm
07936-3710300

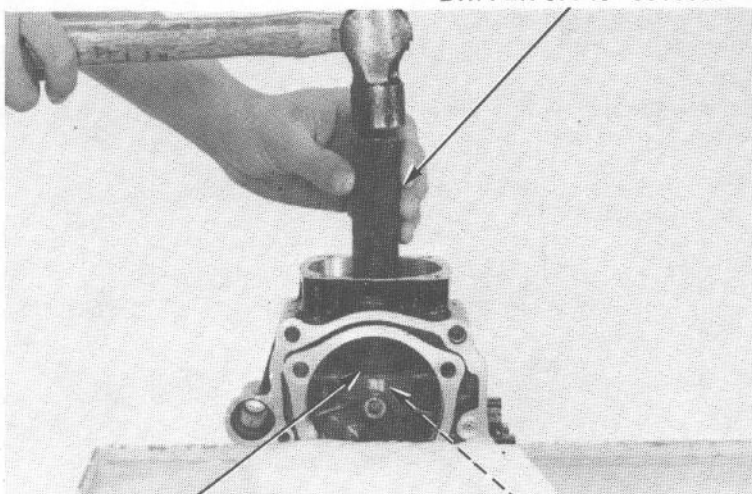
Remove the bearing with the bearing remover.



HANDLE
07936-3710100

WEIGHT
07936-3710200
DRIVER 07749-0010000

Drive a new bearing into the output gear case.



ATTACHMENT, 42 x 47 mm
07746-0010300

PILOT, 17 mm
07746-0040400

GEAR TOOTH CONTACT PATTERN CHECK

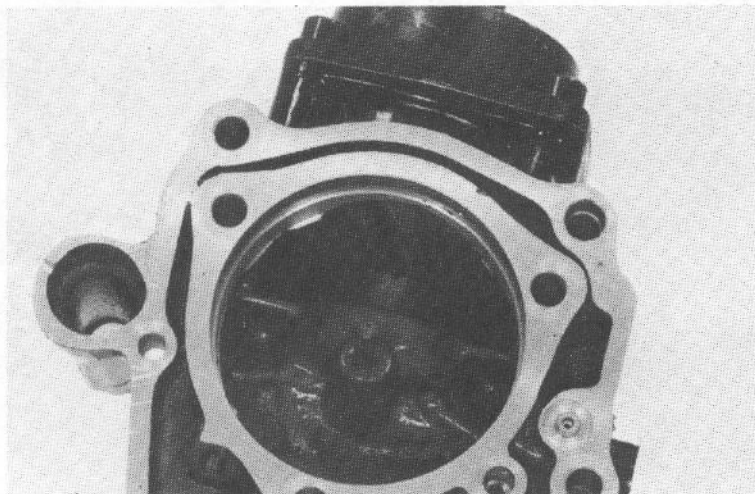
Remove the drive and driven gears (pages 13-5 and 13-9).

Apply Prussian Blue to the driven gear teeth.

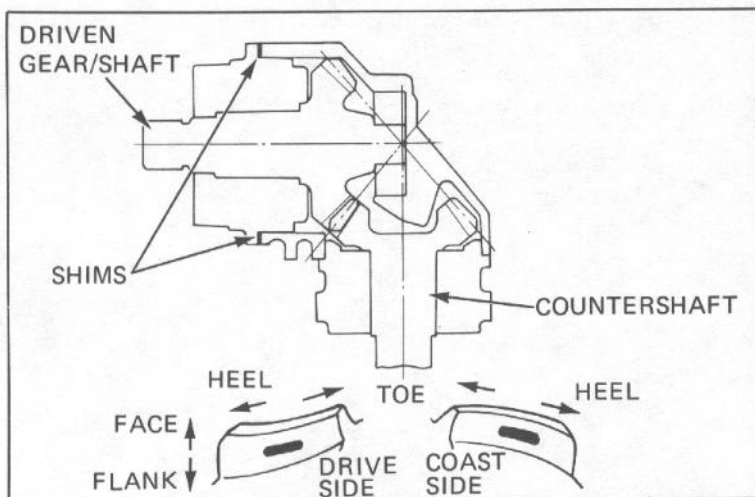
Install the drive and driven gears with the standard shims.

Rotate the drive gear several times in the normal direction of rotation.

Check the gear tooth contact pattern after removing the drive gear.

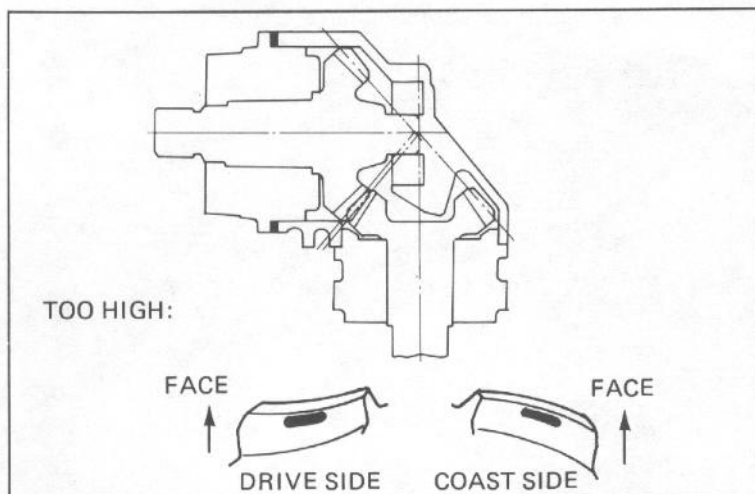


Contact is normal if Prussian Blue is transferred to the approximate center of each tooth and slightly to the side.



If the pattern is not correct, remove and replace the driven gear adjustment shim.

Replace the shim with a thinner one if the contact pattern is too high.

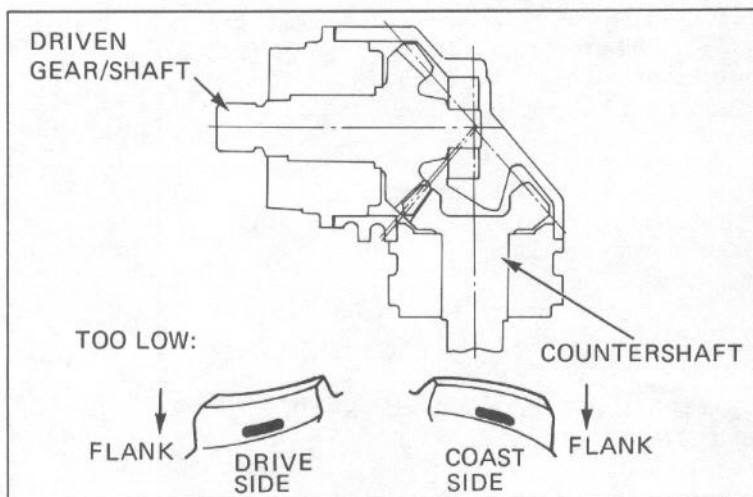


Replace the driven gear adjustment shim with a thicker one if the contact is too low.

The pattern will shift about 1.5–2.0 mm (0.06–0.08 in) when the thickness of the shim is changed by 0.10 mm (0.004 in).

OUTPUT DRIVEN GEAR ADJUSTMENT SHIM:

0.40 mm (0.016 in)
 0.45 mm (0.018 in)
 0.50 mm (0.020 in)
 0.55 mm (0.022 in)
 0.60 mm (0.024 in)



BACKLASH INSPECTION

Place the output gear case in a vise with soft jaws or a shop towel.

Set a horizontal type dial indicator on the countershaft as shown.

Hold the driven gear with the shaft holder and rotate the countershaft by hand until gear slack is taken up.

Turn the countershaft back and forth to read backlash.

SERVICE LIMIT: 0.40 mm (0.016 in)



Remove the dial indicator. Turn the countershaft 120° and measure backlash. Repeat this procedure once more.

Compare the difference of the three measurements.

DIFFERENCE OF MEASUREMENT

SERVICE LIMIT: 0.10 mm (0.004 in)

TRANSMISSION

If the difference in measurements exceeds the limit, it indicates that the bearing is not installed squarely. Inspect the bearings and reinstall if necessary.

If backlash is excessive, replace the countershaft gear adjustment shim with a thinner one.

If the backlash is too small, replace the countershaft shim with a thicker one.

Backlash is changed by about 0.06–0.07 mm (0.002–0.003 in) when thickness of the shim is changed by 0.10 mm (0.004 in).

COUNTERSHAFT/OUTPUT DRIVE GEAR ADJUSTMENT SHIMS:

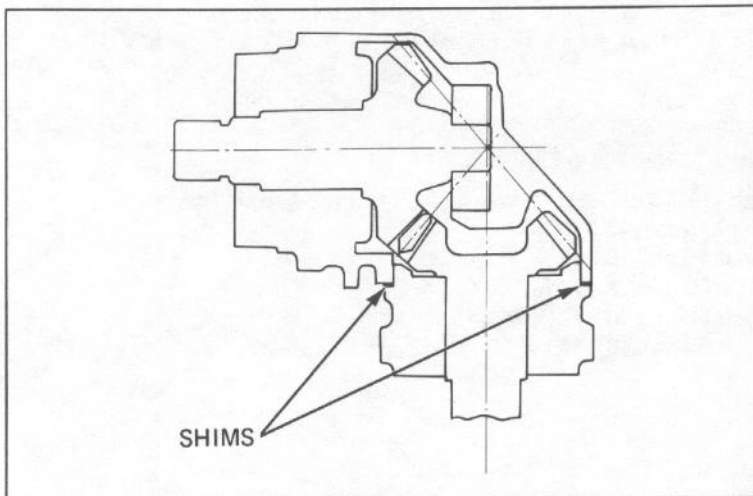
0.40 mm (0.016 in)

0.45 mm (0.018 in)

0.50 mm (0.020 in)

0.55 mm (0.022 in)

0.60 mm (0.024 in)



COUNTERSHAFT INSPECTION

NOTE:

Countershaft spacer selection should be performed whenever you replace any of the following parts:

- Crankcase (Section 11)
- Countershaft bearing (Section 11)
- Countershaft

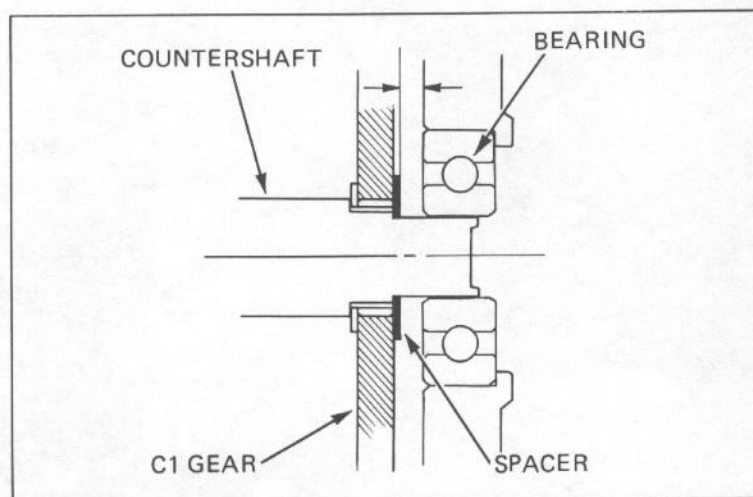
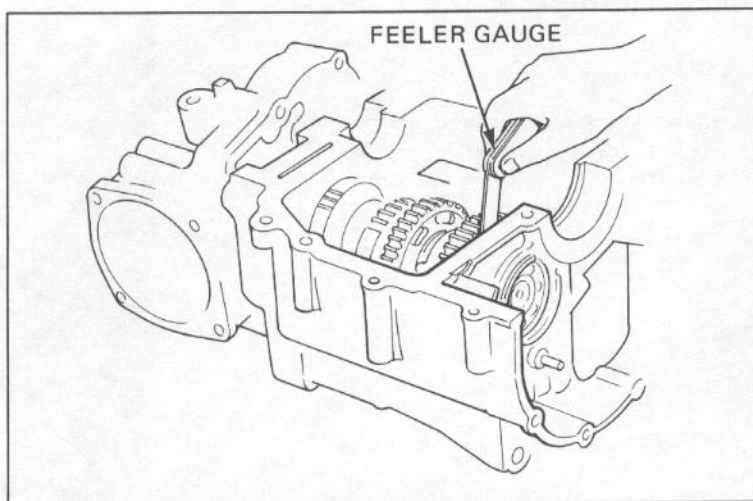
Select the correct output gear case gasket (page 13-15).

Install the output gear case assembly and new gasket onto the lower case.

Assemble the transmission with the original spacer.

Measure the clearance between the bearing and spacer with a feeler gauge.

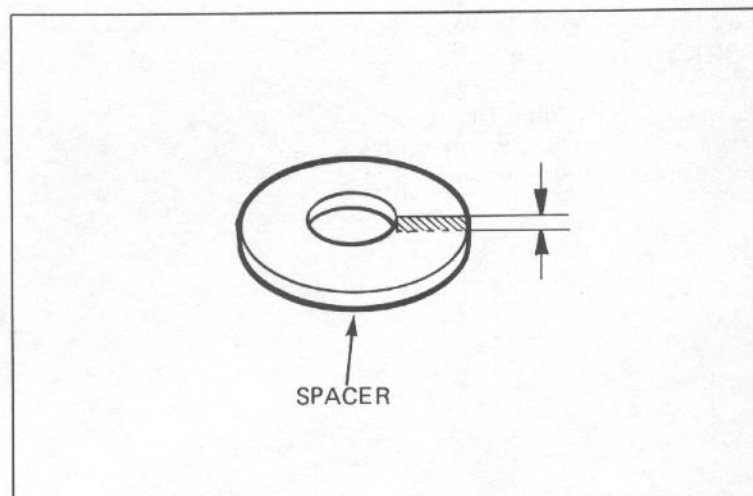
CLEARANCE: 0.3–0.4 mm (0.012–0.016 in)



If the clearance exceeds the limit, select a spacer to obtain the correct clearance:

SPACER/THICKNESS:

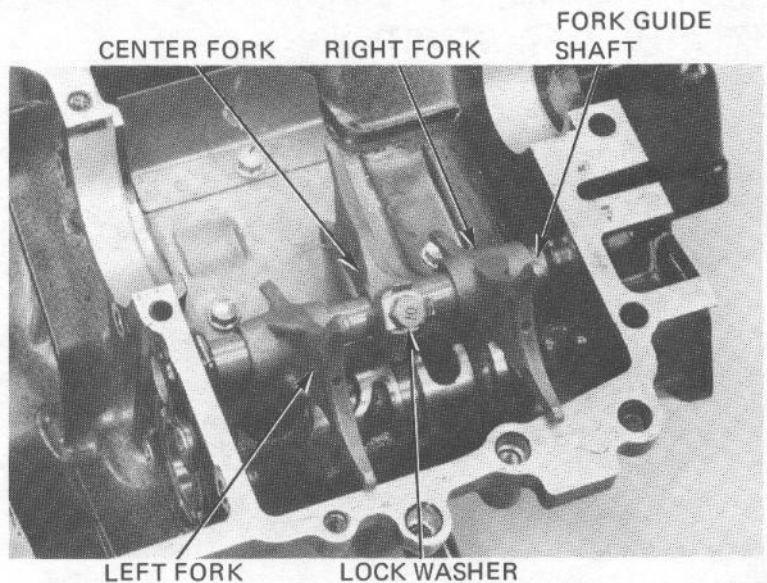
- 0.85 mm (0.033 in)
- 0.90 mm (0.035 in)
- 0.95 mm (0.037 in)
- 1.00 mm (0.039 in)
- 1.05 mm (0.041 in)



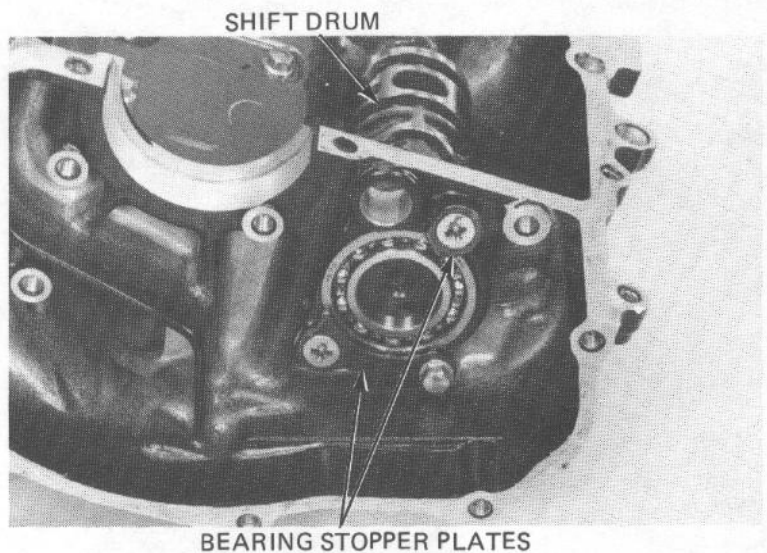
SHIFT FORK AND SHIFT DRUM

REMOVAL

Bend the lock washer tab down and remove the center fork mounting bolt.
Remove the shift fork shaft and shift forks.

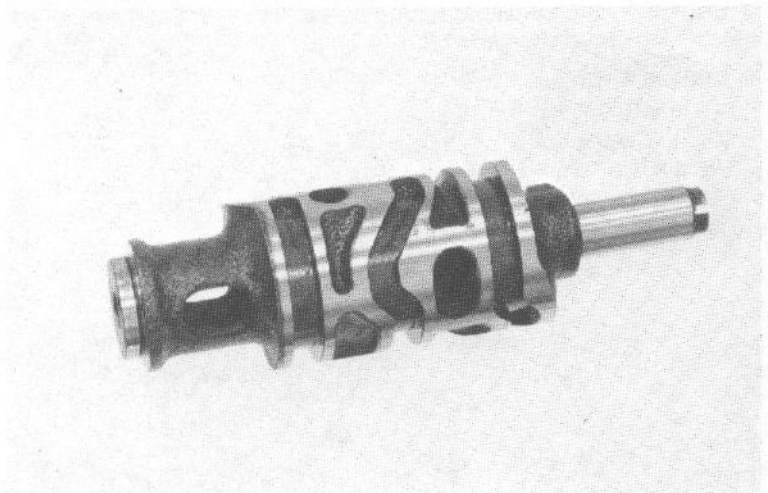


Remove the bearing stopper plates.
Remove the shift drum.

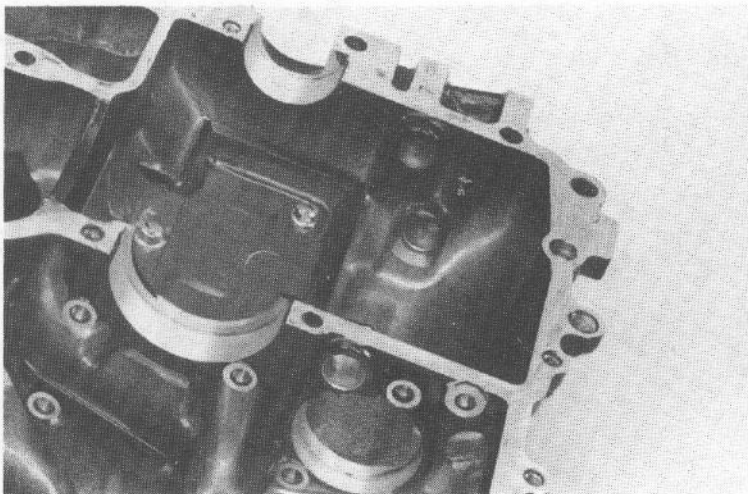


GEAR SHIFT DRUM AND SHIFT FORK INSPECTION

Inspect the shift drum end for scoring, scratches, or evidence of insufficient lubrication.
Check the shift drum grooves for damage.



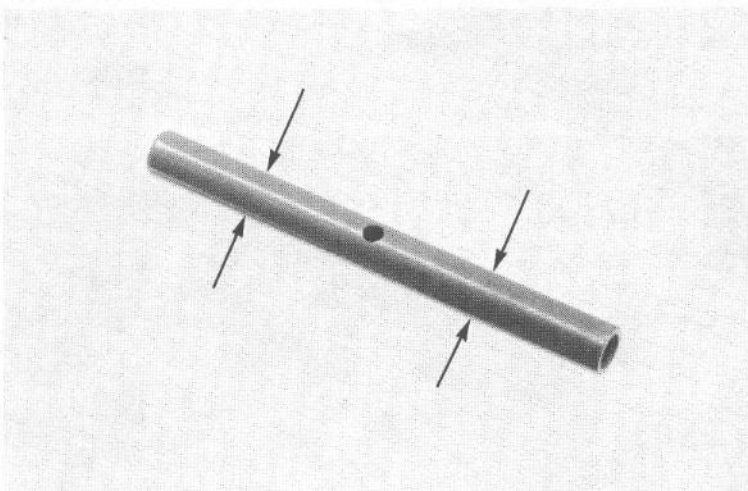
Inspect the shift drum hole and shift fork shaft hole for scoring or scratches.



Measure the shift fork shaft O.D. at right and left shift fork surfaces.

Check for scratches, scoring, or evidence of insufficient lubrication.

SERVICE LIMIT: 13.90 mm (0.547 in)



Measure the right and left shift fork I.D.

Measure the shift fork claw thickness.

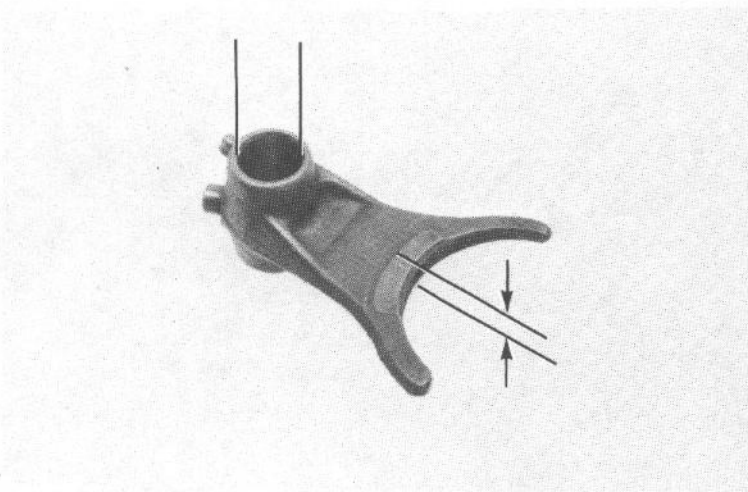
SERVICE LIMITS:

I.D. (right and left fork):

'83~'85: 14.05 mm (0.553 in)

After '85: 14.07 mm (0.554 in)

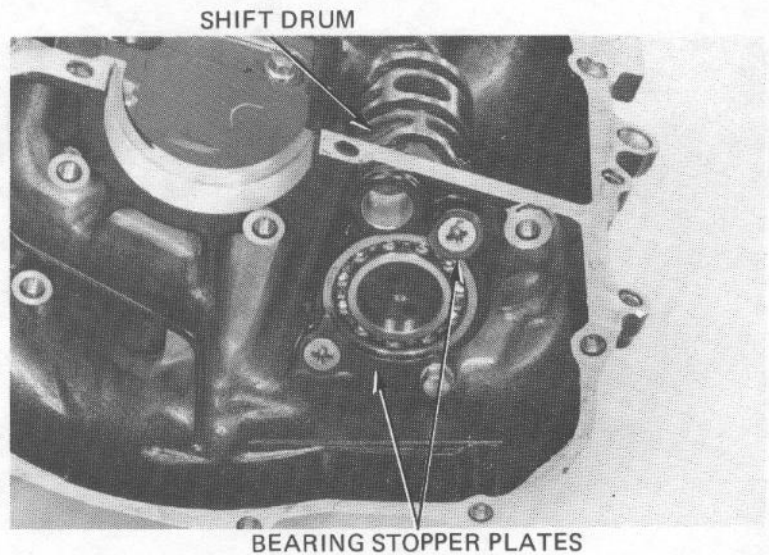
CLAW THICKNESS: 6.1 mm (0.24 in)



INSTALLATION

Install the shift drum .

Apply a locking agent to the screw threads and install the bearing stopper plates.



Install the shift forks and shaft.

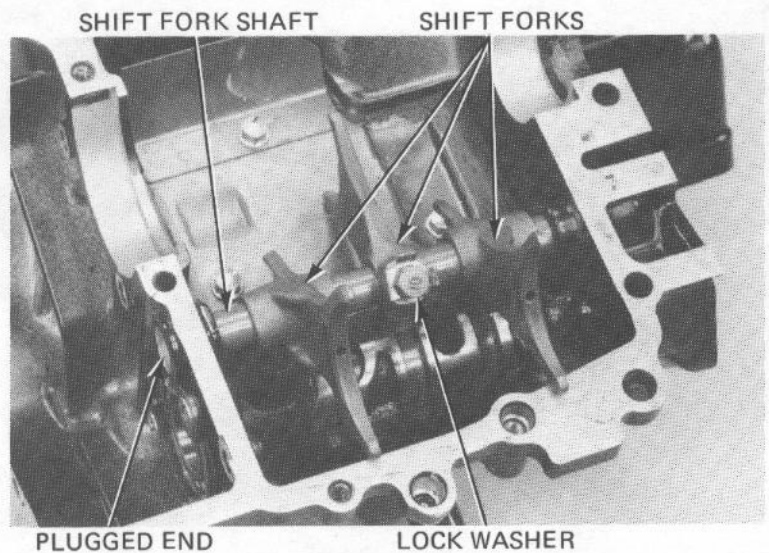
CAUTION:

Install the shift fork shaft so that the plugged end is toward the left side.

Install the lock washer and tighten the center fork bolt.

TORQUE: 16–20 N·m (1.6–2.0 kg·m, 12–14 ft·lb)

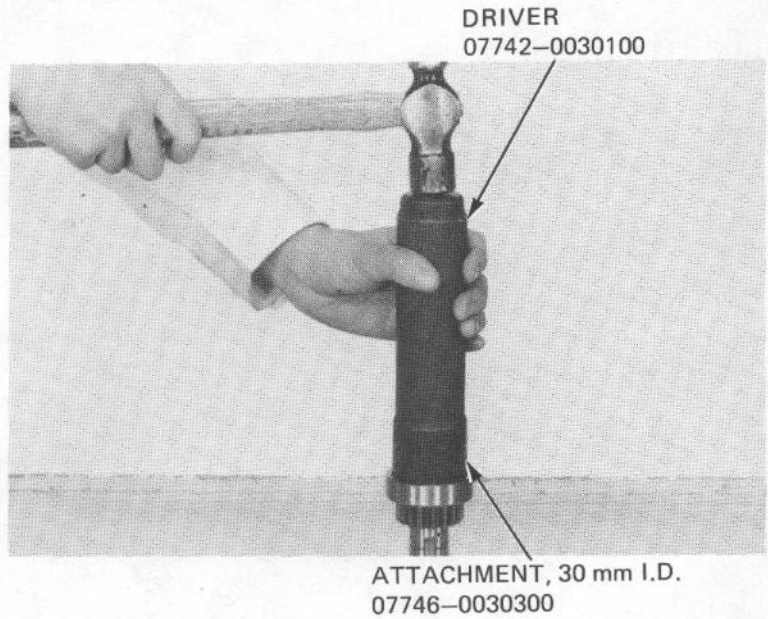
Bend the lock washer tabs up.



TRANSMISSION ASSEMBLY

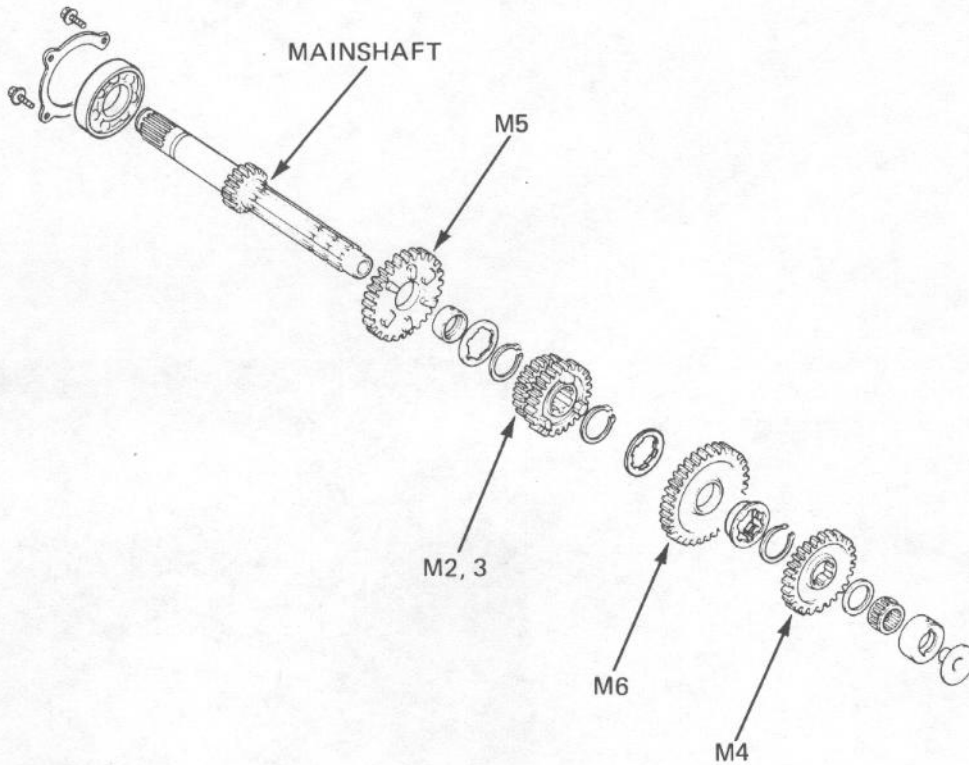
MAINSHAFT

Install the mainshaft bearing with the special tools as shown.



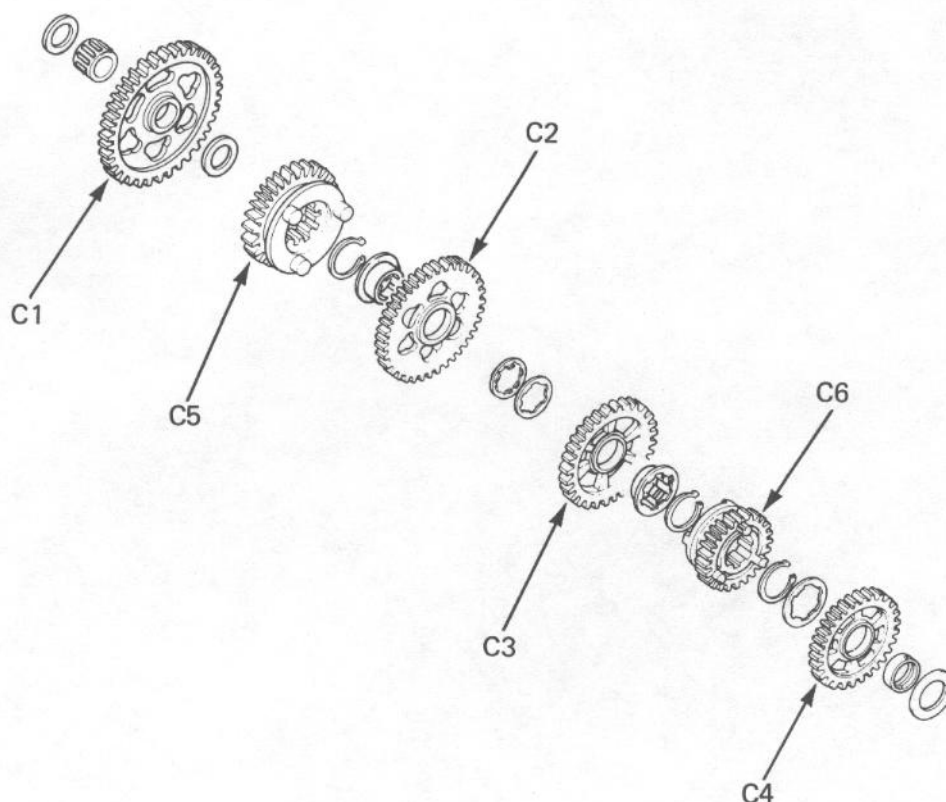
Check the gears for freedom of movement or rotation on the shaft.

Check that the snap rings are seated in the grooves.



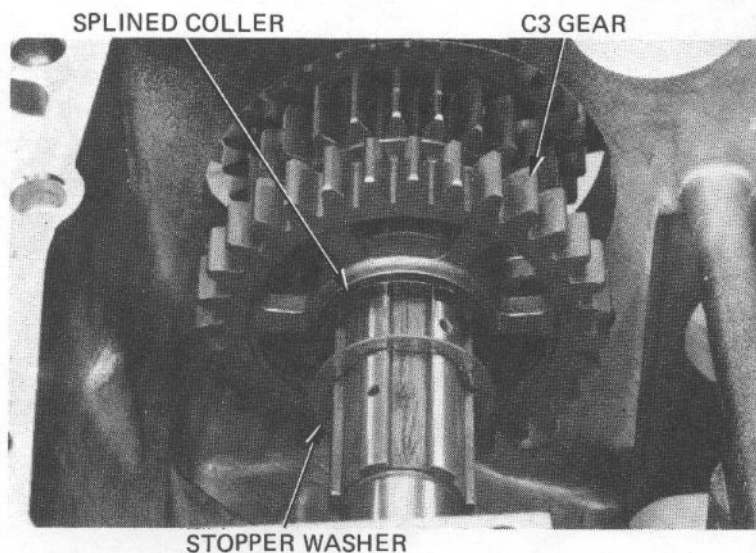
COUNTERSHAFT

Before placing the countershaft in the crankcase, install the C4 and C6 gears, washers, and collar.



Install the C3 gear and splined collar.
Install the stopper washer while aligning the tab of the stopper washer with groove in the splined collar.

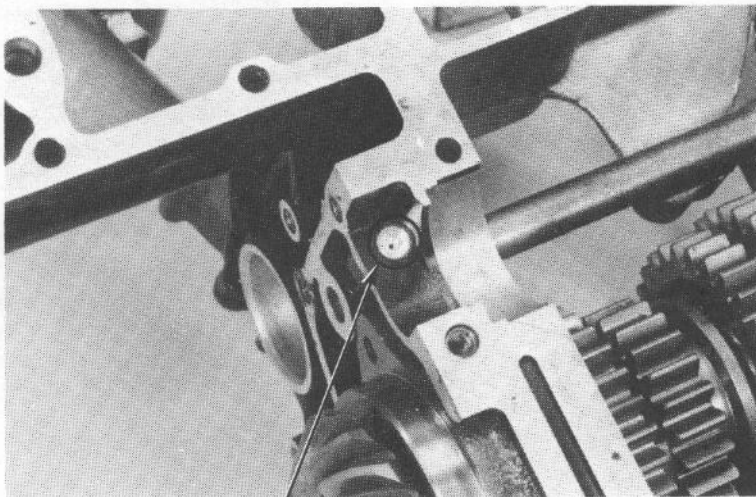
Assemble the C2, C5, and C1 gears, washers, and collars.



Install the lower crankcase (Refer to Section 11).

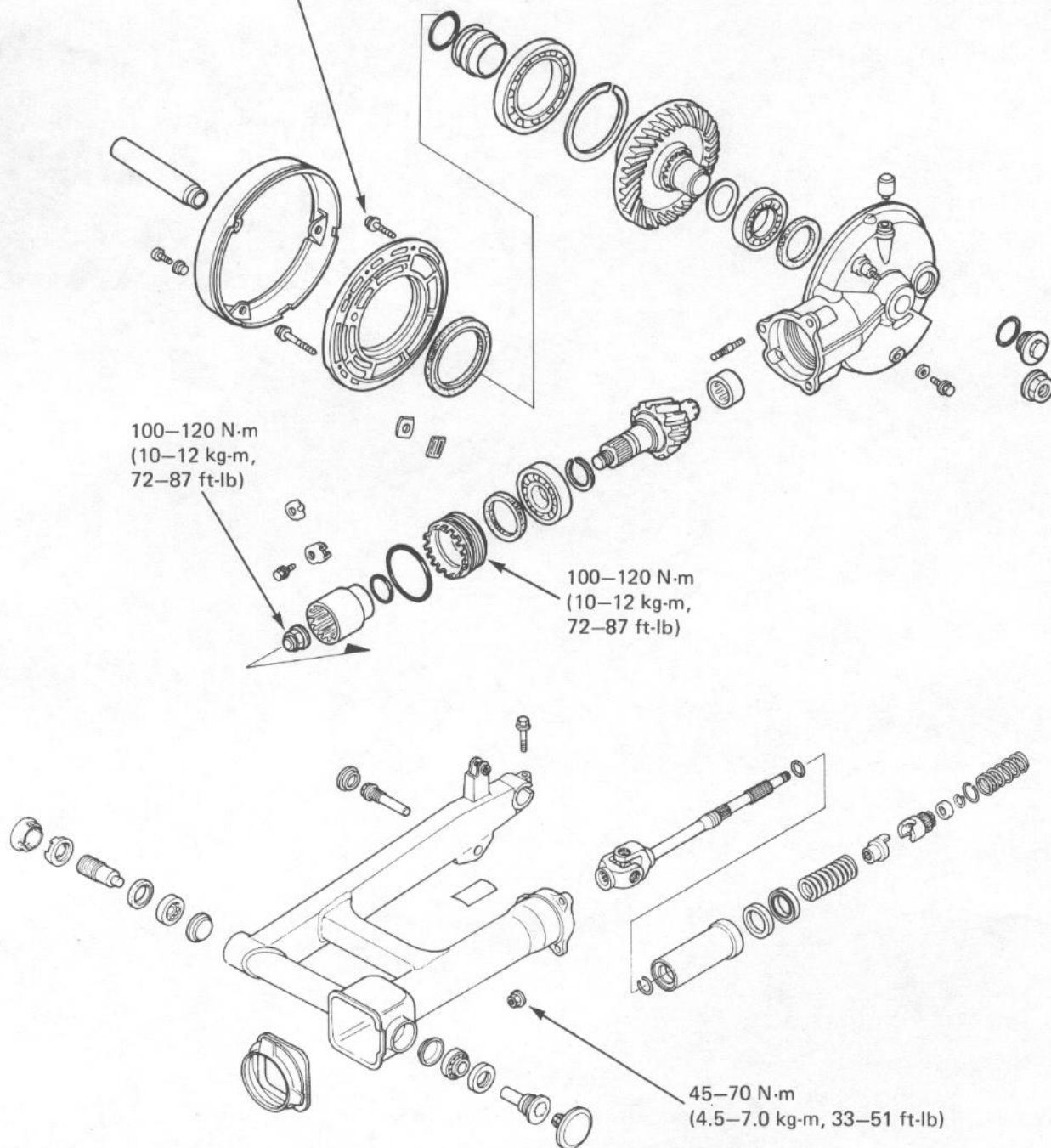
NOTE:

Check the oil orifice for clogging, before installing the lower crankcase.



OIL ORIFICE

8 mm: 23–28 N·m
(2.3–2.8 kg-m, 17–20 ft-lb)
10 mm: 35–45 N·m
(3.5–4.5 kg-m, 25–33 ft-lb)



14. DRIVE TRAIN

| | |
|--------------------------|-------|
| SERVICE INFORMATION | 14-1 |
| TROUBLESHOOTING | 14-2 |
| FINAL DRIVE REMOVAL | 14-3 |
| DRIVE SHAFT | 14-3 |
| FINAL DRIVE GEAR | 14-6 |
| FINAL DRIVE INSTALLATION | 14-18 |

SERVICE INFORMATION

GENERAL

- The final drive gear assembly must be removed together with the drive shaft.
- Replace all oil seals and O-rings whenever the final drive gear assembly is disassembled.
- Check tooth contact pattern and gear backlash when the bearing, gear set and/or gear case have been replaced.

SPECIFICATIONS

'83:

| | | STANDARD | SERVICE LIMIT |
|-------------------------------|-----------------|---|--------------------|
| Final gear oil | Capacity | 170 cc (5.7 ozs) after disassembly | — |
| | Recommended oil | Hypoid-gear oil API, GL-5 Above 5°C/41°F SAE #90 Below 5°C/41°F SAE #80 | — |
| Gear backlash | | 0.08–0.18 mm (0.003–0.007 in) | 0.30 mm (0.012 in) |
| Gear assembly preload | | 0.2–0.3 N·m (2–3 kg-cm, 1.7–2.6 ft-lb) | — |
| Damper case oil capacity | | 80 cc (2.7 oz) | — |
| Damper cam spring free length | | 65 mm (2.6 in) | 63 mm (2.5 in) |

After 83:

| | | STANDARD | SERVICE LIMIT |
|-------------------------------|-----------------|---------------------------------------|--------------------|
| Final gear oil | Capacity | 150 cc (5.1 oz) after disassembly | — |
| | Recommended oil | Hypoid gear oil: SAE #80 | — |
| Gear backlash | | 0.08–0.18 mm (0.003–0.007 in) | 0.30 mm (0.012 in) |
| Gear assembly preload | | 0.2–0.3 N·m (2–3 kg-m, 1.7–2.6 ft-lb) | — |
| Damper case oil capacity | | 80 cc (2.7 oz) | — |
| Damper cam spring free length | | 65 mm (2.6 in) | 63 mm (2.5 in) |

TORQUE VALUES

| | |
|-------------------------------|---|
| Pinion bearing retainer | 100–120 N·m (10–12 kg·m, 72–87 ft·lb) |
| Pinion nut | 100–120 N·m (10–12 kg·m, 72–87 ft·lb) |
| Gear case cover bolt 10 mm | 35–45 N·m (3.5–4.5 kg·m, 25–33 ft·lb) |
| 8 mm | 23–28 N·m (2.3–2.8 kg·m, 17–20 ft·lb) |
| Final gear case attaching nut | 45–70 N·m (4.5–7.0 kg·m, 33–51 ft·lb) |
| Rear axle nut | 85–105 N·m (8.5–10.5 kg·m, 61–76 ft·lb) |
| Axle pinch bolt | 20–30 N·m (2.0–3.0 kg·m, 14–22 ft·lb) |

DRIVE TRAIN

TOOLS

Special

| | |
|---------------------------------------|---|
| Drive shaft dis/assembly tool | 07964-MB40100 |
| Drive shaft dis/assembly tool C | 07964-MB00300 |
| Retainer wrench | 07910-4630100 |
| Final pinion holder | 07926-ME90000 |
| Shaft puller | 07931-ME40000 or Pinion puller set 07935-MB00000 or Pinion puller 07931-4630200 and Pinion puller attachment kit 07931-MB00000 |
| Bearing race insert attachment | 07931-4630300 |
| Bearing puller & driver attachment | 07934-MB00000 |
| Ball race & bearing driver attachment | 07945-3330300 |

Common

| | |
|---------------------------|---------------|
| Driver | 07749-0010000 |
| Attachment, 42 x 47 mm | 07746-0010300 |
| Attachment, 52 x 55 mm | 07746-0010400 |
| Attachment, 32 x 35 mm | 07746-0010100 |
| Attachment, 37 x 40 mm | 07746-0010200 |
| Pilot, 30 mm | 07746-0040700 |
| Driver C | 07742-0030100 |
| Attachment, 25 mm I.D. | 07746-0030200 |
| Shock absorber compressor | 07959-3290001 |

or Driver 07945-3710200

TROUBLESHOOTING

Excessive noise

1. Worn or scored ring gear shaft and driven flange
2. Scored driven flange and wheel hub
3. Worn or scored drive pinion and splines
4. Worn pinion and ring gears
5. Excessive backlash between pinion and ring gear
6. Oil level too low

Oil leak

1. Clogged breather
2. Oil level too high
3. Seals damaged

FINAL DRIVE REMOVAL

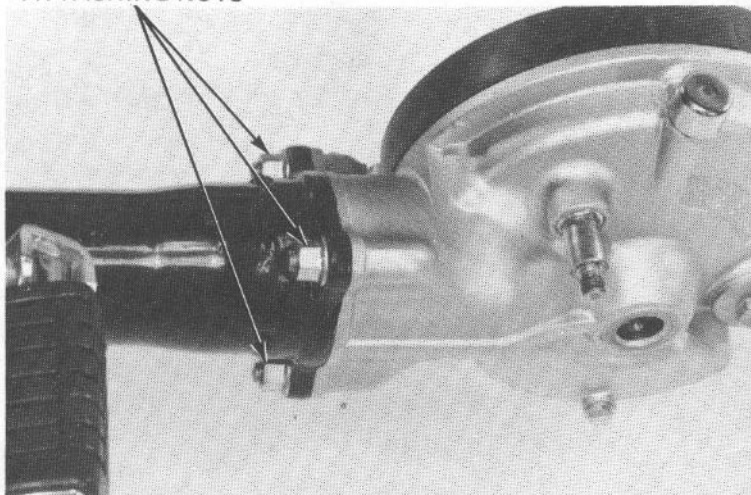
Place the motorcycle on its center stand. Drain the final gear oil (page 2-10) and remove the rear wheel (page 16-3).

Remove the left shock absorber (page 16-9).

Place an oil drain pan under the gear case and swing arm mating surfaces to catch any damper cam oil that may leak out during removal of the gear case.

Remove the final gear case attaching nuts and remove the gear case from the swing arm.

FINAL DRIVE CASE
ATTACHING NUTS



DRIVE SHAFT

REMOVAL

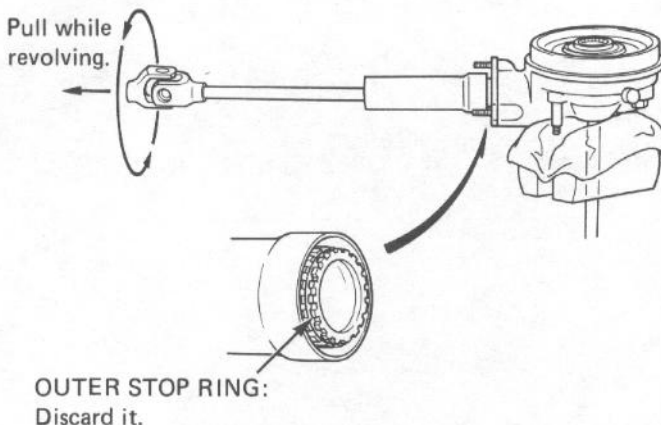
If the drivershaft came out of the swing arm attached to the final gear case, do the following:

Insert the axle through the gear case and secure the case in a vise with soft jaws or shop rags by clamping the axle. Place the shock mount between the jaws for stability.

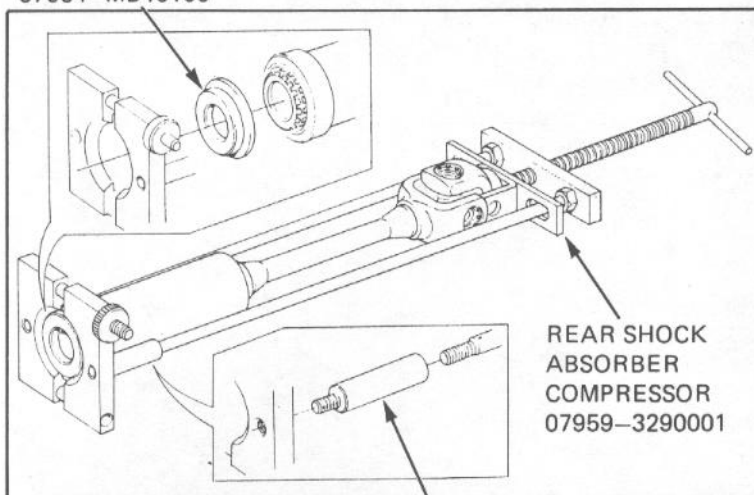
Place an oil drain pan under the damper case to catch the damper oil that will spill out.

Separate the damper unit from the gear case by gently revolving the damper in a circular motion while tugging slightly.

After removing the damper unit from the gear case, remove and discard the outer stop ring that lies in the groove on the splined end of the damper. This ring serves as an aid in mass production, and should not be installed when the final drive is reassembled.



DIS/ASSEMBLY TOOL (PLATE)
07964-MB40100



DIS/ASSEMBLY TOOL C (EXTENSION)
07964-MB00300

DISASSEMBLY

Drain the gear oil from the damper case.
Remove the large spring clip from the damper cam to avoid damaging it.
Compress the drive shaft with the rear shock absorber compressor and attachment tools.

DRIVE TRAIN

Remove the spring stop ring and drive shaft from the compressor.

Remove the spring stop, damper cam, and damper lifter from the drive shaft. Check the damper lifter and cam for wear or damage.

CAUTION:

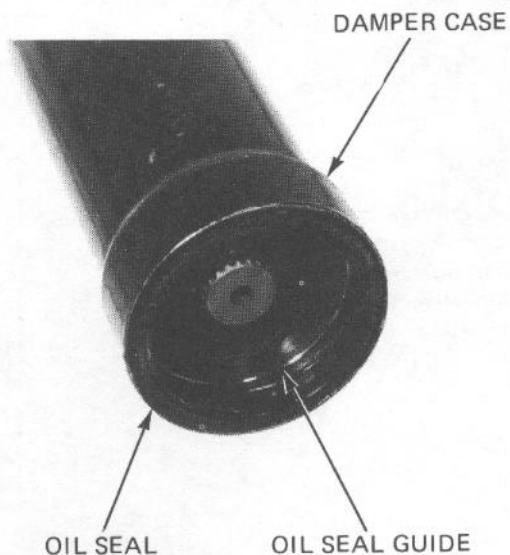
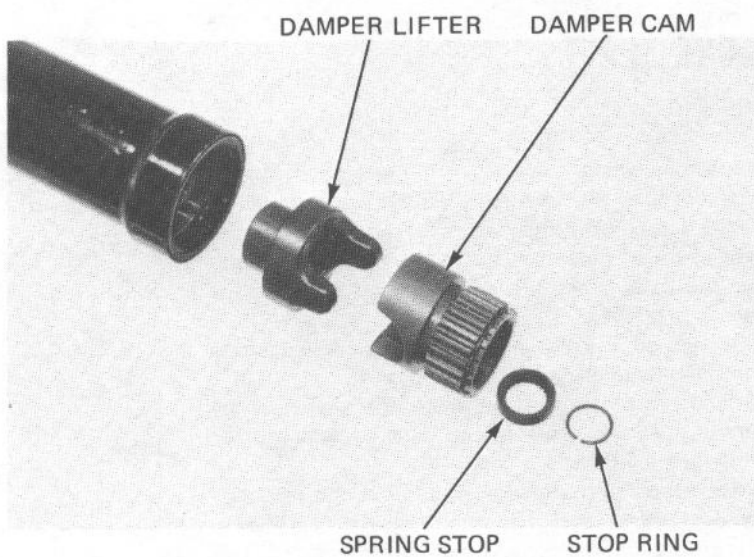
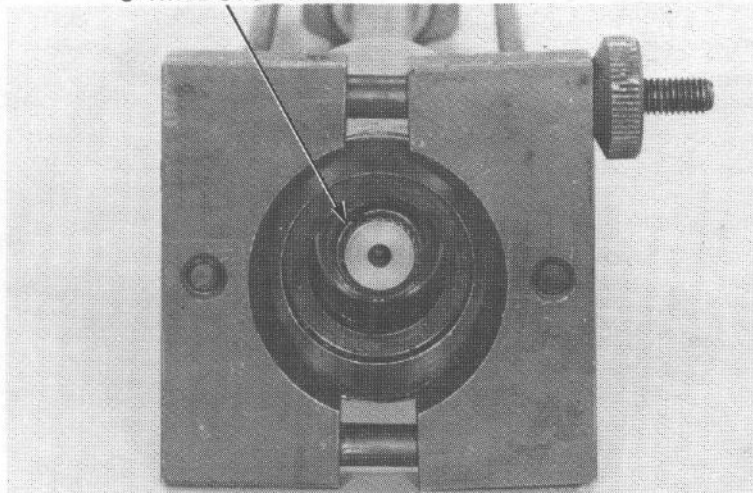
Discard the stop ring and install a new one upon reassembly.

Remove the oil seal and oil seal guide from the damper case.

NOTE:

Replace the oil seal with a new one if it is removed.

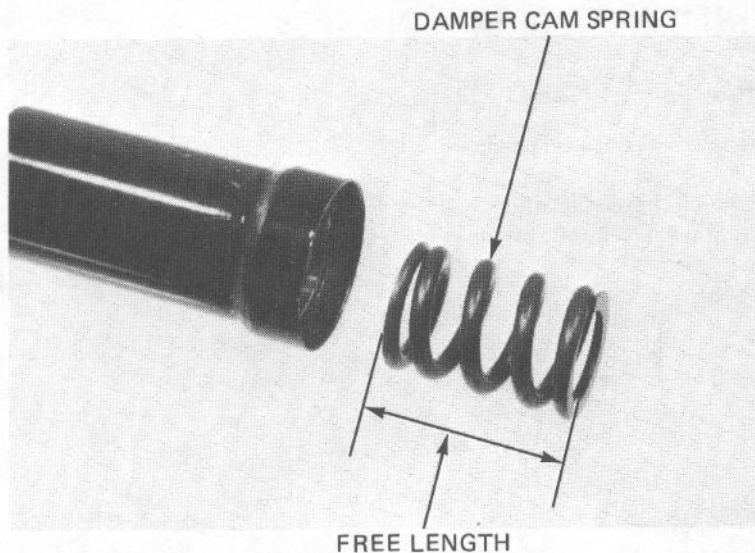
SPRING STOP RING



Remove the damper cam spring.

Measure the damper cam spring free length.

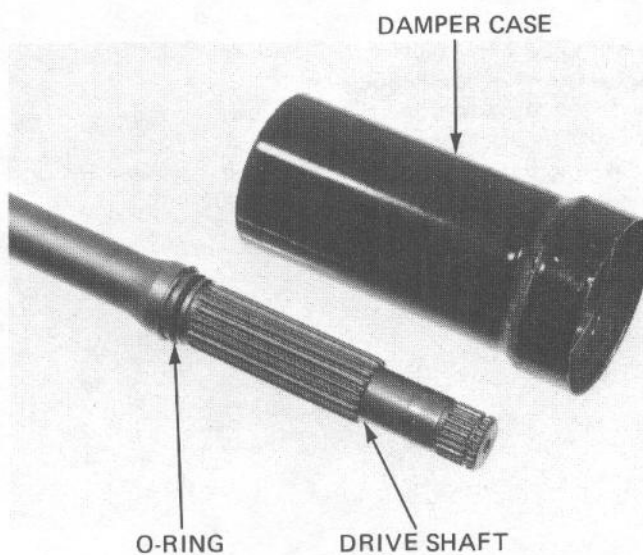
SERVICE LIMIT: 63 mm (2.5 in)



Remove the damper case and O-ring from the drive shaft.

Inspect the O-ring and replace it if necessary.

Replace the damper case on the drive shaft.



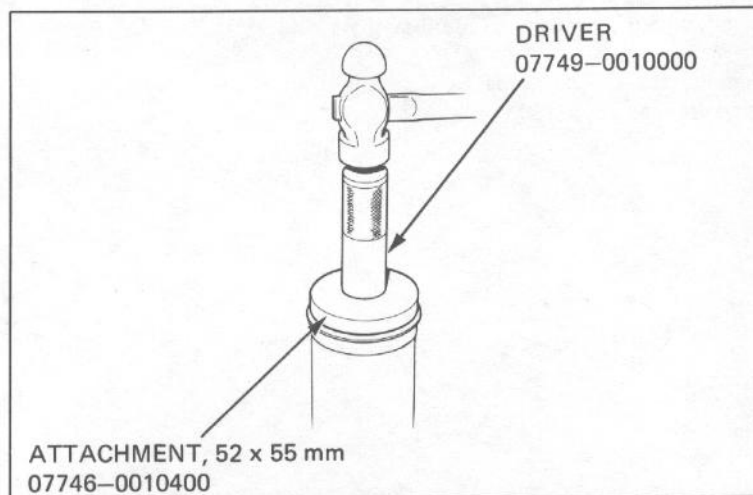
ASSEMBLY

Install the damper cam spring into the damper case. Drive the oil seal guide and oil seal in with the driver and attachment.

Assemble the remaining parts in the reverse order of disassembly.

NOTE:

Replace the O-ring, oil seal, and stop ring with new ones when reassembling the drive shaft.

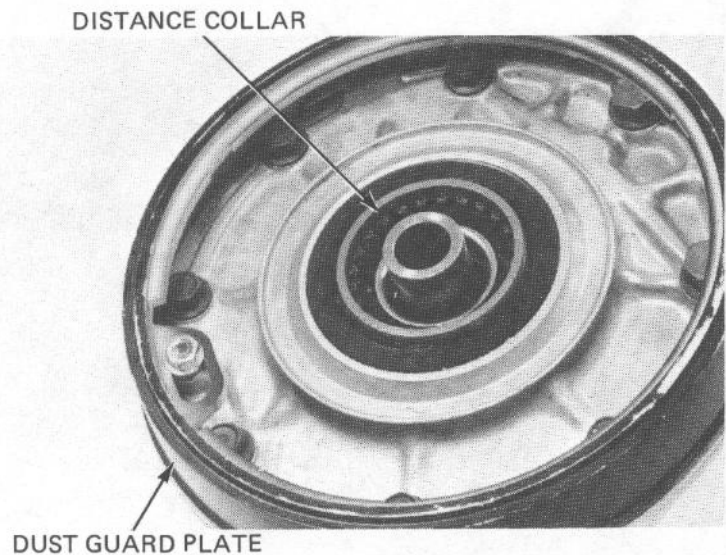


FINAL DRIVE GEAR

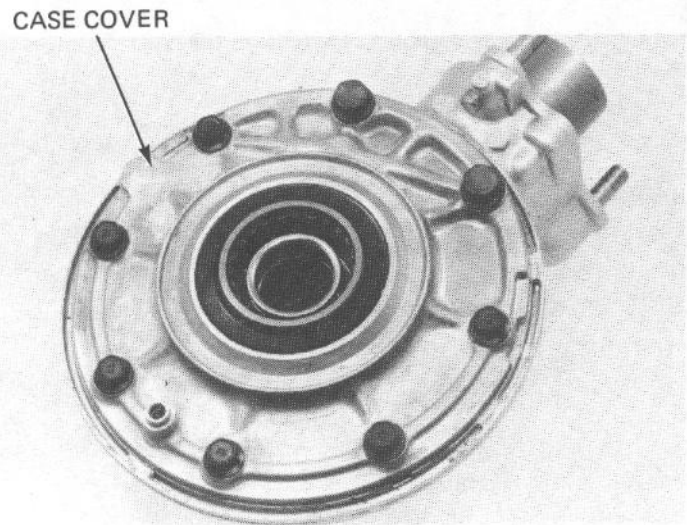
RING GEAR REMOVAL

Remove the distance collar.

Remove the dust guard plate bolts. Remove the dust guard plate by turning it clockwise.

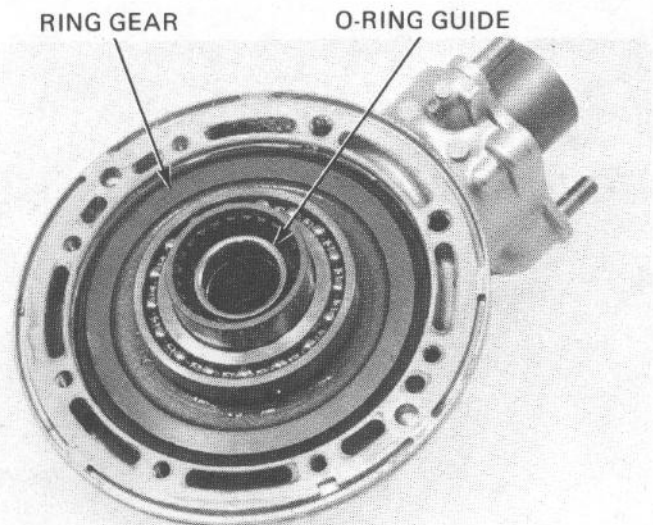


Remove the eight case cover bolts and cover. If the ring gear stays in the cover, do the following: Place the cover in a press with the ring gear down. Make sure the cover is well supported. Press the ring gear out of the cover with driver 07749-0010000 and attachment 07746-0010100.



Remove the ring gear from the final drive case.

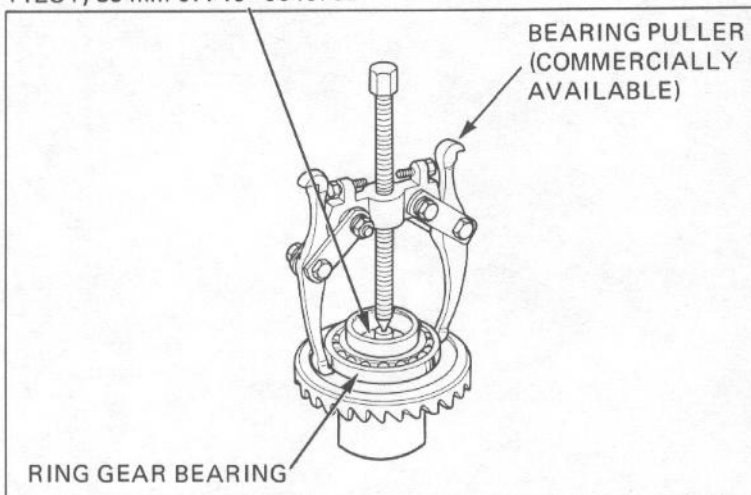
Remove the O-ring guide by tapping it from the opposite side.



RING GEAR BEARING REMOVAL

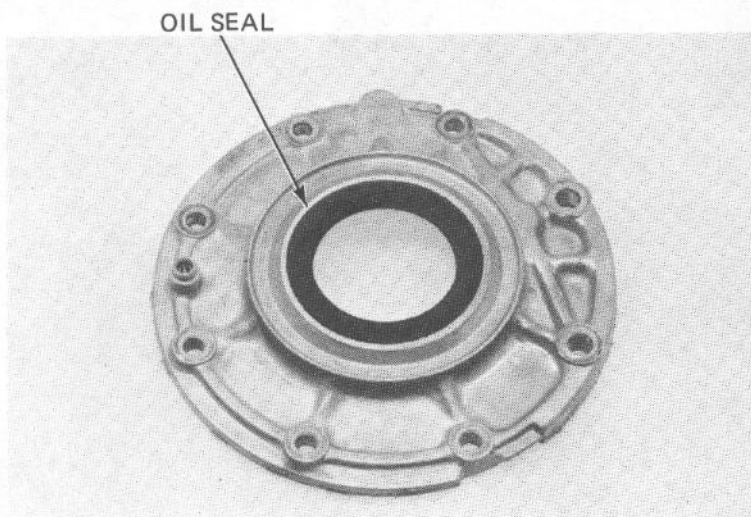
Remove the ring gear bearing and gear adjusting spacer.

ATTACHMENT, 32 x 35 mm 07746-0010100
PILOT, 30 mm 07746-0040700



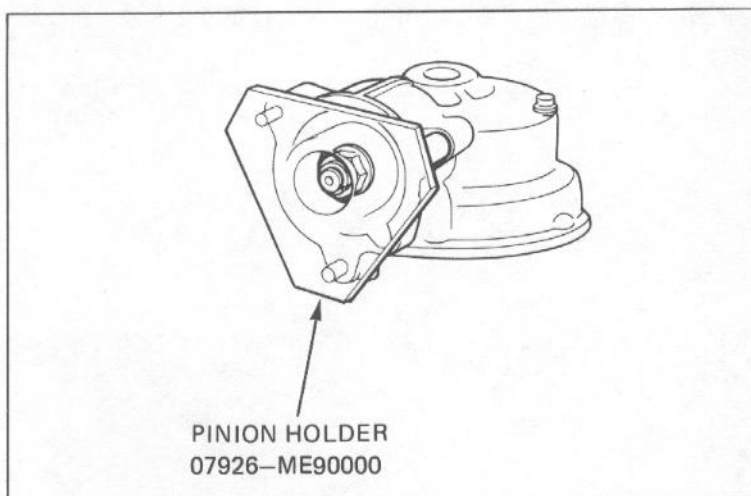
CASE COVER OIL SEAL REPLACEMENT

Remove the oil seal from the case cover and press in a new oil seal.

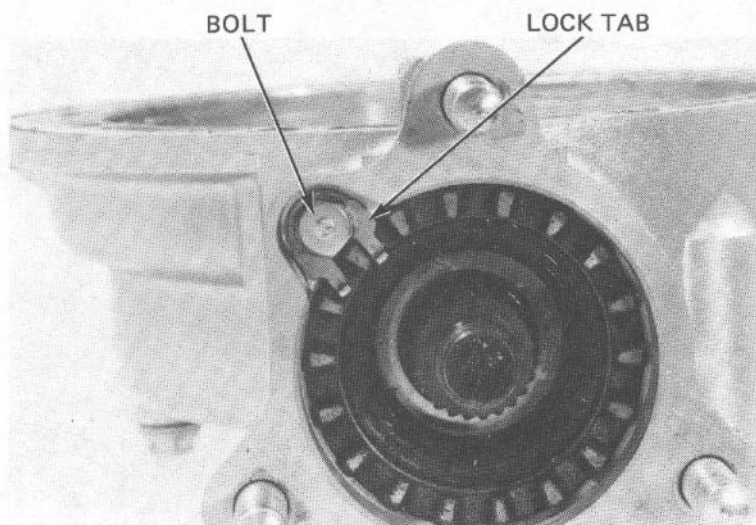


PINION GEAR REMOVAL

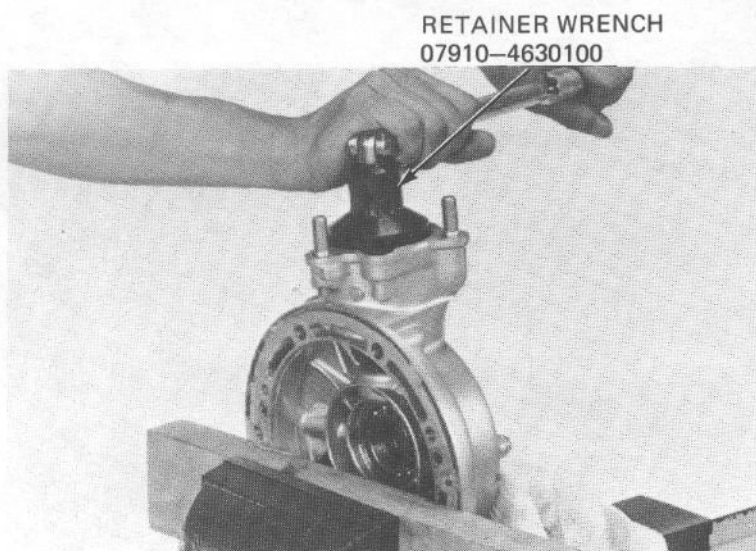
Install the pinion joint holder onto the pinion joint and remove the pinion shaft nut.
Remove the tool and pinion joint.



Remove the retainer lock tab.



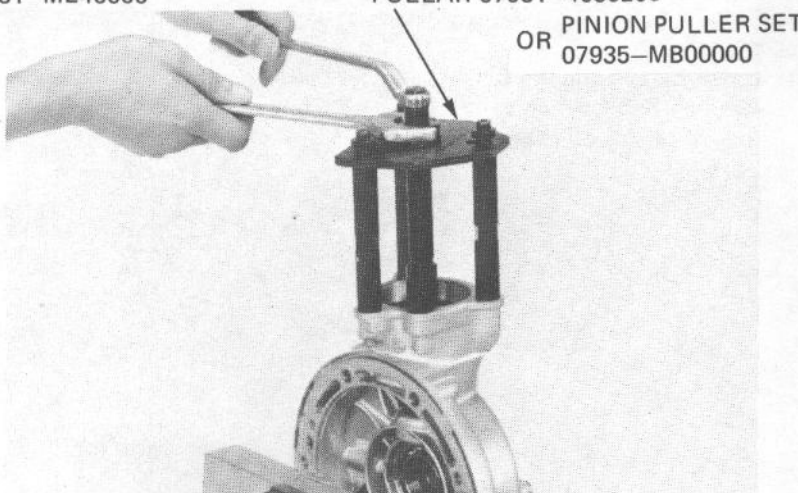
Remove the pinion retainer with the lock nut wrench.



RETAINER WRENCH
07910-4630100

Pull off the pinion assembly with the pinion puller.

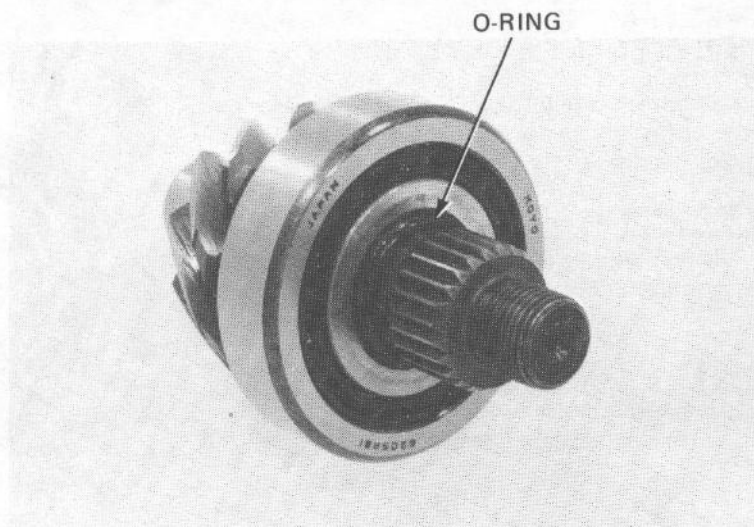
PINION HOLDER 07926-ME90000 WITH SHAFT PULLER 07931-ME40000
PINION PULLER ATTACHMENT KIT OR 07931-MB00000 WITH PINION PULLER 07931-4630200



PINION PULLER SET
OR 07935-MB00000

PINION BEARING REMOVAL

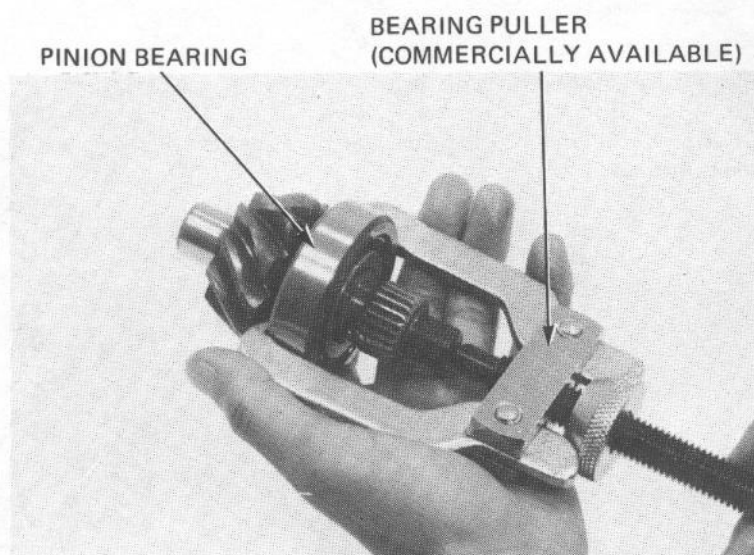
Remove the O-ring from the pinion shaft.



Pull the outer and inner bearing races off the shaft with the bearing puller.

Pull the remaining inner race off with the same tool.

Remove the pinion adjustment spacer.



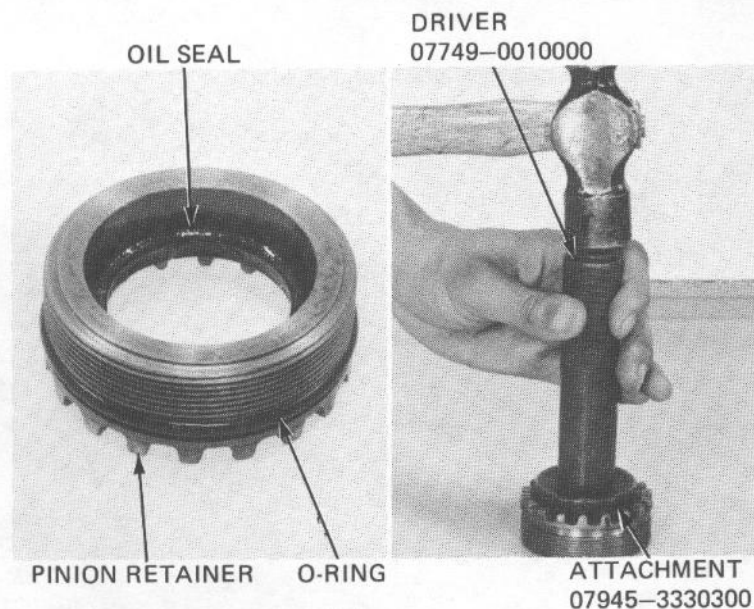
PINION RETAINER OIL SEAL REPLACEMENT

Remove the O-ring and oil seal from the pinion retainer.

Drive a new oil seal into the retainer.

Coat a new O-ring with oil and install it onto the retainer.

To install new oil seal, use driver 07945-3330300.



CASE BEARING AND OIL SEAL REPLACEMENT

Heat the gear case 80°C (176°F). Tap the gear case with a plastic hammer and remove the ring gear and pinion bearings.

WARNING

Always wear gloves when handling the gear case after it has been heated.

NOTE:

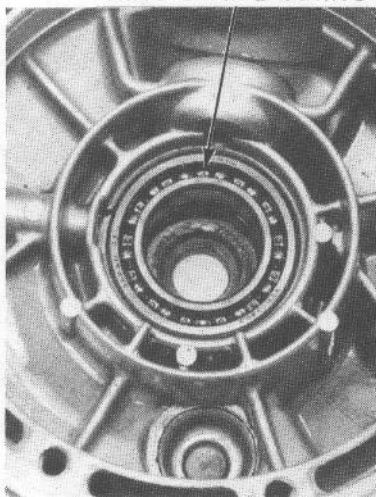
Use bearing remover, 35 mm, 07936-3710400 to remove ring gear case bearing.

Remove the ring gear shaft oil seal.

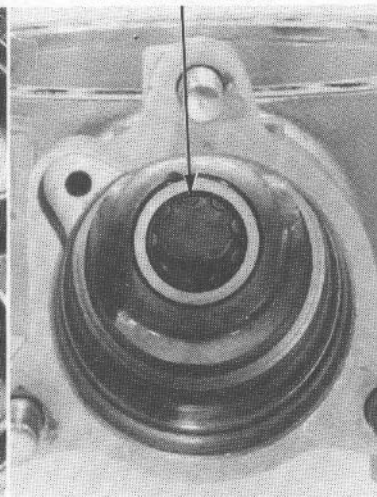
Drive a new oil seal into the case, using the special tools shown.

Drive new pinion and ring gear bearings into the case.

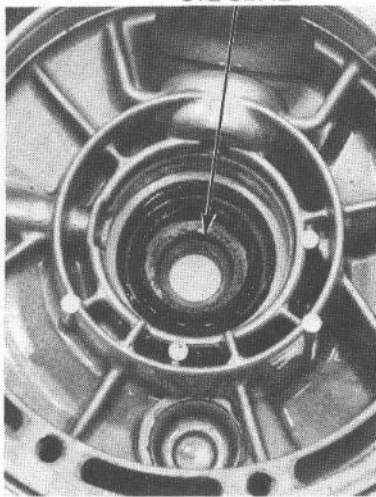
RING GEAR BEARING



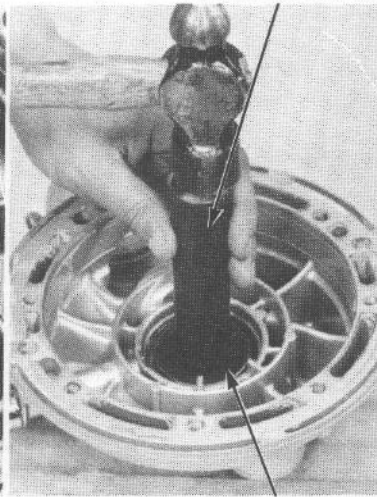
PINION BEARING



OIL SEAL

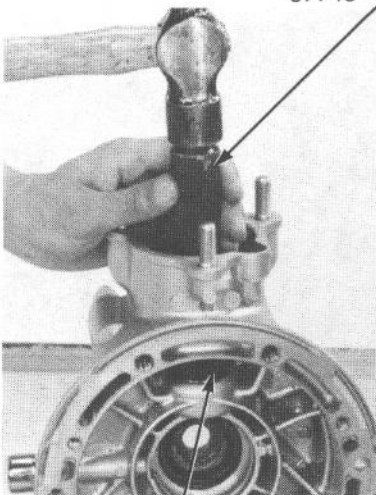


DRIVER
07749-0010000

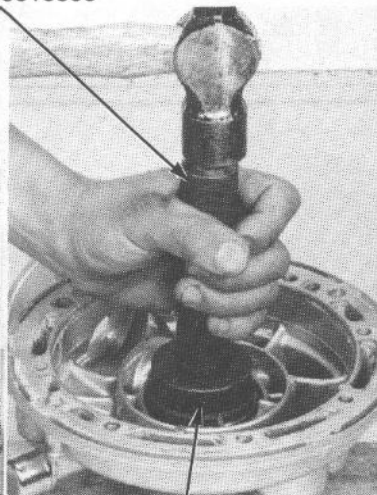


DRIVER
07749-0010000

ATTACHMENT
07945-3330300



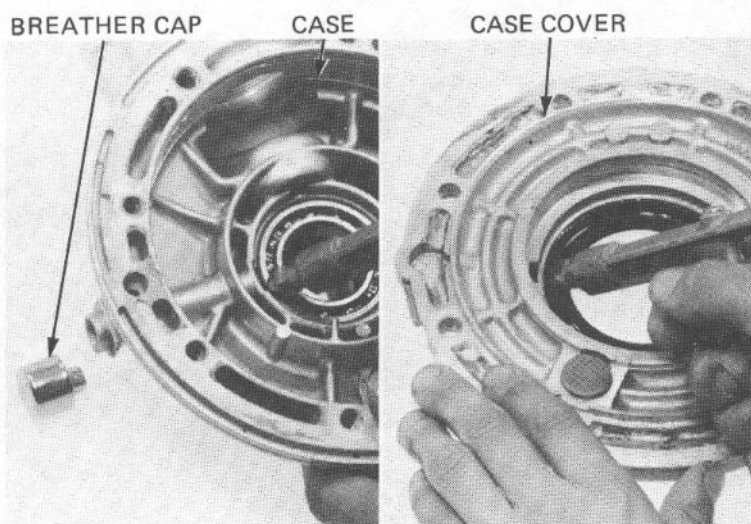
ATTACHMENT, 32 x 35 mm
07746-0010100



ATTACHMENT, 52 x 55 mm
07746-0010400

BREATHER HOLE CLEANING

Remove the breather hole cap and blow through the breather hole with compressed air.

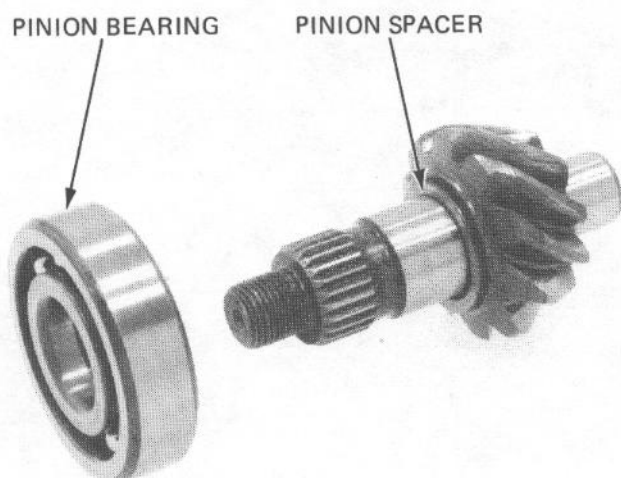


PINION GEAR ASSEMBLY

Install the original pinion gear spacer.

NOTE:

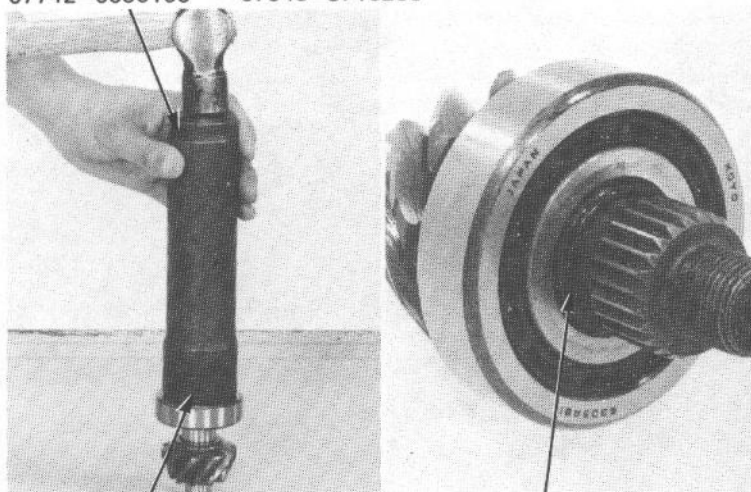
When the gear set, pinion bearing and/or gear case have been replaced, use a 2.0 mm thick spacer.



Press the bearing onto the pinion gear shaft with the special tools shown.

Install a new O-ring over the pinion shaft.

DRIVER 07742-0030100 OR DRIVER 07945-3710200



DRIVE TRAIN

Place the pinion assembly into the gear housing. Drive the pinion assembly into the gear case until pinion retainer threads can engage with the case threads.

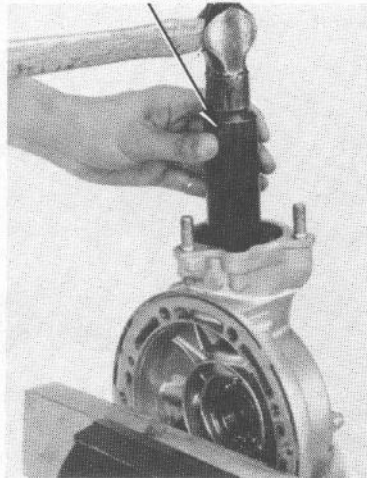
Apply gear oil to the O-ring and threads on the pinion retainer. Install the O-ring guide tool.

Screw in the pinion retainer to press the pinion bearing in place, then tighten it to the specified torque.

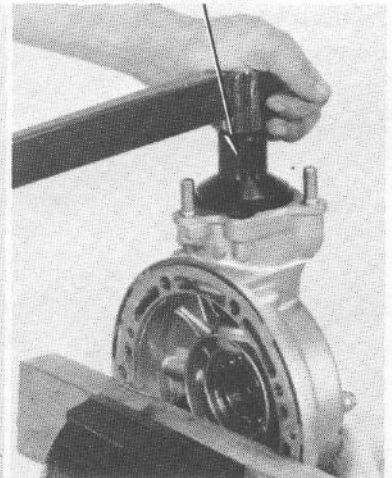
TORQUE:

100–120 N·m (10–12 kg·m, 72–87 ft·lb)

ATTACHMENT
07931–4630300



RETAINER WRENCH
07910–4630100



RING GEAR ASSEMBLY

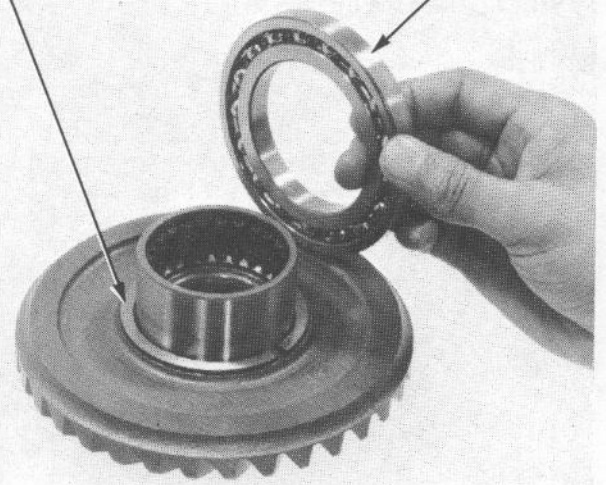
Install the original spacer onto the ring gear.

NOTE:

If the gear set, pinion bearing, ring gear bearing and/or gear case are replaced, install a 2.0 mm thick spacer.

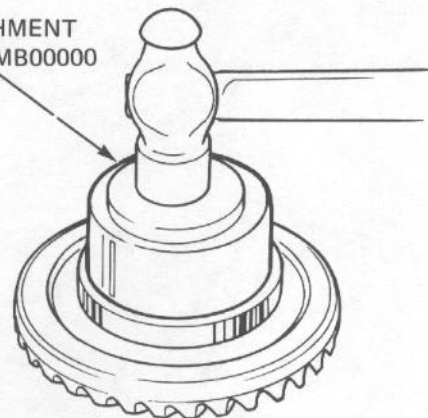
RING GEAR SPACER

RING GEAR BEARING

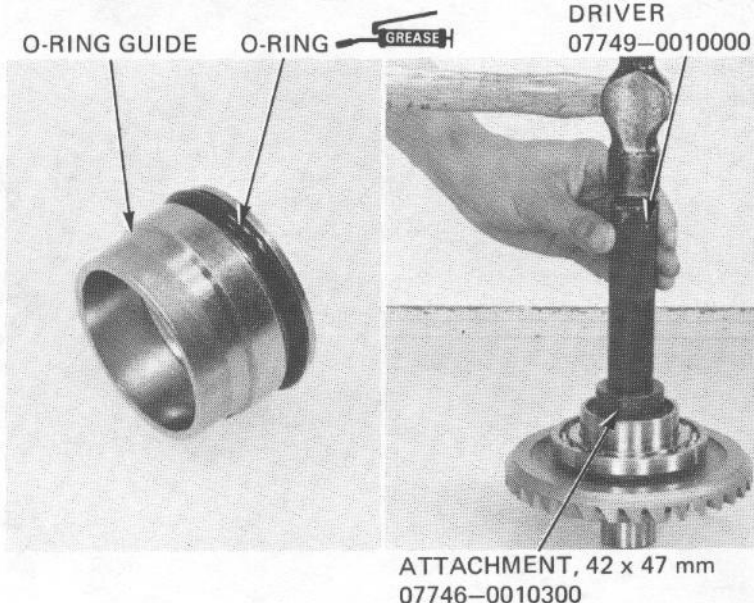


Place a new ring gear bearing on the ring gear shaft. Place the old bearing on top of it. Then, drive the new bearing onto the shaft with the old bearing and attachment. Then remove the old bearing.

ATTACHMENT
07934–MB00000

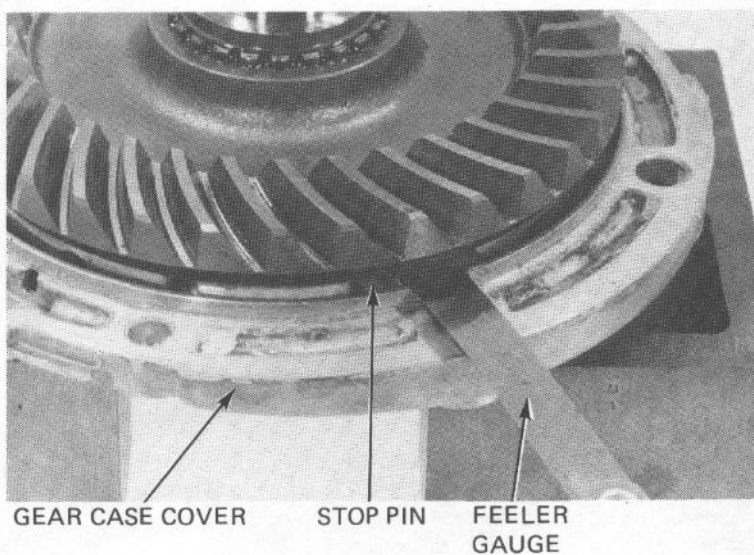


Install a new O-ring on the O-ring guide.
Apply grease to the O-ring and drive the O-ring guide onto the ring gear shaft.



Install the ring gear into the gear case cover.
Measure the clearance between the ring gear and the ring gear stop pin with a feeler gauge.

CLEARANCE: 0.30–0.60 mm (0.012–0.024 in)



If the clearance exceeds the service limit, remove the ring gear. Heat the gear case cover to approximately 80°C (176°F) and remove the stop pin by tapping the cover.

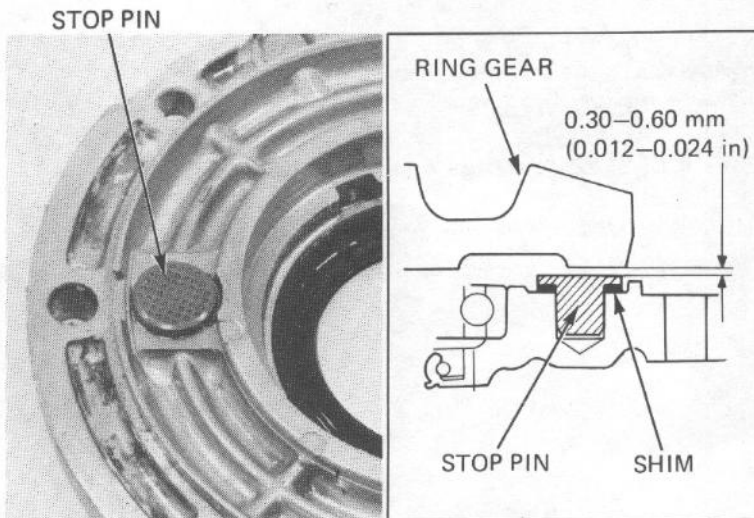
WARNING

Always wear gloves when handling the gear case after it has been heated.

Install a stop pin shim to obtain the correct clearance.

SHIM THICKNESS: A 0.10 mm (0.004 in)
B 0.15 mm (0.006 in)

Install the shim and drive the stop pin into the case cover.

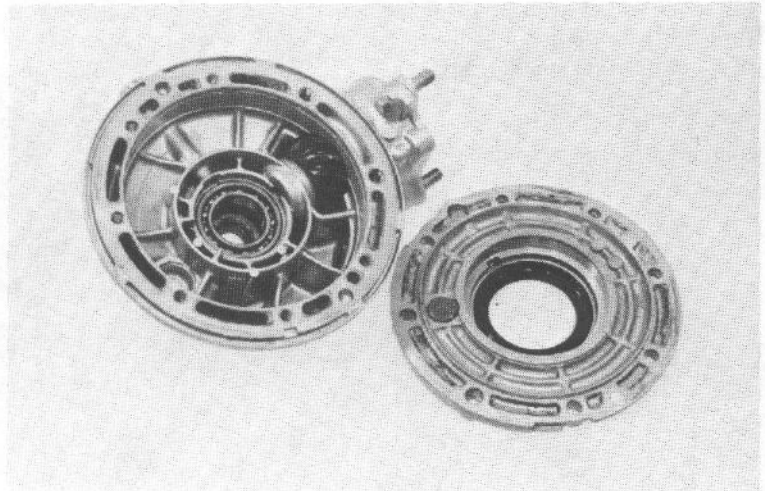


Clean all sealing material off the mating surface of the gear case and cover.

NOTE:

- Keep dust and dirt out of the gear case.
- Be careful not to damage the mating surfaces.

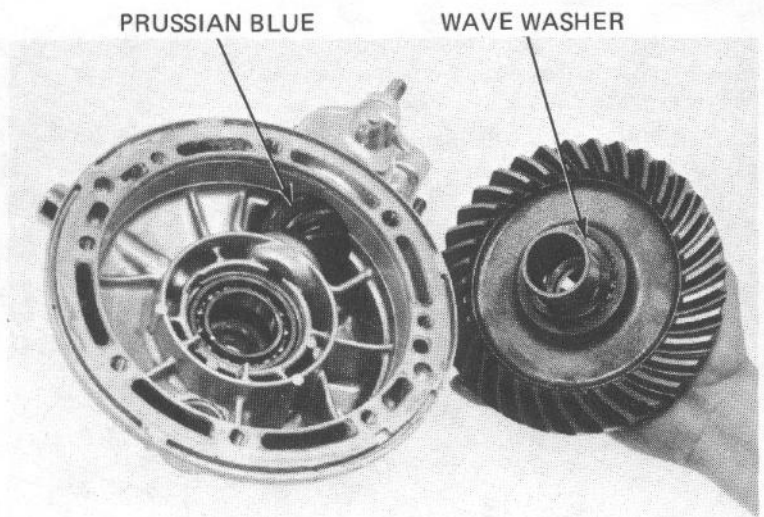
Apply liquid sealant to the mating surface of the gear case cover.



GEAR TOOTH CONTACT PATTERN CHECK

Apply a thin coat of Prussian Blue to the pinion gear teeth for a gear tooth contact pattern check. Place the wave washer and ring gear into the gear case.

Apply gear oil to the lip of the oil seal on the gear case cover and install the gear case cover.

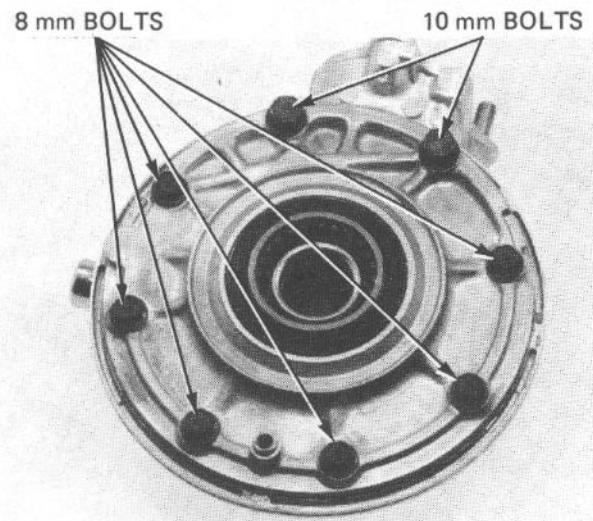


Tighten the cover bolts in 2–3 steps until the cover evenly touches the gear case, then tighten the 8 mm bolts to the specified torque in a crisscross pattern in two or more steps.

TORQUE: 23–28 N·m (2.3–2.8 kg·m, 17–20 ft·lb)

Then tighten the 10 mm bolts.

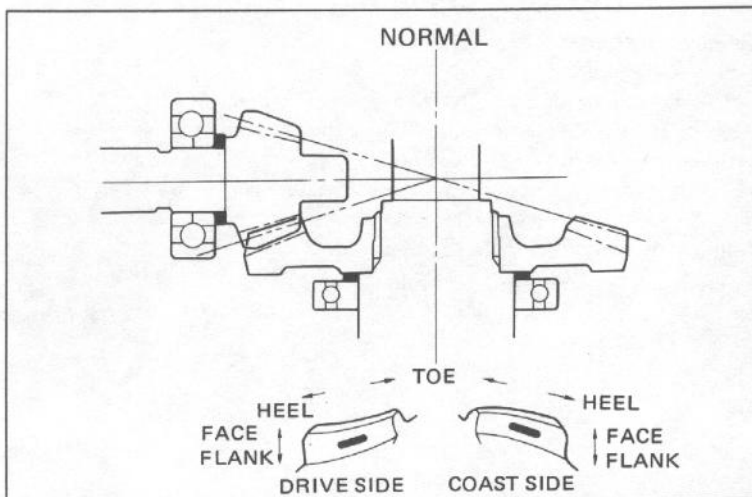
TORQUE: 40–50 N·m (4.5–5.0 kg·m, 33–36 ft·lb)



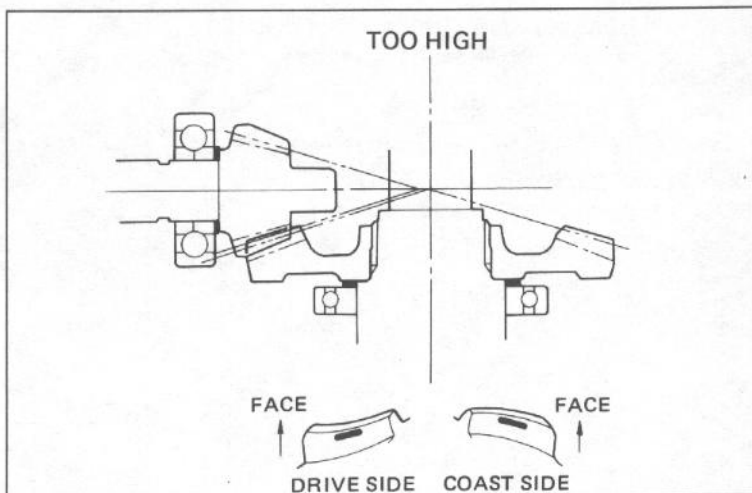
Remove the oil filler cap from the final gear case.

Rotate the ring gear several times in the normal direction of rotation. Check the gear tooth contact pattern through the oil filler hole. The pattern is indicated by the Prussian Blue applied to the pinion before assembly.

Contact is normal if the Prussian Blue is transferred to the approximate center of each tooth and slightly to the flank side.



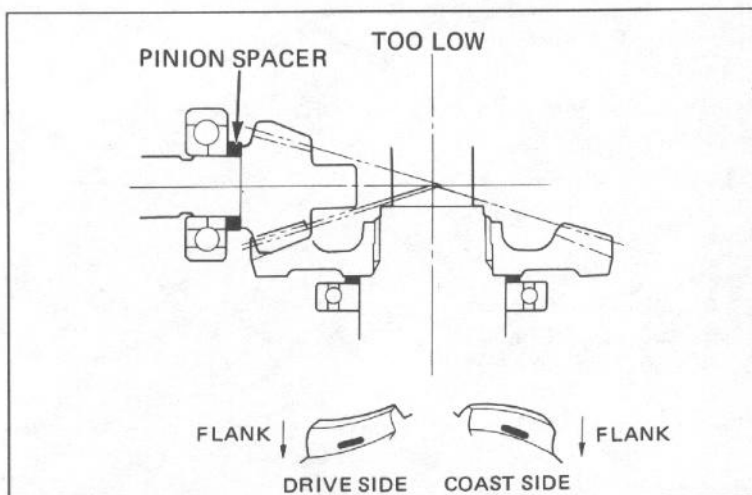
If the patterns are not correct, remove and replace the pinion spacer. Replace the pinion spacer with a thicker one if the contacts are too high, toward the face.



Replace the pinion spacer with a thinner one if the contacts are too low, to the flank side. The patterns will shift about 1.5–2.0 mm (0.06–0.08 in) when the thickness of the spacer is changed by 0.10 mm (0.004 in).

PINION SPACER:

- A 1.82 mm (0.072 in)
- B 1.88 mm (0.074 in)
- C 1.94 mm (0.076 in)
- D 2.00 mm (0.079 in) Standard
- E 2.06 mm (0.081 in)
- F 2.12 mm (0.084 in)
- G 2.18 mm (0.086 in)



DRIVE TRAIN

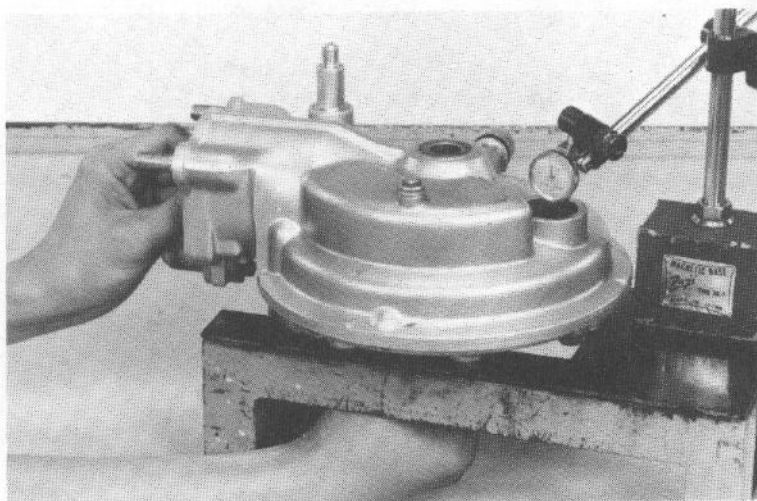
BACKLASH INSPECTION

Remove the oil filler cap.

Set the final gear assembly into a jig or stand to hold it steady. Set a horizontal type dial indicator on the ring gear, through the oil filler hole.

Hold the pinion gear spline by hand. Rotate the ring gear by hand until gear slack is taken up. Turn the ring gear back and forth to read backlash.

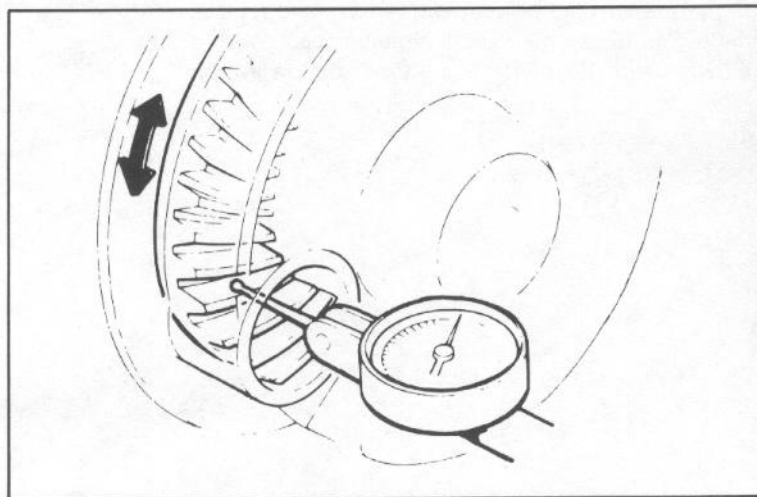
SERVICE LIMIT: 0.30 mm (0.02 in)



Remove the dial indicator. Turn the ring gear 120° and measure backlash. Repeat this procedure once more.

Compare the difference of the three measurements.

**DIFFERENCE OF MEASUREMENT
SERVICE LIMIT: 0.10 mm (0.004 in)**



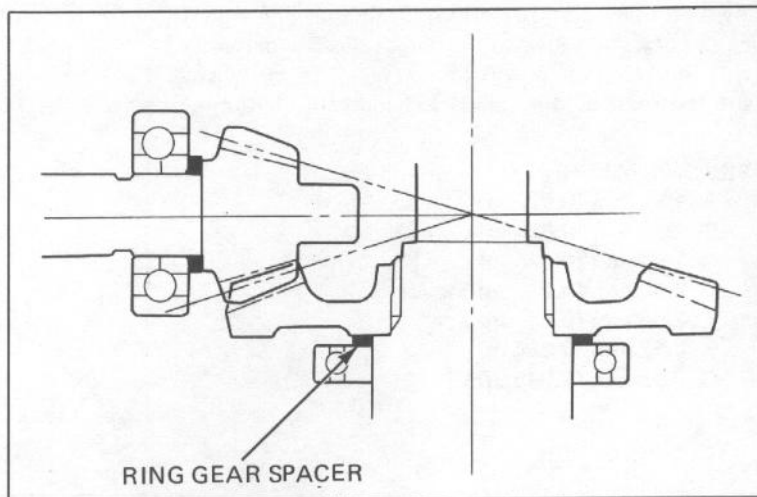
If the difference in measurements exceeds the limit, it indicates that the bearing is not installed squarely. Inspect the bearings and reinstall if necessary.

If backlash is too small, replace the ring gear spacer with a thinner one.

Backlash is changed by about 0.06–0.07 mm (0.002–0.003 in) when thickness of the spacer is changed by 0.10 mm (0.004 in).

RING GEAR SPACER:

- A 1.82 mm (0.072 in)
- B 1.88 mm (0.074 in)
- C 1.94 mm (0.076 in)
- D 2.00 mm (0.079 in) Standard
- E 2.06 mm (0.081 in)
- F 2.12 mm (0.084 in)
- G 2.18 mm (0.086 in)
- H 2.24 mm (0.088 in)
- I 2.30 mm (0.091 in)

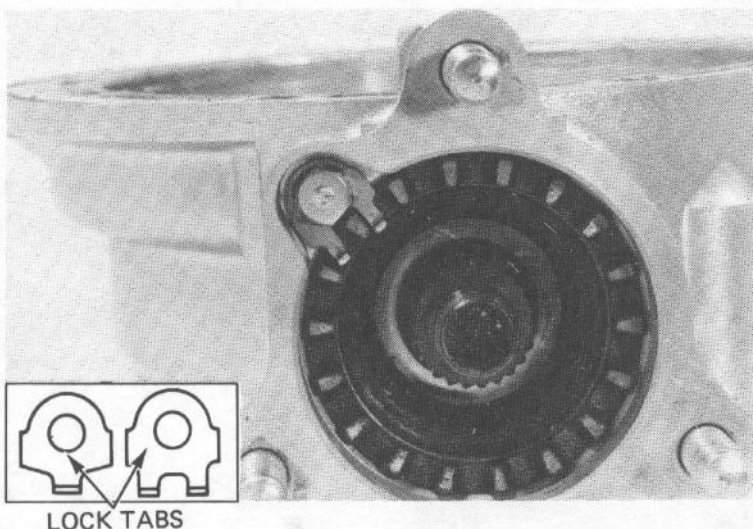


PINION JOINT INSTALLATION

Install the appropriate pinion retainer lock tab.

NOTE:

There are two types of lock tabs as shown.

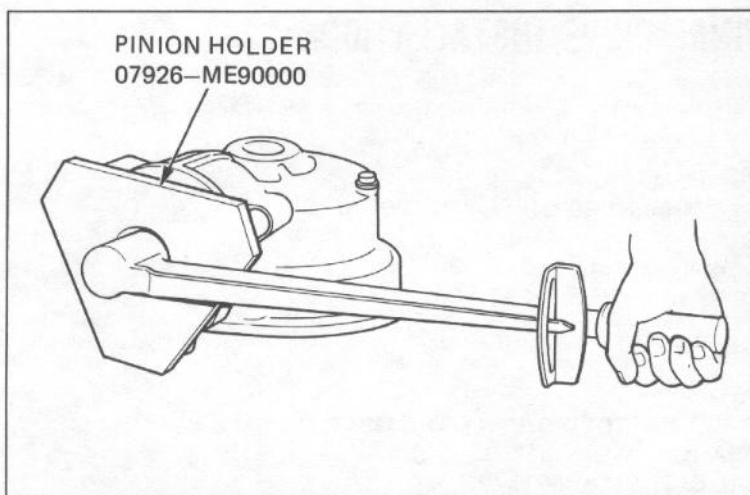


Apply gear oil to the oil seal lip contact surface of the pinion joint and install the pinion joint.

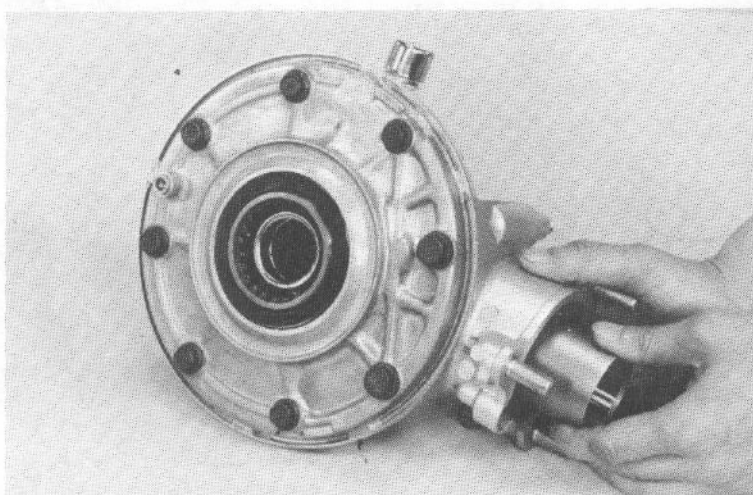
Install the pinion joint holder tool and tighten the pinion nut.

**TORQUE: 100–120 N·m (10–12 kg-m,
72–87 ft-lb)**

Remove the pinion joint holder tool.

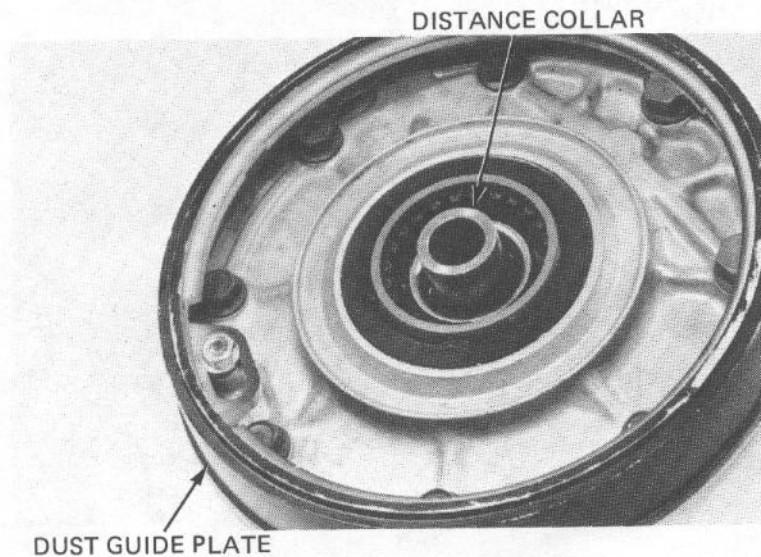


Make sure that the gear assembly rotates smoothly without binding by turning the pinion joint.



DRIVE TRAIN

Install the dust guard plate and torque the bolt.
Install the distance collar.



FINAL DRIVE INSTALLATION

Fill the damper case with the recommended type and amount of lubricant.

'83:

RECOMMENDED OIL: HYPOID GEAR OIL API, GL-5

Above 5°C/41°F: SAE #90

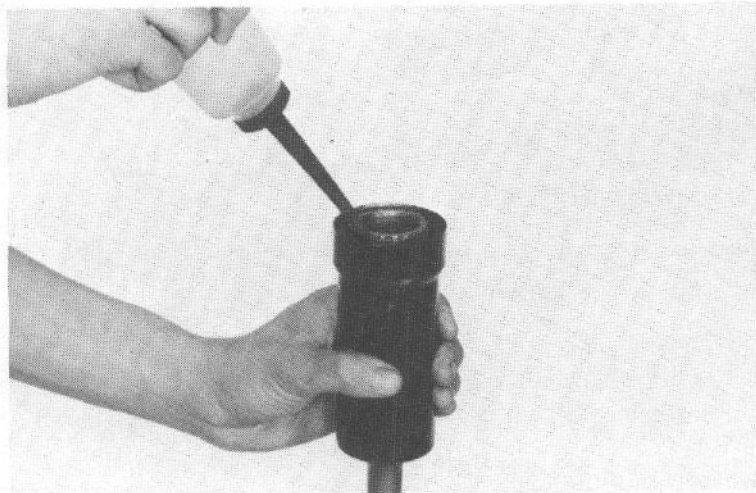
Below 5°C/41°F: SAE #80

OIL CAPACITY: 80 cc (2.7 oz)

After '83:

RECOMMENDED OIL: HYPOID GEAR OIL SAE #80

OIL CAPACITY: 80 cc (2.7 oz)



Keeping the damper case vertical, place the damper spring onto the damper cam and install the final drive gear case over the damper cam.

NOTE:

- Be careful not to damage the damper case oil seal during assembly.
- Do not let the gear case separate from the damper case or the oil will spill out.



Make sure the universal joint is in line with the driveshaft. Then insert the driveshaft into the swing arm aligning its splines with the outer shaft splines. Keep the gear case and damper case together or damper oil will leak out.

Secure the gear case to the swing arm with the three attaching nuts. To ease axle installation, do not tighten the gear case nuts until after the axle is installed.

Install the rear wheel (page 16-8).

Tighten the axle nut.

TORQUE:

85–105 N·m (8.5–10.5 kg-m, 61–76 ft-lb)

Tighten the three final gear case attaching nuts.

TORQUE: 45–70 N·m (4.5–7.0 kg-m, 33–51 ft-lb)

Tighten the axle pinch bolt.

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

Install the shock absorber (page 16-13).

Make sure that the drain bolt is tightened.

Remove the oil filler cap and pour in the specified amount of recommended oil.

'83:

RECOMMENDED OIL: Hypoid Gear Oil API, GL-5

Above 5°C (41°F): SAE #90

Below 5°C (41°F): SAE #80

OIL CAPACITY:

170 cc (5.7 oz) Dry

130 cc (4.4 oz) Refill after draining

After '83:

RECOMMENDED OIL: Hypoid Gear oil

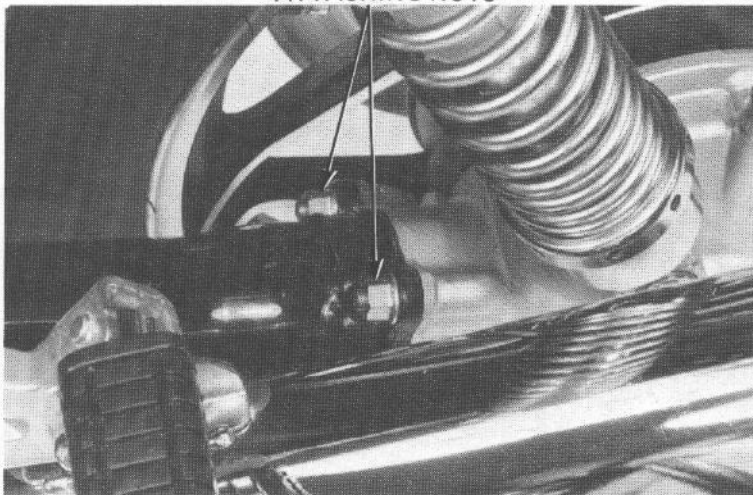
SAE #80

OIL CAPACITY:

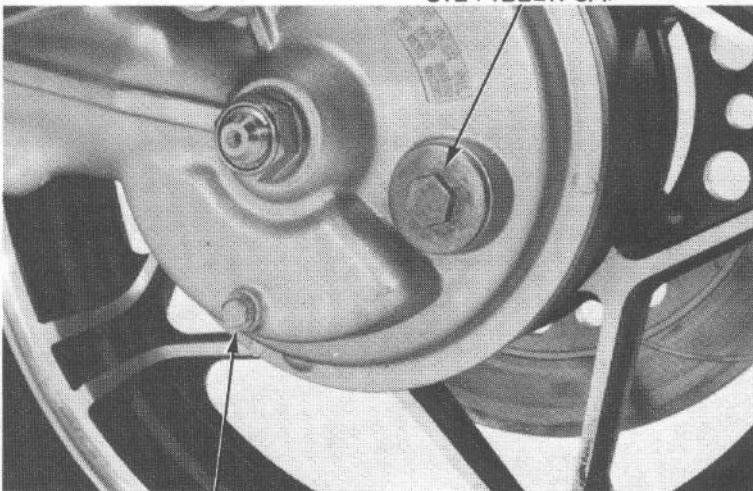
150 cc (5.1 oz) Dry

130 cc (4.4 oz) Refill after draining

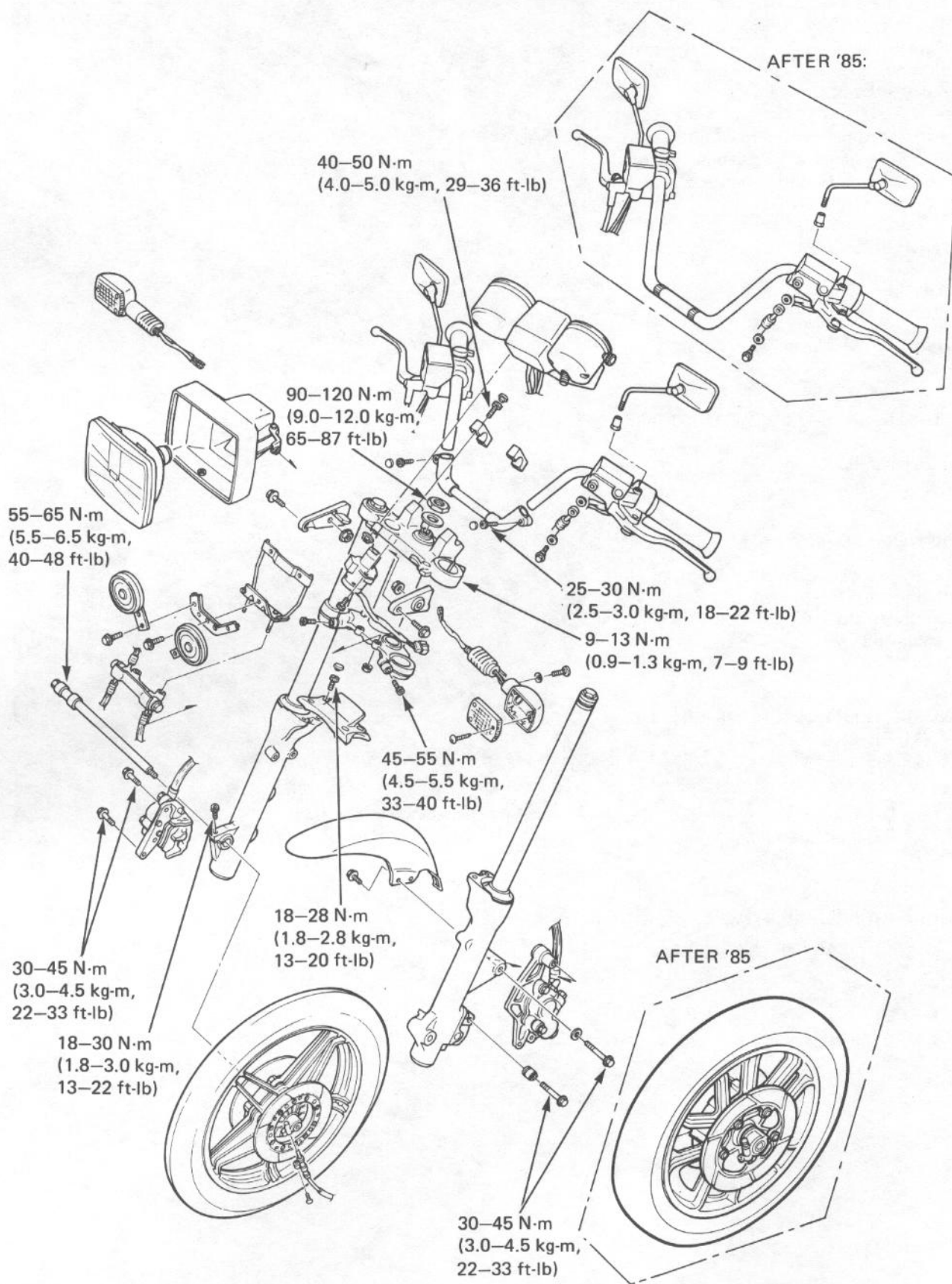
FINAL GEAR CASE
ATTACHING NUTS



OIL FILLER CAP



OIL DRAIN BOLT



15. FRONT WHEEL / SUSPENSION

| | | | |
|---------------------|------|-----------------|-------|
| SERVICE INFORMATION | 15-1 | IGNITION SWITCH | 15-9 |
| TROUBLESHOOTING | 15-2 | HANDLEBARS | 15-11 |
| FUSE/COUPLER BOX | 15-3 | FRONT WHEEL | 15-18 |
| HEADLIGHT | 15-4 | FRONT FORKS | 15-25 |
| INSTRUMENTS | 15-6 | STEERING STEM | 15-38 |

SERVICE INFORMATION

GENERAL

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

SPECIFICATIONS

| | | STANDARD | SERVICE LIMIT |
|---------------------------|--------|---|--------------------|
| Axle shaft runout | | — | 0.2 mm (0.01 in) |
| Front wheel rim runout | Radial | 0.3 mm (0.01 in) max. | 2.0 mm (0.08 in) |
| | Axial | 0.3 mm (0.01 in) max. | 2.0 mm (0.08 in) |
| Wheel bearing play | | — | 0.03 mm (0.001 in) |
| Fork spring free length | | 414.7 mm (16.33 in) | 404 mm (15.9 in) |
| Fork tube runout | | — | 0.2 mm (0.01 in) |
| Front fork fluid capacity | | Right 565 cc (19.1 oz), Left 580 cc (19.6 oz) | — |
| Front fork air pressure | | 0–40 kPa (0–0.4 kg/cm ² , 0–6 psi) | — |

15

TORQUE VALUES

| | |
|---|---|
| Handlebar upper holder | 40–50 N·m (4.0–5.0 kg-m, 29–36 ft-lb) |
| Handlebar pinch bolt | 25–30 N·m (2.5–3.0 kg-m, 18–22 ft-lb) |
| Caliper mounting bolt | 30–45 N·m (3.0–4.5 kg-m, 22–33 ft-lb) |
| Front axle nut | 55–65 N·m (5.5–6.5 kg-m, 40–47 ft-lb) |
| Front axle pinch bolt | 18–30 N·m (1.8–3.0 kg-m, 13–22 ft-lb) |
| Front fork socket bolt | 15–25 N·m (1.5–2.5 kg-m, 11–18 ft-lb) |
| Fork tube cap | 15–30 N·m (1.5–3.0 kg-m, 11–22 ft-lb) |
| Steering bearing adjustment nut | '83: 14–16 N·m (1.4–1.6 kg-m, 10–12 ft-lb) (See pages 15-41 and 42) |
| | After '83: 19–23 N·m (1.9–2.3 kg-m, 14–17 ft-lb) |
| Steering stem nut | '83, '84, '85: 80–120 N·m (8.0–12.0 kg-m, 58–87 ft-lb) |
| | After '85: 90–120 N·m (9.0–12.0 kg-m, 65–87 ft-lb) |
| Brake disc | '83, '84, '85: 25–30 N·m (2.5–3.0 kg-m, 18–22 ft-lb) |
| | After '85: 37–43 N·m (3.7–4.3 kg-m, 27–31 ft-lb) |
| Front fork top pinch bolt | 9–13 N·m (0.9–1.3 kg-m, 7–9 ft-lb) |
| Front fork bottom pinch bolt | 45–55 N·m (4.5–5.5 kg-m, 33–40 ft-lb) |
| Front fork stabilizer bolts | 18–28 N·m (1.8–2.8 kg-m, 13–20 ft-lb) |
| Front brake master cylinder holder bolt | 10–14 N·m (1.0–1.4 kg-m, 7–10 ft-lb) |
| Clutch master cylinder holder bolt | 10–14 N·m (1.0–1.4 kg-m, 7–10 ft-lb) |

TOOLS

Special

| | |
|-----------------------------|--|
| Hex. wrench, 6 mm | 07917-3230000 or commercially available |
| Snap ring pliers | 07914-3230001 or commercially available |
| Fork seal driver | 07947-KA50100 |
| Fork seal driver attachment | 07947-KF00100 |
| Steering stem socket | 07916-3710100 |
| Ball race driver | 07946-3710701 |
| Ball race remover | 07946-3710500 |
| Race remover attachment | 07953-MJ1000A (U.S.A. only) |
| Steering stem driver | 07946-MB00000 or 07946-3710601 and 07964-MB00200 |
| Driver | 07949-3710001 or 07949-3710000 |

Common

| | |
|-----------------------------|---|
| Driver | 07749-0010000 or Driver 07949-6110000 |
| Attachment, 42 x 47 mm | 07746-0010300 |
| Pilot, 15 mm | 07746-0040300 |
| Lock nut wrench, 30 x 32 mm | 07716-0020400 or commercially available |
| Extension bar | 07716-0020500 or commercially available |
| Bearing remover shaft | 07746-0050100 |
| Bearing remover head, 15 mm | 07746-0050400 |
| Attachment, 37 x 40 mm | 07746-0010200 |

TROUBLESHOOTING

Hard steering

1. Steering bearing adjustment nut too tight
2. Faulty steering stem bearings
3. Damaged steering stem bearings
4. Insufficient tire pressure

Steers to one side or does not track straight

1. Unevenly adjusted right and left shock absorbers
2. Bent front forks
3. Bent front axle
4. Wheel installed incorrectly

Front wheel wobbling

1. Bent rim
2. Worn front wheel bearings
3. Faulty tire
4. Axle nut tightened improperly

Soft suspension

1. Weak fork springs
2. Insufficient fluid in front forks
3. Front fork air pressure incorrect

Hard suspension

1. Incorrect fluid weight in front forks
2. Front fork air pressure incorrect
3. Bent fork tubes
4. Clogged fluid passage
5. Clogged anti-dive orifice

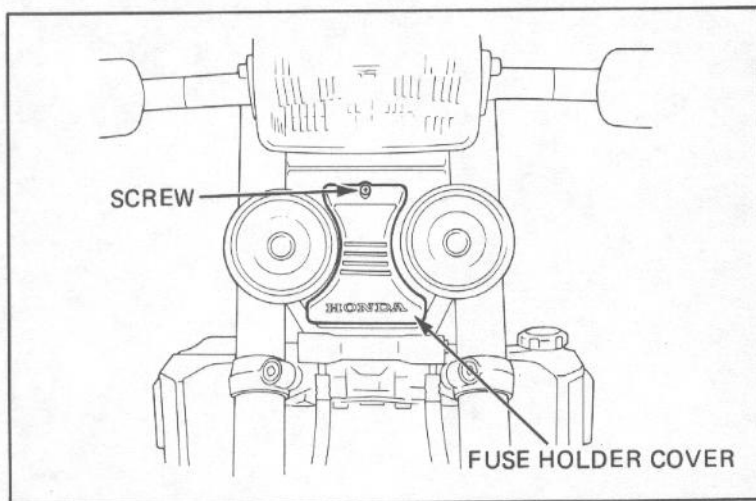
Front suspension noise

1. Worn slider or guide bushings
2. Insufficient fluid in forks
3. Loose front fork fasteners
4. Lack of grease in speedometer gearbox

FUSE/COUPLER BOX

REMOVAL/INSTALLATION

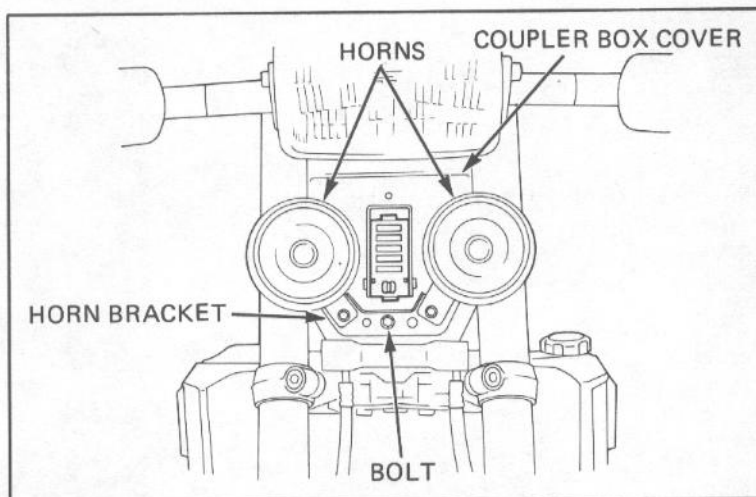
Remove the fuse holder cover.



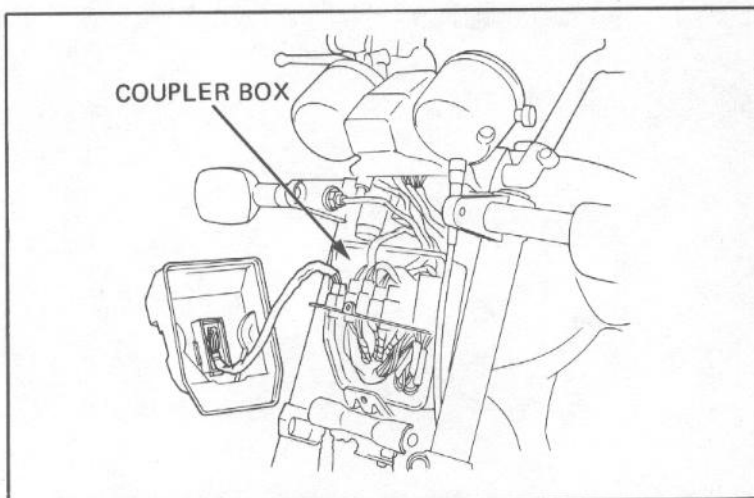
Disconnect the horn wires from the horn terminals.

Remove the bolt attaching the horn bracket.
The bracket and horns will come off as an assembly.

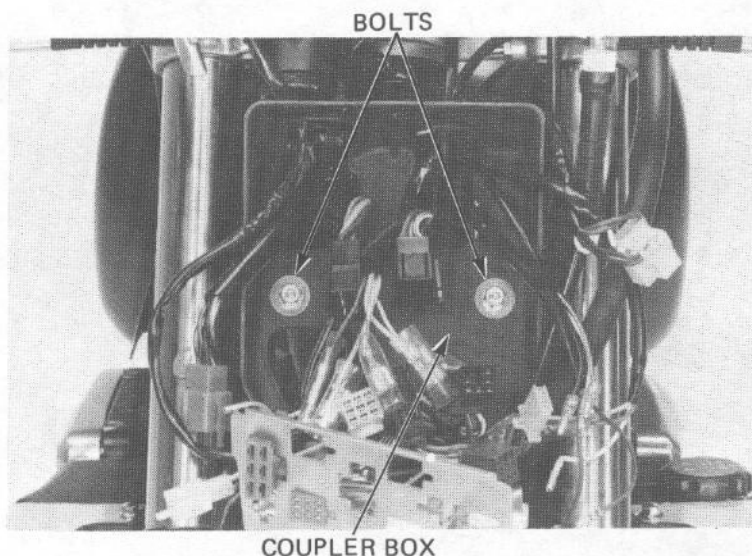
Remove the coupler box cover.



Disconnect all wire couplers and connectors in the coupler box. Note their position for ease of re-installation.



Remove the two coupler box attaching bolts and the coupler box.



HEADLIGHT

REMOVAL/INSTALLATION

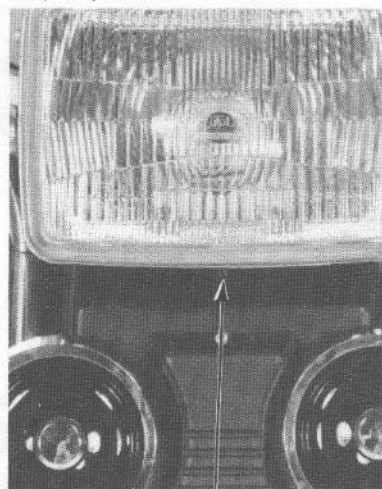
Remove the headlight mounting screw. ('83, '84, '85)

Pull out the headlight from the headlight case.

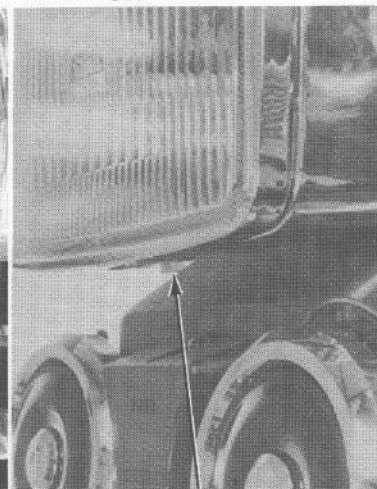
After '85:

Remove the headlight mounting bolt.

'83, '84, '85:



AFTER '85:



HEADLIGHT MOUNTING SCREW

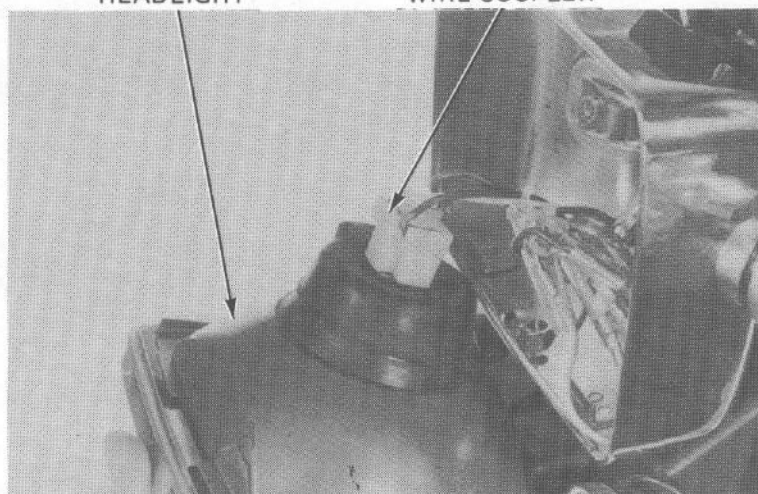
HEADLIGHT

HEADLIGHT MOUNTING BOLT

WIRE COUPLER

Disconnect the wire coupler and remove the headlight.

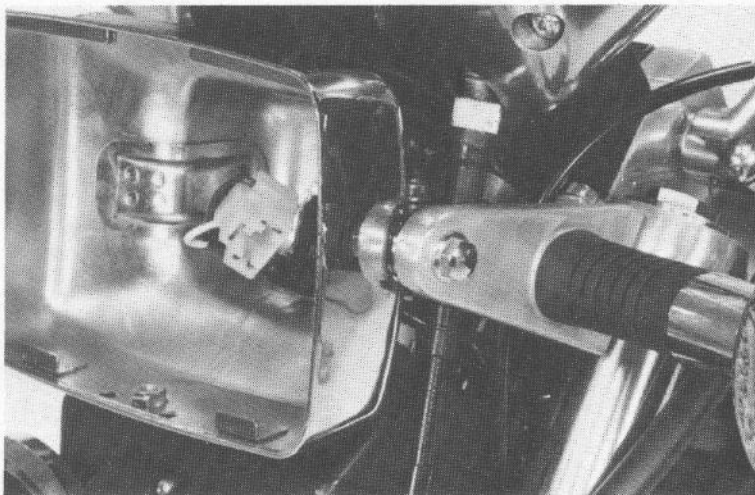
Installation is the reverse order of removal.



CASE REMOVAL/INSTALLATION

Remove the headlight case mounting bolts and the headlight case.

Install the headlight case in the reverse order of removal.

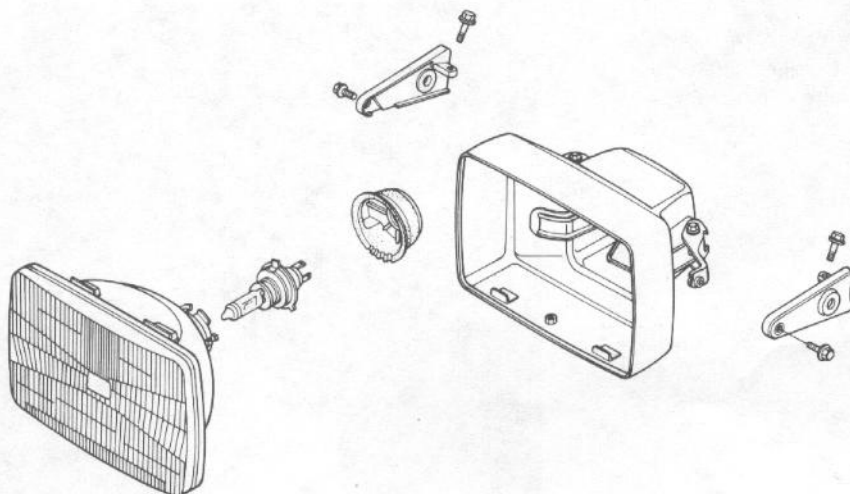
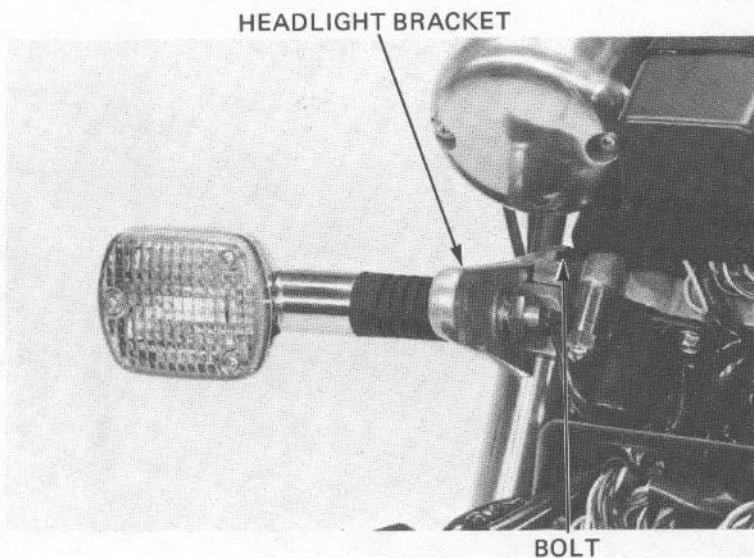


BRACKET REMOVAL/INSTALLATION

Remove the coupler box cover (page 15-3).

Disconnect the front turn signal wire connectors. Remove the headlight bracket mounting bolts and bracket/turn signal assemblies.

Install the headlight bracket in the reverse order of removal.

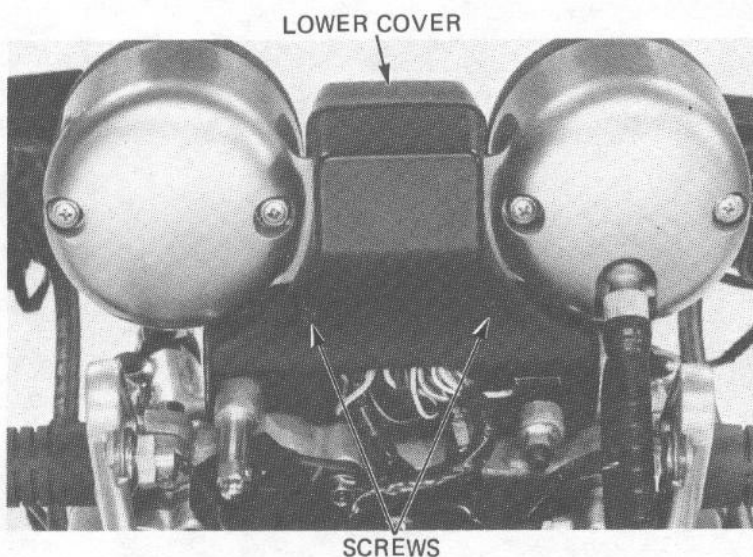


INSTRUMENTS

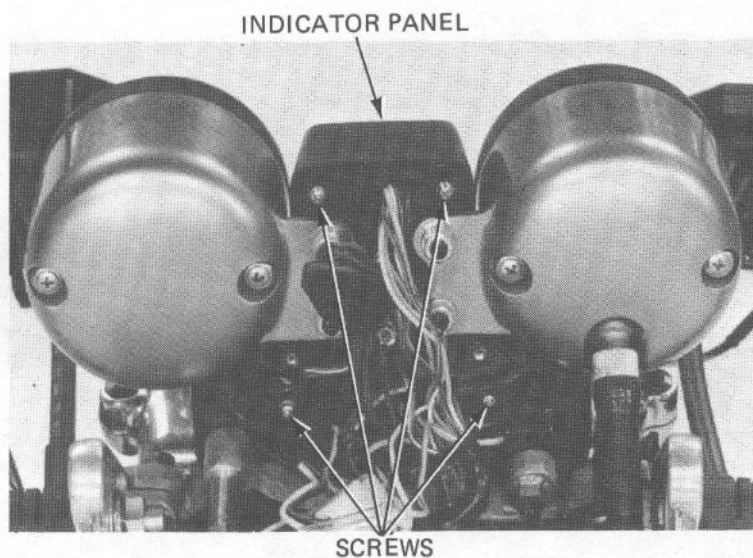
INDICATOR LIGHT BULB REPLACEMENT

Remove the headlight and case (pages 15-4 and 15-5).

Remove the instrument lower cover attaching screws, and lower cover.

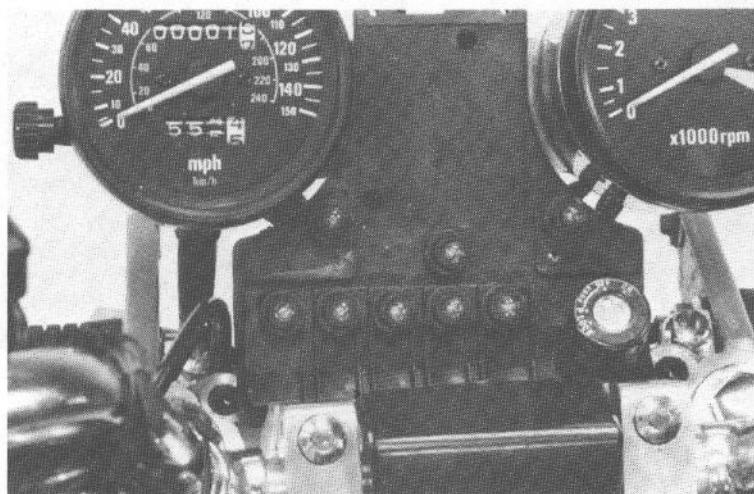


Remove the indicator panel attaching screws and panel.



Replace any inoperative bulbs.

After installing a new bulb, check for continuity. If the new bulb does not light, inspect the wiring for an open or short circuit, or loose connections.



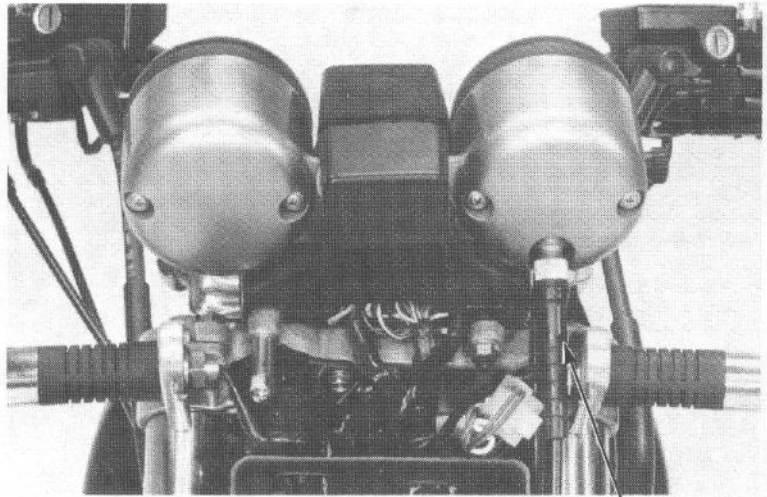
INSTRUMENT REMOVAL

Remove the coupler box cover (page 15-3).
Remove the headlight and case (pages 15-4 and 15-5).

Disconnect the speedometer cable from the instruments.

Disconnect the instrument wire couplers.

Remove the instrument mounting nuts and instruments.



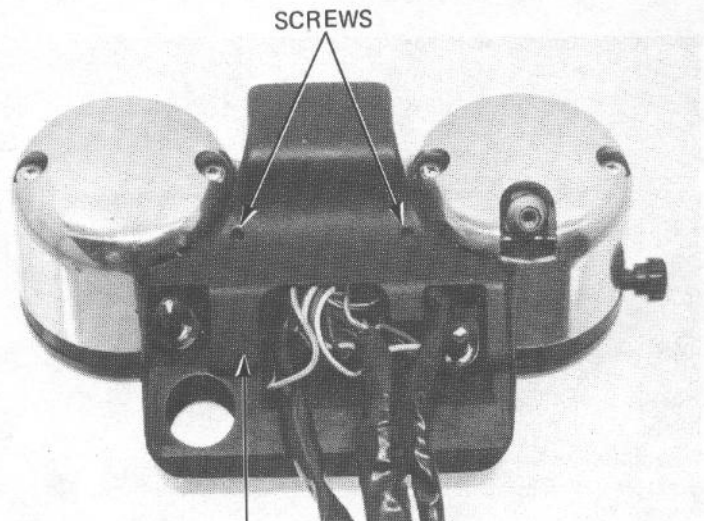
SPEEDOMETER CABLE

DISASSEMBLY

Remove the instrument lower cover.

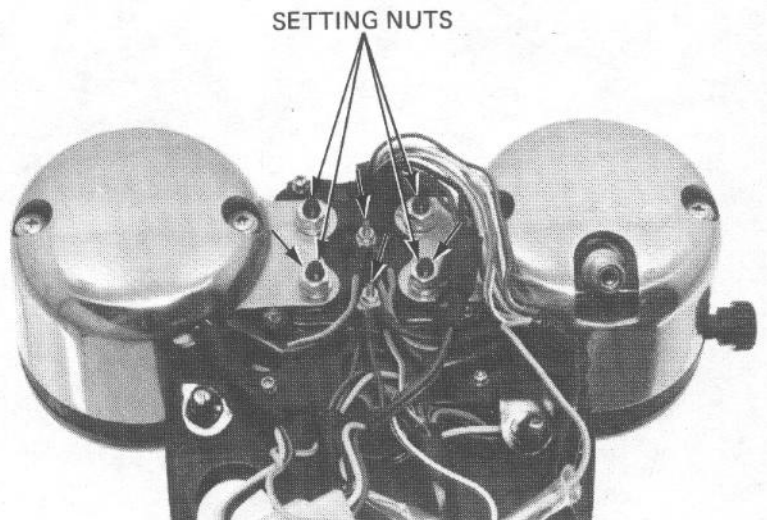
CAUTION:

Do not leave the instruments upside down or damping fluid will leak onto the inside of the lens.



LOWER COVER

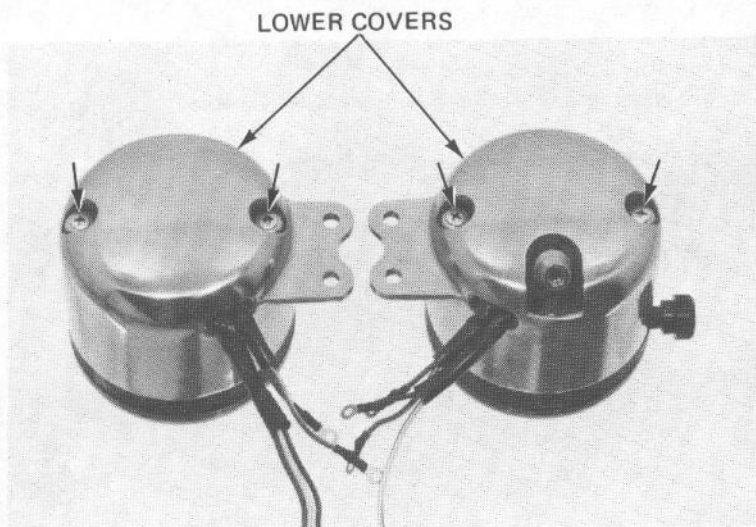
Remove the meter setting nuts and meters.



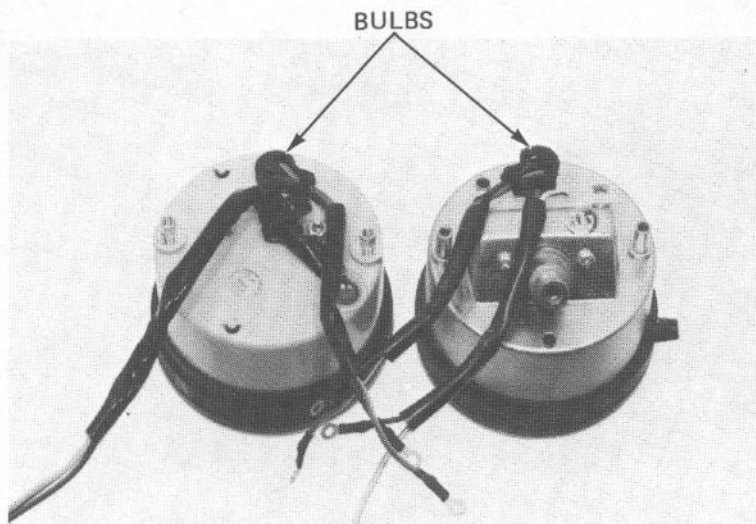
SETTING NUTS

FRONT WHEEL/SUSPENSION

Remove the meter lower cover screws and lower covers.



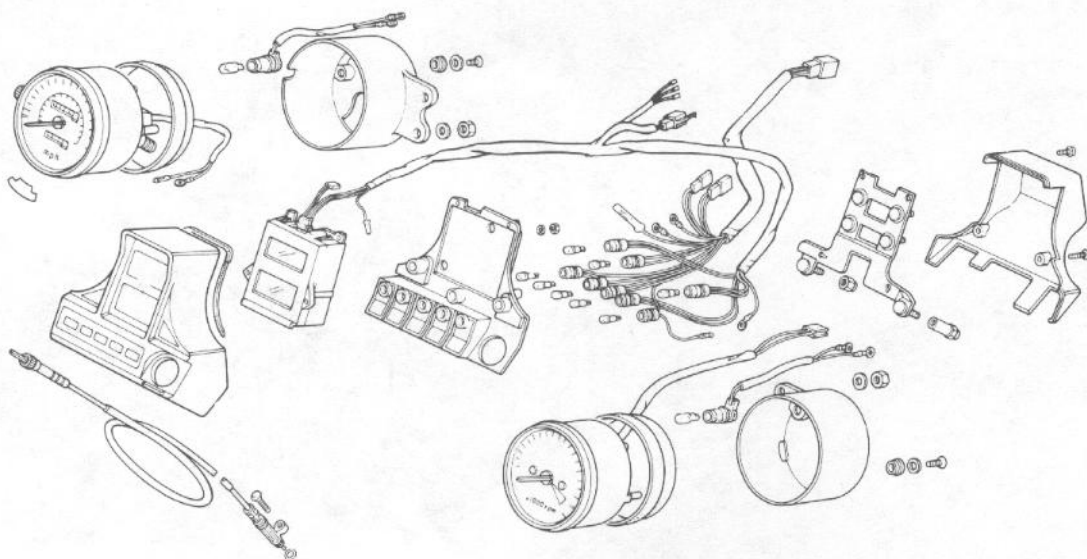
Replace any inoperative bulbs.
If a replacement bulb does not light, check the wiring for a short or open circuit, or check for loose connections.



ASSEMBLY/INSTALLATION

Lubricate the speedometer cable before reconnecting it.

Assemble and install the instruments in the reverse order of disassembly and removal.



IGNITION SWITCH

REMOVAL/INSTALLATION

Remove the headlight and headlight case.

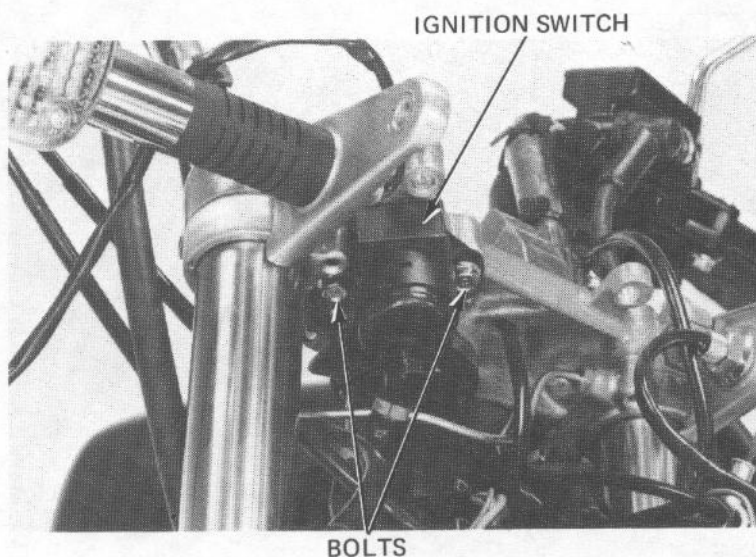
Remove the coupler box cover (page 15-3).

Remove the instruments (page 15-7).

Disconnect the ignition switch wire coupler.

Remove the ignition switch mounting bolts, and ignition switch.

Install the ignition switch in the reverse order of removal.

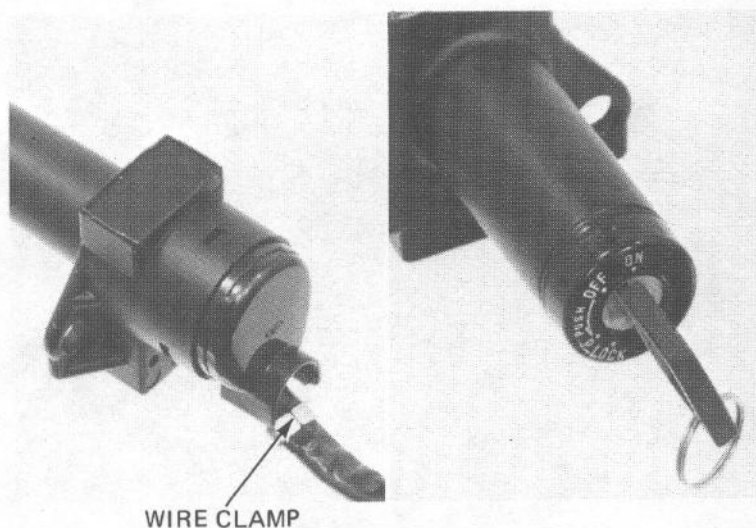


DISASSEMBLY/ASSEMBLY

'83, '84, '85:

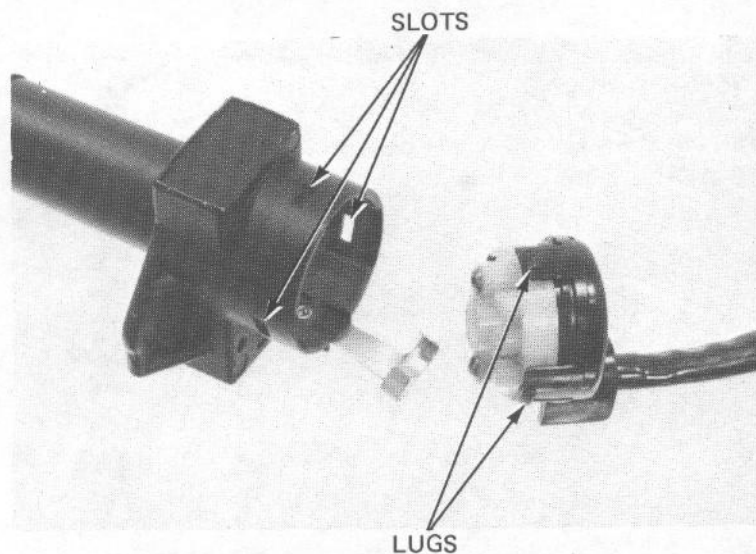
Open the wire clamp.

Insert the ignition key and turn it to between the ON and OFF detent positions.



Push the lugs into the slots and pull the contact base from the switch.

Assemble the ignition switch in the reverse order of disassembly.



FRONT WHEEL/SUSPENSION

AFTER '85:

Insert the ignition key and turn it between the ON and OFF detent positions.

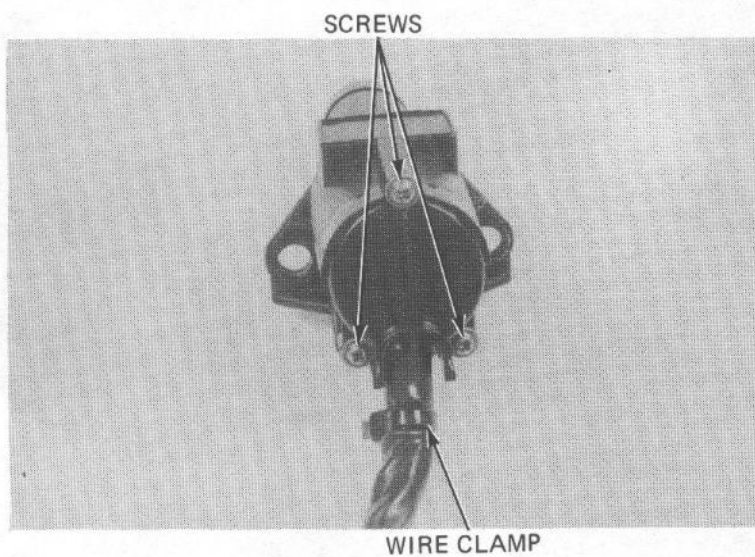


Cut the wire clamp.

NOTE:

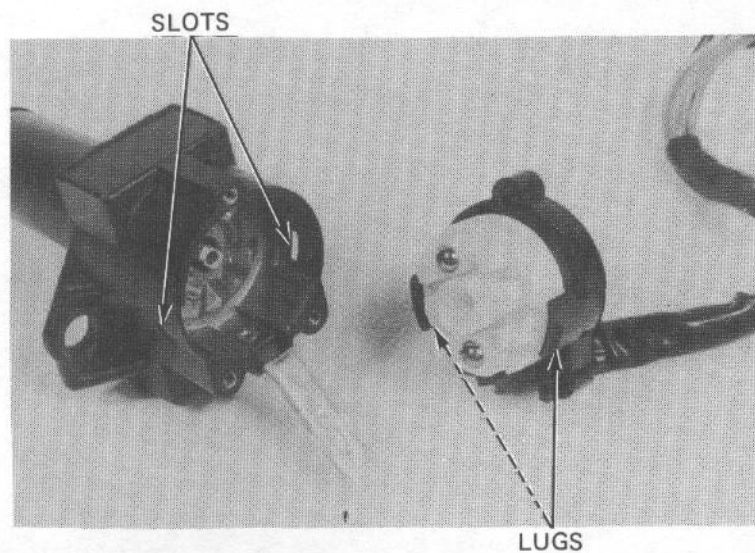
Replace the wire clamp with new one whenever it is removed.

Remove the three screws.



Push the lugs into the slots and pull the contact base from the switch.

Assemble the ignition switch in the reverse order of disassembly.



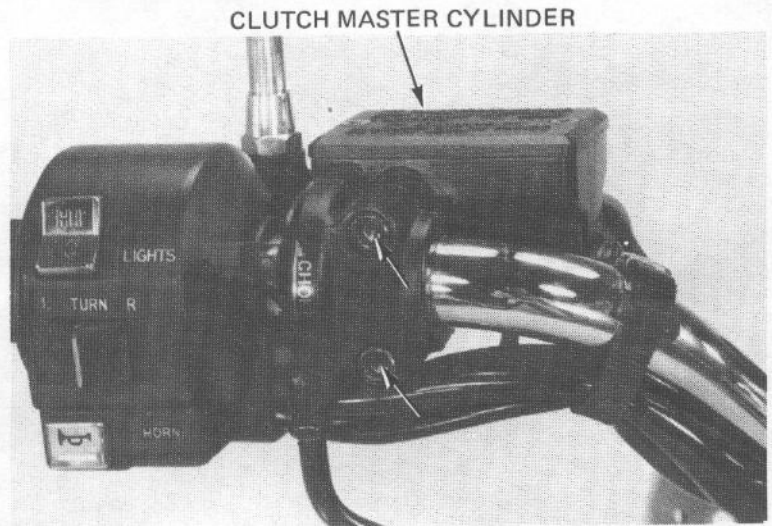
HANDLEBARS

'83, '84, '85:

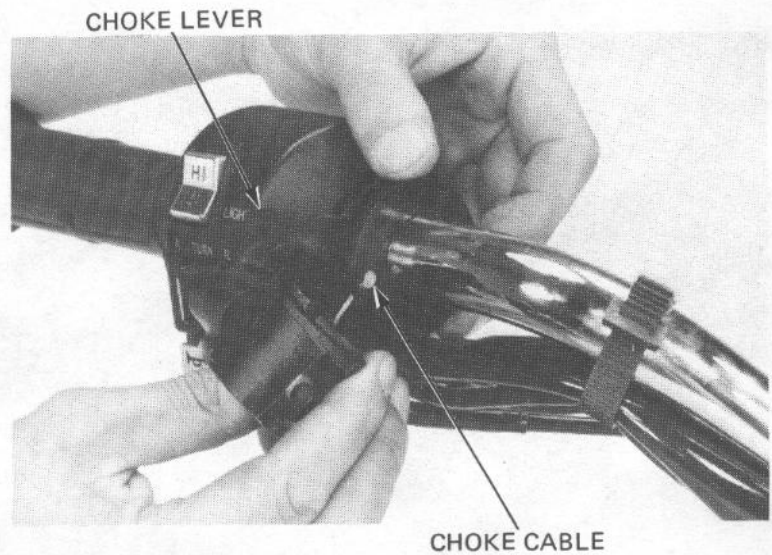
REMOVAL/INSTALLATION

Disconnect the clutch switch wires.

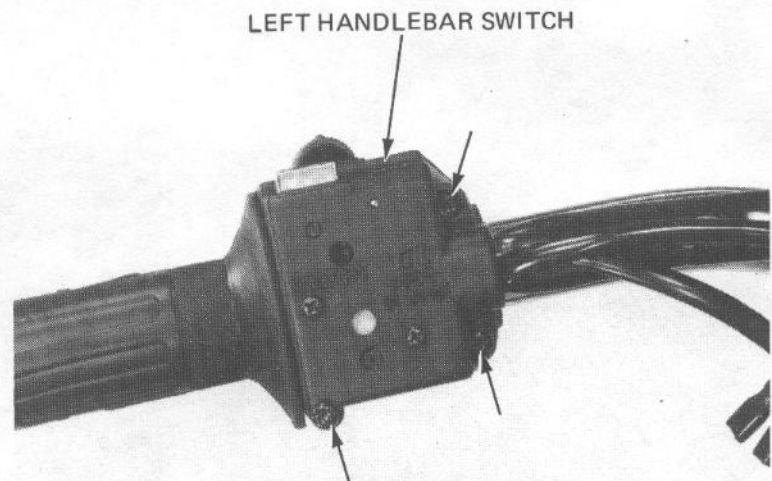
Remove the clutch master cylinder.



Disconnect the choke cable from the choke lever.

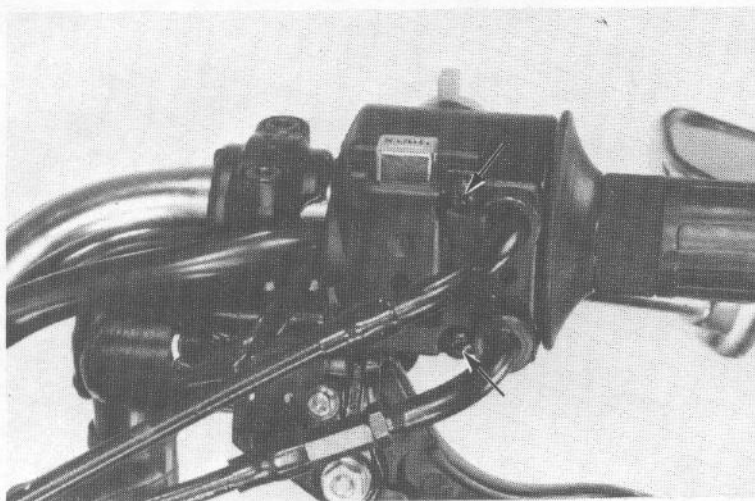


Remove the left handlebar switch.



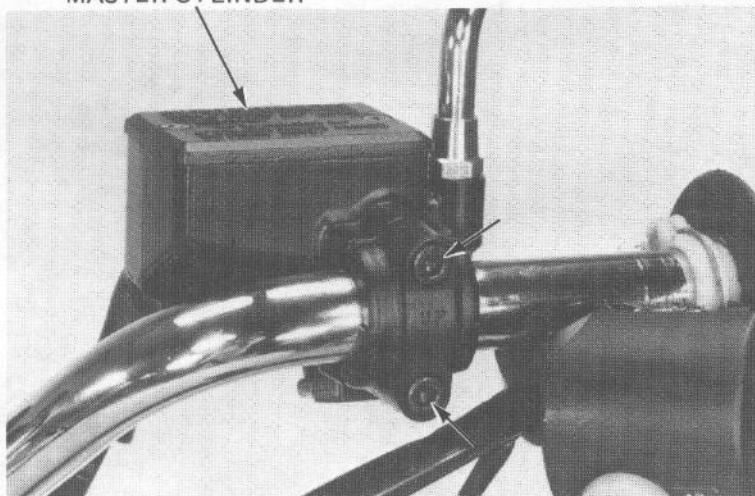
FRONT WHEEL/SUSPENSION

Remove the right handlebar switch and disconnect the front brake switch wires.



Remove the brake master cylinder.

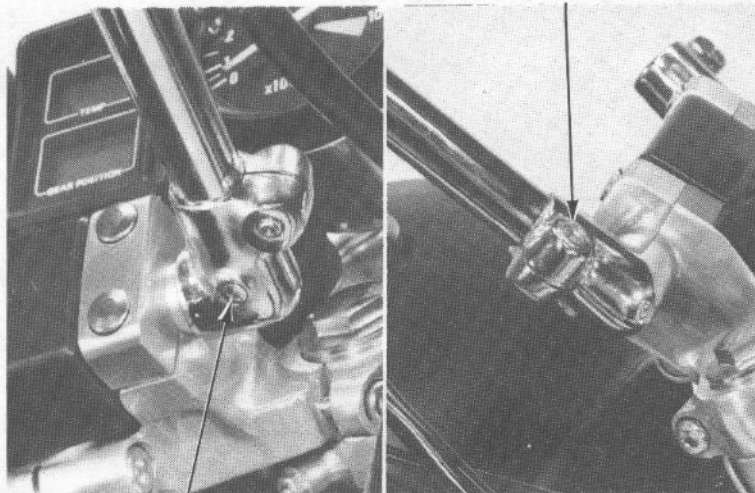
MASTER CYLINDER



Remove the handlebar set screw.

Loosen the handlebar pinch bolt and remove the handlebar.

HANDLEBAR PINCH BOLT

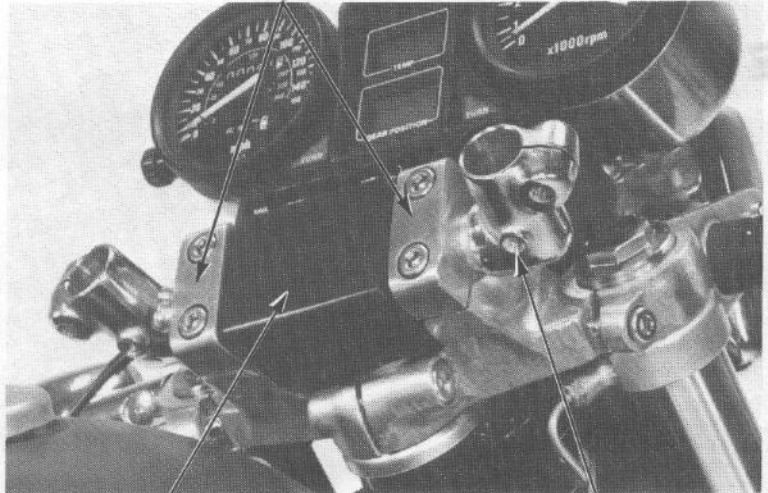


HANDLEBAR SET SCREW

Remove the bolt caps and the handlebar cover.
Remove the handlebar upper holder bolts.

Remove the handlebar upper holders and the center handlebar.

UPPER HOLDERS



HANDLEBAR COVER

CENTER HANDLEBAR

INSTALLATION

Place the center handlebar onto the lower holder, aligning its punch mark with the upper surface of the lower holder.

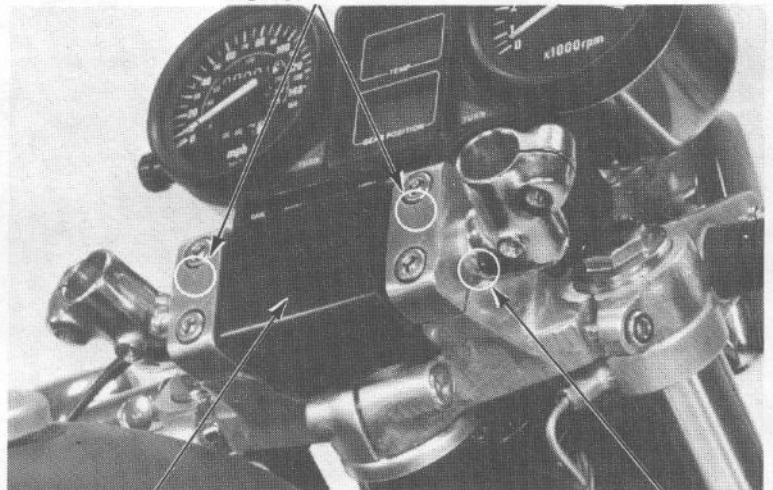
Place the upper holder onto the lower holder with its punch mark facing forward.

Tighten the forward bolts first, then tighten the rear bolts.

TORQUE: 40–50 N·m (4.0–5.0 kg·m, 29–36 ft·lb)

Install the bolt caps and handlebar cover.

PUNCH MARKS



HANDLEBAR COVER

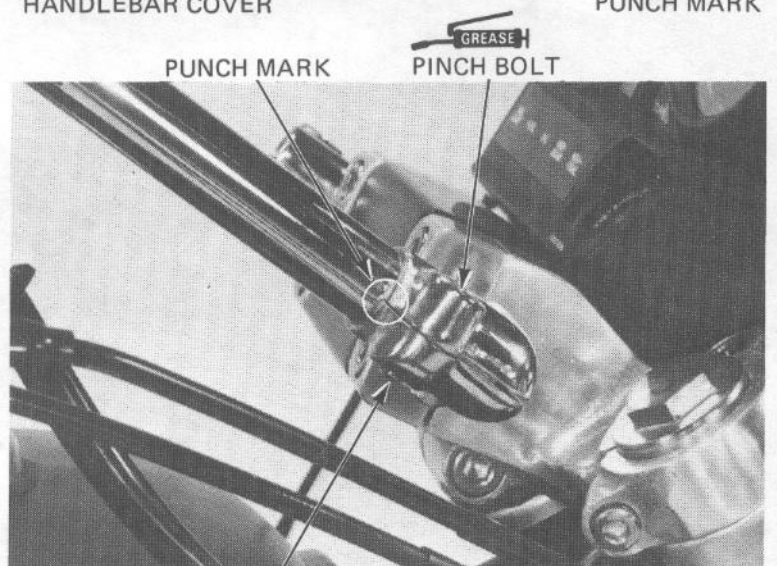
PUNCH MARK

Install the right and left handlebars into the center handlebar.

Install the handlebar set screws.

Apply grease to the handlebar pinch bolts.
Tighten the pinch bolts after aligning the punch marks with the slits on the center handlebar.

TORQUE: 25–30 N·m (2.5–3.0 kg·m, 18–22 ft·lb)



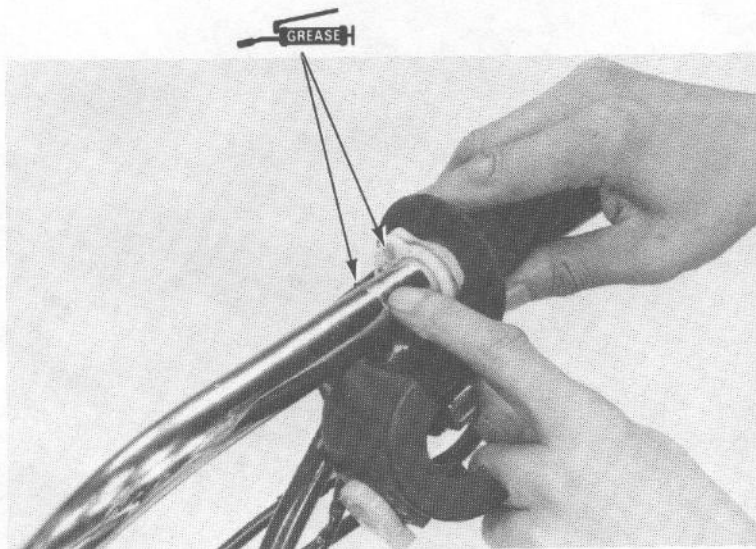
PUNCH MARK

GREASE
PINCH BOLT

SET SCREW

FRONT WHEEL/SUSPENSION

Apply grease to the throttle grip sliding surface and install the throttle grip over the handlebar.



Install the front brake master cylinder with "UP" mark facing up. Align the end of the holder with the handlebar punch mark.

Tighten the upper bolt first, then the lower bolt.

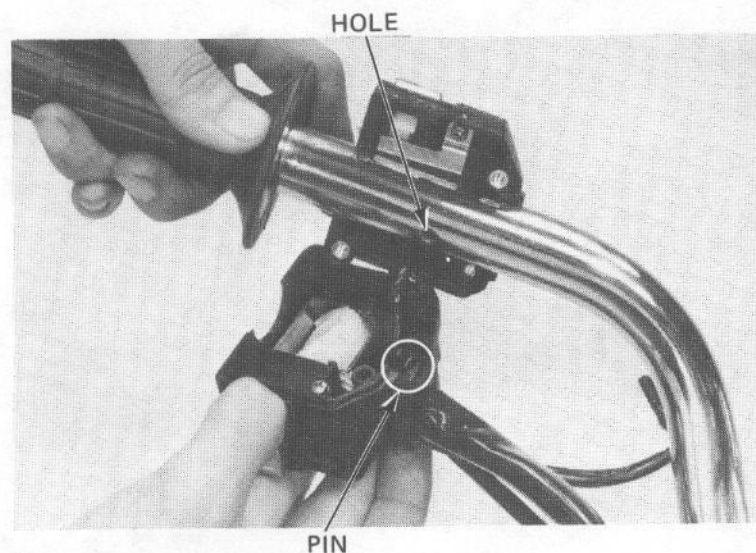
TORQUE: 10–14 N·m (1.0–1.4 kg·m, 7–10 ft·lb)

Connect the brake light switch wires.

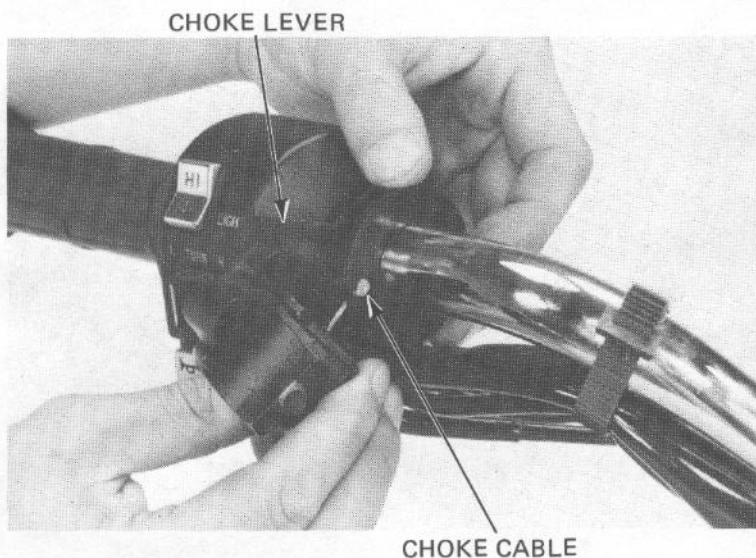


Install the right and left switches by aligning the locating pin with the hole in the handlebar.

Tighten the forward screw(s) first, then tighten the rear screw.



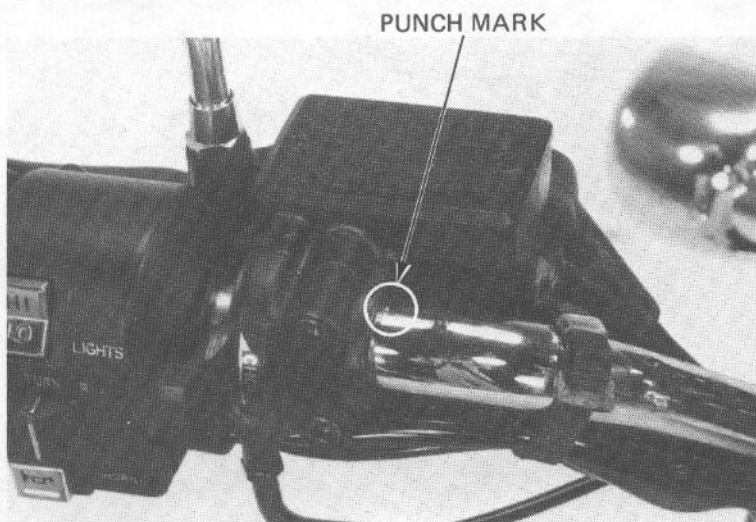
Connect the choke cable to the choke lever.



Install the clutch master cylinder.
Align the end of the holder with the punch mark on the handlebar.
Tighten the upper bolt first, then tighten the lower bolt.

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

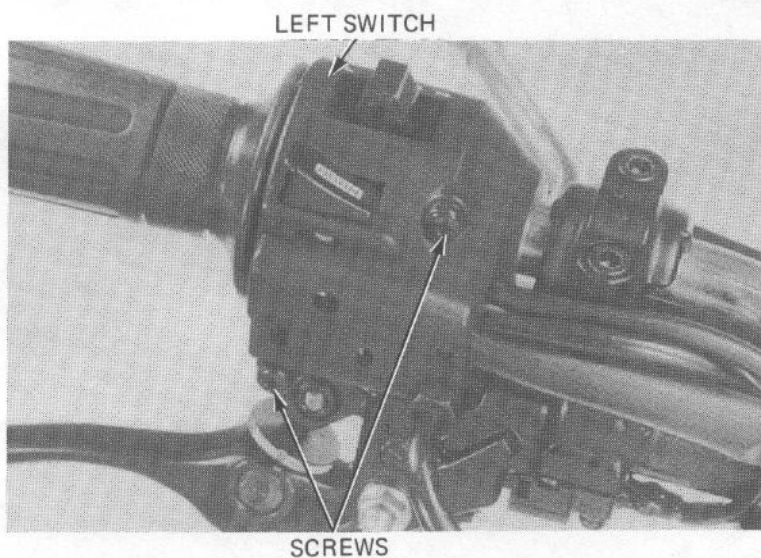
Connect the clutch screw wires.



AFTER '85: REMOVAL/INSTALLATION

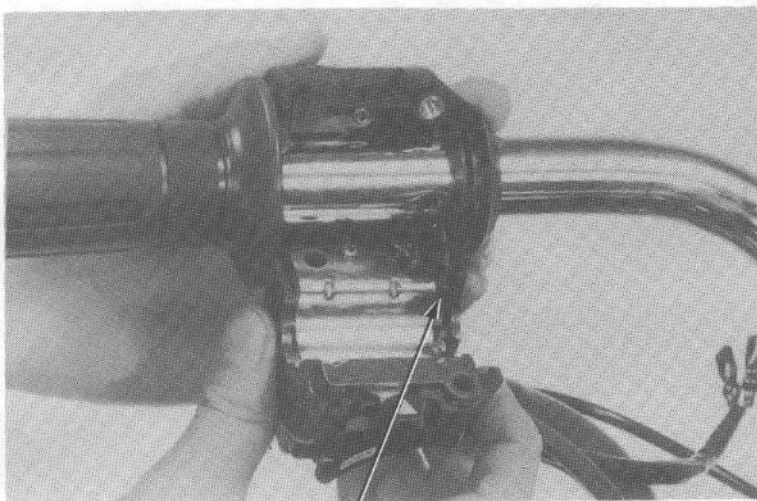
Disconnect the clutch switch wires.
Remove the clutch master cylinder ('83~'85 as shown).

Remove the two screws and open the left switch.



FRONT WHEEL/SUSPENSION

Disconnect the choke cable from the choke lever.

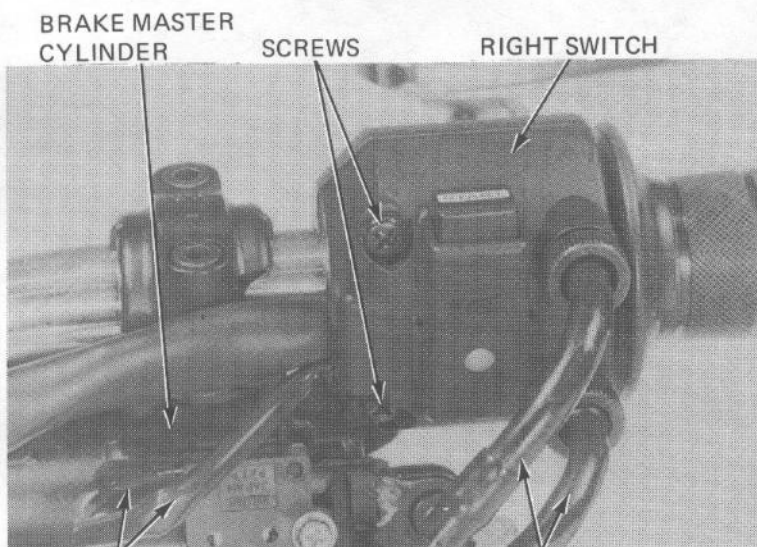


CHOKE CABLE

Remove the two screws and open the right handle-bar switch.

Disconnect the throttle cable wires.

Disconnect the brake switch wires.
Remove the brake master cylinder.



BRAKE MASTER CYLINDER

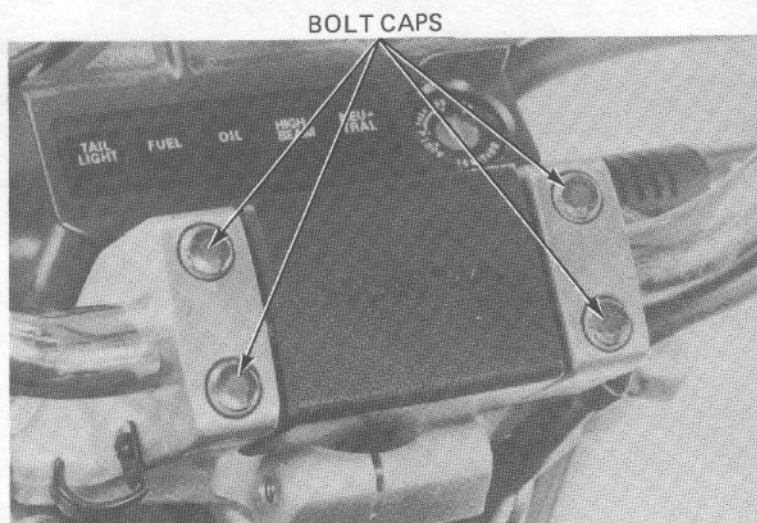
SCREWS

RIGHT SWITCH

BRAKE SWITCH WIRES

THROTTLE CABLES

Remove the bolt caps.



BOLT CAPS

Remove the handlebar cover.

Remove the handlebar upper holder bolts, handlebar upper holder and handlebar.

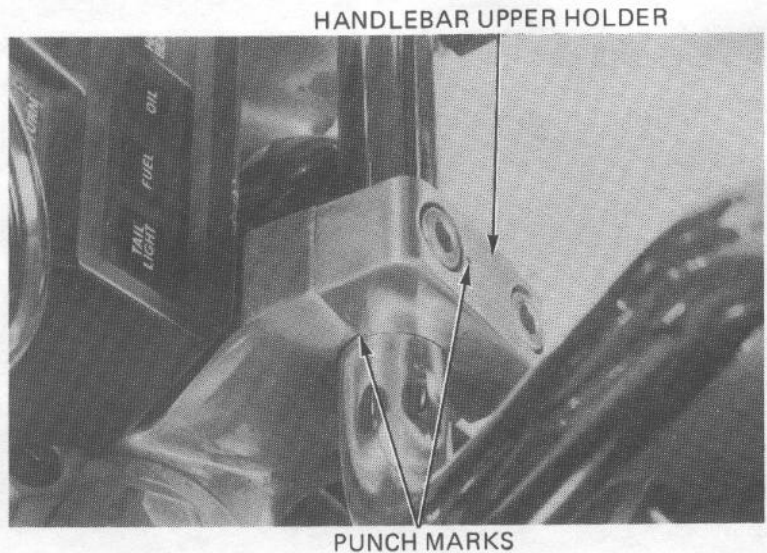


INSTALLATION

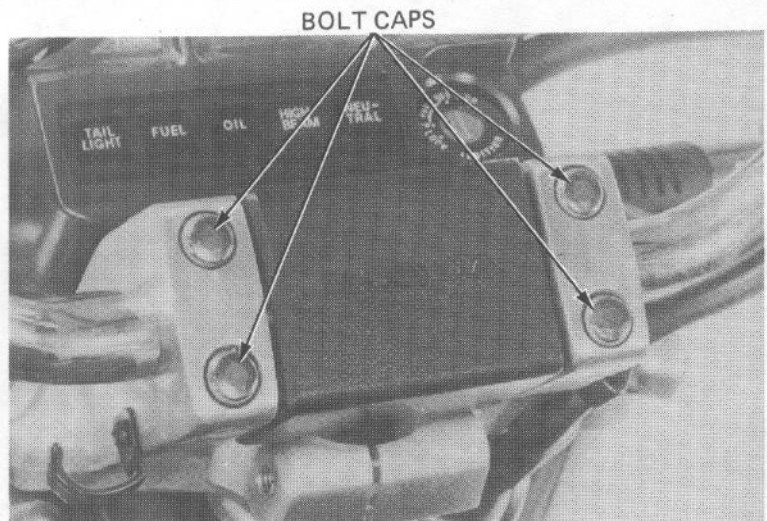
Place the handlebar on the lower holder aligning the punch mark with the upper face of the lower holder.

Place the upper holders on the handlebar with the punch marks facing forward. Tighten the forward bolts first, then tighten the rear bolts.

TORQUE: 40–50 N·m (4.0–5.0 kg-m, 29–36 ft-lb)



Install the bolt caps.

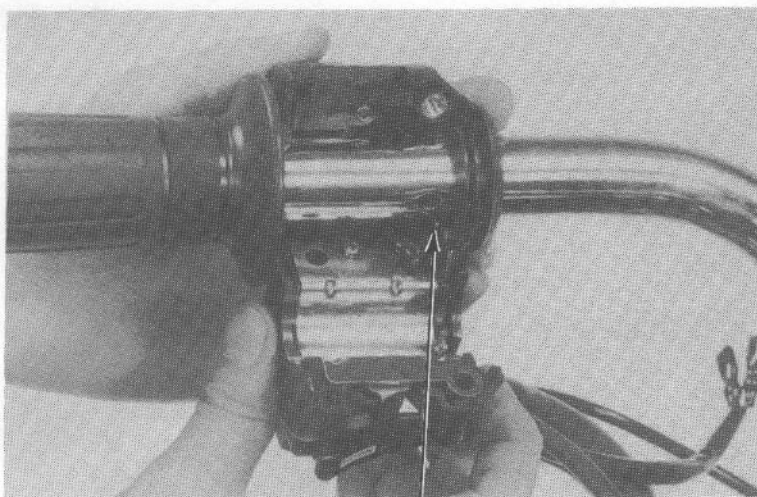


FRONT WHEEL/SUSPENSION

Connect the choke cable to the choke lever.

Install the right and left switches by aligning the locating pin with the hole in the handlebar.

Tighten the forward screw(s) first, then tighten the rear screw.



CHOKE CABLE

FRONT WHEEL

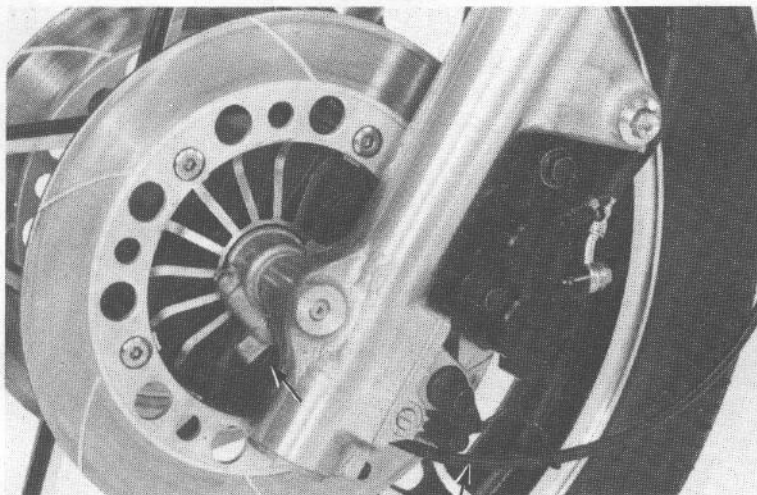
REMOVAL

Remove the speedometer cable set screw and the speedometer cable.

Remove the right and left side caliper assemblies by removing the bolts.

NOTE:

Do not operate the front brake lever after removing the calipers. To do so will cause difficulty in fitting the brake disc between the brake pads.

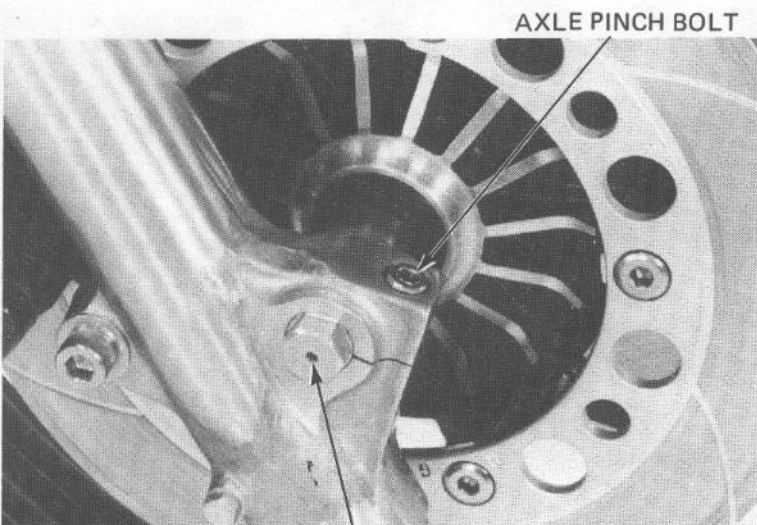


SPEEDOMETER
CABLE

Loosen the axle pinch bolt.

Loosen and remove the front axle.

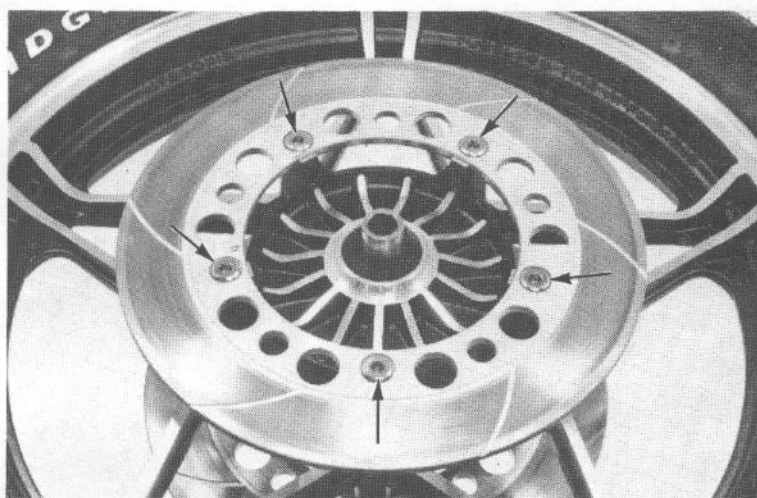
Remove the front wheel.



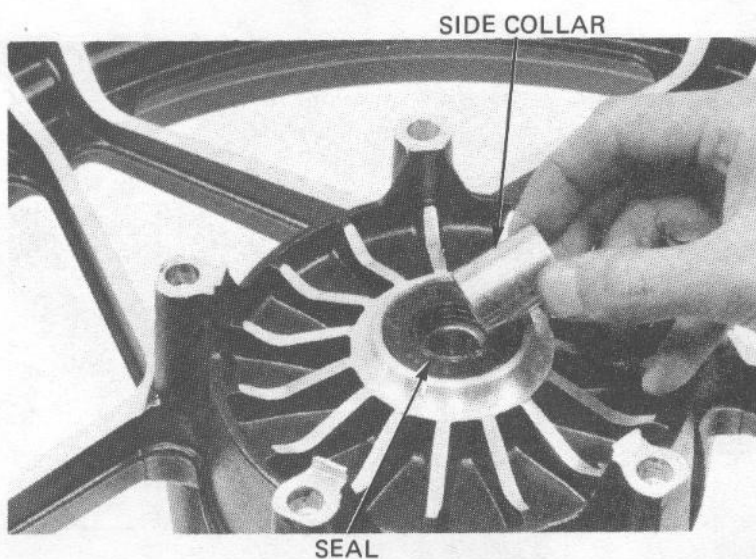
FRONT AXLE

DISASSEMBLY

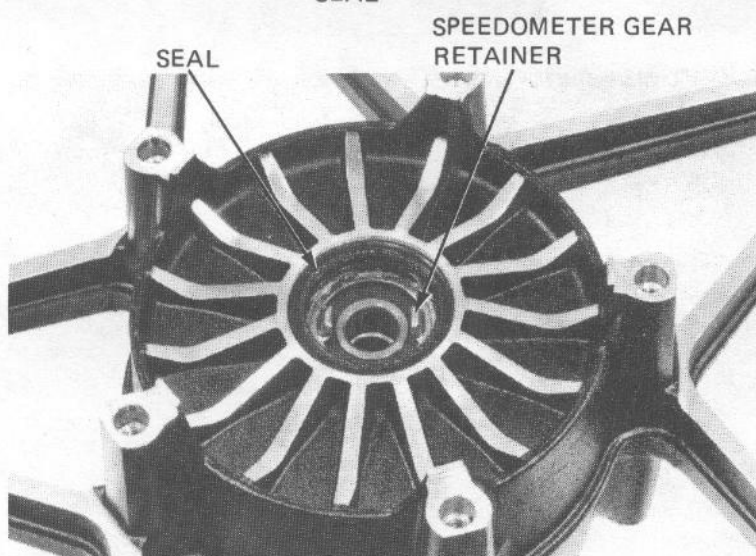
Remove the brake disc mounting bolts and discs.



Remove the side collar and right seal.



Remove the left seal and speedometer gear retainer.



FRONT WHEEL/SUSPENSION

WHEEL INSPECTION

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

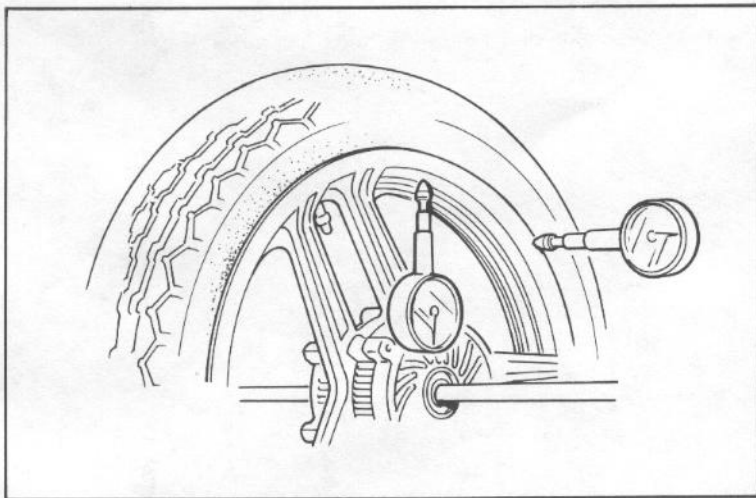
SERVICE LIMITS:

RADIAL RUNOUT: 2.0 mm (0.08 in)

AXIAL RUNOUT: 2.0 mm (0.08 in)

NOTE:

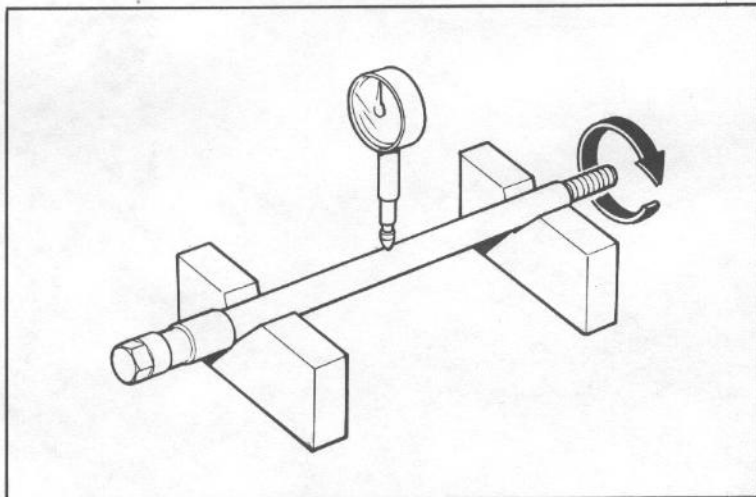
The wheel cannot be repaired and must be replaced with a new one if the service limits are exceeded.



AXLE INSPECTION

Set the axle in V blocks and measure the runout.

SERVICE LIMIT: 0.2 mm (0.01 in)



WHEEL BEARING INSPECTION

Turn the inner race of each bearing with your finger. The bearings should turn smoothly and quietly. Also check that the bearing outer race fits tightly in the hub.

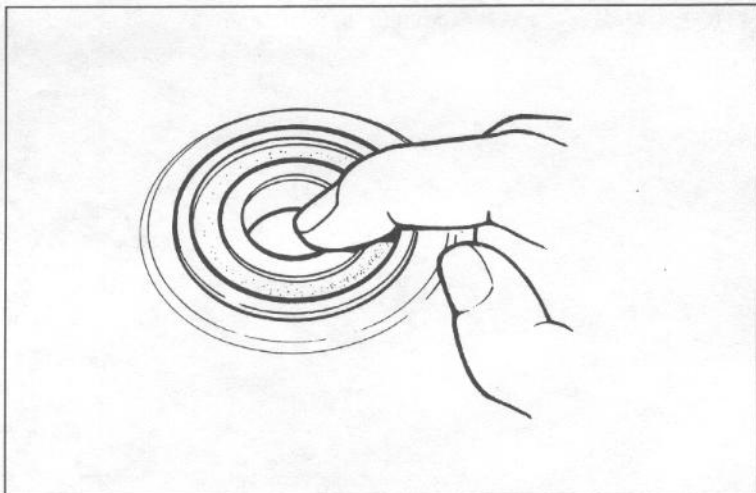
Remove and discard the bearings if the races do not turn smoothly, quietly, or if they fit loosely in the hub.

NOTE:

Replace hub bearings in pairs.

Pack new bearings with grease and install them into the hub with the special tools.

For bearing replacement, see page 15-22.

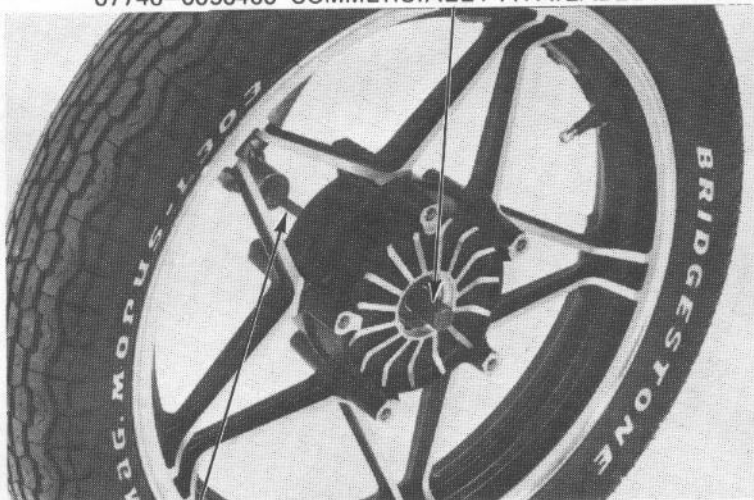


Remove the wheel bearings and the distance collar from the hub.

NOTE:

If the bearings are removed, they should be replaced with new ones.

WHEEL BEARING REMOVER HEAD, 15 mm
07746-0050400 COMMERCIALLY AVAILABLE IN U.S.A.



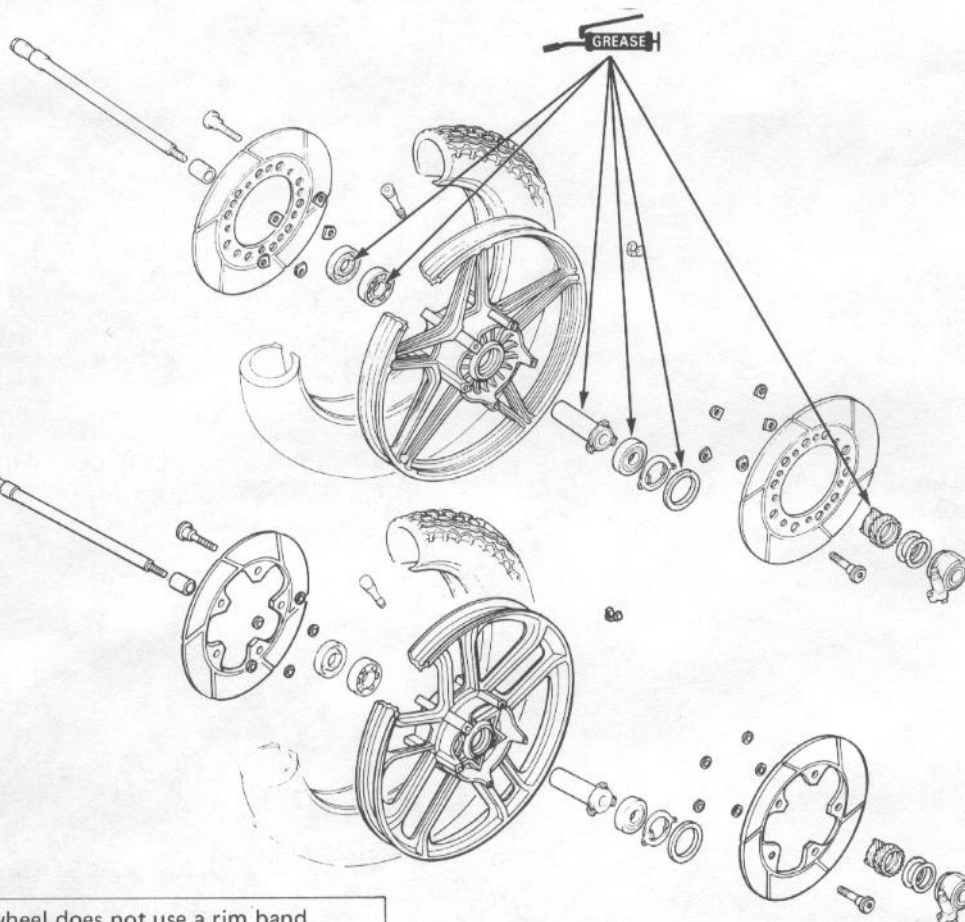
BEARING REMOVER
SHAFT 07746-0050100

ASSEMBLY

'83, '84, '85:

WARNING

Do not get grease on the brake disc or stopping power will be reduced.



AFTER '85:

NOTE:

- The cast wheel does not use a rim band.
- The front wheel uses a tubeless tire. For tubeless tire repair, refer to the HONDA TUBELESS TIRE MANUAL.

FRONT WHEEL/SUSPENSION

Pack all bearing cavities with grease.
Drive in the right bearing first and press the distance collar into place.

NOTE:

Be certain the distance collar is in position before installing the left bearing.

Drive in the left bearing squarely.

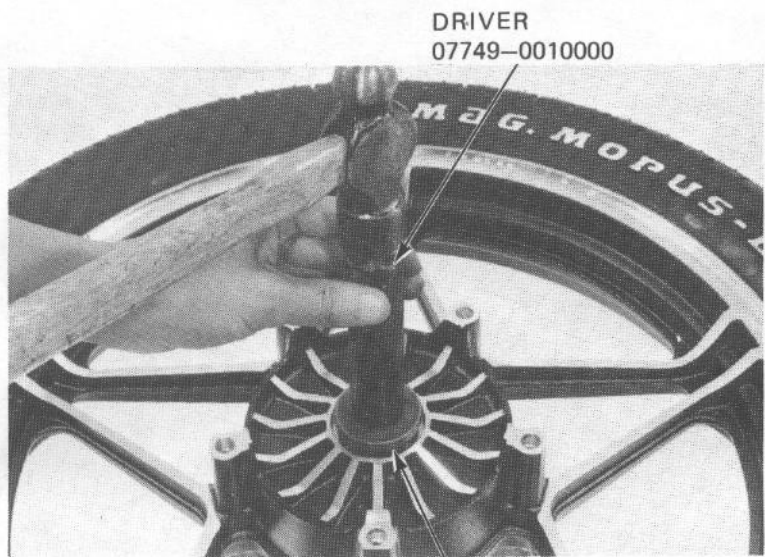
NOTE:

Make sure that the bearings are fully seated and that the sealed sides are facing out.

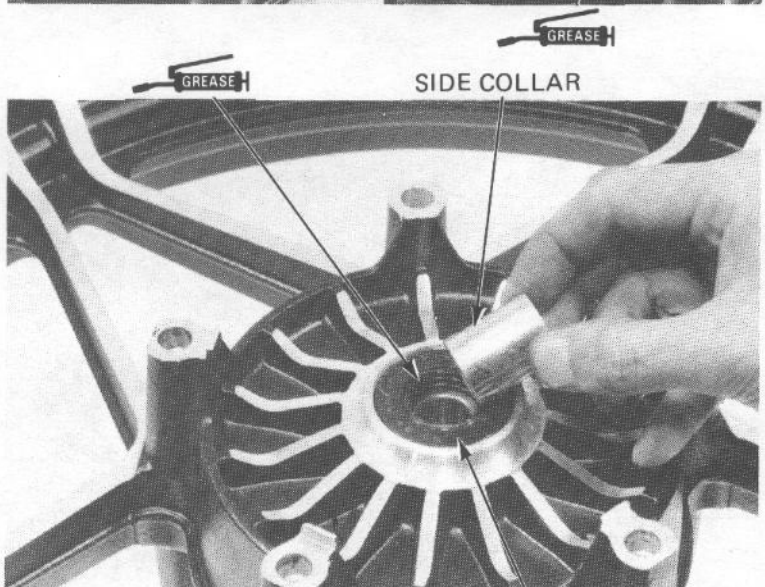
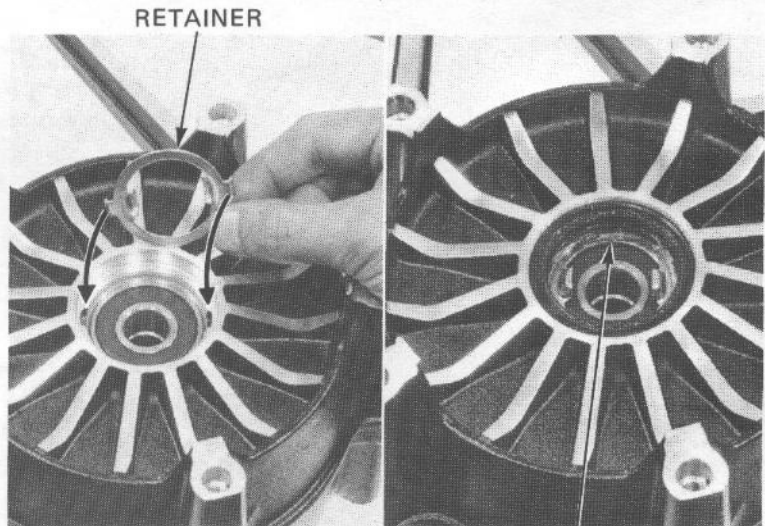
Install the speedometer gear retainer in the wheel hub, aligning the tangs with the slots.

Install the left seal.

Install the right seal. Apply grease to the inner seal lip and insert the side collar.

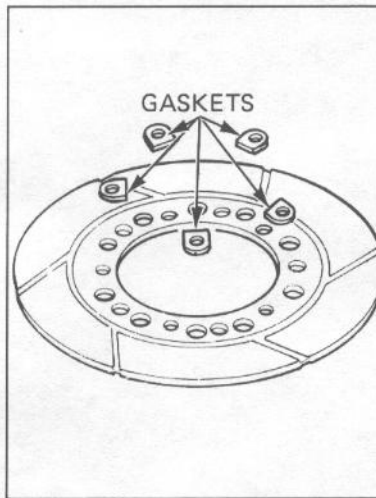


DRIVER
07749-0010000
ATTACHMENT, 42 x 47 mm 07746-0010300
PILOT, 15 mm 07746-0040300

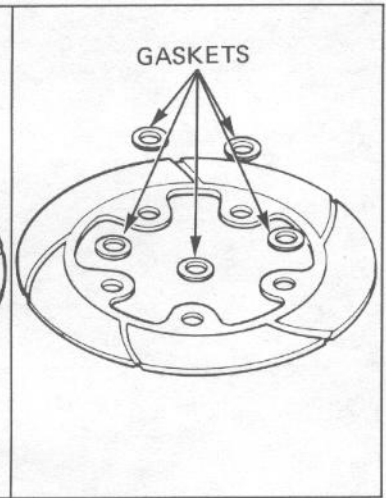


Attach new gaskets to each brake disc.

'83, '84, '85:



AFTER '85:



Install the brake disc with the "R" mark on the right and the disc with the "L" mark on the left.

TORQUE:

'83, '84, '85:

25–30 N·m (2.5–3.0 kg-m, 18–22 ft-lb)

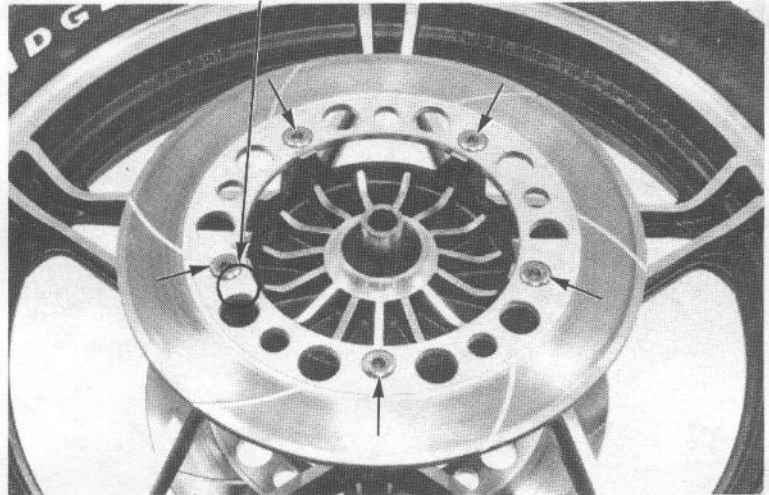
After '85:

37–43 N·m (3.7–4.3 kg-m, 27–31 ft-lb)

Install the speedometer gearbox in the wheel hub, aligning the tangs with the slots.

Clean the brake discs with a high quality degreasing agent.

"R" OR "L" MARK



INSTALLATION

Fit the calipers over the discs, taking care not to damage the brake pads. Install the caliper mounting bolts.

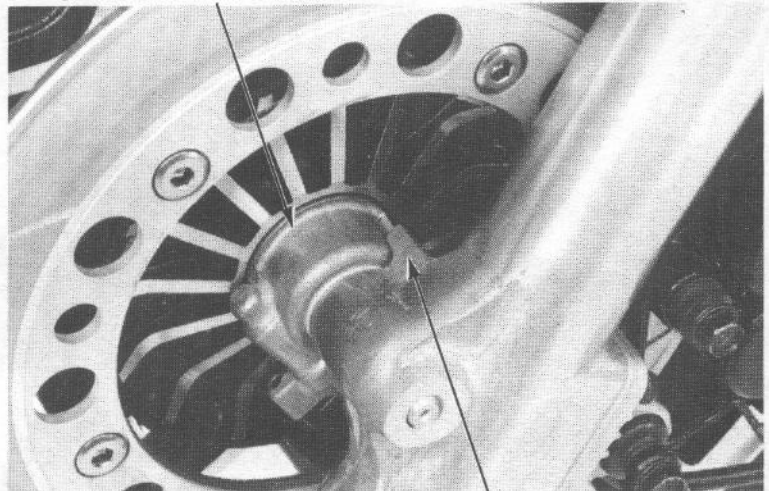
TORQUE: 30–45 N·m (3.0–4.5 kg-m, 22–33 ft-lb)

Align the speedometer gearbox with the tang on the left fork leg as shown.

Tighten the axle to the specified torque.

TORQUE: 55–65 N·m (5.5–6.5 kg-m, 40–47 ft-lb)

SPEEDOMETER GEARBOX



TANG ON FORK LEG

FRONT WHEEL/SUSPENSION

Measure between the outside surface of the right brake disc and the inside of the right caliper holder with a 0.7 mm (0.028 in) feeler gauge.

If the gauge cannot be inserted, pull the right fork out until the gauge can be inserted.



0.7 mm (0.028 in) FEELER GAUGE

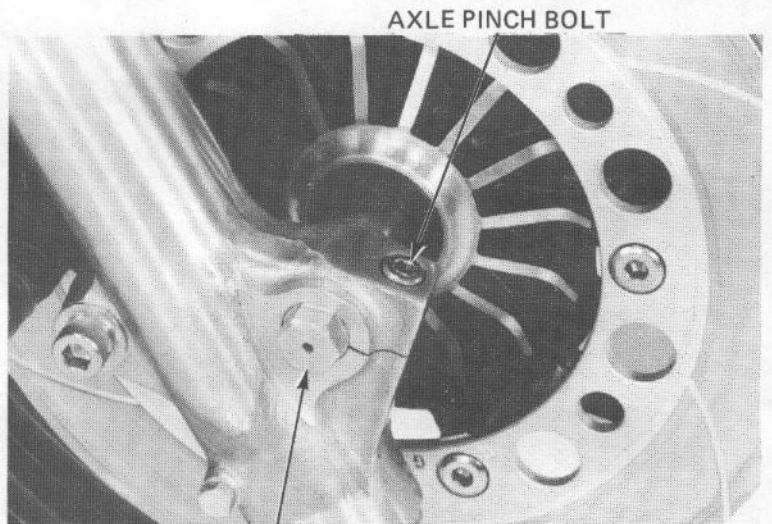
Tighten the axle pinch bolt to the specified torque.

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

There should still be at least 0.7 mm (0.028 in) clearance between the caliper holder and disc.

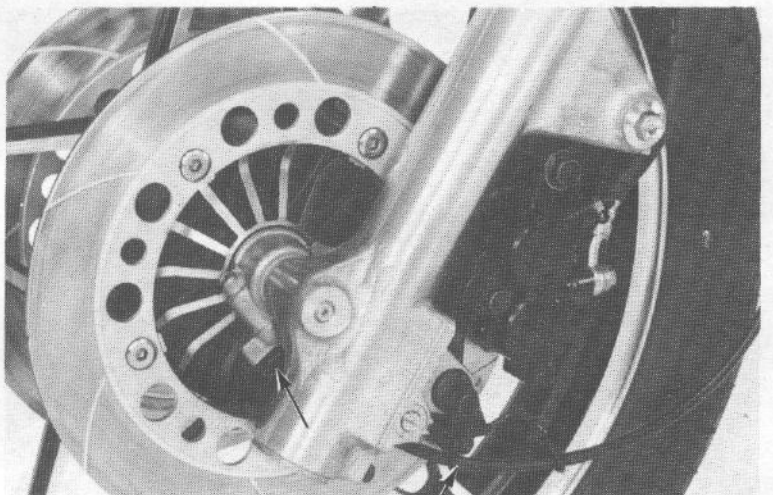
CAUTION:

After installing the wheel, apply the brakes several times and recheck the clearance on both sides. Failure to provide clearance will damage the brake discs and affect braking efficiency.



FRONT AXLE

Install the speedometer cable.



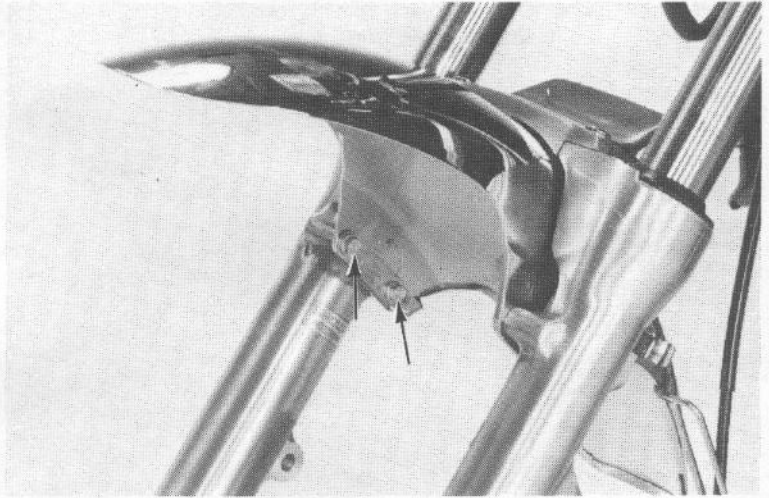
SPEEDOMETER CABLE

FRONT FORKS

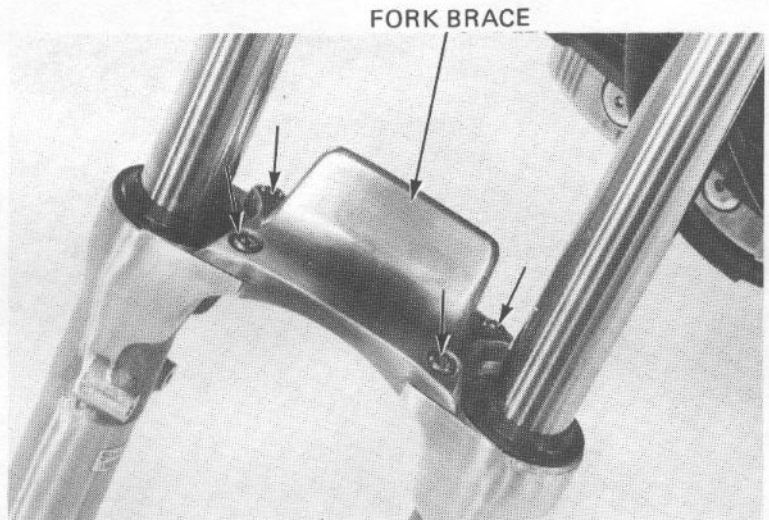
REMOVAL

Remove the following parts:

- front wheel.
- brake calipers.
- front fender.



Remove the fork brace.



Release fork air pressure.
Loosen the fork upper and lower pinch bolts.

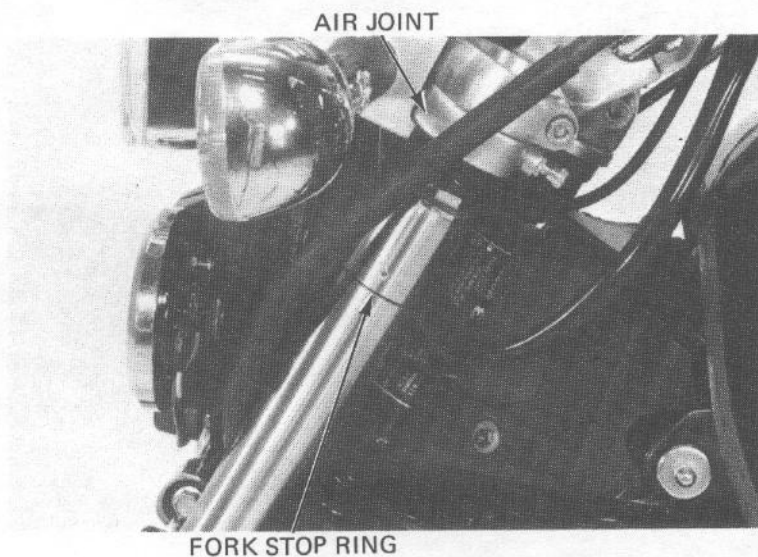


FRONT WHEEL/SUSPENSION

Pull each fork tube down and out of the fork top bridge and air joint. Rotate the fork tube while pulling.

Remove the fork stop rings.

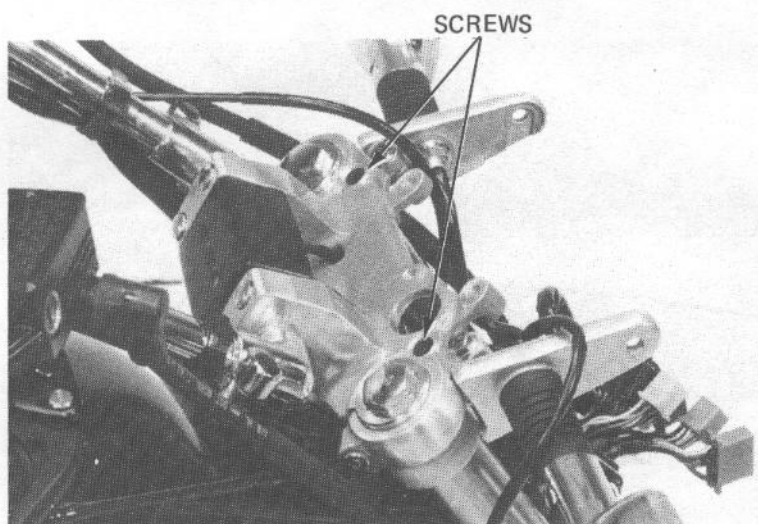
Pull each fork tube out of the bottom bridge.



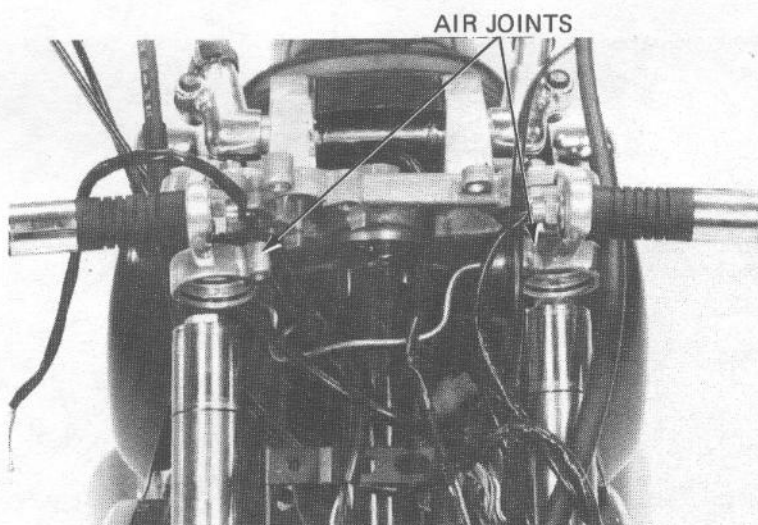
If service of the air joints is necessary, remove the following parts:

- coupler box (page 15-3).
- headlight and case (pages 15-4 and 15-5).
- instruments (page 15-7).

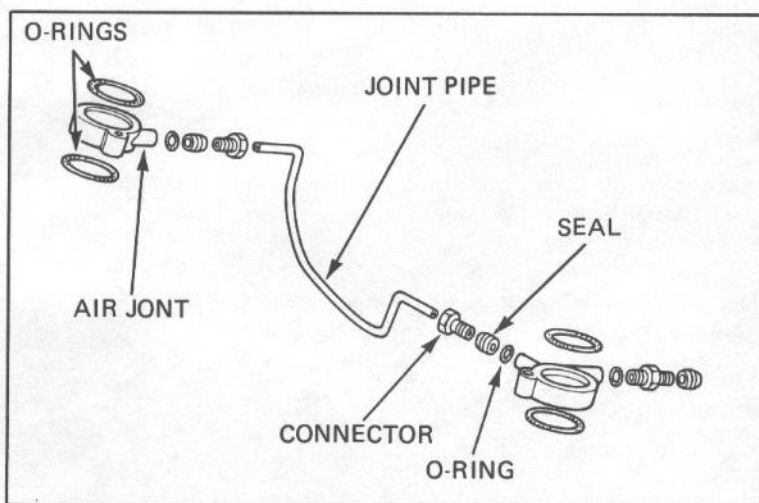
Remove the two screws attaching the fork air joints to the fork top bridge.



Remove the air joints.



Loosen the air joint pipe connectors and remove the joint pipe.

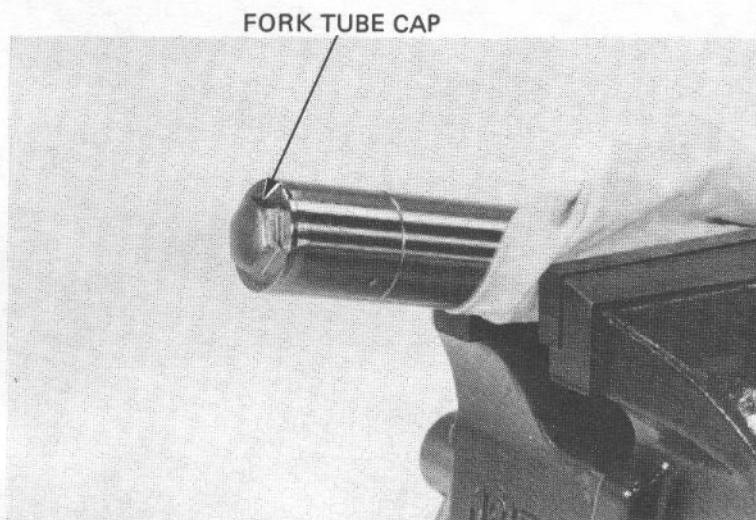


DISASSEMBLY

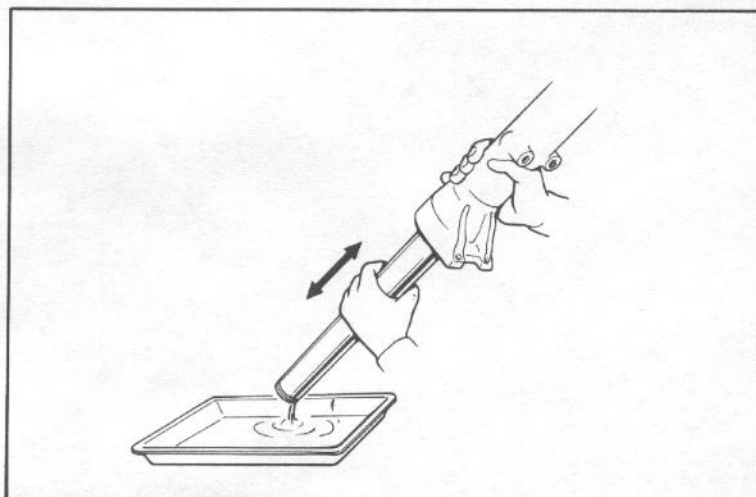
Hold the fork tube in a vise with soft jaws or a shop towel and remove the fork tube cap.

CAUTION:

Do not damage the sliding surface.



Remove the fork spring, spacer, and washer. Force out the fork fluid by pumping the fork up and down several times.



FRONT WHEEL/SUSPENSION

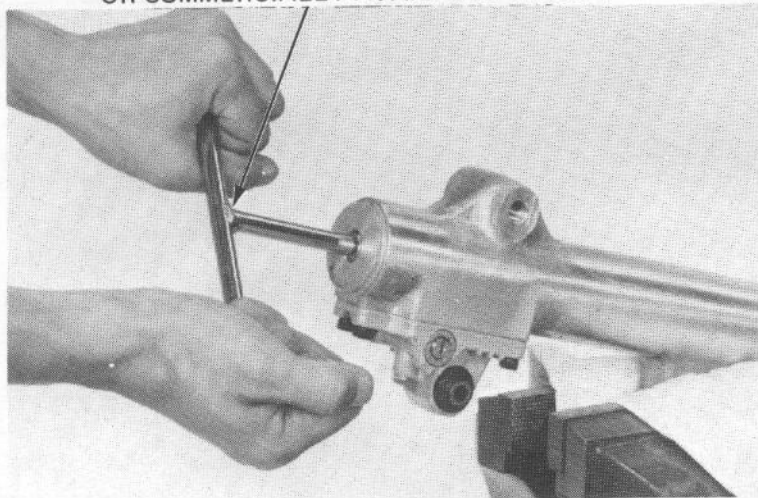
Hold the fork slider in a vise with soft jaws or a shop towel.
Remove the socket bolt with a hex wrench.

NOTE:

Temporarily install the spring and fork tube cap if difficulty is encountered in removing the bolt.

The piston and rebound spring can now be removed from the right fork.

HEX WRENCH (6 mm) 07917-3230000
OR COMMERCIALLY AVAILABLE IN U.S.A.



'83, '84, '85:

Remove the dust seal, sponge seal, and plastic washer. Discard the sponge seal and plastic washer.

After '85:

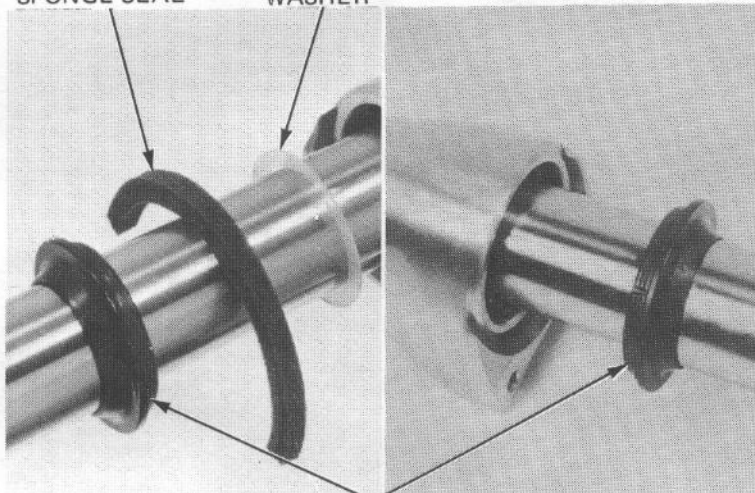
Remove the dust seal.

NOTE:

Do not reinstall the dust seal or sponge seal.
They are not needed.

'83, '84, '85:
SPONGE SEAL

PLASTIC AFTER '84:
WASHER

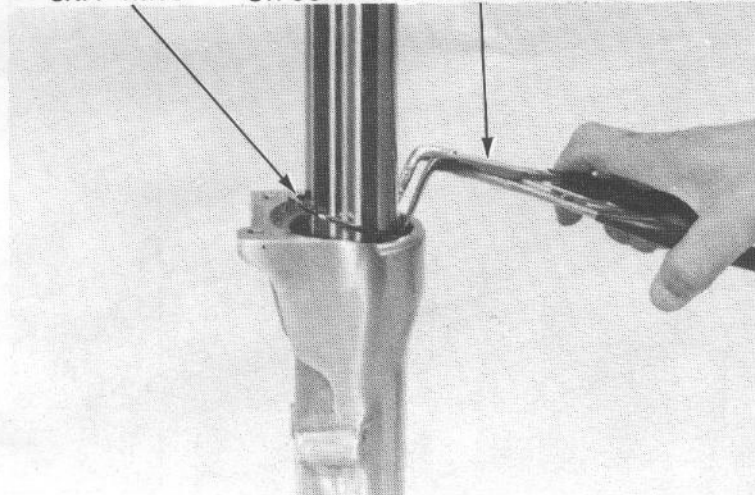


DUST SEAL

SNAP RING PLIERS 07914-3230001
OR COMMERCIALLY AVAILABLE IN U.S.A.

Remove the snap ring.

SNAP RING



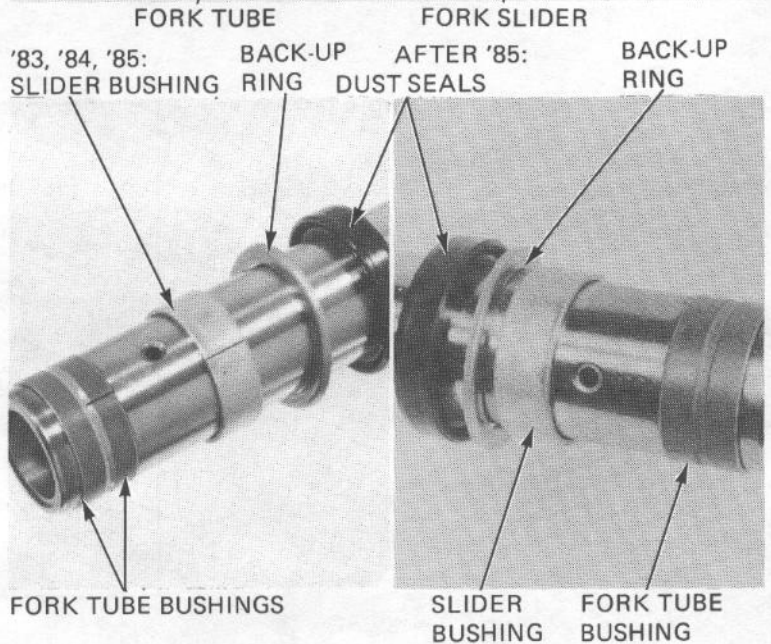
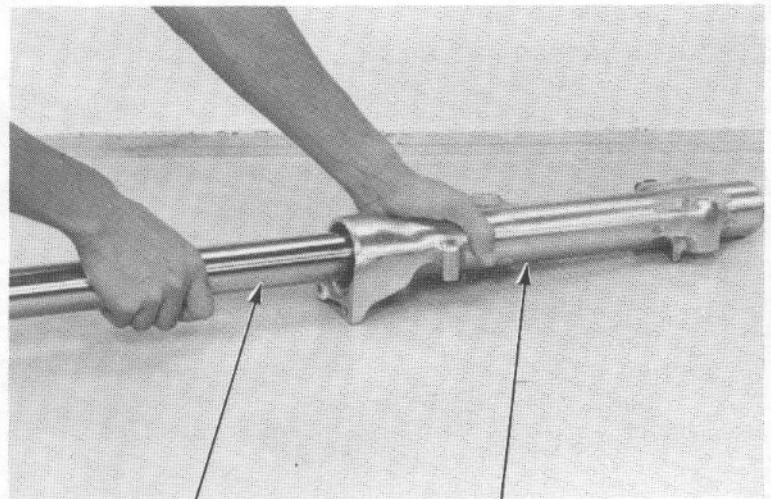
Pull the fork tube out until resistance from the slider bushing is felt. Then move it in and out, tapping the bushing lightly until the fork tube separates from the slider. The slider bushing will be forced out by the fork tube bushing.

Remove the oil lock piece from inside the slider.

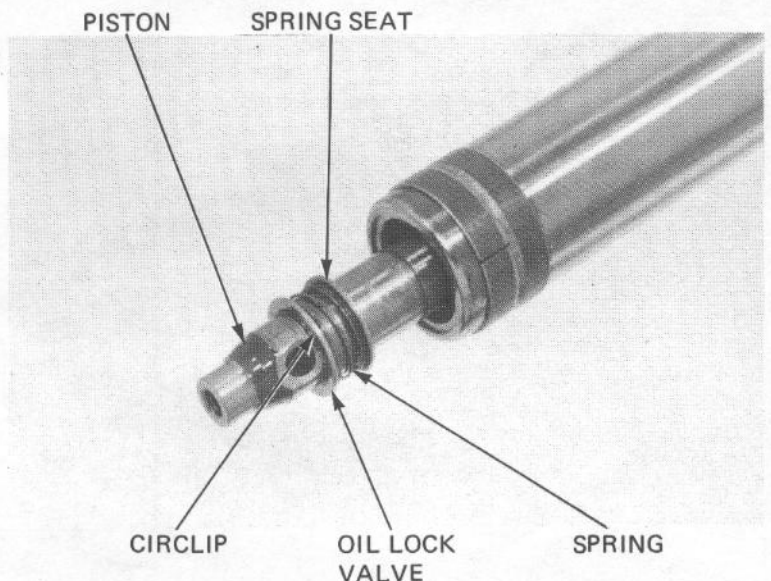
Remove the oil seal, back-up ring, and slider bushing from the fork tube.

NOTE:

Do not remove the fork tube bushing unless it is necessary to replace it with a new one.



From the left fork, remove the circlip, oil lock valve, spring, and spring seat from the piston. Remove the piston and rebound spring from the fork tube.



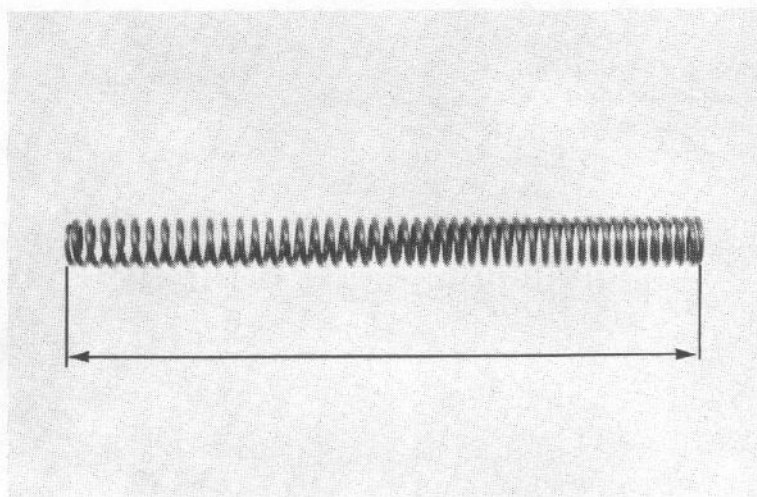
FRONT WHEEL/SUSPENSION

INSPECTION

FORK SPRING FREE LENGTH

Measure the fork spring free length.

SERVICE LIMIT: 404 mm (15.9 in)

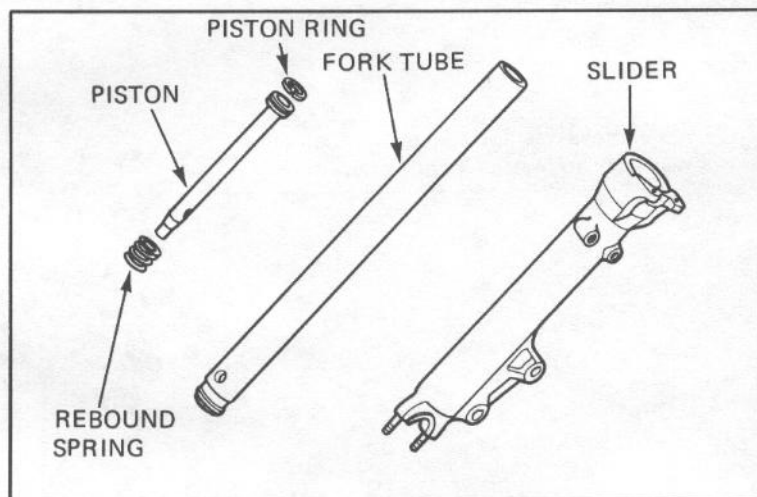


FORK TUBE/FORK SLIDER/PISTON

Check the fork tube, fork slider, and piston for score marks, scratches, or excessive or abnormal wear. Replace any components which are worn or damaged.

Check the fork piston ring for wear or damage.

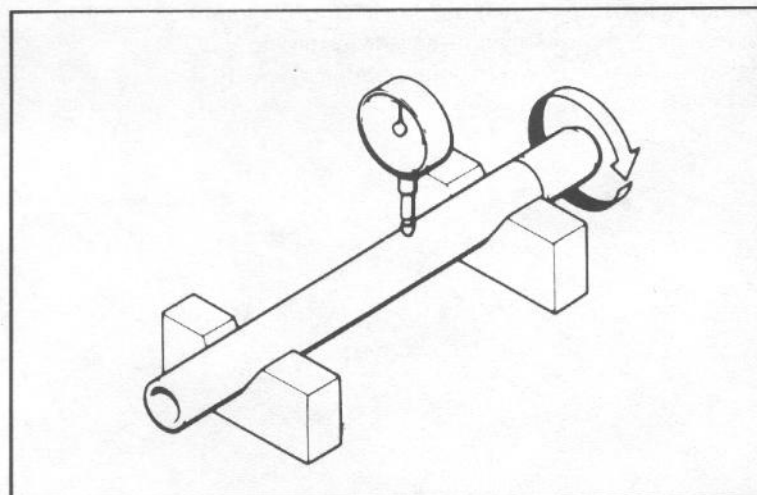
Check the rebound spring for fatigue or damage.



FORK TUBE

Set the fork tube in V blocks and read the runout.

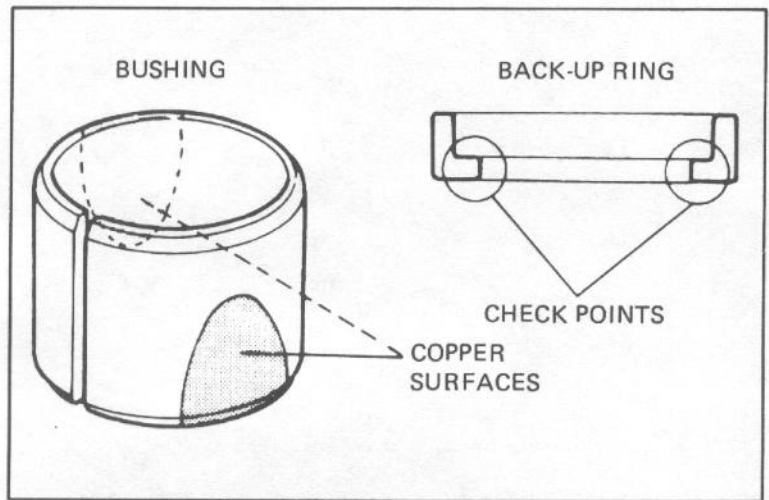
SERVICE LIMIT: 0.2 mm (0.01 in)



BUSHING/BACK-UP RING

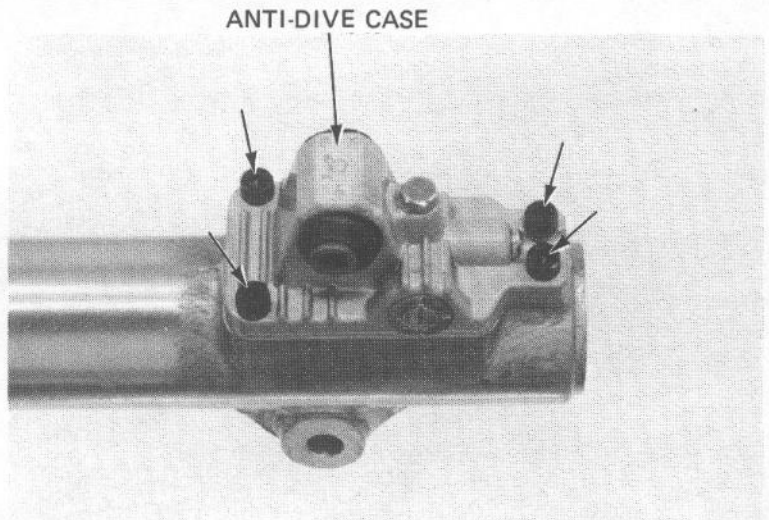
Visually inspect the slider and fork tube bushings. Replace the bushings if there is excessive scoring or scratching, or if the teflon is worn so that the copper surface appears on more than 3/4 of the entire surface.

Check the back-up ring; replace it if there is any distortion at the points shown.

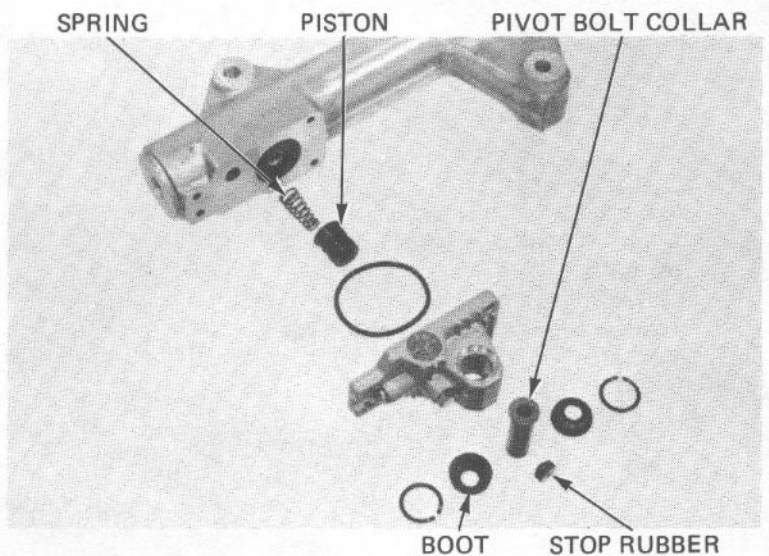


ANTI-DIVE CASE

Remove the four socket bolts and remove the anti-dive case.

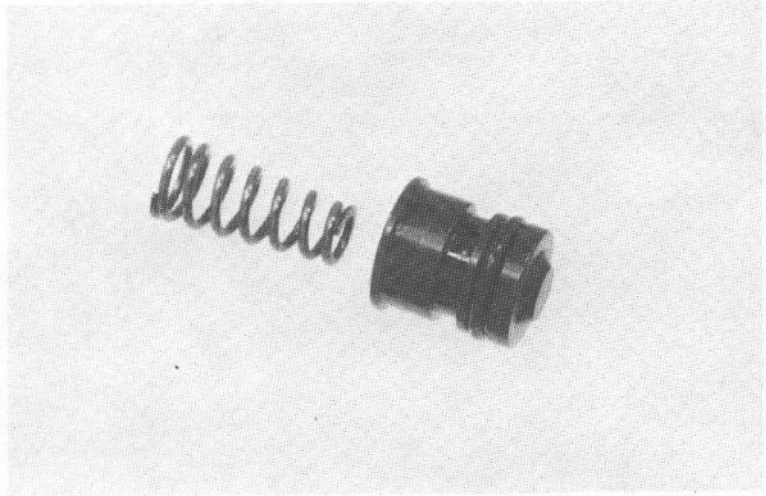


Remove the piston and spring. Remove the boots, pivot bolt collar, and stop rubber.

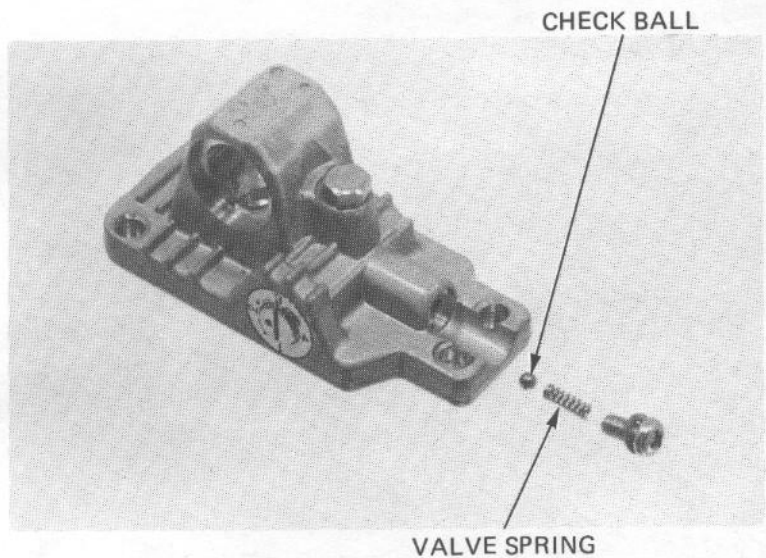


FRONT WHEEL/SUSPENSION

Check the spring and piston for wear or damage.



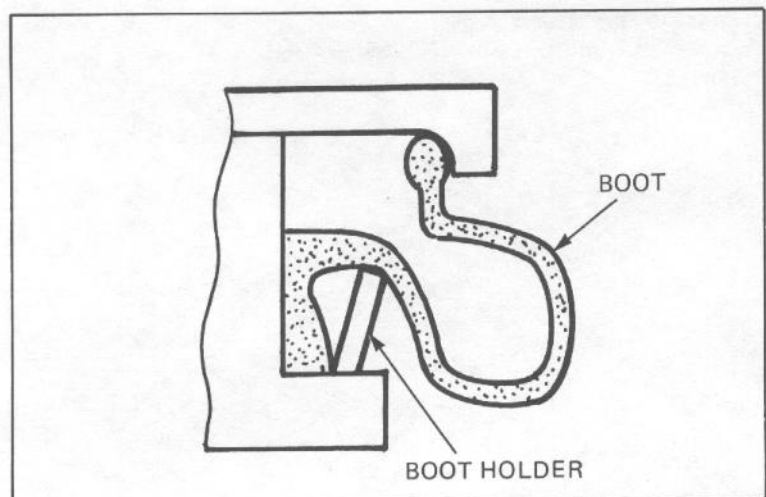
Remove the check valve setting screw, valve spring, and check ball.



Assemble the anti-dive case in the reverse order of disassembly.

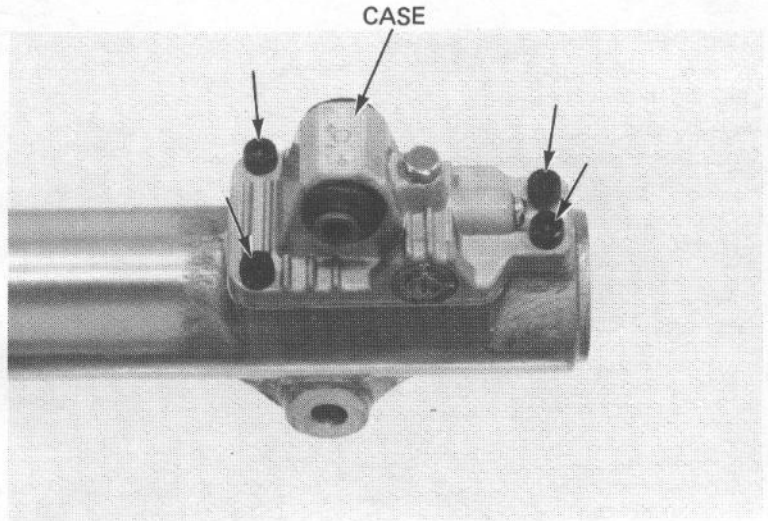
NOTE:

- Apply a Thread Lock Agent to the threads of the screws and socket bolts before assembly.
- Apply ATF to the piston and piston O-ring.
- Apply silicone grease to the pivot bolt collar.
- Install the pivot bolt collar boot holder as shown.



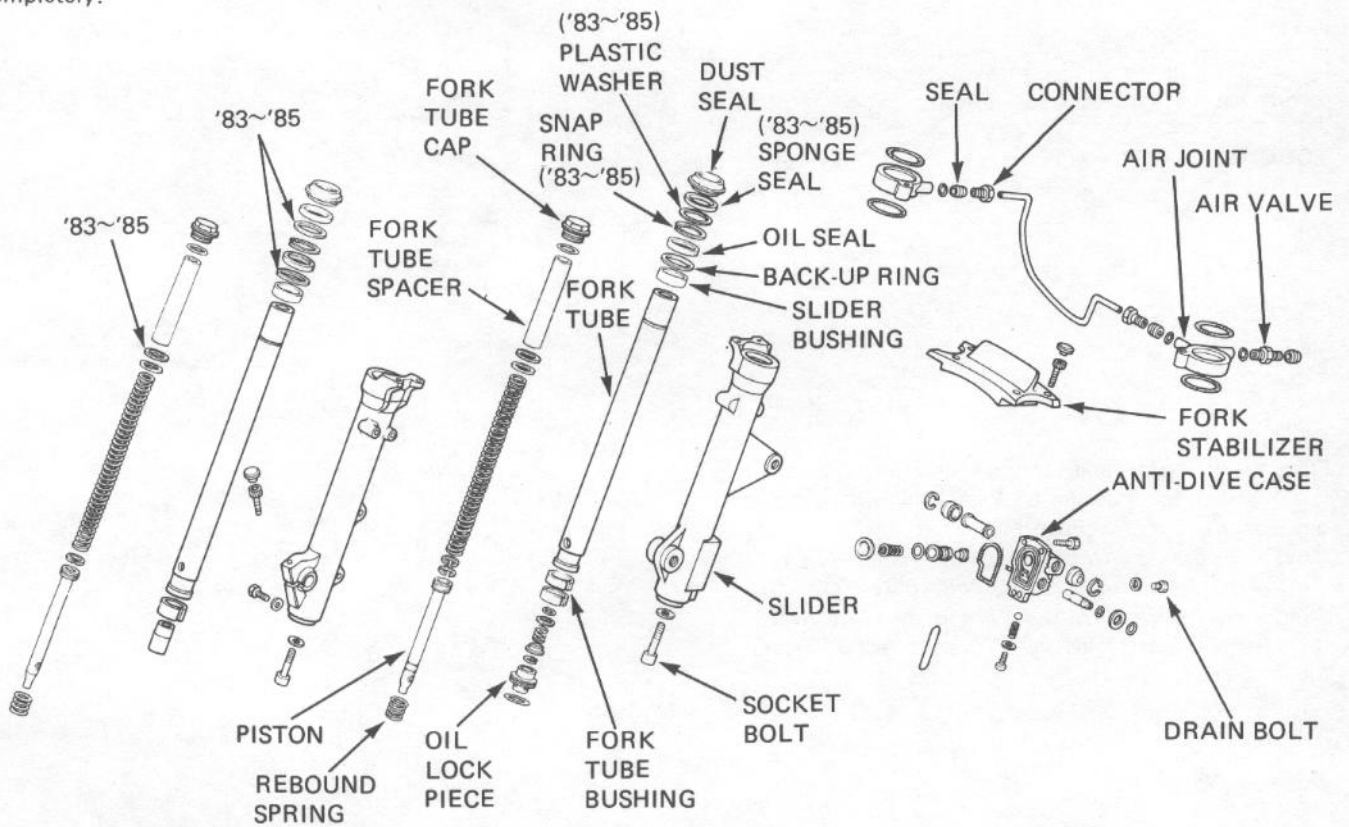
Check the operation of the collar and piston.

STANDARD PISTON STROKE: 2.5 mm (0.10 in)



ASSEMBLY

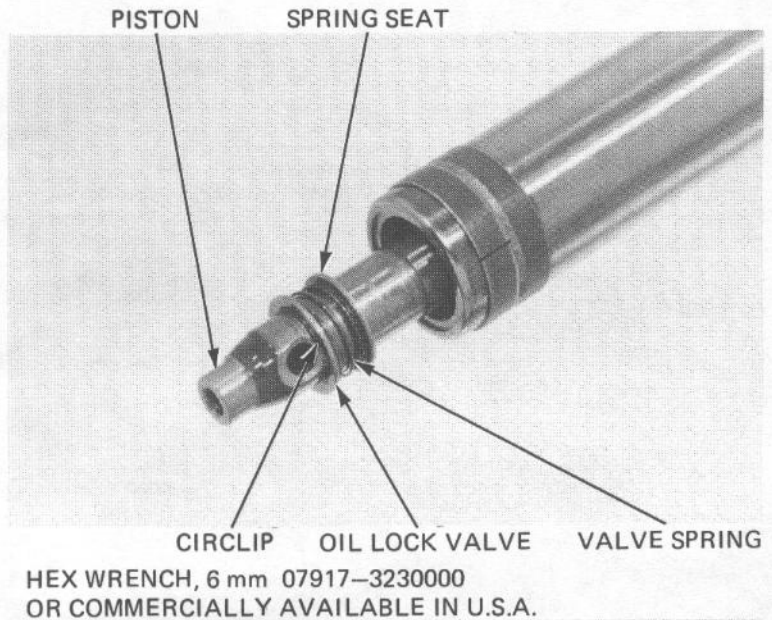
Before assembly, wash all parts with a high flash point or non-flammable solvent and wipe them off completely.



FRONT WHEEL/SUSPENSION

Insert the rebound spring and piston into the fork tube.

On the left fork, install the spring seat, valve spring, oil lock valve, and circlip on the piston. Place the oil lock piece on the end of the piston and insert the fork tube into the slider.



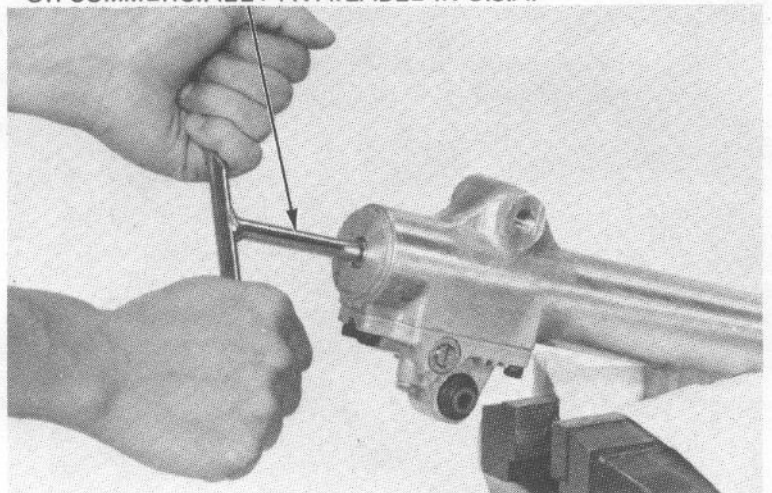
Place the fork slider in a vise with soft jaws or a shop towel.

Apply a locking agent to the socket bolt and thread it into the piston. Tighten with a 6 mm hex wrench.

NOTE:

Temporarily install the fork spring and fork tube cap to tighten the socket bolt.

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

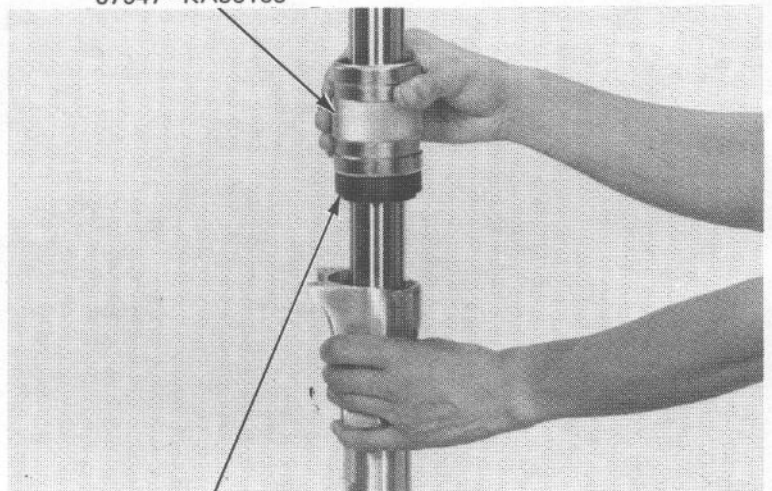


Place the slider bushing over the fork tube and rest it on the slider. Put the back-up ring and an old bushing or equivalent tool on top.

Drive the bushing into place with the seal driver and remove the old bushing or equivalent tool.

Coat a new oil seal with ATF and install it with the seal markings facing up. Drive the seal in with the seal driver.

FORK SEAL DRIVER
07947-KA50100



FORK SEAL DRIVER ATTACHMENT
07947-KF00100

'83, '84, '85:

Install the snap ring with its radiused edge facing down and install the plastic washer, the sponge seal, and the dust seal.

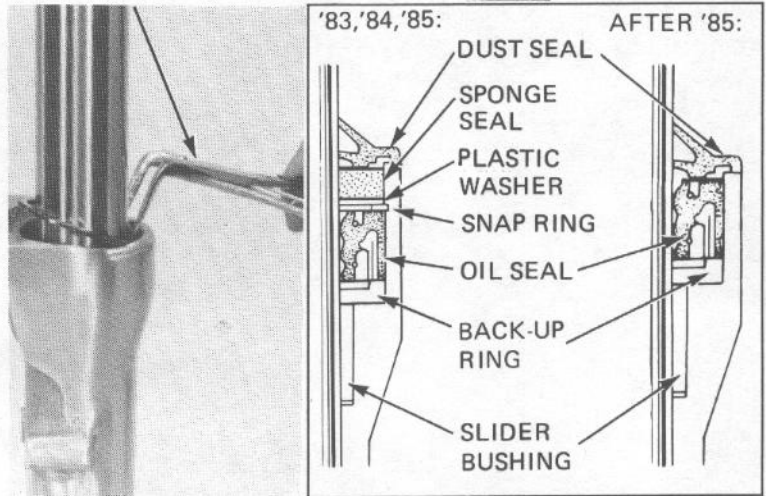
After '85:

Install the snap ring with its radiused edge facing down and install the dust seal.

NOTE:

Do not install a plastic washer or sponge seal.
They are not needed.

SNAP RING PLIERS 07914-3230001 OR
COMMERCIALLY AVAILABLE IN U.S.A.

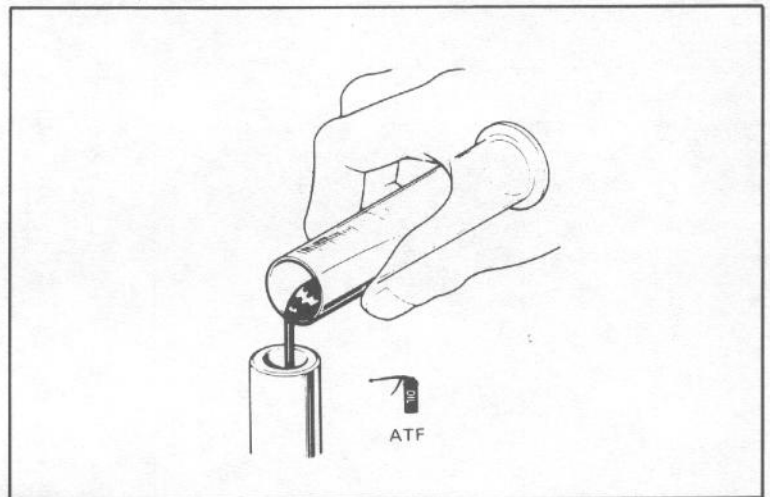


Pour the specified amount of ATF into the fork tube.

CAPACITY:

Right fork: 565 cc (19.1 oz)

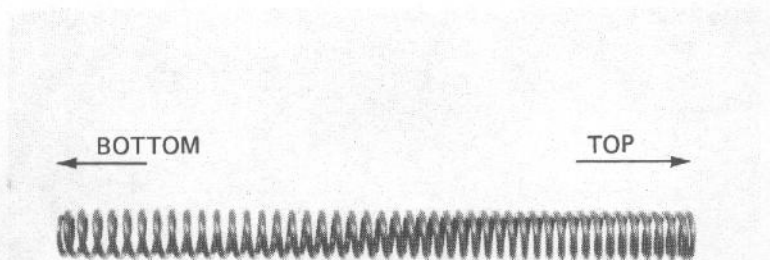
Left fork: 580 cc (19.6 oz)



Install the fork spring, spring seat, and spacer in the fork tube.

NOTE:

Note the spring direction; the narrow pitches should be at the top of the fork tube.

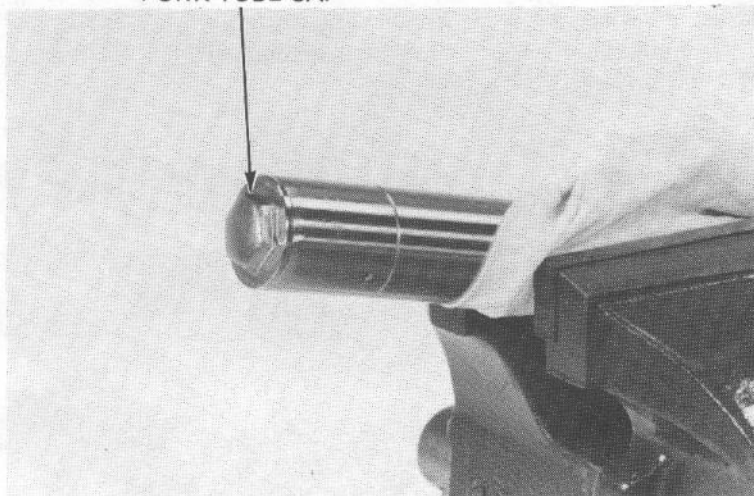


FRONT WHEEL/SUSPENSION

Install and torque the fork tube cap.

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

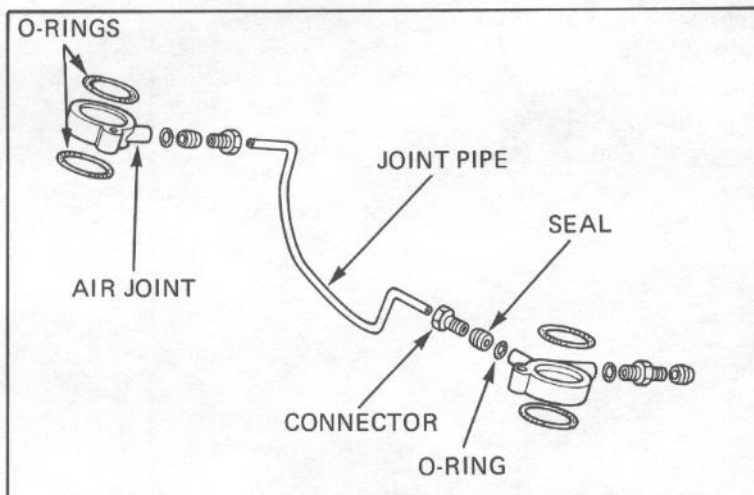
FORK TUBE CAP



INSTALLATION

If the air joints are disassembled, install new O-rings in the air joint groove.

Install the air joint pipe connectors, with new seals and O-rings over both ends of the air joint pipe and loosely tighten the connectors.

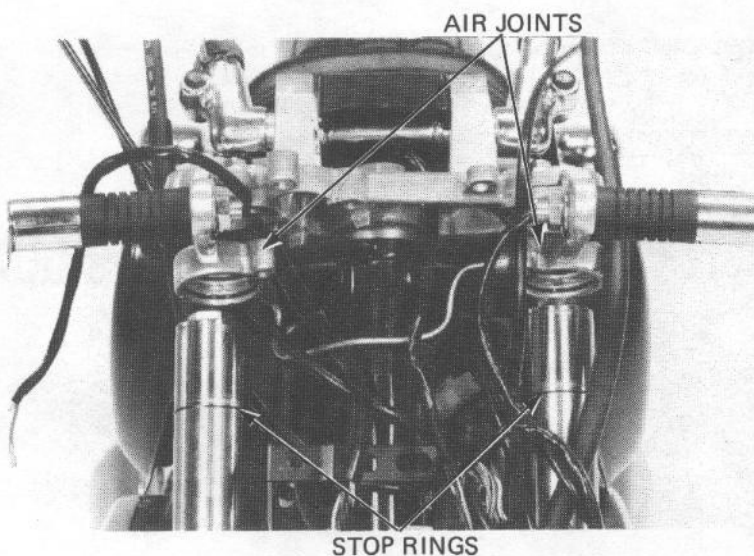


Install the front forks and temporarily tighten the lower fork pinch bolts.

Install the air joint stop rings in the grooves in the fork tubes.

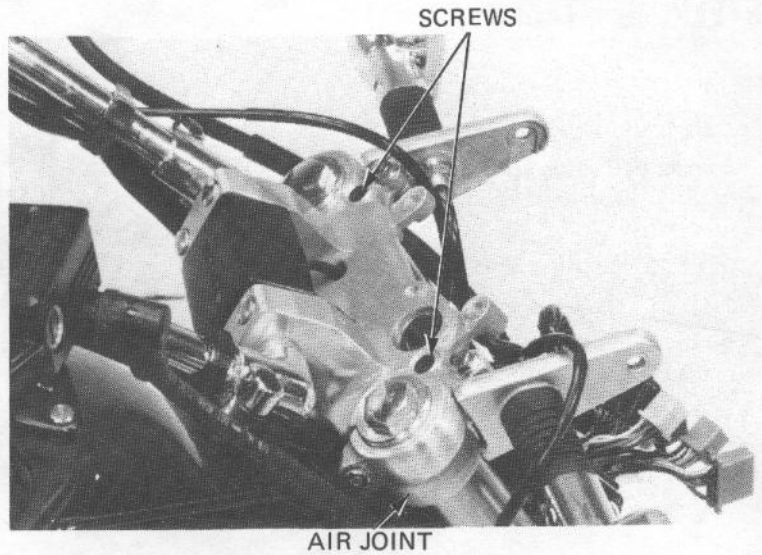
Install the fork air joints over the fork tubes and tighten the connectors.

TORQUE: 4–7 N·m (0.4–0.7 kg-m, 3–5 ft-lb)



Loosen the lower fork pinch bolts and adjust the fork tube level so that the air joints touch the underside of the fork top bridge.

Tighten the air joint mounting screws.



Tighten the upper and lower fork pinch bolts.

TORQUE:

Upper: 9–13 N·m (0.9–1.3 kg-m, 7–9 ft-lb)

Lower: 45–55 N·m (4.5–5.5 kg-m, 33–40 ft-lb)

Install the front fork stabilizer.

Install the removed parts in the reverse order of removal.

- front fender.
- front wheel.
- brake calipers.
- instruments.
- coupler box.
- headlight case and headlight.

With the front brake applied, pump the front forks up and down several times.

Tighten the front fork stabilizer mounting bolts.

TORQUE: 18–28 N·m (1.8–2.8 kg-m, 13–20 ft-lb)

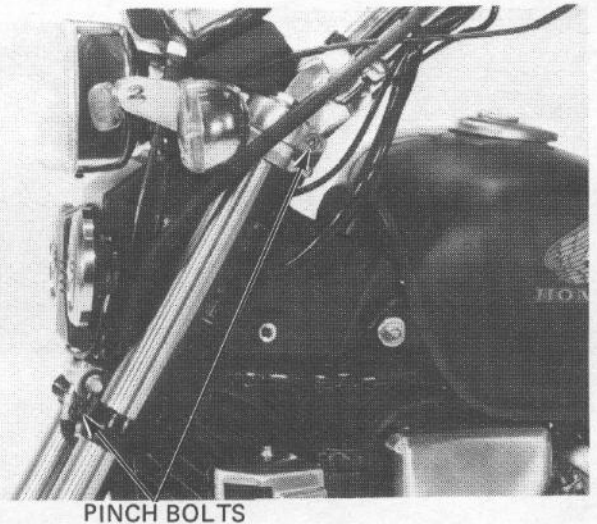
Install the bolt caps.

Fill the fork tubes with air to 0–40 kPa (0–0.4 kg/cm², 0–6 psi), and check for leaks.

CAUTION:

- Use only a hand operated air pump to fill the fork tubes. Do not use compressed air.
- Maximum pressure is 300 kPa (3 kg/cm², 43 psi). Do not exceed this or fork tube component damage may occur.

With the front brake applied, pump the front forks up and down several times. Place the motorcycle on its center stand. Check the air pressure and adjust if necessary.



FRONT FORK STABILIZER

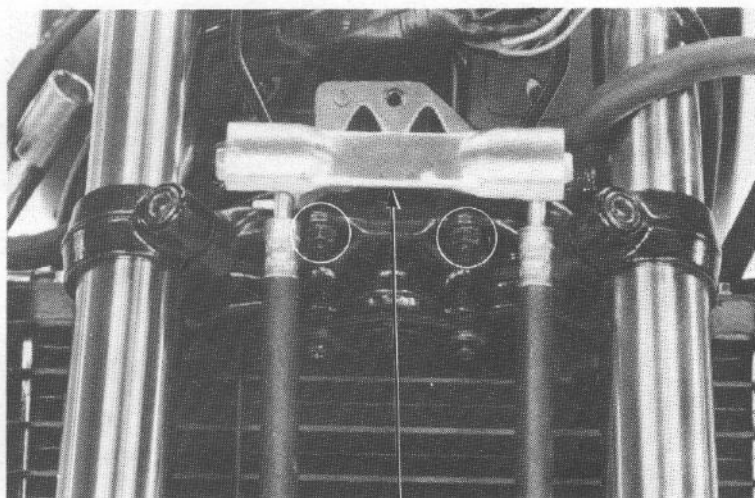


STEERING STEM

REMOVAL

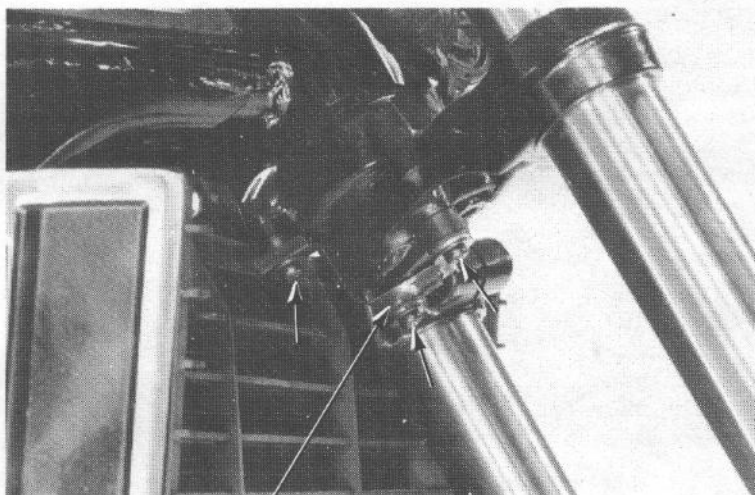
Remove the following components.

- coupler box (page 15-3).
- headlight and case (pages 15-4 and 15-5) and bracket.
- instruments (page 15-6).
- ignition switch (page 15-9).
- handlebars (page 15-11).
- front wheel (page 15-18).
- brake three way joint.



BRAKE THREE WAY JOINT

Remove the angle sensor.

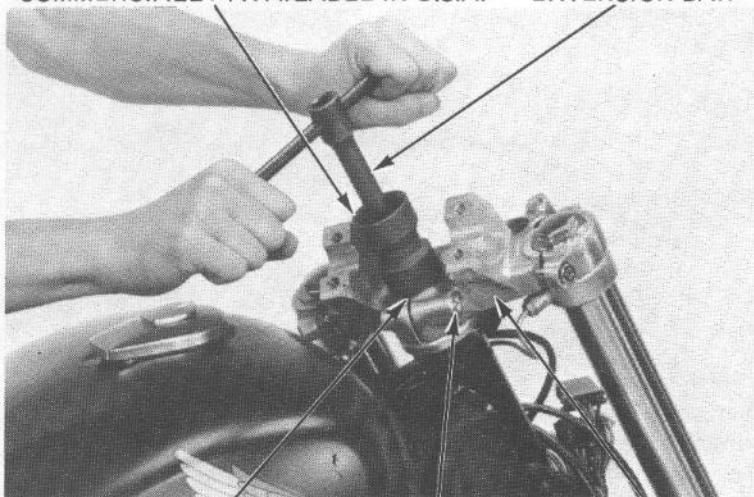


ANGLE SENSOR

Loosen the steering stem pinch bolt.

Remove the steering stem nut, fork bridge, front forks, and fork air joints (page 15-25).

LOCK NUT WRENCH, 30 x 32 mm 07716-0020400 OR
COMMERCIALLY AVAILABLE IN U.S.A. EXTENSION BAR

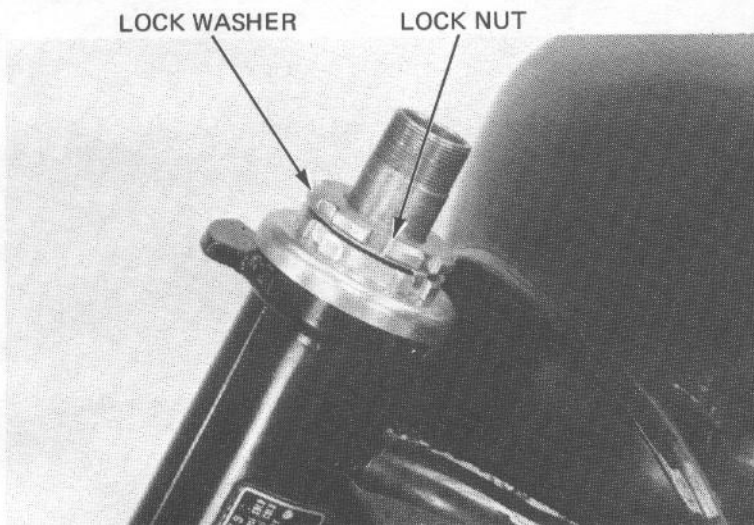


STEM NUT

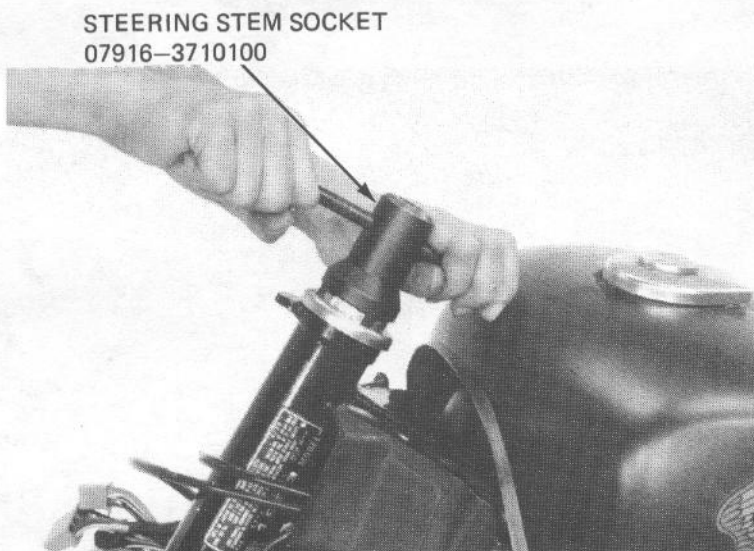
STEM PINCH
BOLT

FORK
BRIDGE

Straighten the lock washer tabs and remove the lock nut and lock washer.



Loosen the bearing adjustment nut and remove the steering stem.



Check the steering stem bearings for damage or wear.

BEARING REPLACEMENT

NOTE:

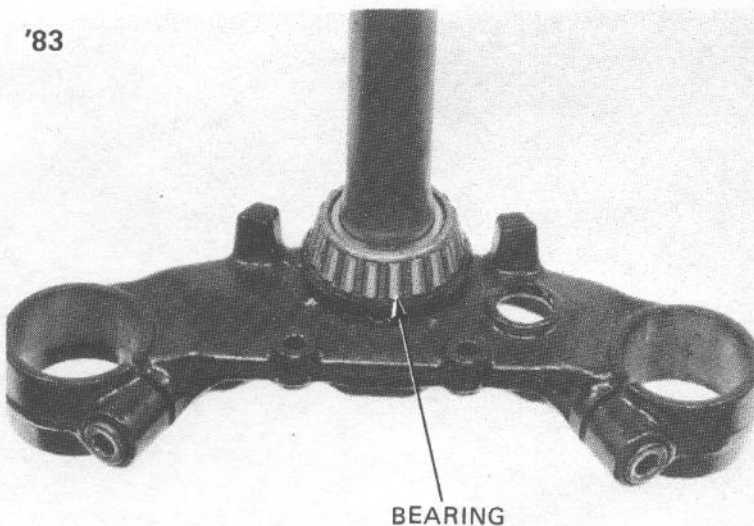
Replace the bearing and bearing race as a set.

'83:

Remove the bearing from the steering stem.

After '83:

Remove the bearing inner case and dust seal from the steering stem.

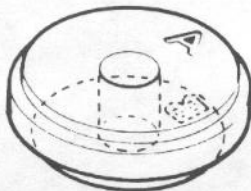


FRONT WHEEL/SUSPENSION

Remove the upper bearing race with the special tool.

NOTE:

Use side "A" of the race remover attachment 07953-MJ1000A.



Remove the lower bearing race with the special tool.

NOTE:

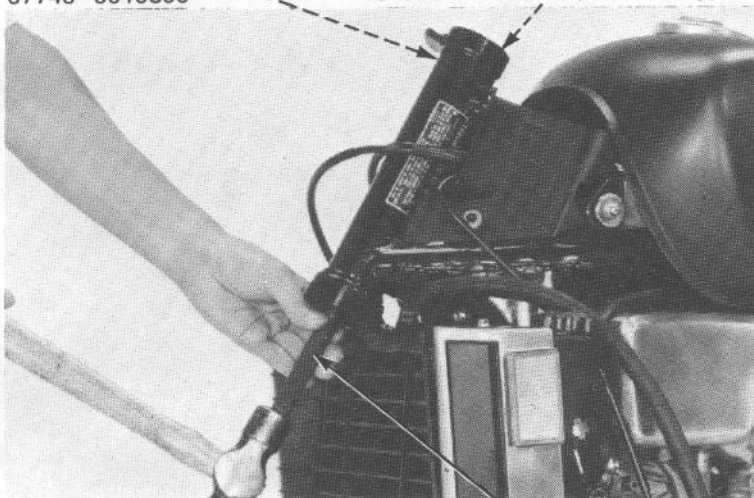
If the motorcycle has been involved in an accident, examine the area around the steering head for cracks.

Drive the upper bearing outer race into the head pipe with the special tools.

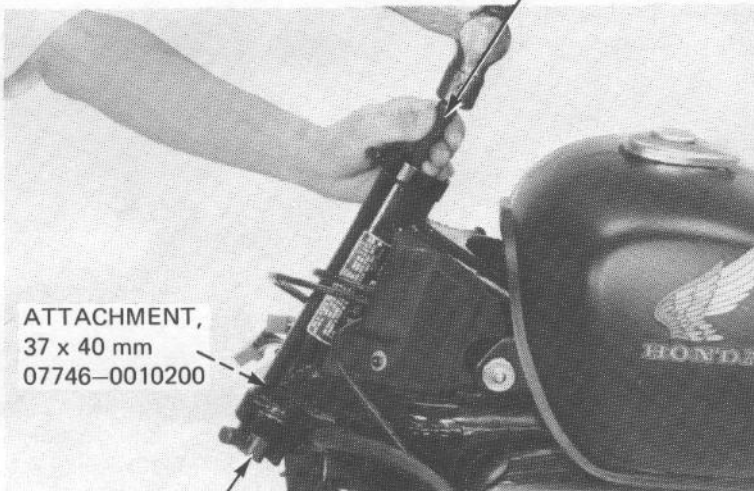
Drive the lower bearing outer race into the head pipe with the special tool.

ATTACHMENT, 42 x 47 mm
07746-0010300

RACE REMOVER ATTACHMENT
07953-MJ1000A (U.S.A. only)



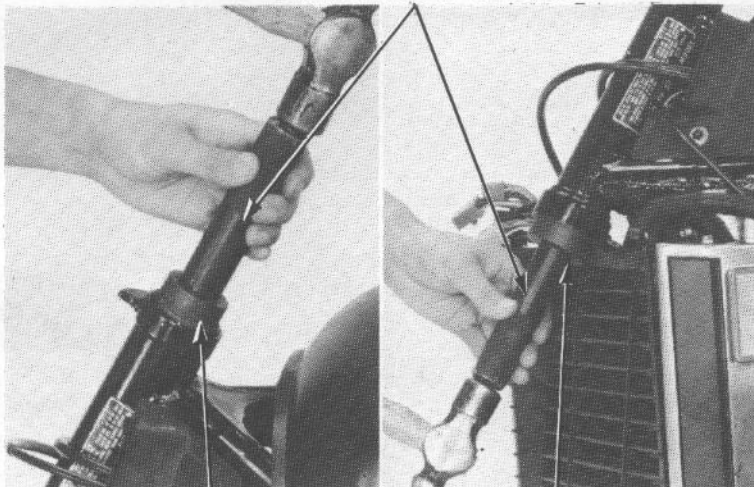
DRIVER 07949-3710001 OR
07949-3710000



ATTACHMENT,
37 x 40 mm
07746-0010200

BALL RACE REMOVER
07946-3710500

DRIVER 07749-0010000



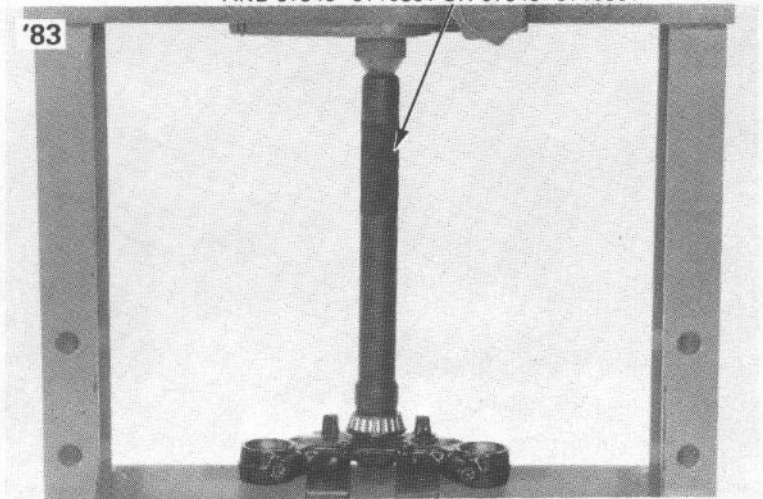
ATTACHMENT, 42 x 47 mm
07746-0010300

BALL RACE DRIVER
07946-3710701 OR ATTACHMENT,
52 x 55 mm 07746-0010400

FRONT WHEEL/SUSPENSION

Install a dust seal onto the steering stem and press the lower bearing inner race over the stem with the special tool.

STEERING STEM DRIVER 07946-MB00000 OR
ATTACHMENT "B" COLLAR 07964-MB00200
AND 07946-3710601 OR 07946-3710601



INSTALLATION

Pack the bearing cavities with grease.

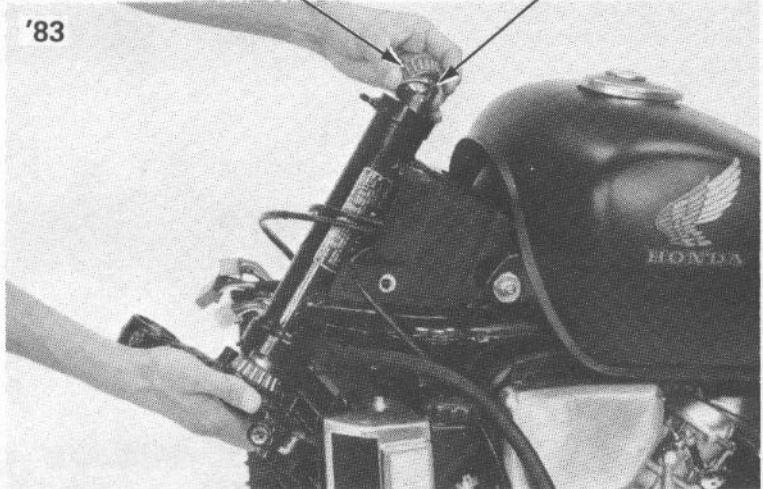
'83:

Insert the steering stem into the steering head pipe and install the bearing retainer and upper bearing inner race.

After '83:

Install the lower bearing and grease retainer onto the steering stem, then insert the steering stem into the steering head. Install the upper bearing and inner race.

UPPER BEARING
INNER RACE BEARING RETAINER



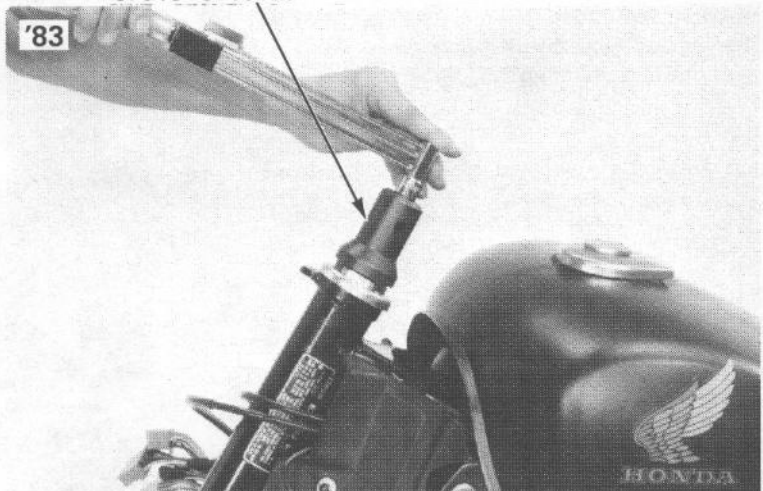
STEERING STEM SOCKET
07916-3710100

Install and tighten the bearing adjustment nut:

TORQUE:

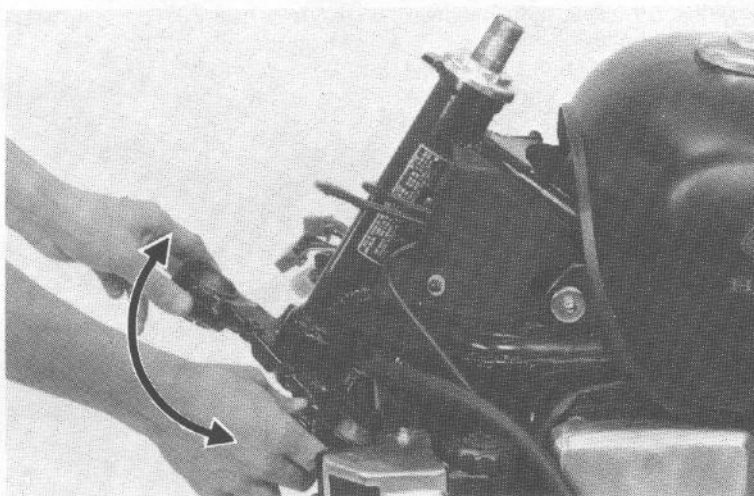
'83: 14–16 N·m (1.4–1.6 kg-m, 10–12 ft-lb)

After '83: 19–23 N·m (1.9–2.3 kg-m, 14–17 ft-lb)



FRONT WHEEL/SUSPENSION

Turn the steering stem lock-to-lock 5 times to seat the bearings.



'83:
Tighten the adjustment nut to the specified torque.

TORQUE: 10–12 N·m (1.0–1.2 kg·m, 7–9 ft·lb)

Again turn the steering stem lock-to-lock 5 times to seat the bearings, then tighten the adjustment nut to the same torque.

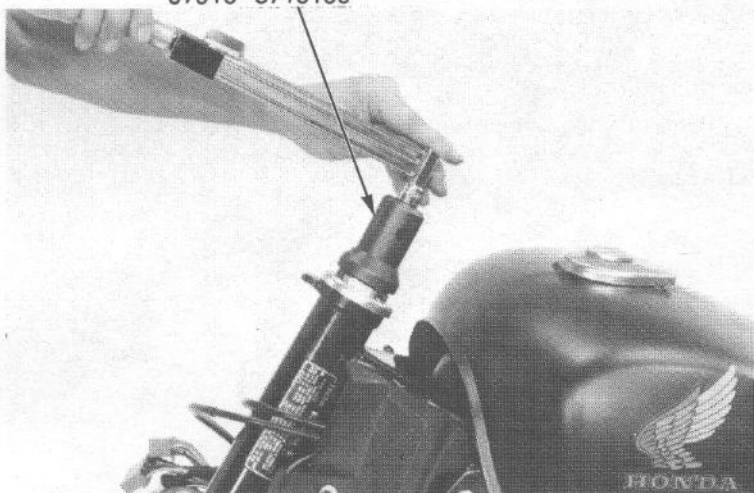
After '83:
Tighten the adjustment nut to the specified torque.
TORQUE: 19–21 N·m (1.9–2.1 kg·m, 14–15 ft·lb)

Install a new bearing adjustment nut lock washer aligning the tabs with the grooves in the nut. Bend two opposite tabs down into the grooves.

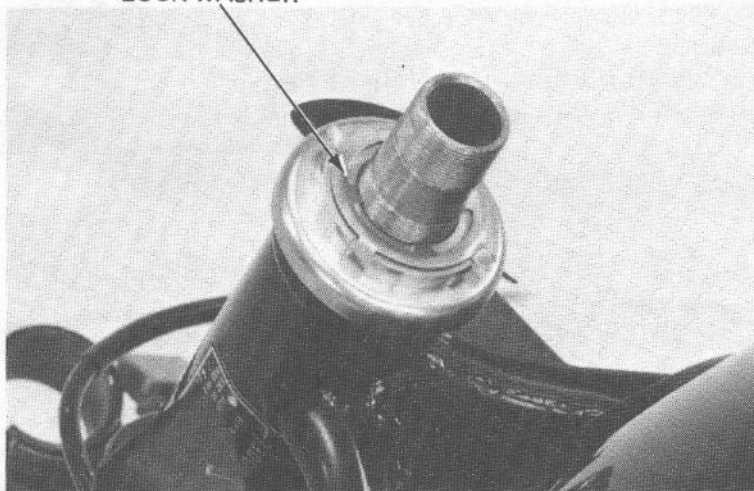
NOTE:

DO NOT install a used bearing adjustment nut lock washer.

STEERING STEM SOCKET
07916-3710100



LOCK WASHER

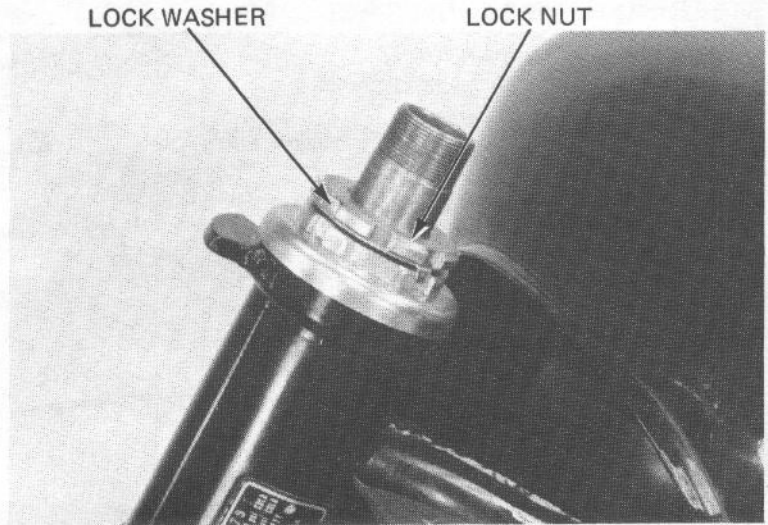


Hand tighten the lock nut.
Hold the adjustment nut and further tighten the lock nut only enough to align its grooves with the lock washer tabs.

NOTE:

If the lock nut grooves cannot be easily aligned with the lock washer tabs, remove the nut, turn it over and reinstall it.

Bend two lock washer tabs up into the lock nut grooves.

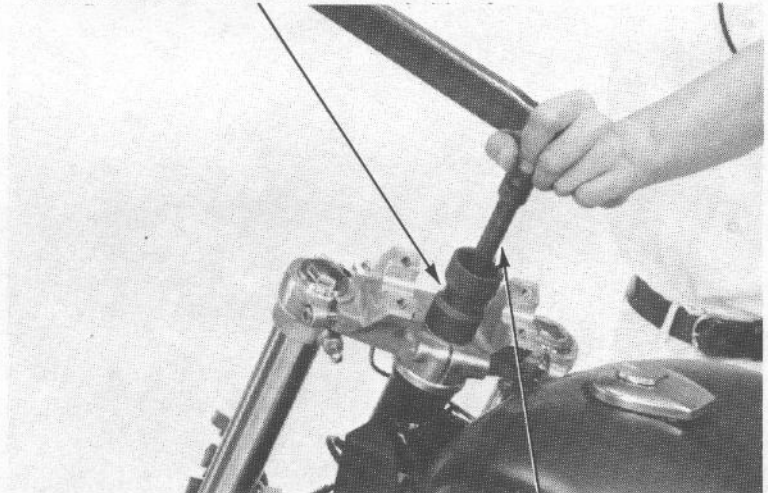


LOCK NUT WRENCH, 30 x 32 mm 07716-0020400
COMMERCIALY AVAILABLE IN U.S.A.

Install the front forks (page 15-36).
Install the fork top bridge and tighten the stem nut.

TORQUE:

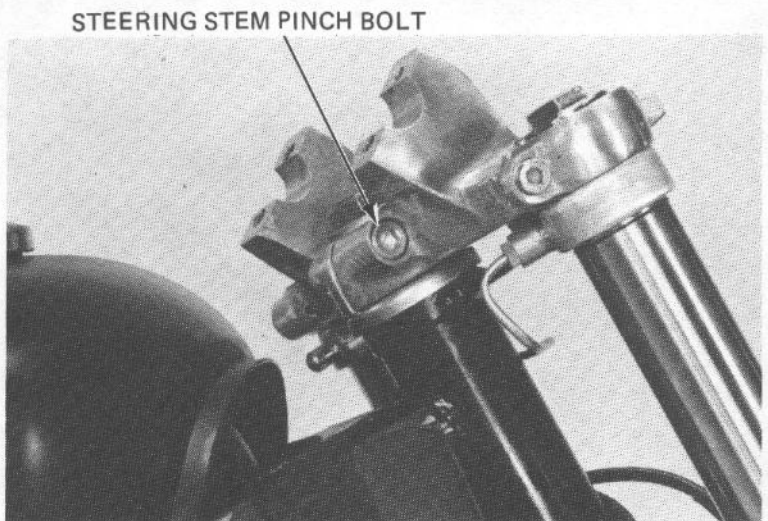
'83, '84, '85:
80-120 N·m (8.0-12.0 kg-m, 58-87 ft-lb)
After '85:
90-120 N·m (9.0-12.0 kg-m, 65-87 ft-lb)



EXTENSION BAR 07716-0020500
COMMERCIALY AVAILABLE IN U.S.A.

Tighten the steering stem pinch bolt.

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



FRONT WHEEL/SUSPENSION

STEERING HEAD BEARING PRELOAD

Install the front wheel (page 15-23).

Place a stand under the engine and raise the front wheel off the ground.

Position the steering stem at the straight ahead position.

Hook a spring scale to the fork tube and measure the steering head bearing preload.

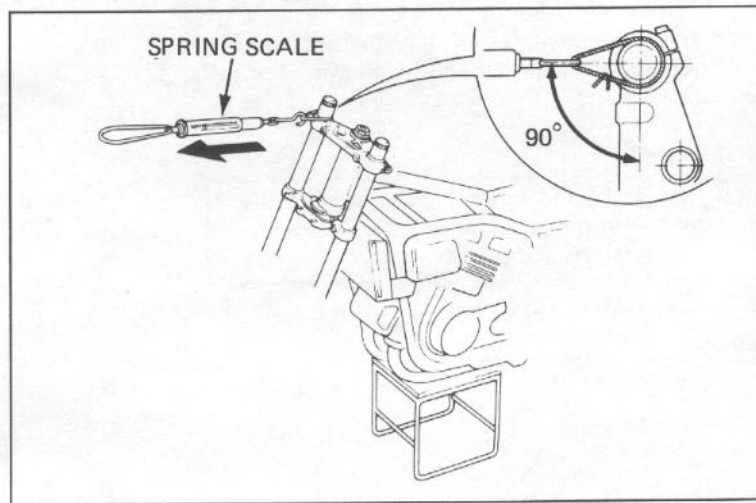
NOTE:

Make sure that there is no cable or wire harness interference.

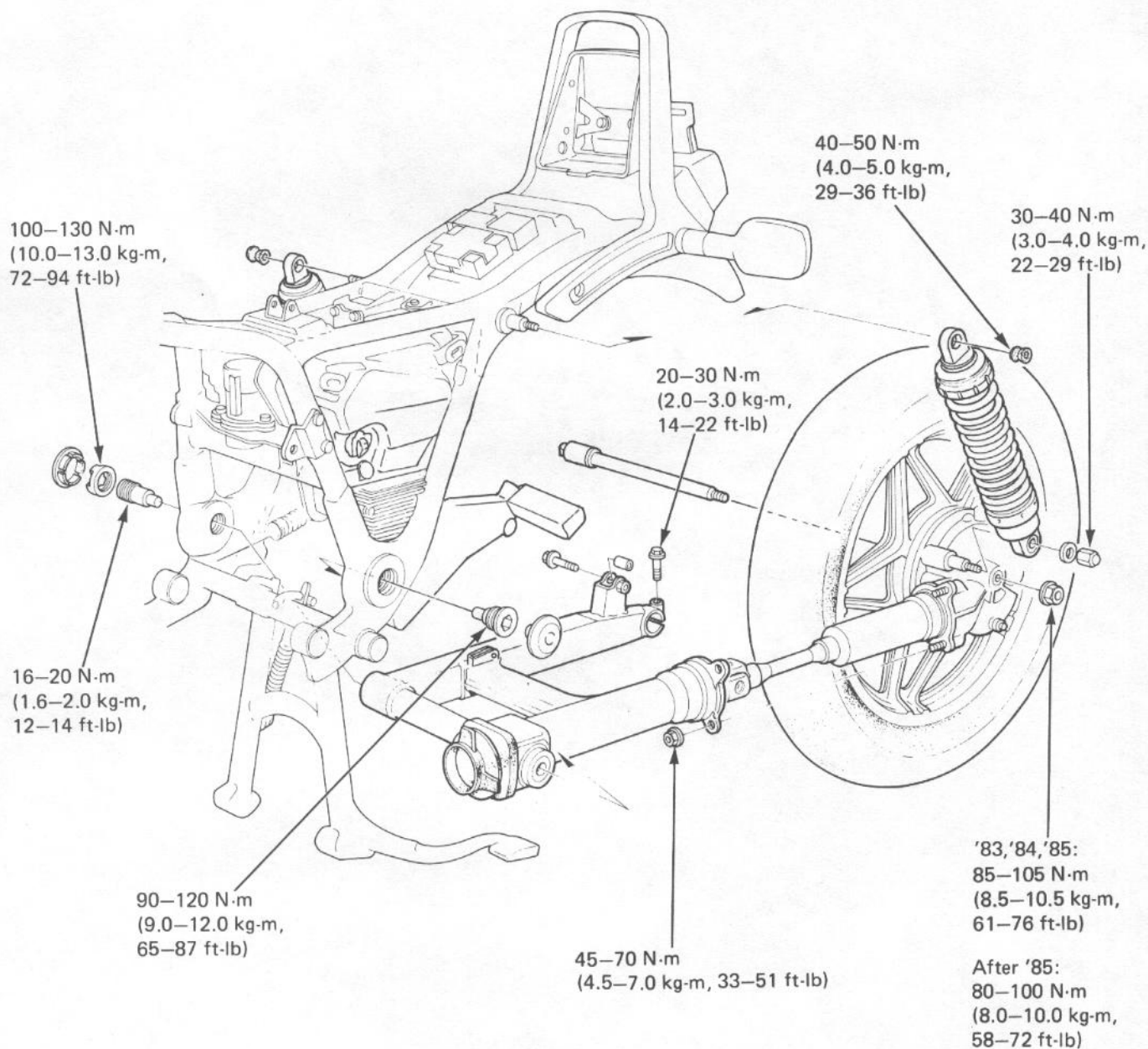
The preload should be within 1.0–1.6 kg (2.21–3.53 lb) for right and left turns.

If the readings do not fall within the limit, lower the front wheel on the ground and adjust the bearing adjustment nut.

After establishing the bearing correct preload, install the removed parts in the reverse order of removal.



REAR WHEEL/SUSPENSION



16. REAR WHEEL/SUSPENSION

| | |
|---------------------|-------|
| SERVICE INFORMATION | 16-1 |
| TROUBLESHOOTING | 16-2 |
| REAR WHEEL | 16-3 |
| SHOCK ABSORBER | 16-9 |
| SWING ARM | 16-14 |

SERVICE INFORMATION

GENERAL

- The rear wheel uses a tubless tire. For tubeless tire repairs, refer to the TUBELESS TIRE MANUAL.
- When using the lock nut wrench, use a deflecting beam type torque wrench 14-20 inches long. The lock nut wrench increases the torque wrench's leverage, so the torque wrench reading will be less than the torque actually applied to the lock nut. The specification given is the actual torque applied to the lock nut, not the reading on the torque wrench when used with the lock nut wrench. The torque wrench scale reading is given with the actual torque specification.

SPECIFICATIONS

| | | STANDARD | SERVICE LIMIT |
|-----------------------------------|--------|------------------|--------------------|
| Axle runout | | — | 0.2 mm (0.01 in) |
| Rear wheel rim runout | Radial | — | 2.0 mm (0.08 in) |
| | Axial | — | 2.0 mm (0.08 in) |
| Wheel bearing play | | — | 0.03 mm (0.001 in) |
| Shock absorber spring free length | | 248 mm (9.76 in) | 244 mm (9.6 in) |

TORQUE VALUES

| | | |
|-------------------------------|----------------|---|
| Rear axle nut | '83, '84, '85: | 85-105 N·m (8.5-10.5 kg-m, 61-76 ft-lb) |
| | After '85: | 80-100 N·m (8.0-10.0 kg-m, 58-72 ft-lb) |
| Axle pinch bolt | | 20-30 N·m (2.0-3.0 kg-m, 14-22 ft-lb) |
| Shock absorber mount bolt/nut | Upper | 40-50 N·m (4.0-5.0 kg-m, 29-36 ft-lb) |
| | Lower | 30-40 N·m (3.0-4.0 kg-m, 22-29 ft-lb) |
| Swing arm left pivot bolt | | 90-120 N·m (9.0-12.0 kg-m, 65-87 ft-lb) |
| Swing arm right pivot bolt | | 16-20 N·m (1.6-2.0 kg-m, 12-14 ft-lb) |
| Swing arm pivot lock nut | | 100-130 N·m (10.0-13.0 kg-m, 72-94 ft-lb) |
| Rear brake torque rod | | 18-25 N·m (1.8-2.5 kg-m, 13-18 ft-lb) |
| Final gear case attaching nut | | 45-70 N·m (4.5-7.0 kg-m, 33-51 ft-lb) |

TOOLS

| | | | |
|----------------|--------------------------------------|---------------|--|
| Special | Shock absorber compressor attachment | 07967-KC10000 | or KS-HBA-08-469 (U.S.A. ONLY) Commercially available in U.S.A. |
| | Swingarm pivot lock nut wrench | 07908-4690001 | |
| | Socket bit, 17 mm | 07703-0020500 | |
| | Bearing remover shaft | 07936-8890100 | |
| | Remover handle | 07936-3710100 | |
| | Remover weight | 07936-3710200 | |
| Common | Driver | 07749-0010000 | |
| | Attachment, 42 x 47 mm | 07746-0010300 | |
| | Pilot, 20 mm | 07746-0040500 | |
| | Attachment, 37 x 40 mm | 07746-0010200 | |
| | Shock absorber compressor | 07959-3290001 | |
| | Attachment, 52 x 55 mm | 07746-0010400 | |
| | Bearing remover shaft | 07746-0050100 | |
| | Bearing remover head, 20 mm | 07746-0050600 | |

TROUBLESHOOTING

Oscillation

1. Worn tires
2. Tire pressure incorrect
3. Faulty tire
4. Bent rim
5. Loose axle
6. Swingarm bearings worn
7. Loose wheel bearings

Soft suspension

1. Shock fluid leaking
2. Shock absorber worn internally

Hard suspension

- Bent shock absorber

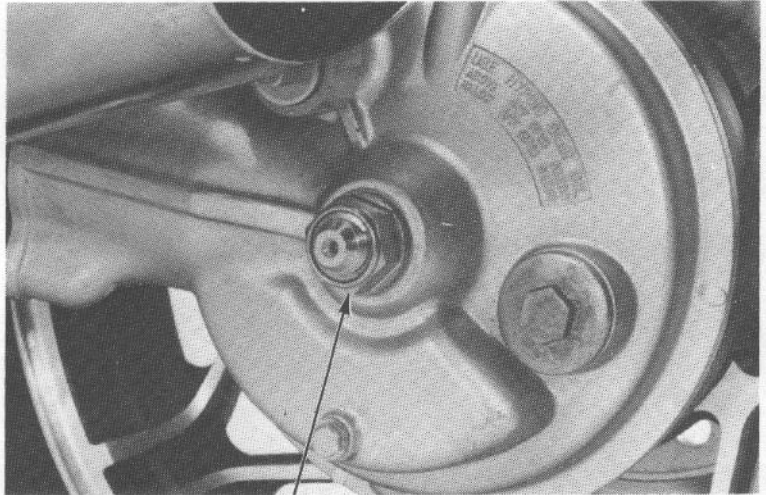
Suspension noise

1. Shock case binding
2. Loose fasteners

REAR WHEEL

REMOVAL

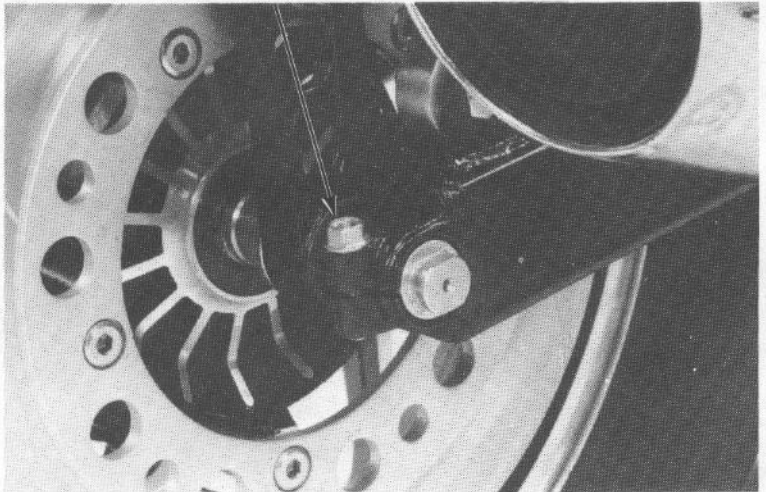
Place the motorcycle on its center stand and remove the axle nut.



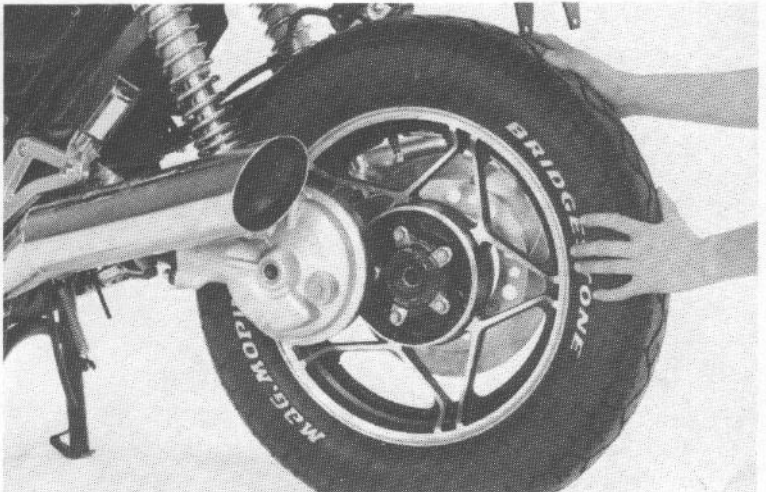
AXLE NUT

Loosen the axle pinch bolt and remove the rear axle.

AXLE PINCH BOLT



Move the wheel to the right to separate it from the final drive gear case.
Remove the rear wheel.



REAR WHEEL/SUSPENSION

WHEEL RIM RUNOUT

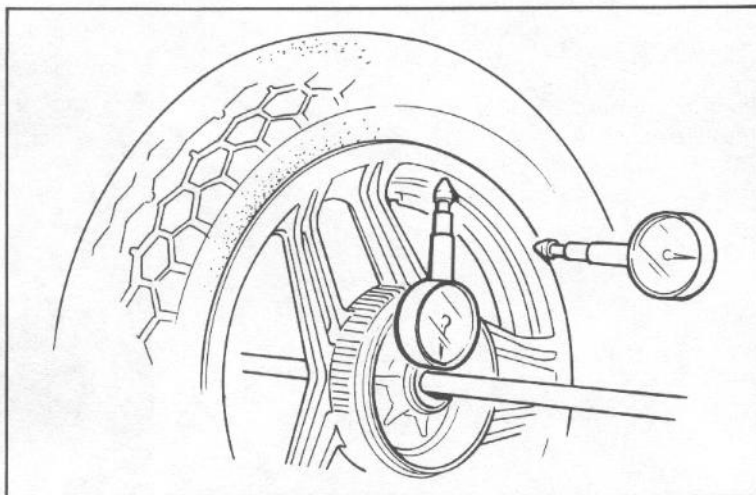
Check the rim for runout by placing the wheel in a truing stand. Turn the wheel slowly, and read the runout using a dial indicator.

SERVICE LIMITS:

RADIAL RUNOUT: 2.0 mm (0.08 in)

AXIAL RUNOUT: 2.0 mm (0.08 in)

The wheel cannot be trued and must be replaced if the above limits are exceeded.



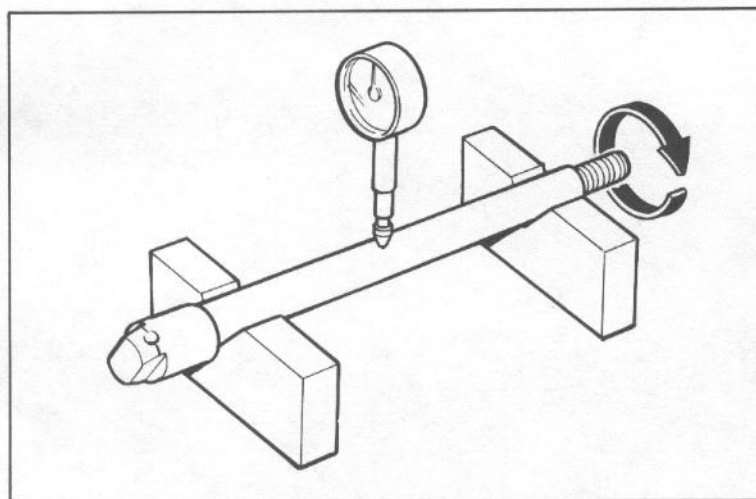
INSPECTION

AXLE

Set the axle in V blocks and read the axle runout with a dial indicator.

The actual axle runout is 1/2 of total indicator reading.

SERVICE LIMIT: 0.2 mm (0.01 in)



WHEEL BEARING INSPECTION

Turn the inner race of each bearing with your finger. The bearings should turn smoothly and quietly. Also check that the bearing outer race fits tightly in the hub.

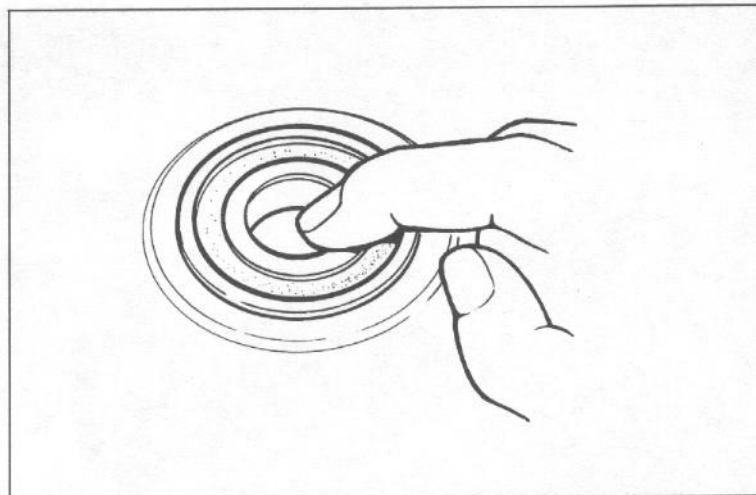
Remove and discard the bearings if the races do not turn smoothly, quietly, or if they fit loosely in the hub.

NOTE:

Replace hub bearings in pairs.

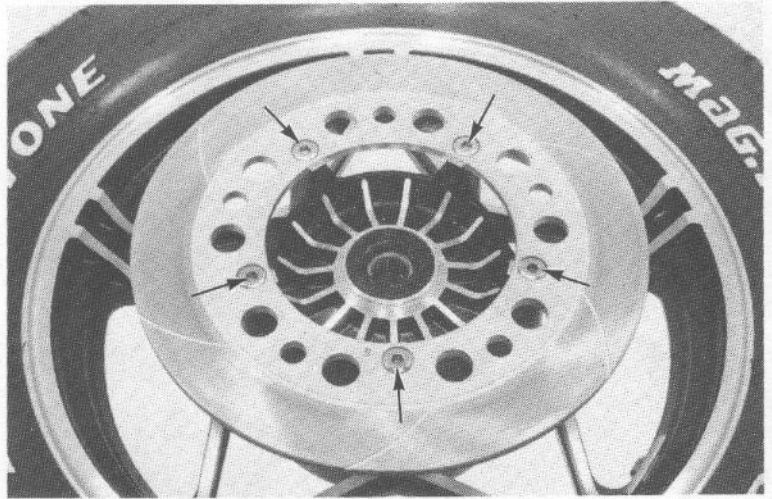
Pack new bearings with grease and install them into the hub with the special tools.

For bearing replacement, see page 16-6.

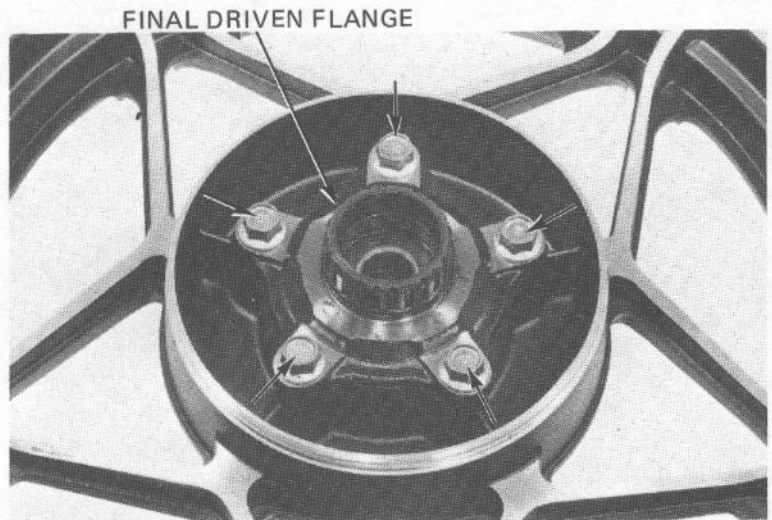


DISASSEMBLY

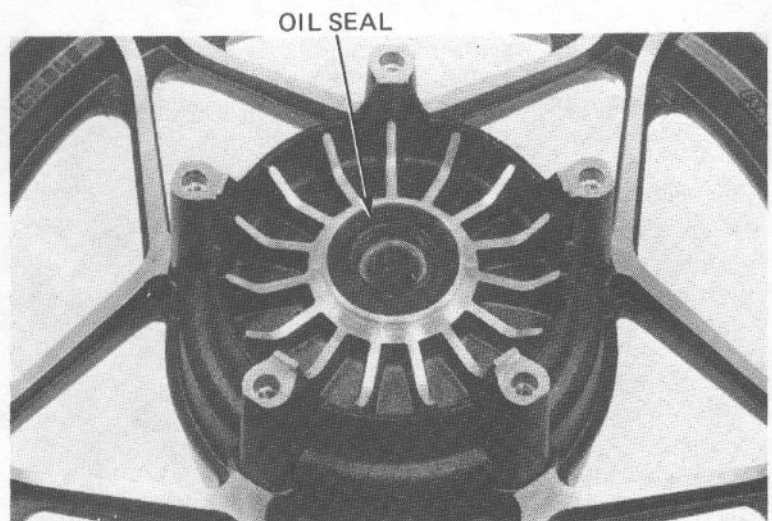
Remove the rear disc bolts and the discs.



Remove the final driven flange mount bolts and lift the driven flange out of the hub.

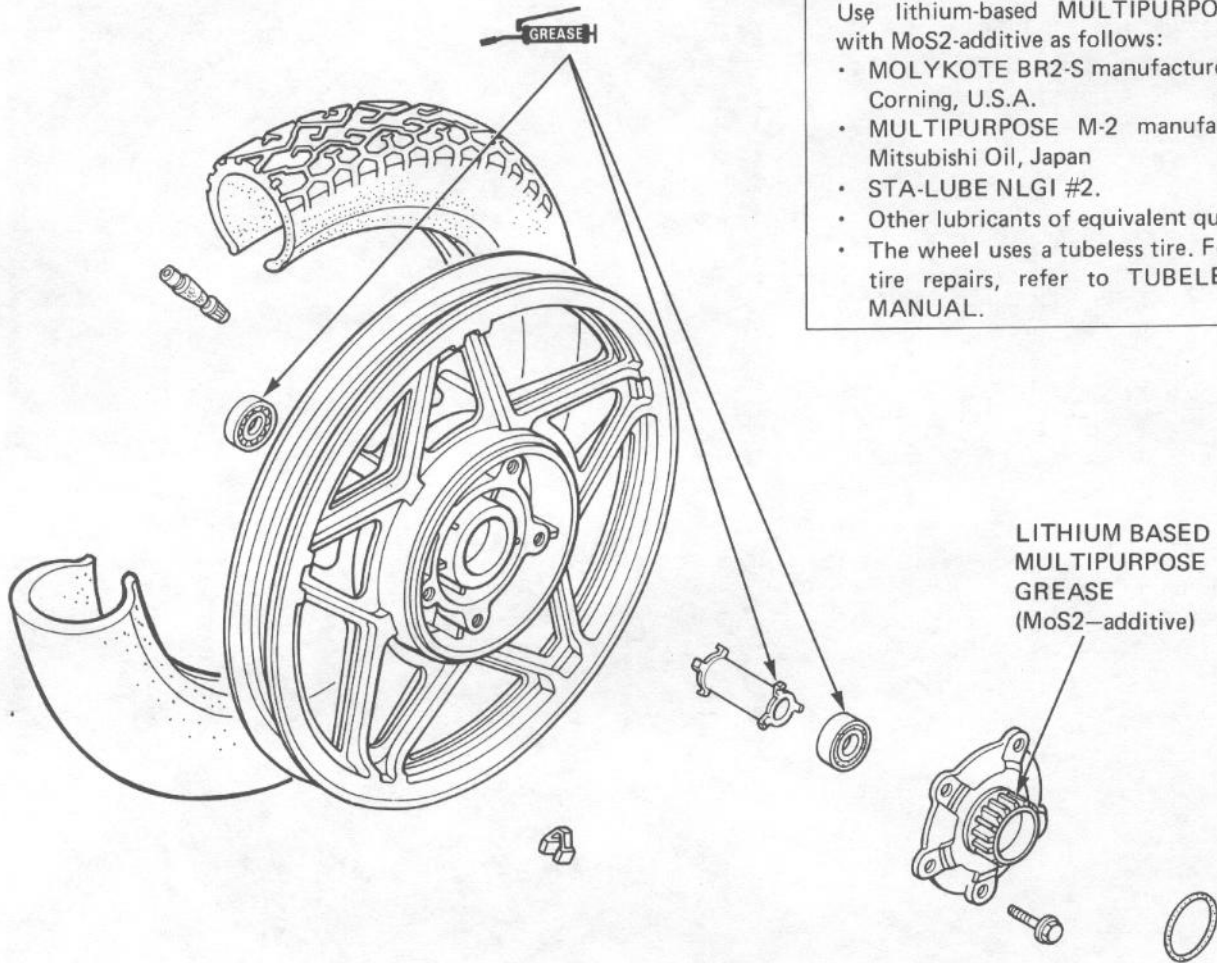


Remove the oil seal from the hub.
Inspect the condition of the bearings (page 16-4).
Remove the bearings with the bearing remover shaft (07746-0050100) and head (07746-0050600).
Remove the distance collar.
The bearing must be replaced with a new one if it is removed.



REAR WHEEL/SUSPENSION

ASSEMBLY



NOTE

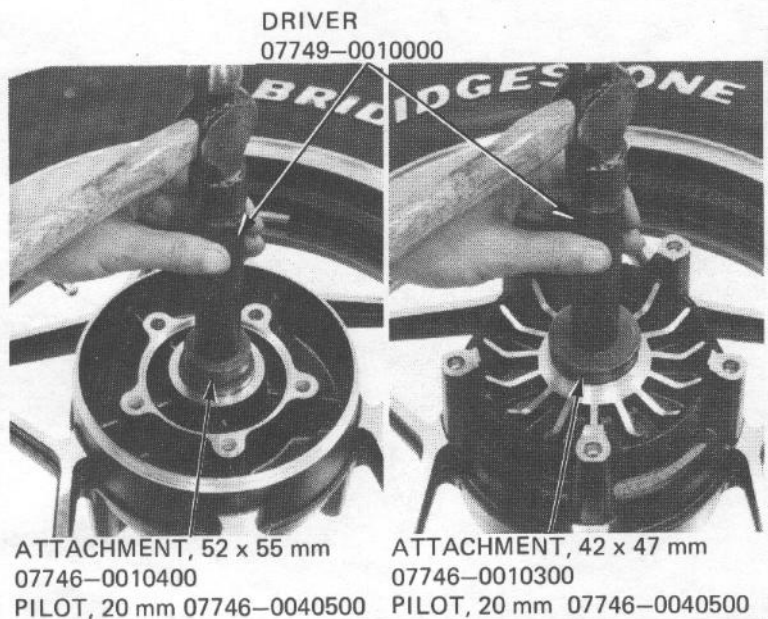
Use lithium-based MULTIPURPOSE grease with MoS₂-additive as follows:

- MOLYKOTE BR2-S manufactured by Dow Corning, U.S.A.
- MULTIPURPOSE M-2 manufactured by Mitsubishi Oil, Japan
- STA-LUBE NLGI #2.
- Other lubricants of equivalent quality.
- The wheel uses a tubeless tire. For tubeless tire repairs, refer to TUBELESS TIRE MANUAL.

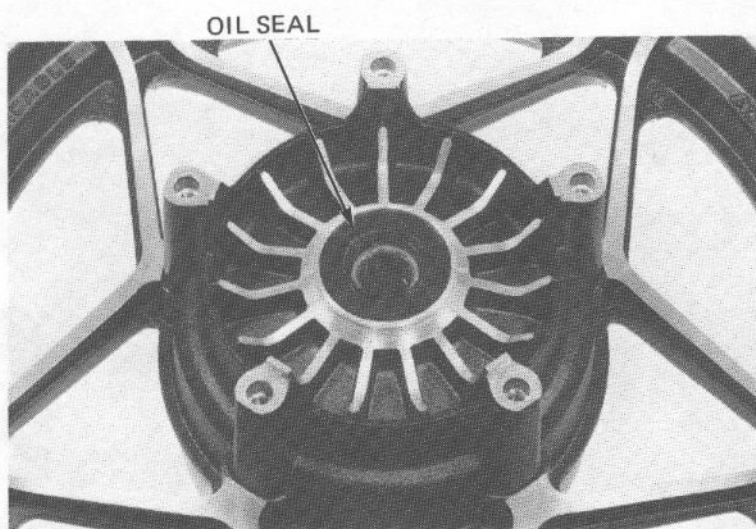
Pack all bearing cavities with grease.
Press the distance collar into place from the left side. Drive the right ball bearing in first, then the left ball bearing.

CAUTION

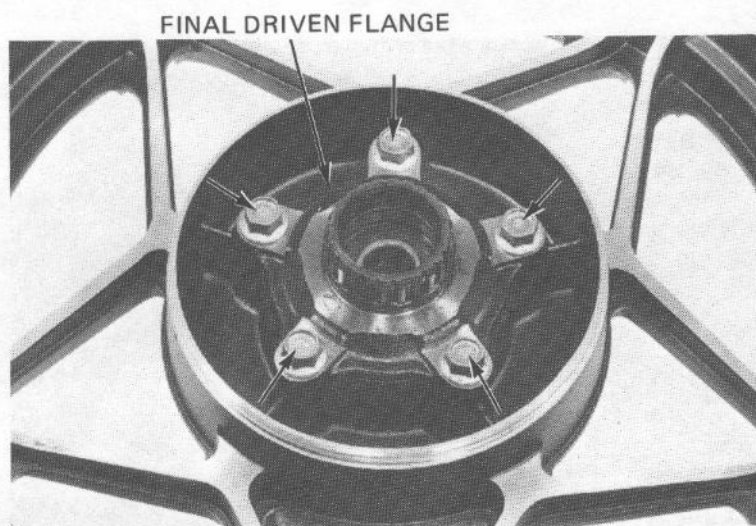
- Drive the bearings in squarely.
- Install the bearings with the sealed end facing out, making sure they are fully seated.



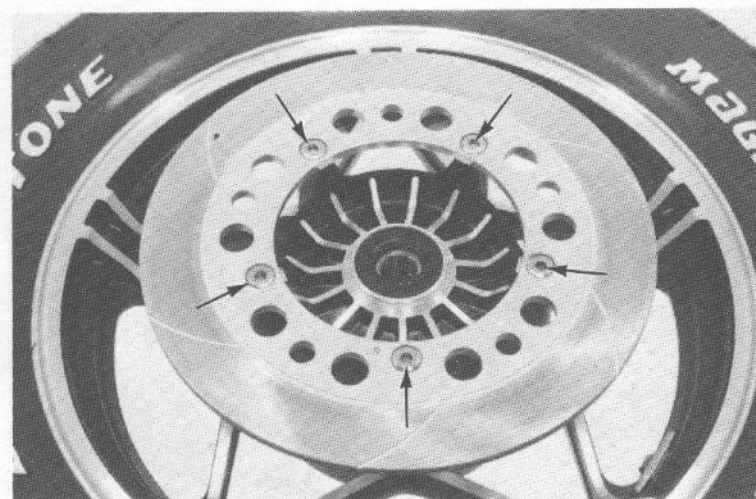
Install a new oil seal into the hub.



Install the final driven flange onto the hub and tighten the bolts.



Install the rear disc and tighten the bolts.

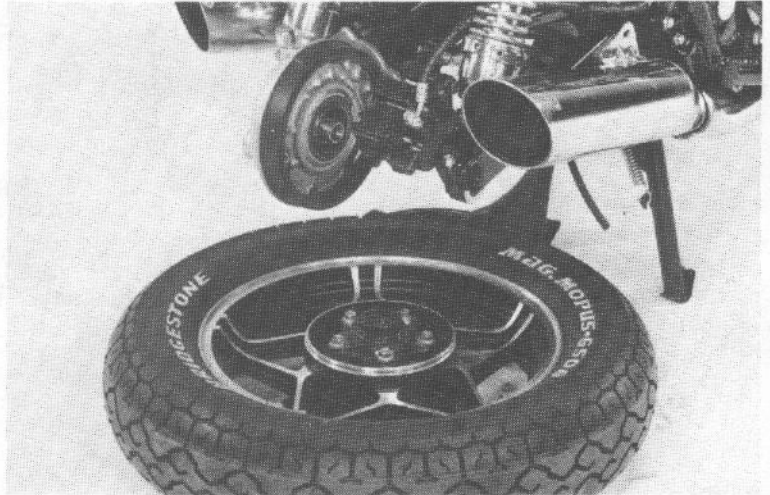


REAR WHEEL/SUSPENSION

INSTALLATION

Apply MULTIPURPOSE NLGI No. 2 Grease (MoS2-additive) to the final driven flange splines of the rear wheel and ring gear.

Engage the rear wheel with the final drive case, making sure the splines are correctly aligned.



Insert the rear axle through the swing arm, washer, caliper bracket, side collar, hub, and final drive gear. Tighten the axle nut.

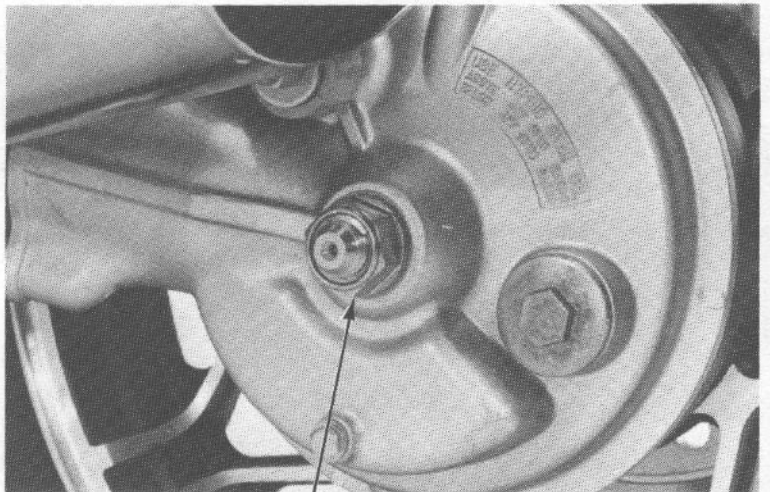
TORQUE:

'83, '84, '85:

85–105 N·m (8.5–10.5 kg-m, 61–76 ft-lb)

After '85:

80–100 N·m (8.0–10.0 kg-m, 58–72 ft-lb)

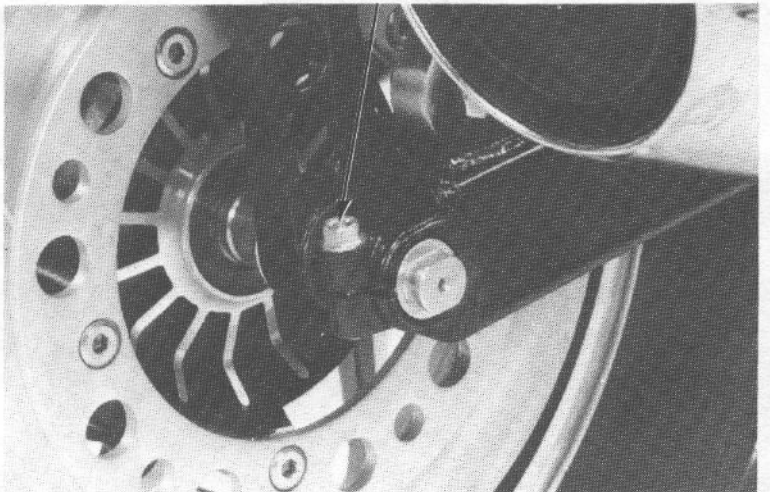


AXLE NUT

AXLE PINCH BOLT

Tighten the axle pinch bolt.

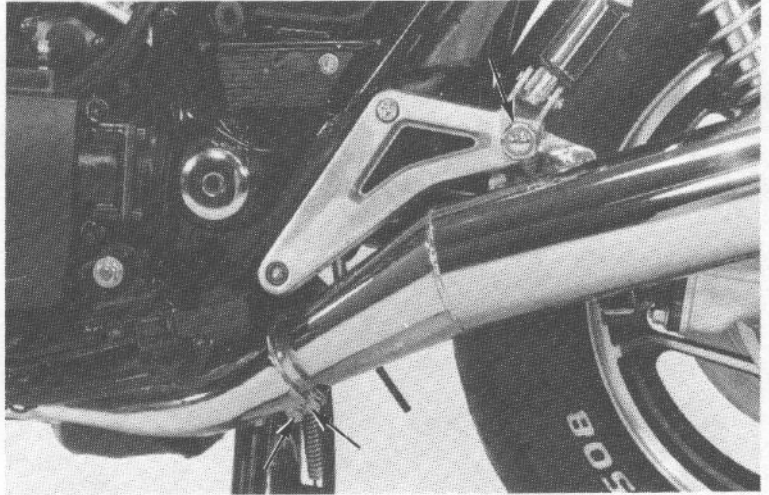
TORQUE: 20–30 N·m (2.0–3.0 kg-m, 14–22 ft-lb)



SHOCK ABSORBER

REMOVAL

Remove the left muffler.

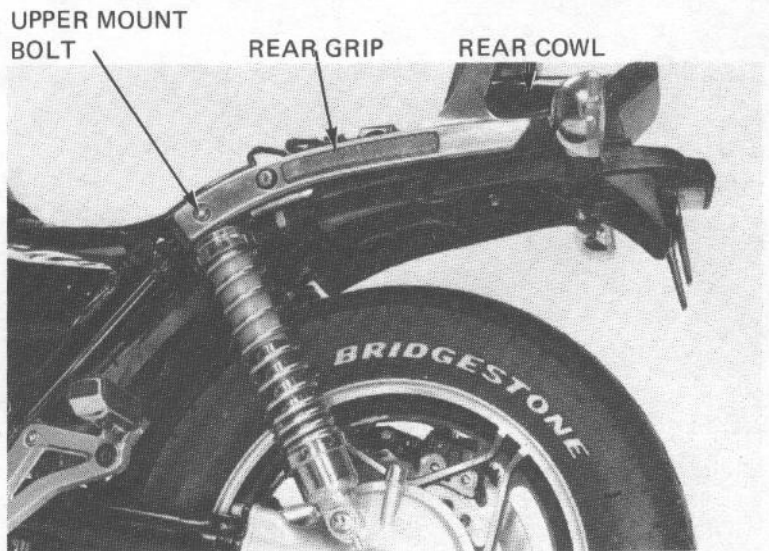


Remove the seat.

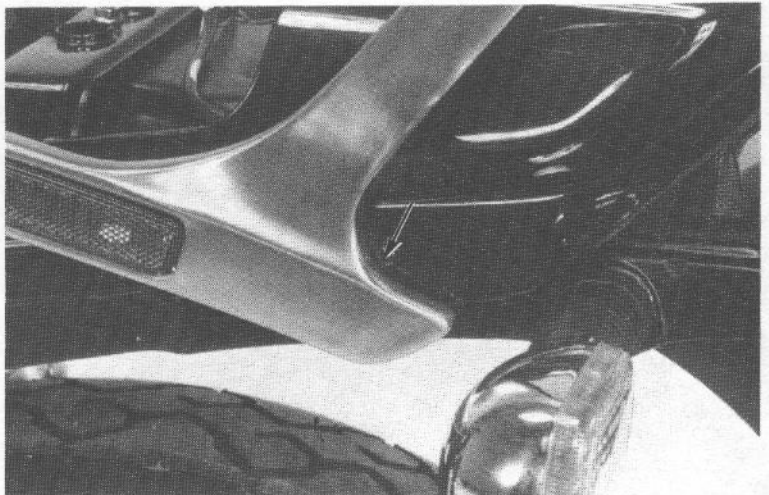
Remove the tool box.

Remove the right and left shock absorber upper mount bolts.

Remove the two bolts attaching the rear cowl and rear grip.

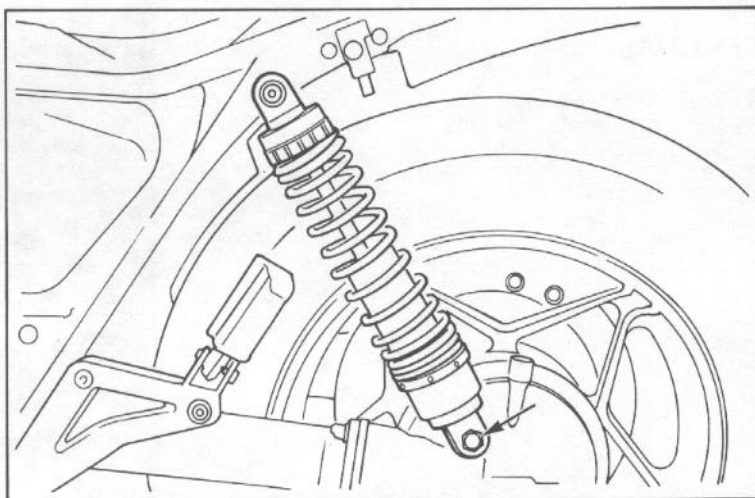


Remove the rear cowl attaching screws and remove the rear cowl and rear grip.



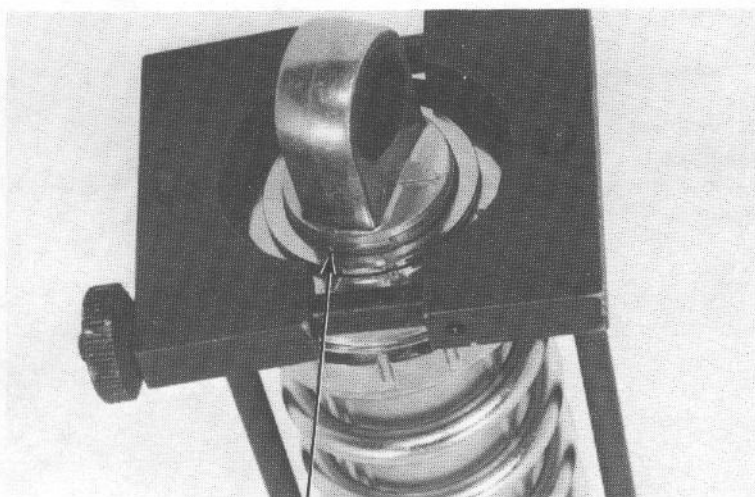
REAR WHEEL/SUSPENSION

Remove the shock absorber lower mount bolt or nut and remove the shock absorber.



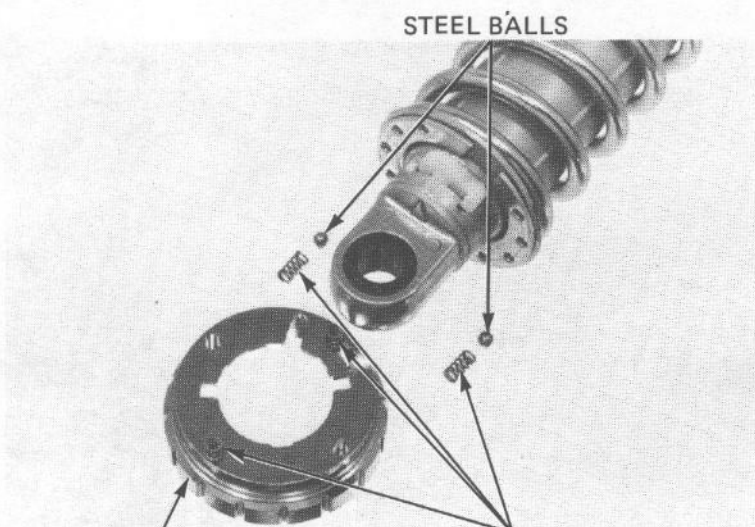
DISASSEMBLY

Lightly compress the damper upper adjuster and remove the adjuster stopper ring. Remove the upper adjuster cover.



ADJUSTER STOPPER RING

Release the shock from the compressor tool. Remove the damper adjuster, springs, and steel balls.



STEEL BALLS

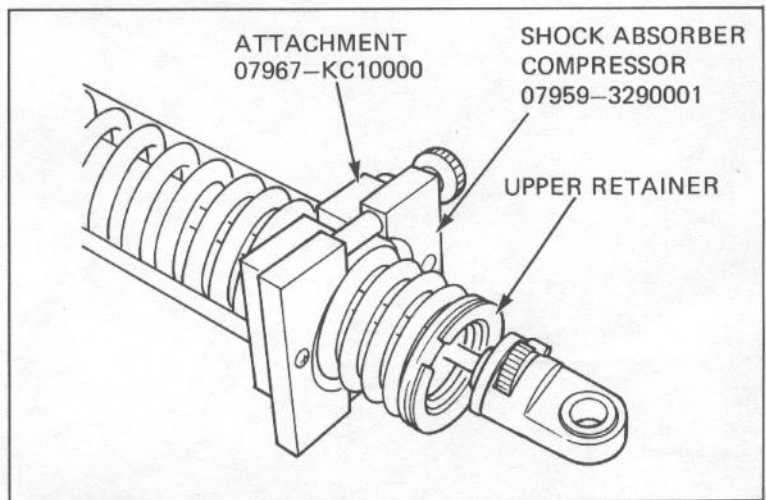
DAMPER ADJUSTER

SPRINGS

Install the attachment onto the spring.

Set the shock in the compressor as shown and compress the spring 30 mm by turning the compressor handle.

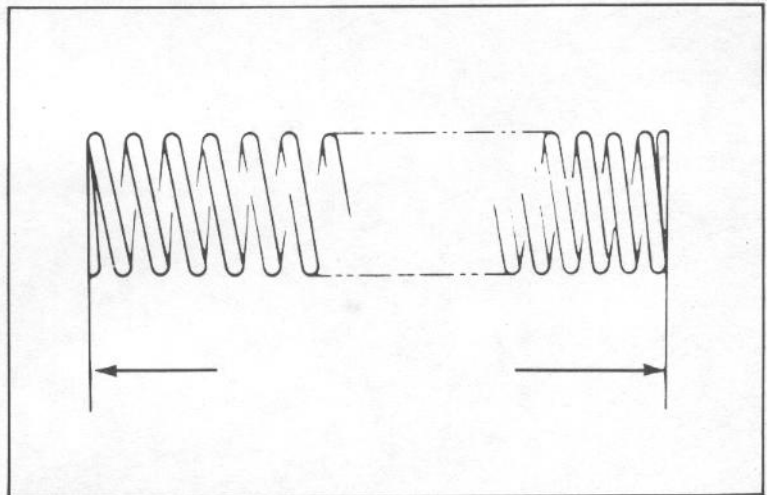
Remove the upper retainer through its cutout and remove the compressor.



SPRING FREE LENGTH

Measure the rear shock absorber spring free length.

SERVICE LIMIT: 244 mm (9.6 in)



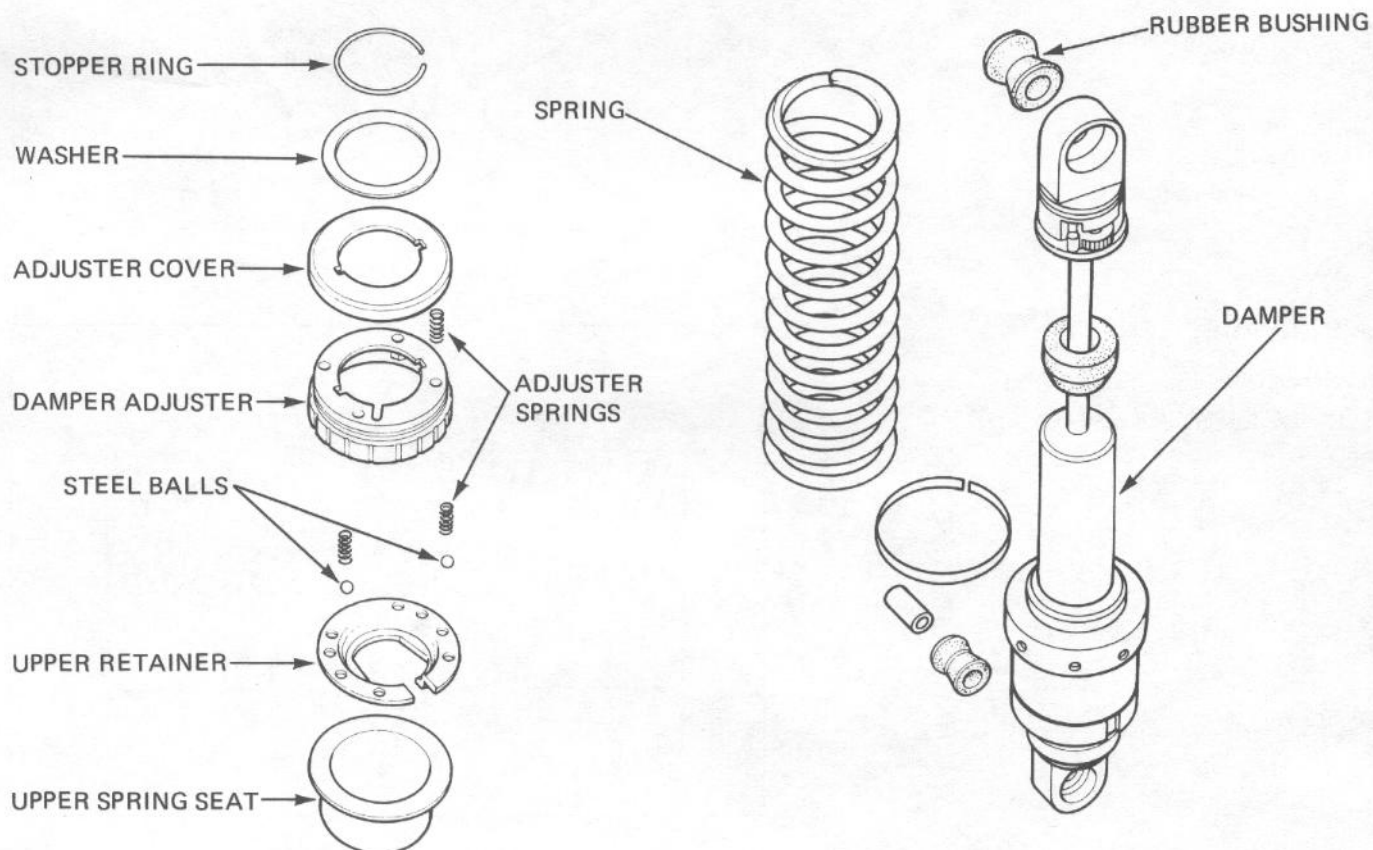
REAR WHEEL/SUSPENSION

ASSEMBLY

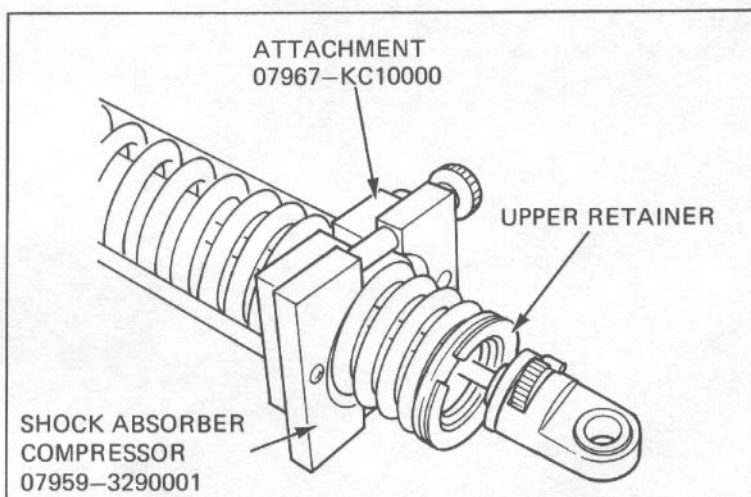
Place the spring and spring upper seat on the damper.

NOTE:

Install the spring with the tightly wound end facing up.



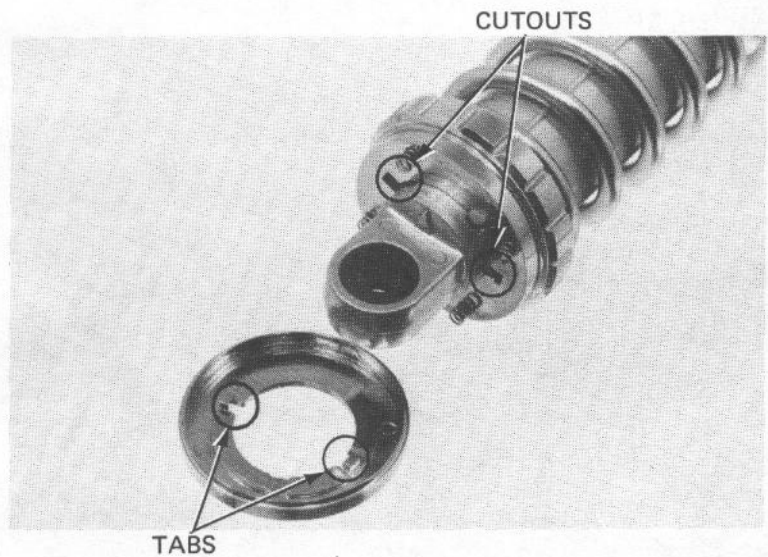
Set the shock absorber in the compressor with the attachment and compress the spring. Install the upper retainer and remove the compressor and attachment.



Install the steel balls on their original position.
Install the springs and upper adjuster.

Install the upper adjuster cover, aligning the tabs of the cover with cutouts in the adjuster.

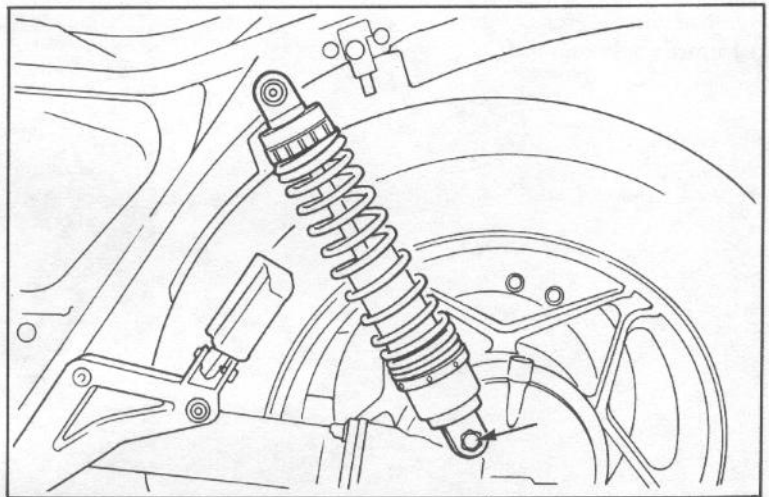
Lightly compress the damper upper adjuster and install the stopper ring.



INSTALLATION

Install the shock absorber and tighten the lower mount bolt or nut.

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



Install the rear cowl and rear grip.

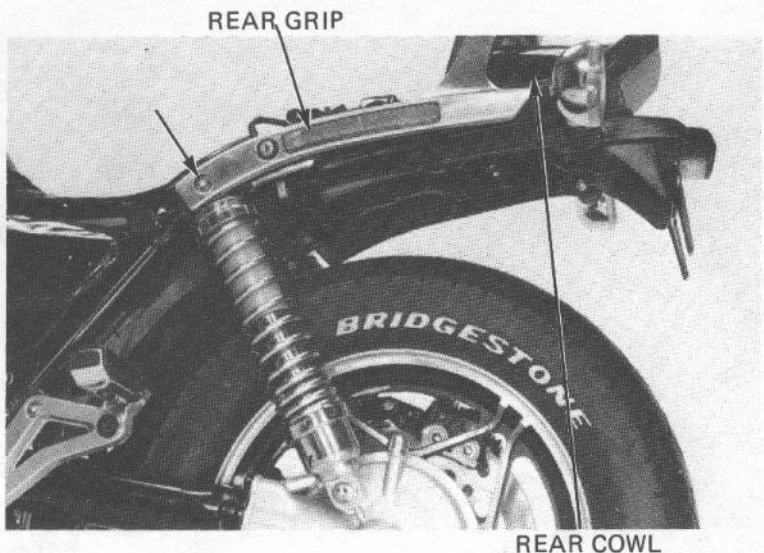
Install the tool box.

Tighten the upper mount bolt.

TORQUE: 40–50 N·m (4.0–5.0 kg·m, 29–36 ft·lb)

Install the seat.

Install the left muffler.



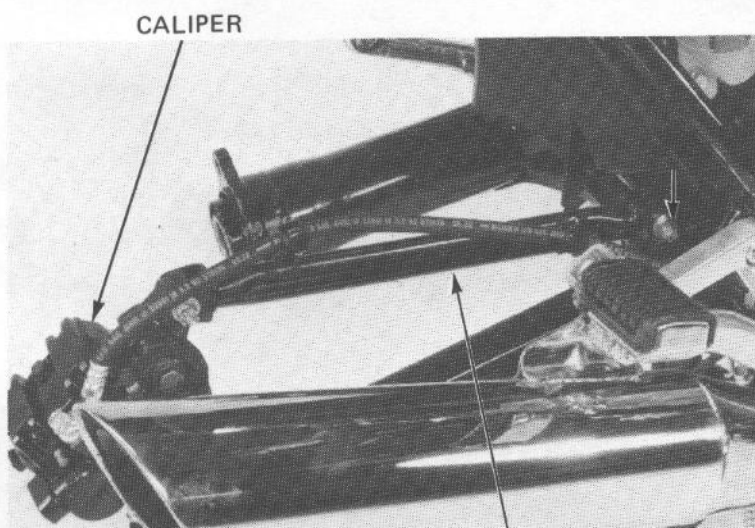
SWINGARM

REMOVAL

Remove the rear wheel (page 16-3) and the final drive gear case (page 14-3).

Remove the shock absorbers.

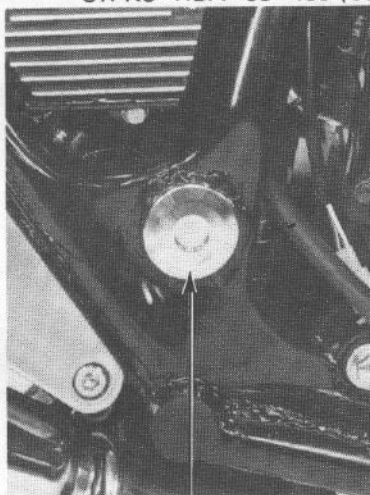
Remove the rear brake torque rod.



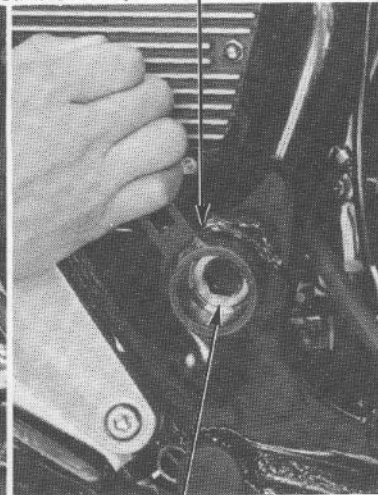
TORQUE ROD

SWINGARM PIVOT LOCK NUT WRENCH 07908-4690001
OR KS-HBA-08-469 (U.S.A. ONLY)

Remove the swingarm pivot caps and loosen the right pivot bolt lock nut.



PIVOT CAP

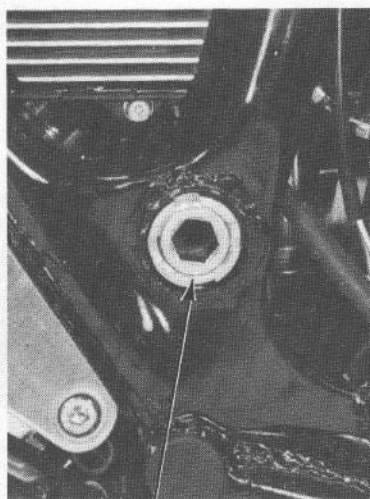


LOCK NUT

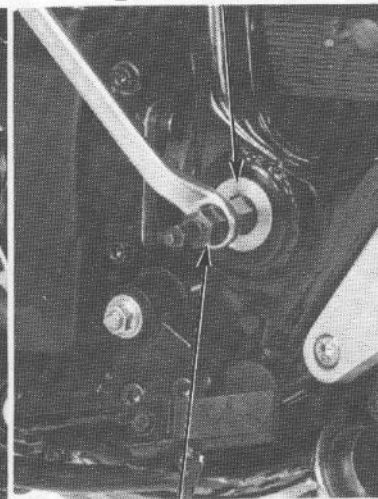
Remove the right pivot bolt, using a 17 mm socket bit.

Remove the left pivot bolt and remove the swingarm.

Remove the boot from the swingarm.



RIGHT PIVOT BOLT



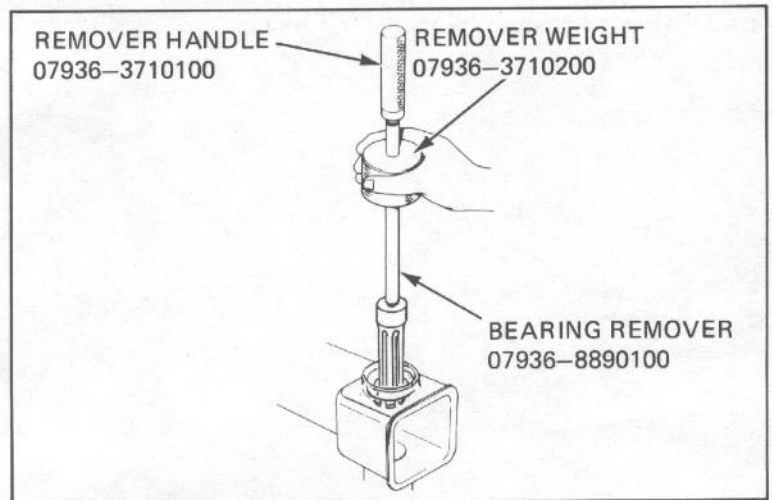
LEFT PIVOT BOLT

SOCKET BIT, 17 mm 07703-00205000R
COMMERCIALLY AVAILABLE IN U.S.A.

PIVOT BEARING REPLACEMENT

Remove the dust seals and bearings from both sides of the swingarm as follows:

Remove the swingarm bearings using the bearing remover, 97936-8890300, handle, 07936-3710100, and weight, 07936-3710200. Install the remover and expand it as much as possible behind the bearing race. Strike the weight lightly several times to move the race out enough so that the remover can be expanded completely. Slide the weight again with enough force to remove the race.

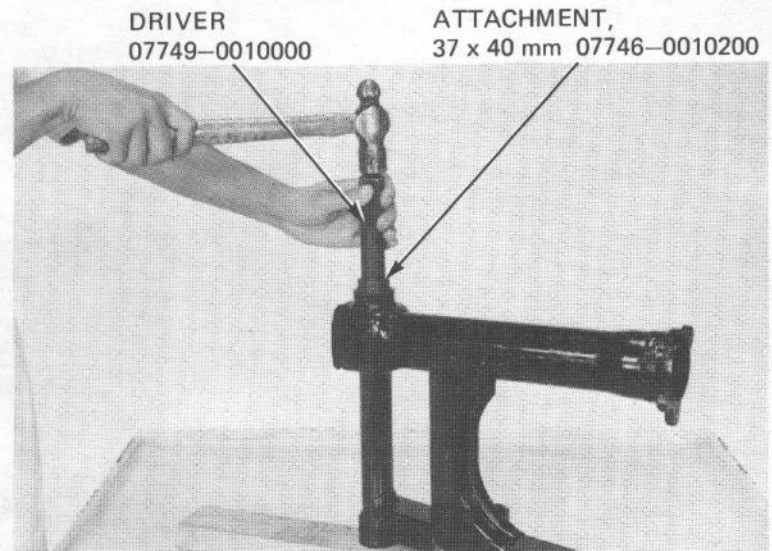


INSTALLATION

NOTE:

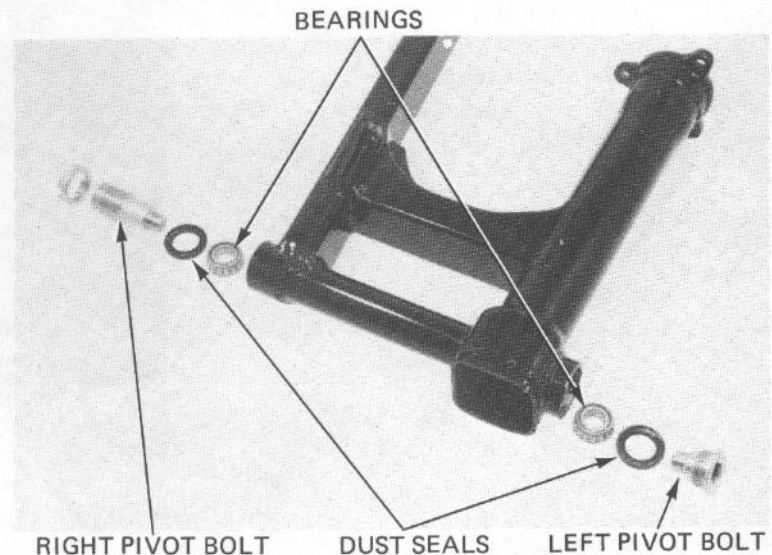
Replace the inner and outer bearing races as a set. Replace the grease retainer plate whenever it is removed.

Install new grease retainer plates. Drive new outer bearing races into the swingarm.



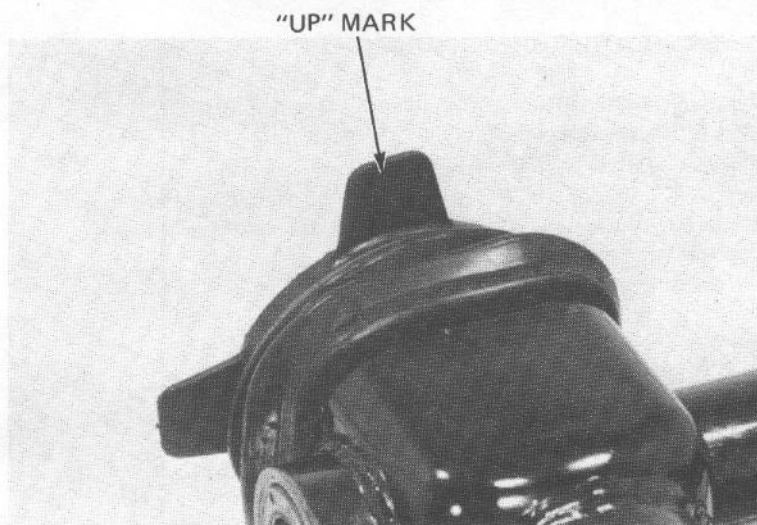
Apply grease to the pivot bearings, dust seals, and pivot bolt tips.

Install the bearings and dust seals.



REAR WHEEL/SUSPENSION

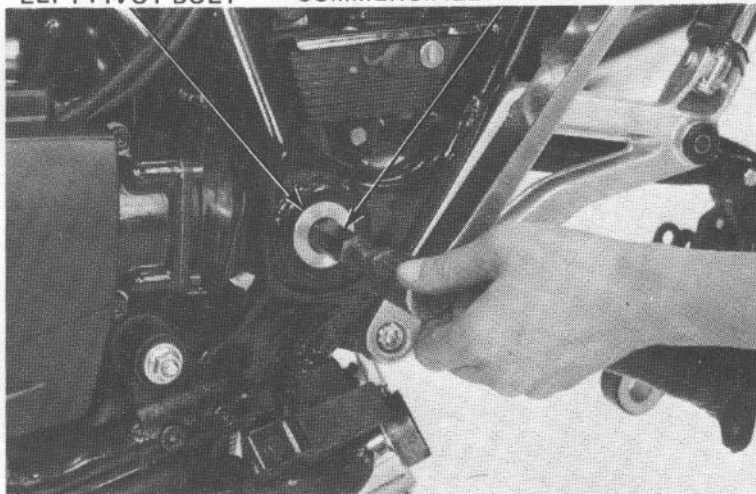
Install the swingarm boot with the "UP" mark up.



Install the swingarm and pivot bolts.
Tighten the left pivot bolt to the specified torque.

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

LEFT PIVOT BOLT
SOCKET BIT, 17 mm 07703–0020500 OR
COMMERCIALLY AVAILABLE IN U.S.A.

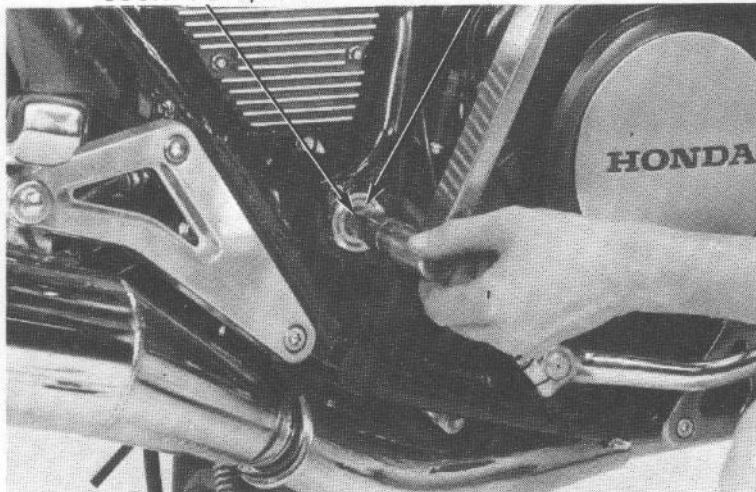


Tighten the right pivot bolt to 40 N·m (4.0 kg-m, 29 ft-lb), loosen it and retighten to the specified torque.

TORQUE: 16–20 N·m (1.6–2.0 kg-m, 12–14 ft-lb)

Move the swingarm up and down several times.
Retighten the right pivot bolt to the specified torque.

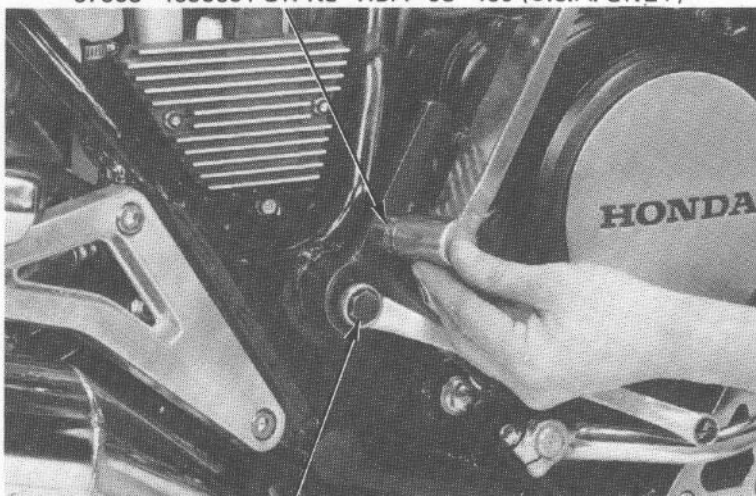
SOCKET BIT, 17 mm RIGHT PIVOT BOLT



Tighten the lock nut while holding the right pivot bolt.

TORQUE: 100–130 N·m
(10.0–13.0 kg·m, 72–94 ft·lb)

SWINGARM LOCK NUT WRENCH
07908–4690001 OR KS–HBA–08–469 (U.S.A. ONLY)



SOCKET BIT, 17 mm OR
COMMERCIALLY AVAILABLE IN U.S.A.

Connect the rear brake torque rod to the swingarm and tighten the nut.

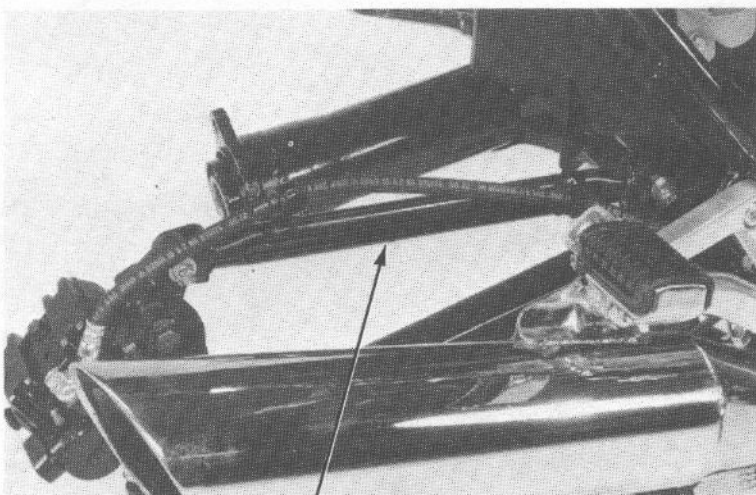
TORQUE: 18–25 N·m (1.8–2.5 kg·m, 13–18 ft·lb)

Secure the nut with a new cotter pin.

Install the final gear (page 14-18).

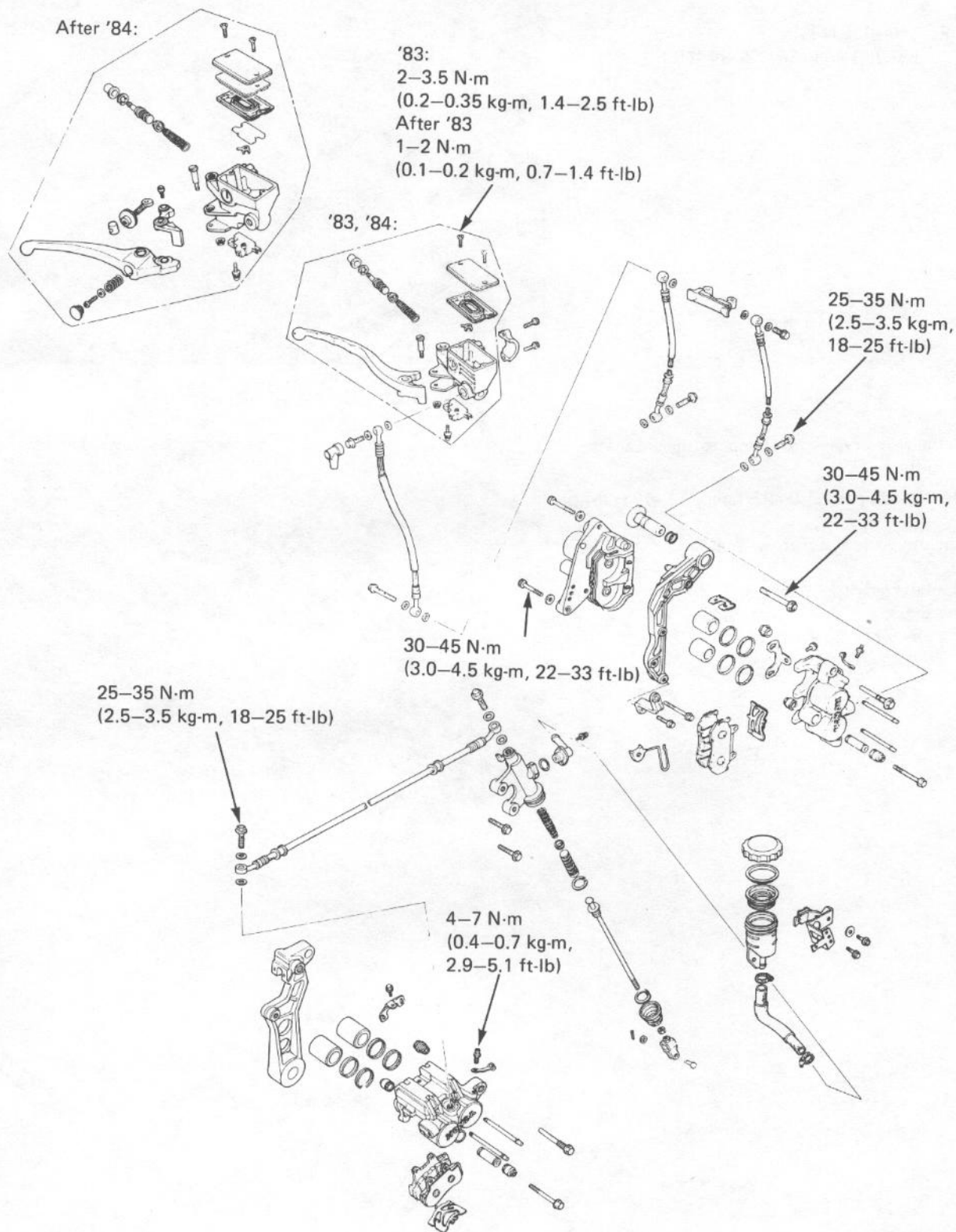
Install the shock absorbers (page 16-13).

Install the rear wheel (page 16-8).



REAR BRAKE TORQUE ROD

HYDRAULIC BRAKES



17. HYDRAULIC BRAKE

| | | | |
|--|------|-----------------------|-------|
| SERVICE INFORMATION | 17-1 | FRONT MASTER CYLINDER | 17-8 |
| TROUBLESHOOTING | 17-2 | BRAKE CALIPERS | 17-10 |
| BRAKE FLUID REPLACEMENT/ AIR BLEEDING | 17-3 | REAR MASTER CYLINDER | 17-14 |
| BRAKE PAD/DISC | 17-5 | BRAKE PEDAL SHAFT | 17-17 |

SERVICE INFORMATION

GENERAL

- The front and rear brakes can be removed without disconnecting the hydraulic system.
- Once the hydraulic systems have been opened, or if the brakes feel spongy, the system must be bled.
- Do not allow foreign material to enter the system when filling the reservoirs.
- Avoid spilling brake fluid on painted surfaces or instrument lenses, as severe damage can result.
- Always check brake operation before riding the motorcycle.

SPECIFICATIONS

| | STANDARD | SERVICE LIMIT |
|-----------------------------|--|-----------------------|
| Front disc thickness | 4.8–5.2 mm (0.19–0.20 in) | 4.0 mm (0.16 in) |
| Front disc runout | — | 0.30 mm (0.012 in) |
| Front master cylinder I.D. | 15.870–15.913 mm (0.6248–0.6265 in) | 15.93 mm (0.627 in) |
| Front master piston O.D. | 15.827–15.854 mm (0.6231–0.6242 in) | 15.8 mm (0.62 in) |
| Front caliper piston O.D. | 31.948–31.998 mm (1.2578–1.2598 in) | 31.940 mm (1.2575 in) |
| Front caliper cylinder I.D. | 32.030–32.080 mm (1.2610–1.2630 in) | 32.09 mm (1.263 in) |
| Rear master cylinder I.D. | 14.000–14.043 mm (0.5512–0.5529 in) | 14.055 mm (0.5533 in) |
| Rear master piston O.D. | 13.957–13.984 mm (0.5495–0.5506 in) | 13.945 mm (0.5490 in) |
| Rear caliper cylinder I.D. | 30.230–30.280 mm (1.1902–1.1921 in) | 30.29 mm (1.193 in) |
| Rear caliper piston O.D. | 30.148–30.198 mm (1.1869–1.1889 in) | 30.140 mm (1.1866 in) |
| Rear disc thickness | '83~'85: 6.9–7.1 mm (0.272–0.280 in) | 6.0 mm (0.24 in) |
| | After '85: 7.1–7.7 mm (0.280–0.303 in) | 6.6 mm (0.26 in) |
| Rear disc runout | — | 0.30 mm (0.012 in) |

TORQUE VALUES

| | |
|---------------------------|--|
| Brake hose bolt | '83, '84, '85: 25–35 N·m (2.5–3.5 kg-m, 18–25 ft-lb) After '85: 37–43 N·m (3.7–4.3 kg-m, 27–31 ft-lb) |
| Front brake caliper | 30–45 N·m (3.0–4.5 kg-m, 22–33 ft-lb) |
| Rear brake pedal | 24–30 N·m (2.4–3.0 kg-m, 17–22 ft-lb) |
| Master cylinder holder | 10–14 N·m (1.0–1.4 kg-m, 7–10 ft-lb) |
| Rear brake torque rod | 18–25 N·m (1.8–2.5 kg-m, 13–18 ft-lb) |
| Brake master cylinder cap | '83 2–3.5 N·m (0.2–0.35 kg-m, 1.4–2.5 ft-lb) After '83: 1–2 N·m (0.1–0.2 kg-m, 0.7–1.4 ft-lb) |

TOOL

| | |
|-----------------------------|---------------|
| Special Snap ring pliers | 07914–3230001 |
|-----------------------------|---------------|

TROUBLESHOOTING

Brake lever/pedal soft or spongy

1. Air bubbles in hydraulic system
2. Low fluid level
3. Hydraulic system leaking

Brake lever/pedal too hard

1. Sticking piston(s)
2. Clogged hydraulic system
3. Pads glazed or worn excessively

Brakes drag

1. Hydraulic system sticking
2. Sticking piston(s)
3. Incorrect rear brake pedal adjustment

Brakes grab

1. Pads contaminated
2. Disc or wheel misaligned

Brake chatter or squeal

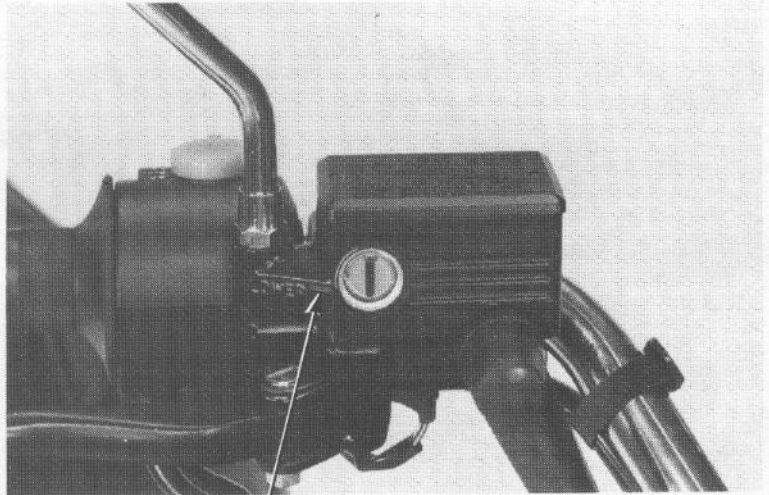
1. Pads contaminated
2. Excessive disc runout
3. Caliper installed incorrectly
4. Disc or wheel misaligned

BRAKE FLUID REPLACEMENT / AIR BLEEDING

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

CAUTION:

- *Install the diaphragm on the reservoir when operating the brake lever (or pedal). Failure to do so will allow brake fluid to squirt out of the reservoir during brake operation.*
- *Avoid spilling fluid on painted or plastic surfaces. Place a rag over the fuel tank whenever the system is serviced.*



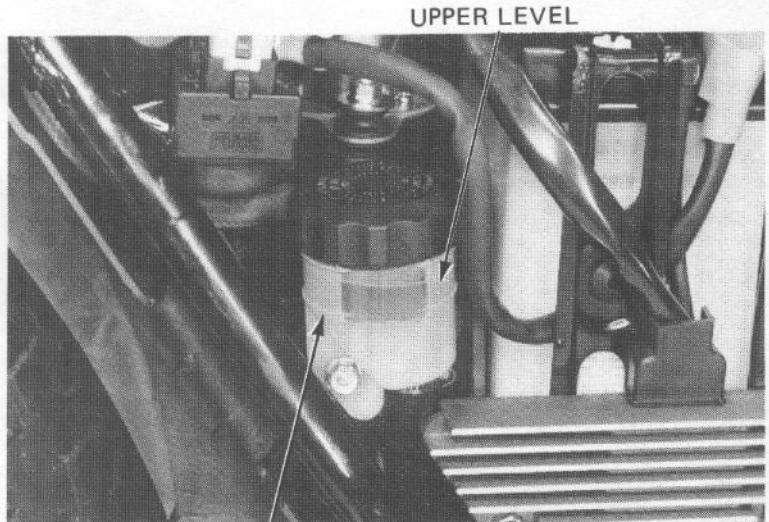
LOWER LEVEL

BRAKE FLUID DRAINING

Connect a bleed hose to the bleeder valve. Loosen the caliper bleeder valve and pump the brake lever (or pedal). Stop operating the lever (or pedal) when no fluid flows out of the bleeder valve.

WARNING

A contaminated brake disc or pad reduces stopping power. Discard contaminated pads and clean a contaminated disc with a high quality brake degreasing agent.



LOWER LEVEL

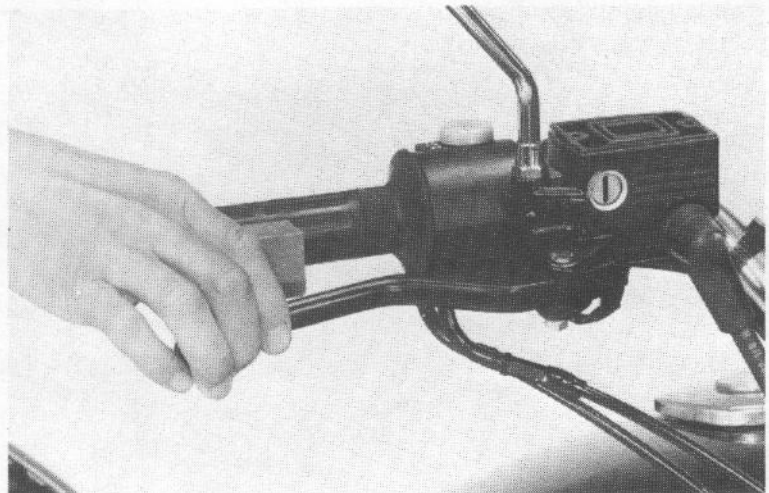
BRAKE FLUID FILLING

NOTE

Do not mix different types of brake fluid since they are not compatible.

Close the bleed valve, fill the reservoir with DOT-4 brake fluid, and install the diaphragm.

To prevent piston overtravel and brake fluid seepage, keep a 20 mm (3/4 in) spacer between the handlebar grip and lever 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 and lever resistance is felt.

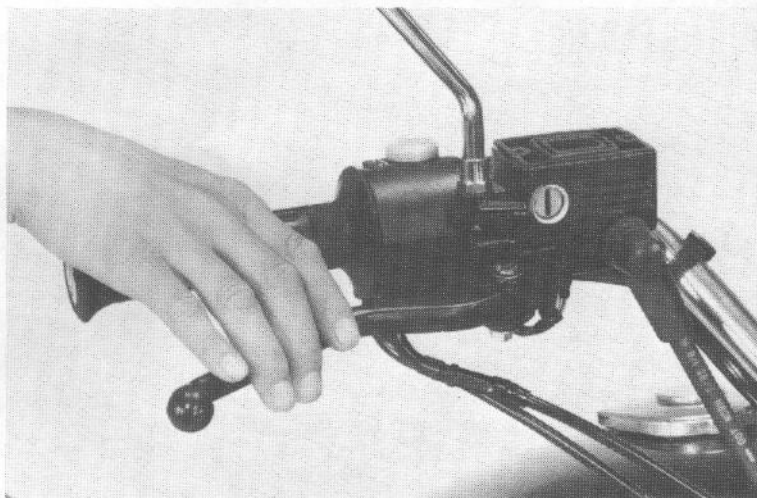


HYDRAULIC BRAKES

AIR BLEEDING

NOTE

- Check the fluid level often while bleeding the brakes to prevent air from being pumped into the system.
- Use only **DOT 4 brake fluid** from a sealed container.
- Do not mix brake fluid types and never reuse the contaminated fluid which has been pumped out during brake bleeding, because this will impair the efficiency of the brake system.



- 1) Squeeze the brake lever (or depress the brake pedal), open the bleed valve 1/2 turn, and then close the valve.

NOTE

Do not release the brake lever until the bleed valve has been closed.

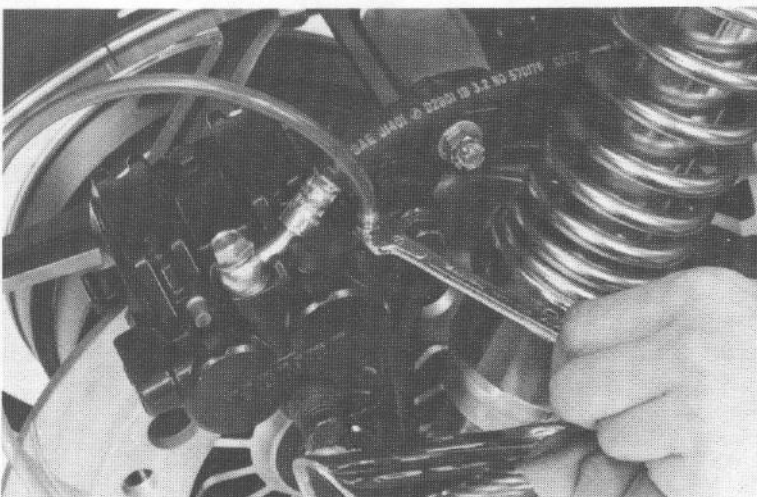
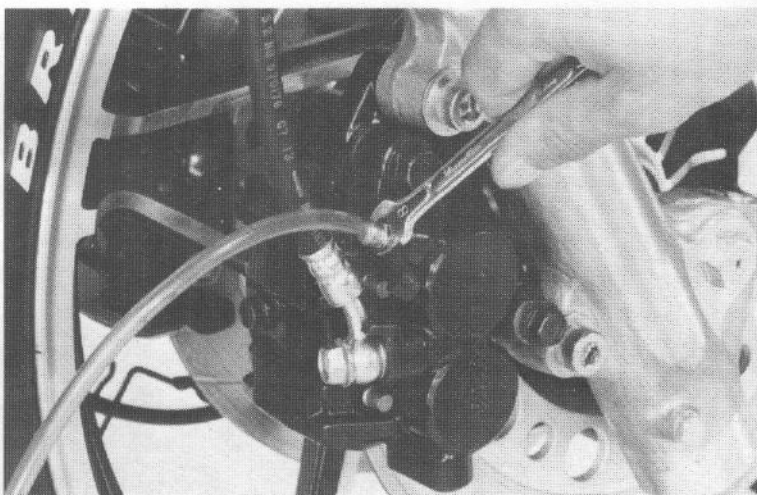
- 2) Release the brake lever (or pedal) slowly and wait several seconds after it reaches the end of its travel.

Repeat steps 1 and 2 until bubbles cease to appear in the fluid coming out of the bleeder valve.

Fill the fluid reservoir to the upper level mark.

WARNING

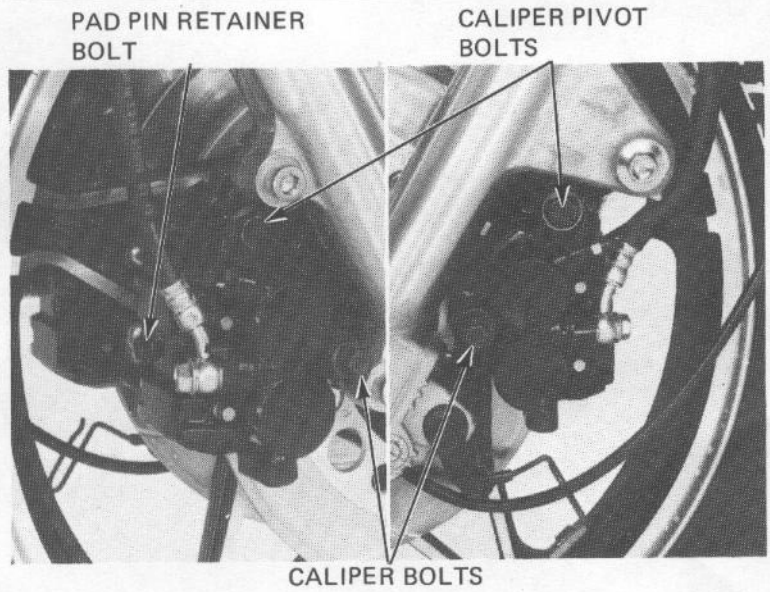
A contaminated brake disc or pad reduces stopping power. Discard contaminated pads and clean a contaminated disc with a high quality brake degreasing agent.



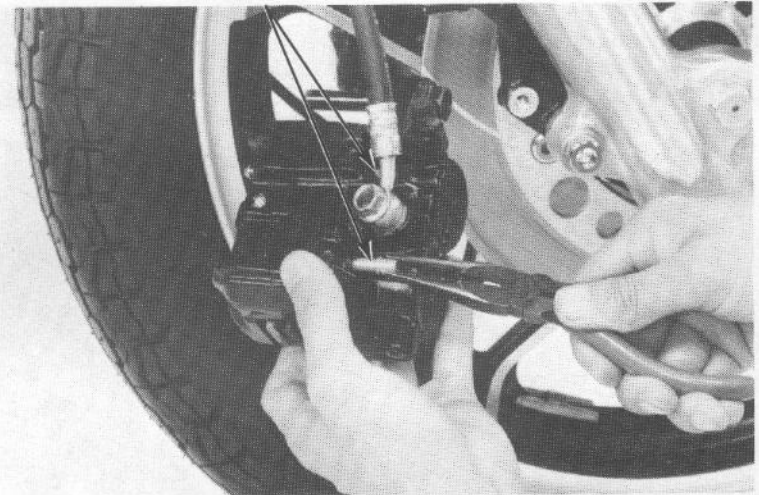
BRAKE PAD/DISC**FRONT PAD REPLACEMENT****NOTE:**

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

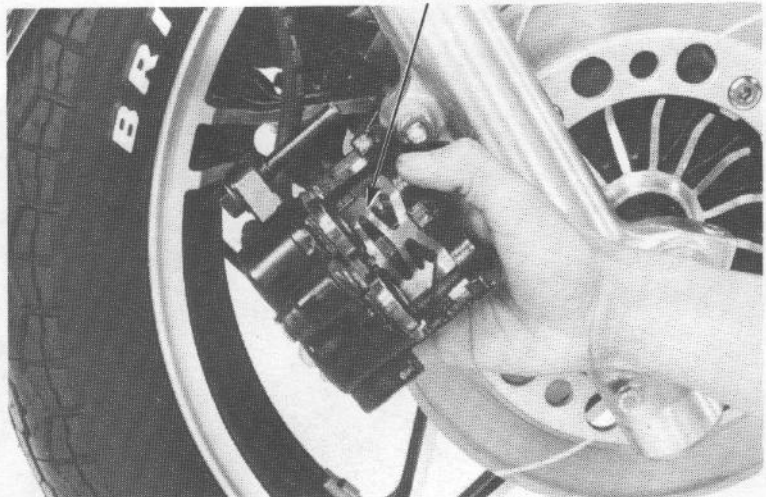
Remove the pad pin retainer bolt and caliper bolt.
Remove the calipers.



Remove the pad pin retainer and pull the pad pins out of the caliper.
Remove the brake pads.

PAD PINS

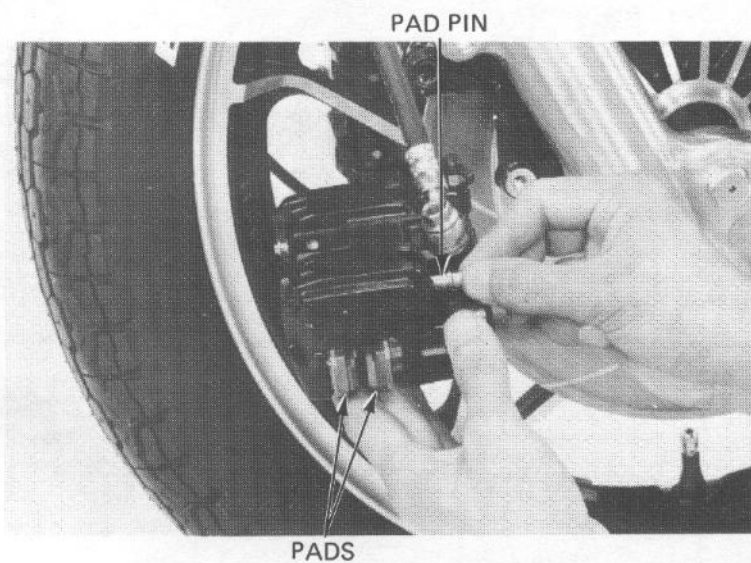
Position the pad spring in the caliper as shown.
Push the caliper pistons in all the way.

PAD SPRING

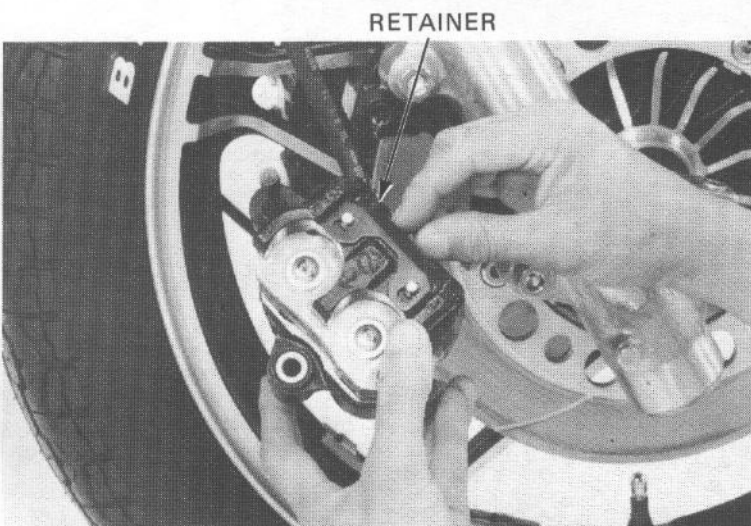
HYDRAULIC BRAKES

Install the new pads in the caliper.

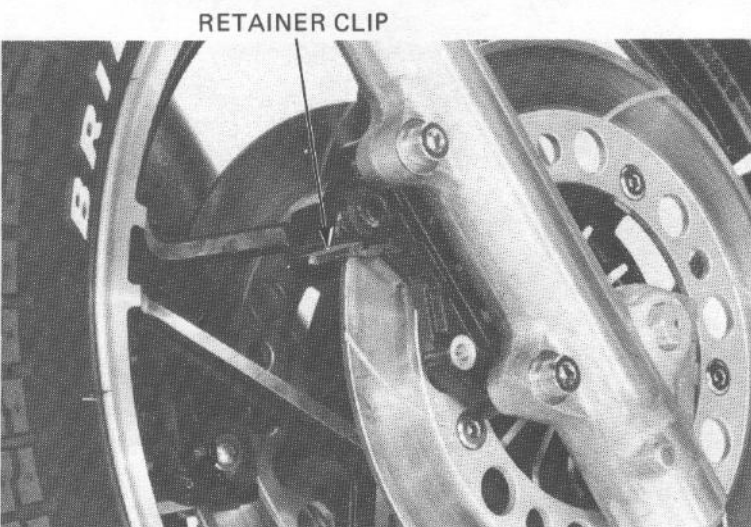
Install the pad pins; one pad pin first, then install the other pin by pushing the pads against the caliper to depress the pad spring.



Place the pad pin retainer over the pad pins. Push the retainer down to secure the pins.



Check to be sure that the retainer clip is in place on the caliper bracket.

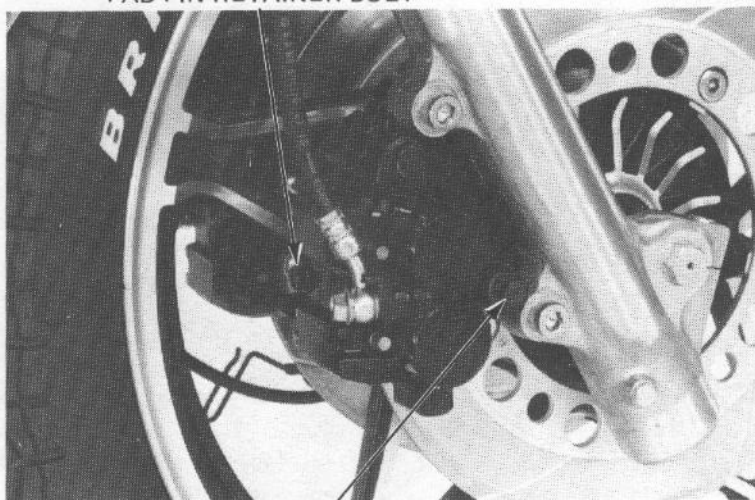


Install the calipers over the brake discs so that the discs are positioned between the pads, making sure not to damage the pads. Install the caliper pivot bolts.

Install the caliper bolts.

Install the pad pin retainer bolts.

PAD PIN RETAINER BOLT



CALIPER BOLT

REAR PAD REPLACEMENT

Replace the rear brake pads using the same method as used for front brake pad replacement.

PAD PIN RETAINER BOLT



CALIPER BOLT

DISC THICKNESS

Measure the disc thickness with a micrometer.

SERVICE LIMITS:

FRONT: 4.0 mm (0.16 in)

REAR: '83, '84, '85: 6.0 mm (0.24 in)

After '85: 6.6 mm (0.26 in)

BRAKE DISC WARPAGE

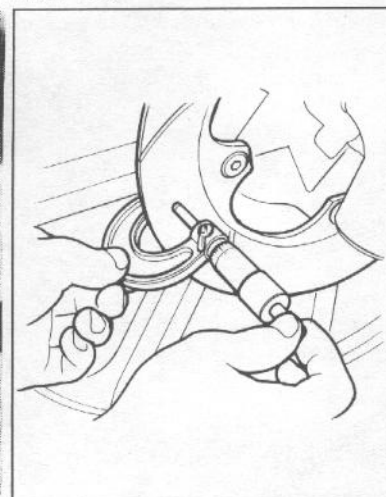
Measure the brake disc warpage on a surface plate with a feeler gauge.

SERVICE LIMIT: 0.30 mm (0.012 in)

'83, '84, '85:



After '85:



HYDRAULIC BRAKES

FRONT MASTER CYLINDER

DISASSEMBLY

Drain brake fluid from the hydraulic system. Remove the brake lever and rear view mirror from the master cylinder. Disconnect the brake hose.

CAUTION:

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

NOTE

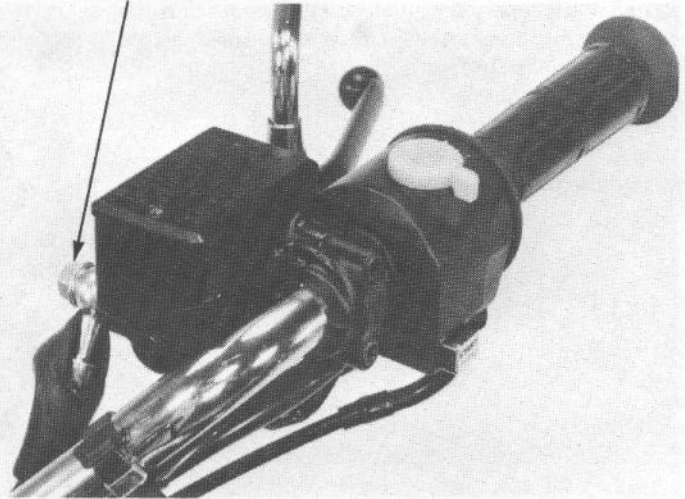
When removing the oil hose bolt, cover the end of the hose to prevent contamination. Secure the hose to prevent fluid from leaking out.

Remove the master cylinder.

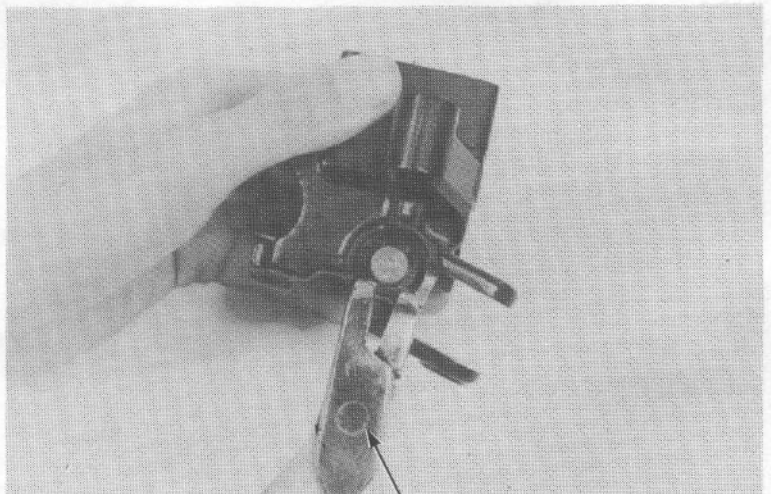
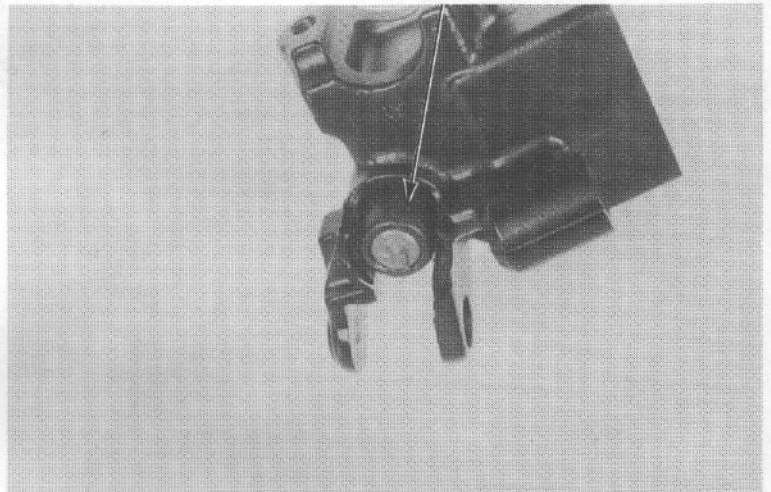
Remove the piston boot from the master cylinder.

Remove the circlip from the master cylinder body.

OIL HOSE BOLT



PISTON BOOT



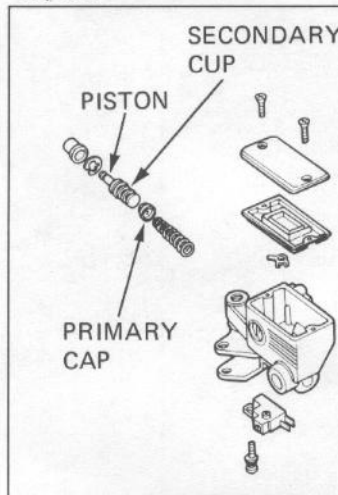
SNAP RING PLIERS
07914-3230001

Remove the secondary cup and piston. Then remove the primary cup and spring.

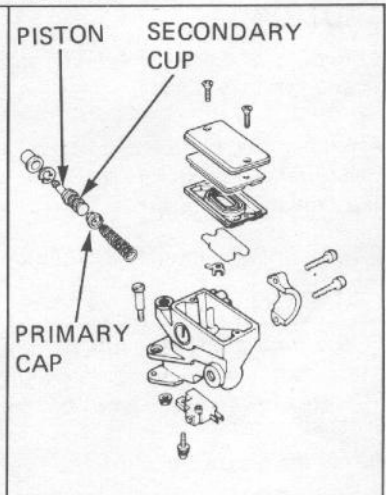
Remove the brake light switch from the master cylinder body, if necessary.

Clean the inside of the master cylinder and reservoir with brake fluid.

'83, '84:



After '84:

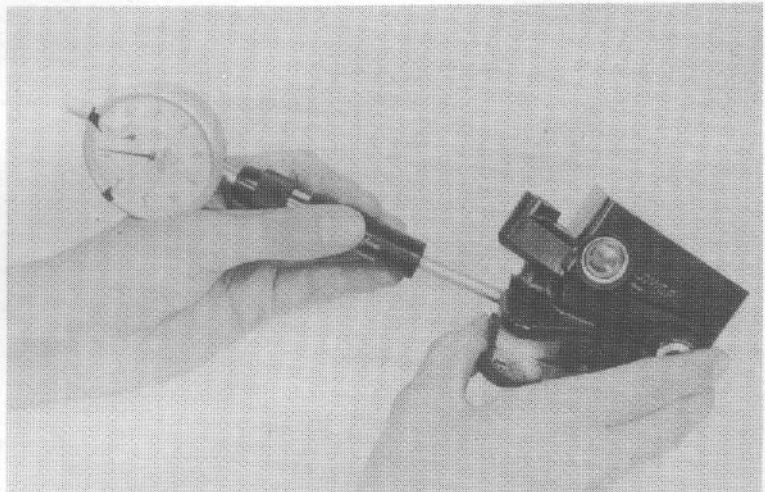


INSPECTION

Measure the master cylinder I.D.

Check the master cylinder for scores, scratches, or nicks.

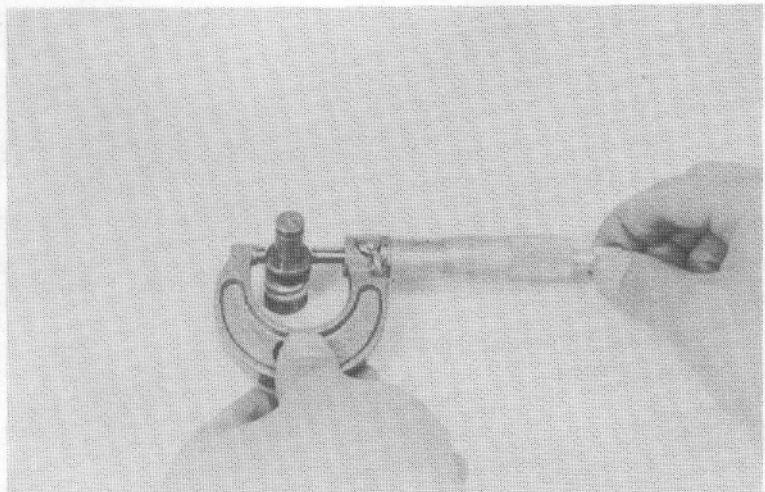
SERVICE LIMIT: 15.93 mm (0.627 in)



Measure the master piston O.D.

SERVICE LIMIT: 15.8 mm (0.62 in)

Check the primary and secondary cups for damage before assembly.



HYDRAULIC BRAKES

ASSEMBLY

CAUTION:

Replace the master cylinder piston, cylinder, and spring as a set.

Assemble the master cylinder. Coat all parts with clean brake fluid before assembly. Install the spring and primary cup together.

Dip the piston cup in brake fluid before assembly.

CAUTION:

When installing the cups, do not allow the lips to turn inside out. Be certain the circlip is seated firmly in the groove.

Install the piston and clip.
Install the boot.

Place the master cylinder on the handlebar and install the holder and the two mounting bolts. Align the end of the holder with the punch mark on the handlebar, and tighten the upper bolt first then tighten the lower bolt.

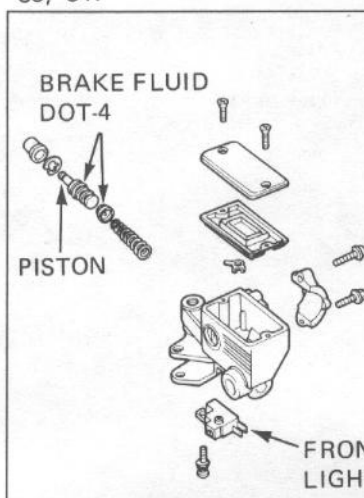
TORQUE: 10–14 N·m (1.0–1.4 kg·m, 7–10 ft·lb)

Install the oil hose with the bolt and its two sealing washers.

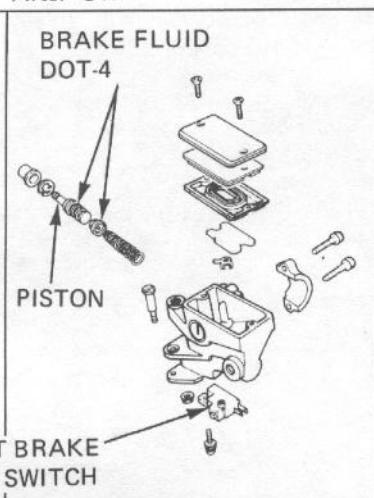
Install the brake lever.

Fill the reservoir to the upper level and bleed the brake system according to page 17-4.

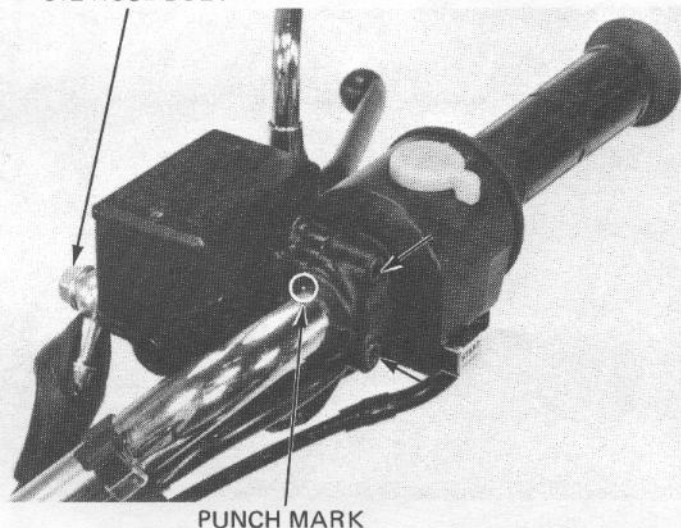
'83, '84:



After '84:



OIL HOSE BOLT



BRAKE CALIPERS

REMOVAL

Place a clean container under the caliper and disconnect the brake hose from the caliper.

CAUTION:

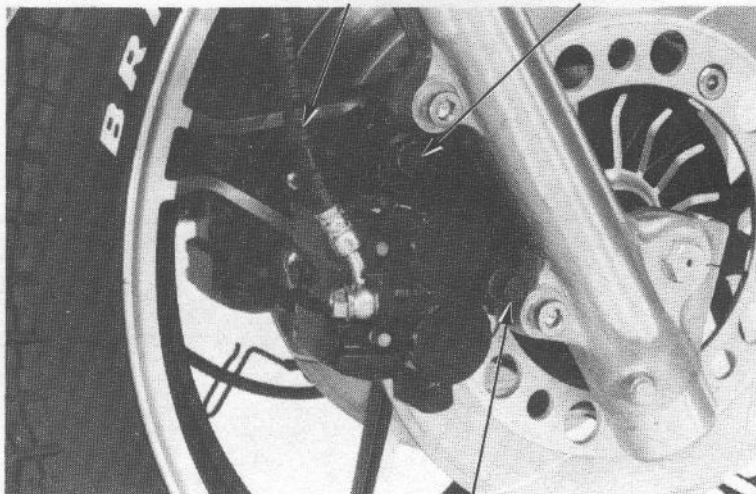
Avoid spilling brake fluid on painted surfaces.

Remove the caliper bolt and pivot bolt.
Remove the caliper.

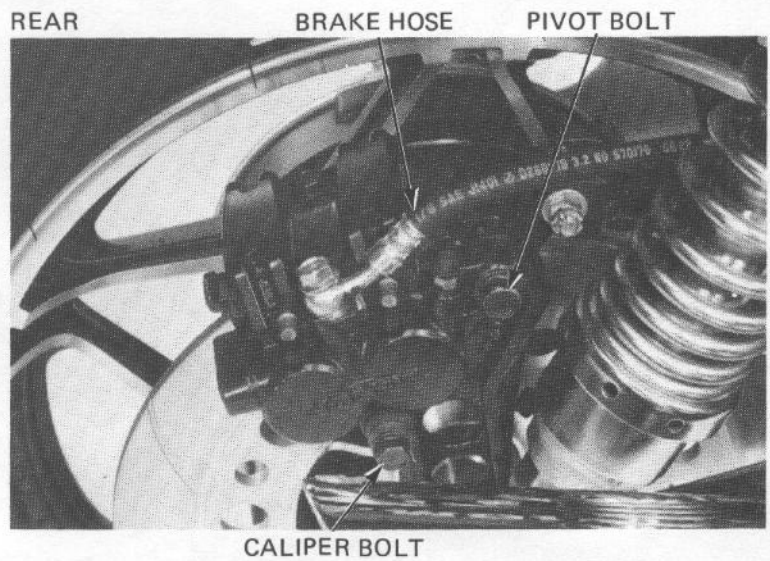
FRONT

BRAKE HOSE

PIVOT BOLT

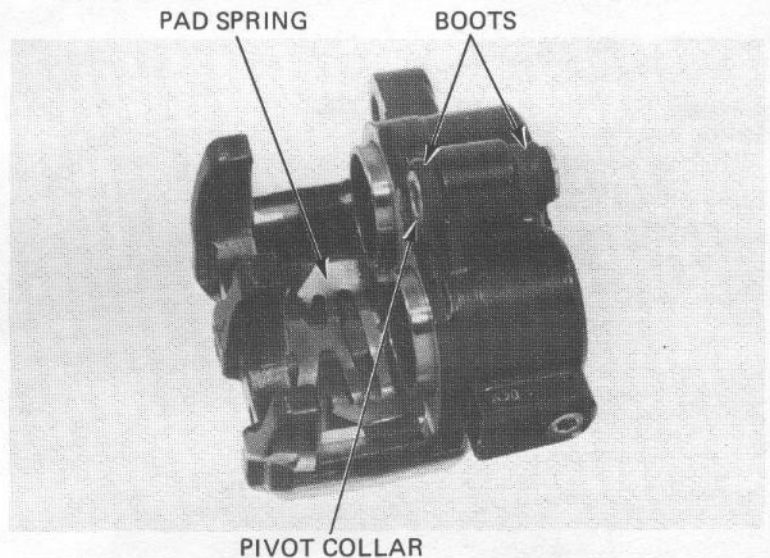


CALIPER BOLT



DISASSEMBLY

Remove the pad pin retainer.
 Remove the pads and pad spring.
 Remove the caliper pivot collar and boots.
 Remove the pistons from the caliper.

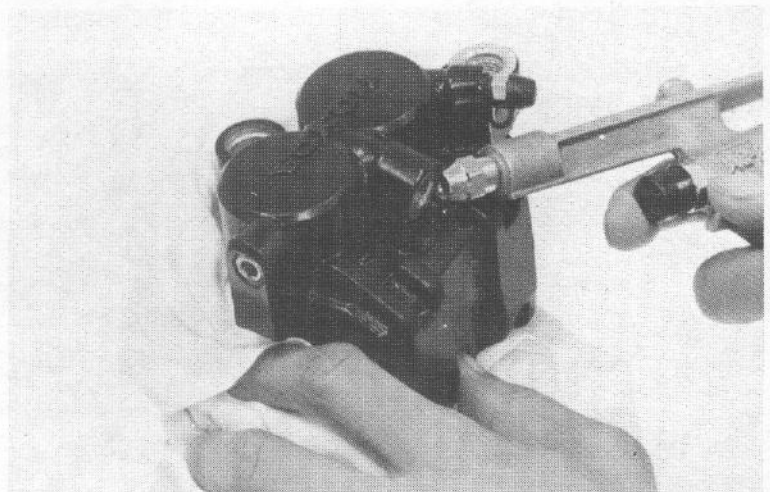


If necessary, apply compressed air to the caliper fluid inlet to get the piston out. Place a shop rag under the caliper to cushion the piston when it is expelled. Use the air in short spurts.

WARNING

Do not bring the nozzle too close to the inlet.

Examine the pistons and cylinders for scoring, scratches, or other damage and replace if necessary.



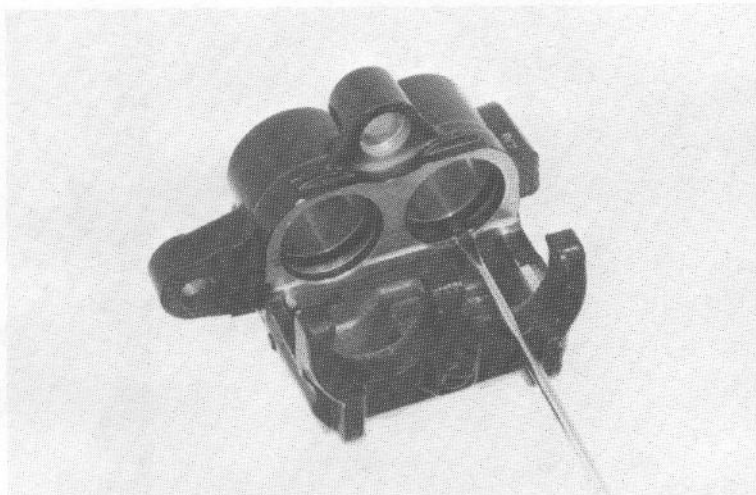
HYDRAULIC BRAKES

Push the piston seals in and lift them out and discard them.

Clean the oil seal grooves with brake fluid.

CAUTION:

Be careful not to damage the piston sliding surfaces.



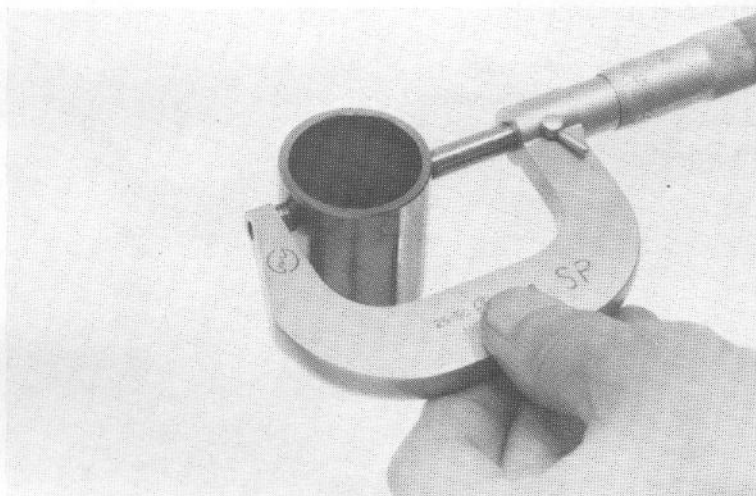
PISTON INSPECTION

Check the pistons for scoring, scratches, or other faults. Measure the piston diameter with a micrometer.

SERVICE LIMITS:

FRONT: 31.940 mm (1.2575 in)

REAR: 30.140 mm (1.1866 in)



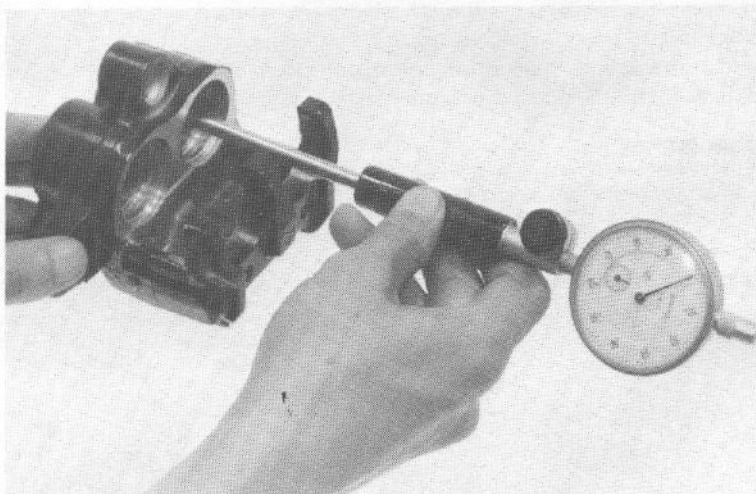
CYLINDER INSPECTION

Check the caliper cylinder for scoring, scratches, or other faults. Measure the caliper cylinder bore.

SERVICE LIMITS:

FRONT: 32.09 mm (1.263 in)

REAR: 30.29 mm (1.193 in)



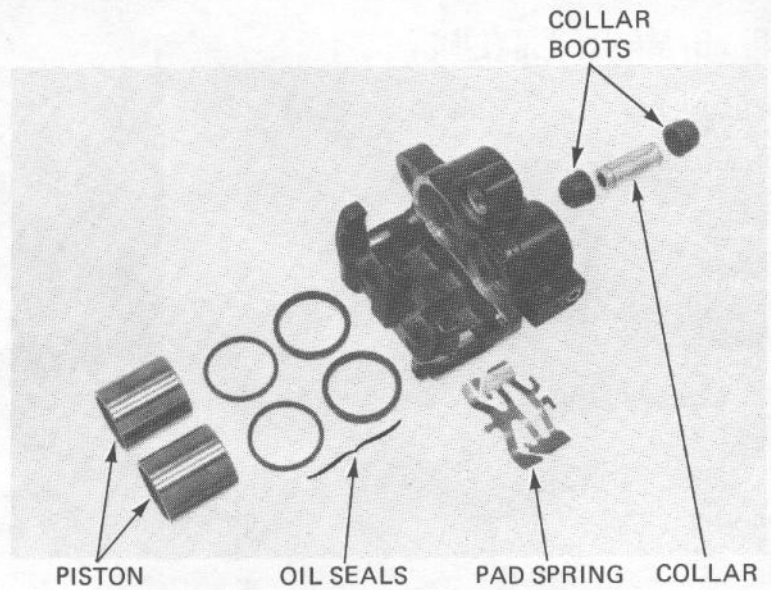
ASSEMBLY

If the piston boots are hardened or deteriorated, replace them with new ones. The piston seals must be replaced with new ones whenever they are removed. Coat the seals with silicone grease or brake fluid before assembly.

Install the pistons with the dished ends toward the pads.

Install the collar boots and collar making sure that the boots are seated in the collar and caliper grooves properly.

Install the pad spring and pads.



INSTALLATION

Be sure that the retainer clip is in position on the caliper bracket.

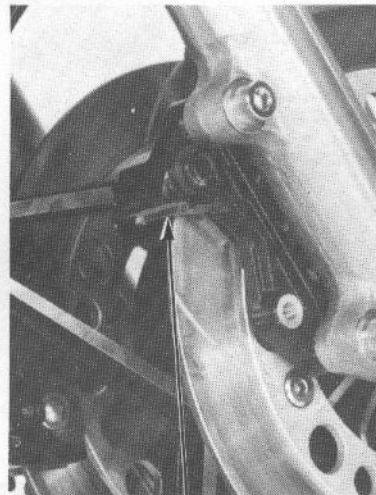
Inspect the condition of the caliper pivot bolt boot. Apply silicone grease or brake fluid to the caliper pivot bolt.

Install the caliper assembly over the brake disc so that the disc is positioned between the pads.

CAUTION:

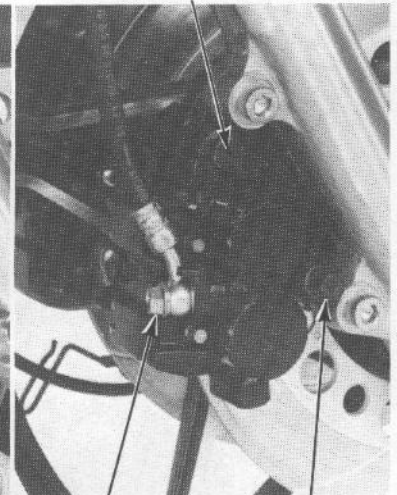
Be careful not to damage the pads.

FRONT



RETAINER CLIP

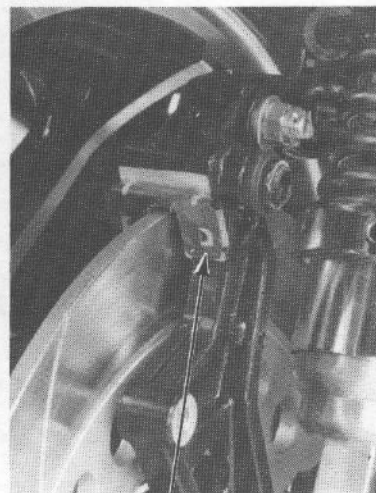
CALIPER PIVOT BOLT



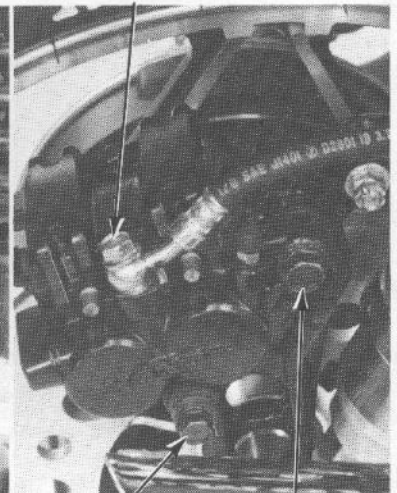
BRAKE HOSE BOLT

CALIPER BOLT

REAR



RETAINER



CALIPER BOLT

PIVOT BOLT

Install the caliper pivot bolt and caliper bolt. Connect the brake hose and tighten the brake hose bolt.

TORQUE:

'83, '84, '85:

25–35 N·m (2.5–3.5 kg-m, 18–25 ft-lb)

After '85:

37–43 N·m (3.7–4.3 kg-m, 27–31 ft-lb)

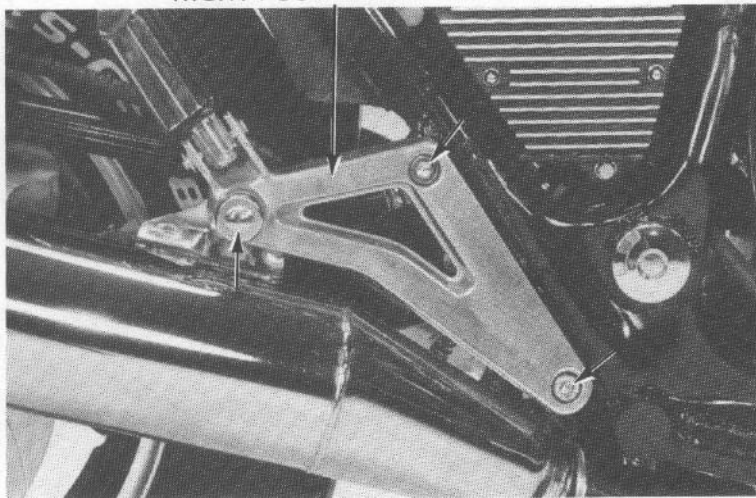
Fill the brake fluid reservoir and bleed the brake system (page 17-4).

REAR MASTER CYLINDER

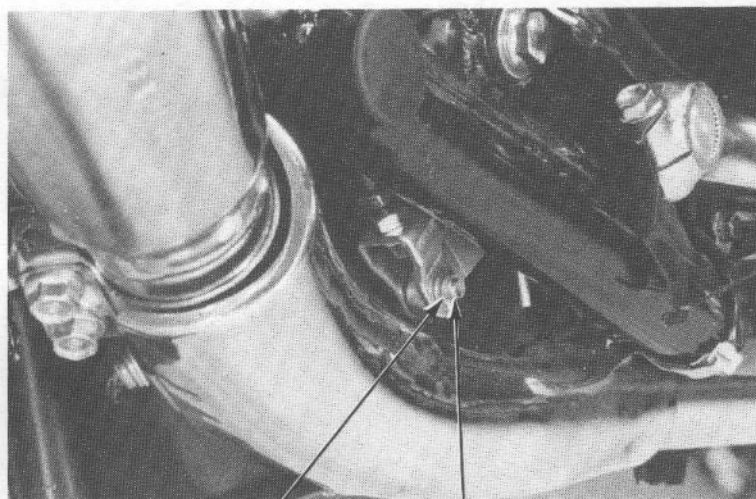
REMOVAL

Remove the right foot peg bracket.

RIGHT FOOT PEG BRACKET



Remove the cotter pin and pull out the joint pin connecting the master cylinder push rod end and rear brake pedal shaft.



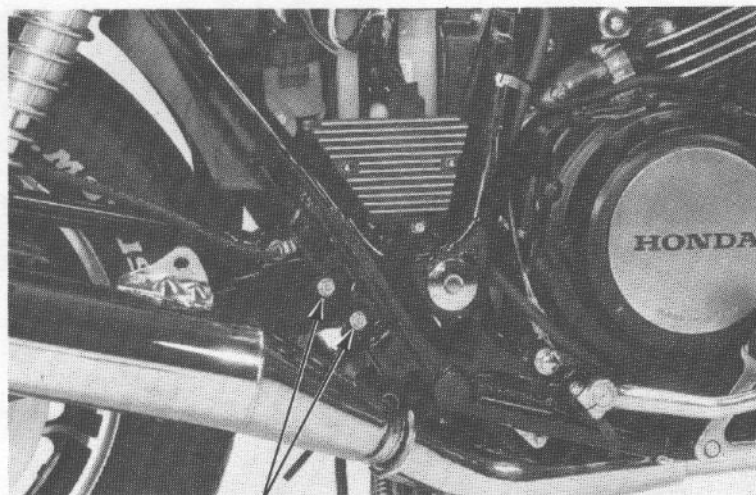
COTTER PIN JOINT PIN

Place a clean drain pan under the master cylinder and disconnect the brake hoses from the master cylinder.

CAUTION:

Avoid spilling brake fluid on painted or plastic surfaces to prevent paint damage.

Remove the master cylinder attaching bolts and remove the master cylinder.

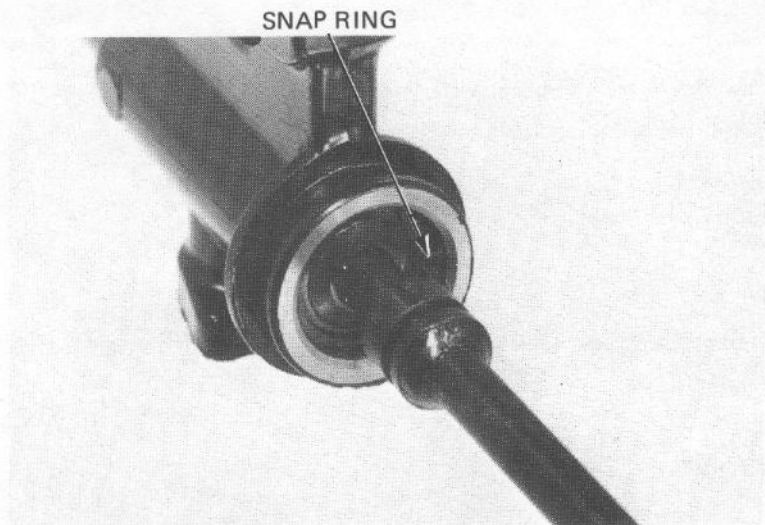


ATTACHING BOLTS

DISASSEMBLY

Remove the rubber cover.

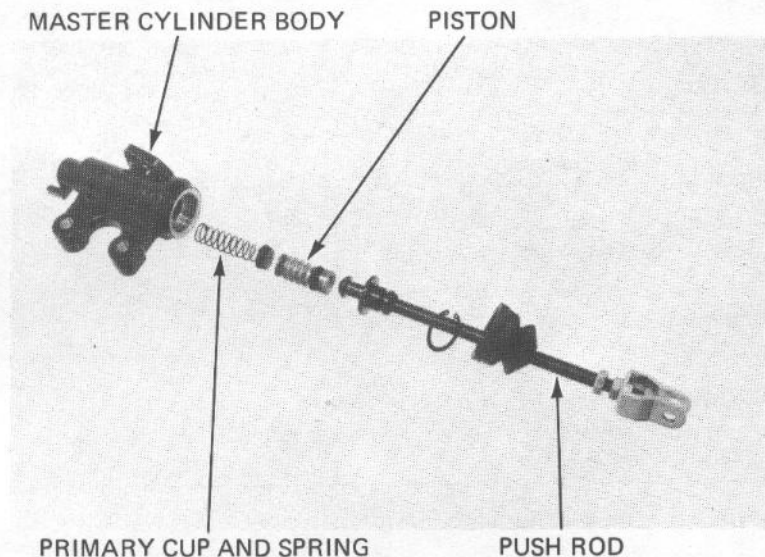
Remove the snap ring with snap ring pliers (07914-3230001) and remove the push rod from the master cylinder.



Remove the master piston, primary cup, and spring.

It may be necessary to apply a small amount of air pressure to the fluid outlet to remove the master piston and primary cup.

Clean all parts with brake fluid.

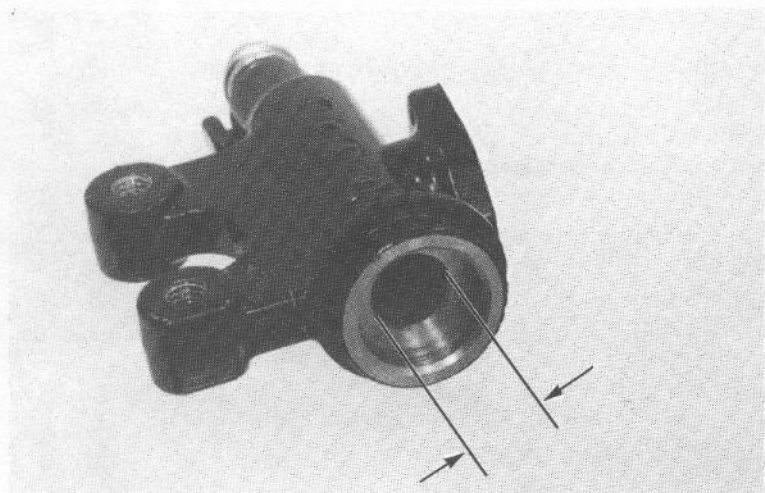


REAR MASTER CYLINDER I.D. INSPECTION

Measure the inside diameter of the master cylinder bore.

SERVICE LIMIT: 14.005 mm (0.5533 in)

Check for scores, scratches, or nicks.



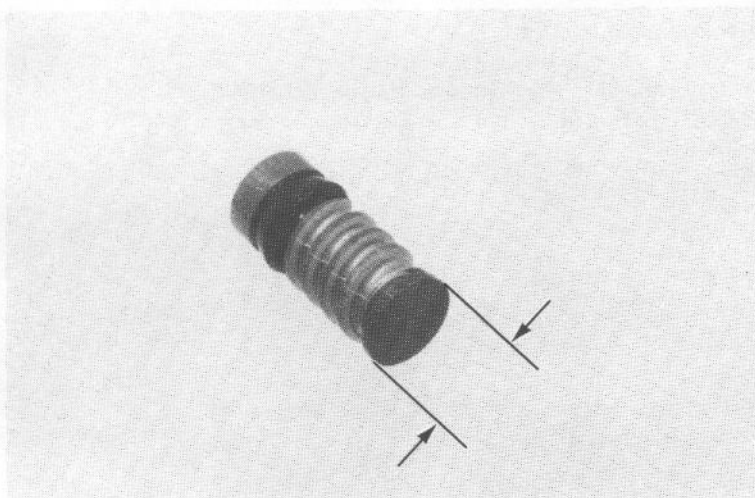
HYDRAULIC BRAKES

REAR MASTER PISTON O.D. INSPECTION

Measure the master piston O.D.

SERVICE LIMIT: 13.945 mm (0.5490 in)

Check the primary cup and secondary cup for damage before assembly.



ASSEMBLY

CAUTION:

Replace the master cylinder piston, cylinder, and spring as a set.

Assemble the master cylinder.

Coat all parts with clean brake fluid.

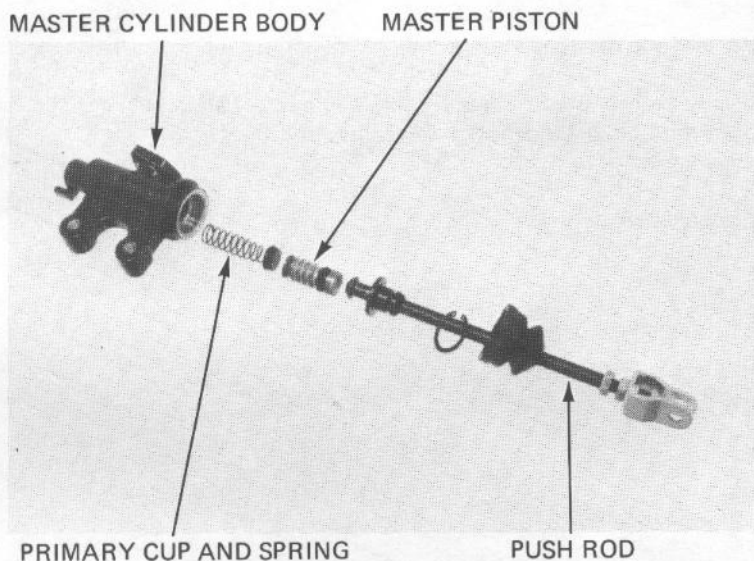
Dip the piston cup in DOT-4 brake fluid before assembly.

CAUTION:

When installing the cups, do not allow the lips to turn inside out. Be certain the snap ring is seated firmly in the groove.

Install the primary cup and piston.

Install the push rod and snap ring.



ASSEMBLY

Install the master cylinder and tighten the attaching bolt.

Connect the push rod end and brake pedal shaft with the joint pin. Secure the joint pin with a new cotter pin.

Connect the brake hoses to the master cylinder and tighten the brake hose bolt.

TORQUE:

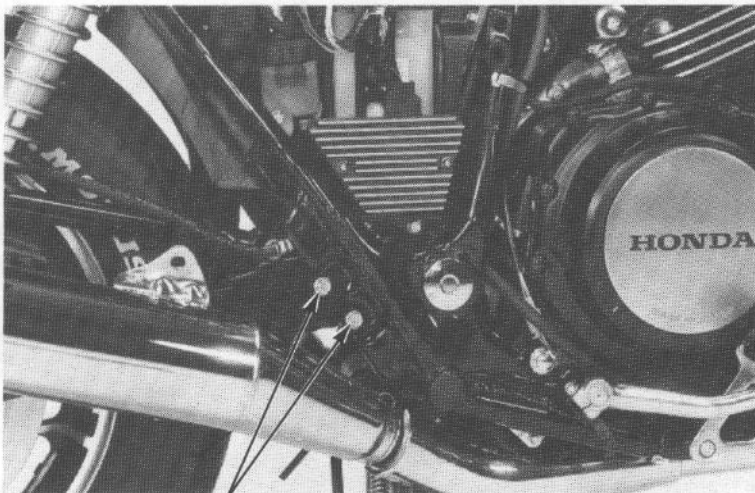
'83, '84, '85:

25–35 N·m (2.5–3.5 kg-m, 18–25 ft-lb)

After '85:

37–43 N·m (3.7–4.3 kg-m, 27–31 ft-lb)

Install the right foot peg bracket.



ATTACHING BOLTS

Fill the brake fluid reservoir and bleed the rear brake system (page 17-4).

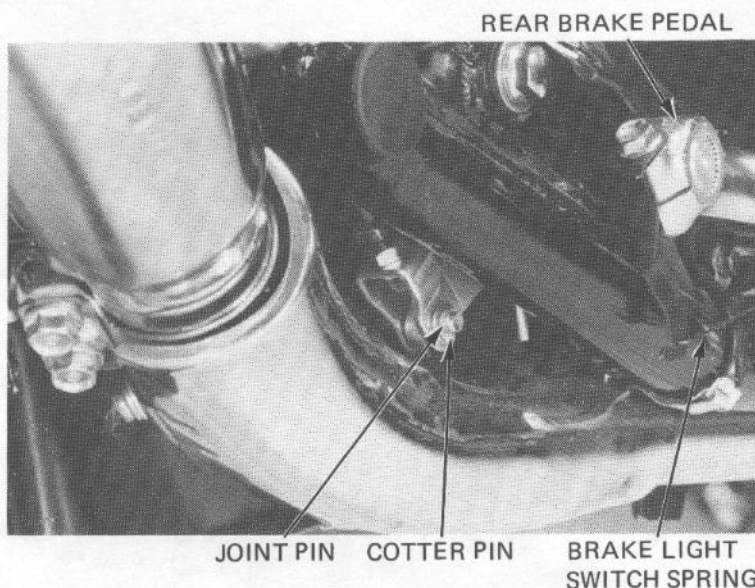
BRAKE PEDAL SHAFT

REMOVAL

Unhook the brake light switch spring and remove the rear brake pedal.

Remove the cotter pin and joint pin, and then disconnect the pedal shaft from the master cylinder push rod.

Unhook the brake return spring and remove the rear brake pedal shaft.



INSTALLATION

Apply grease to the brake pedal shaft and install it in the frame.

Hook the brake return spring correctly.

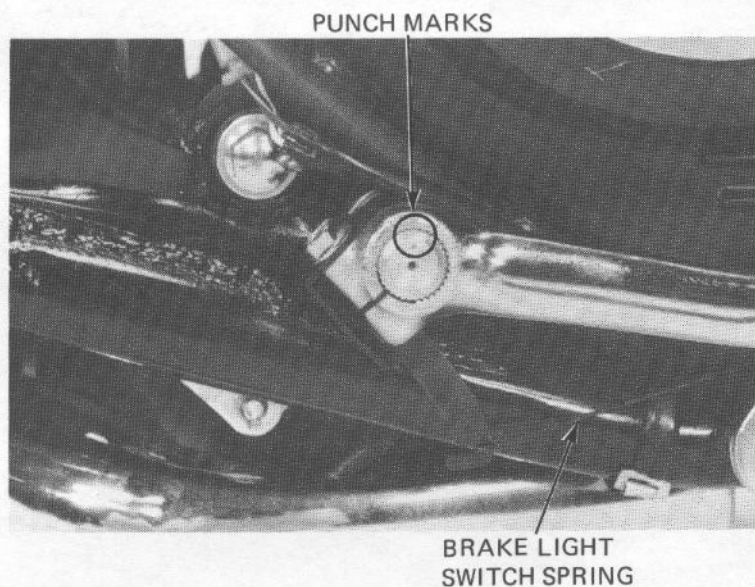
Connect the pedal shaft to the master cylinder push rod end and install the joint pin. Secure the joint pin with a new cotter pin.

Install the brake pedal aligning the punch marks on the shaft and pedal.

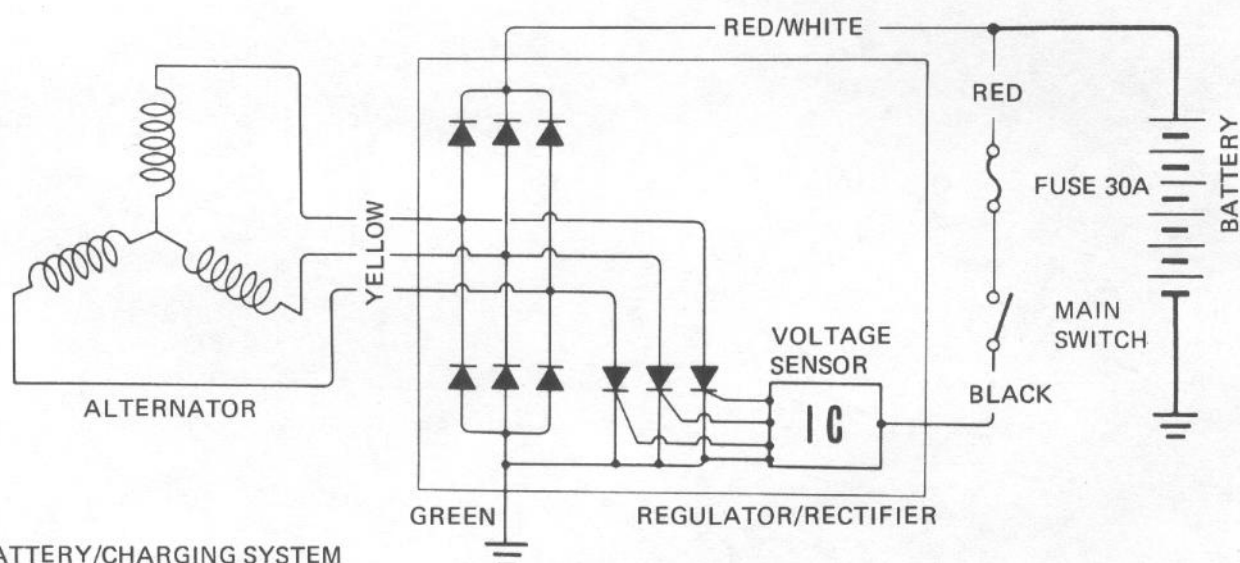
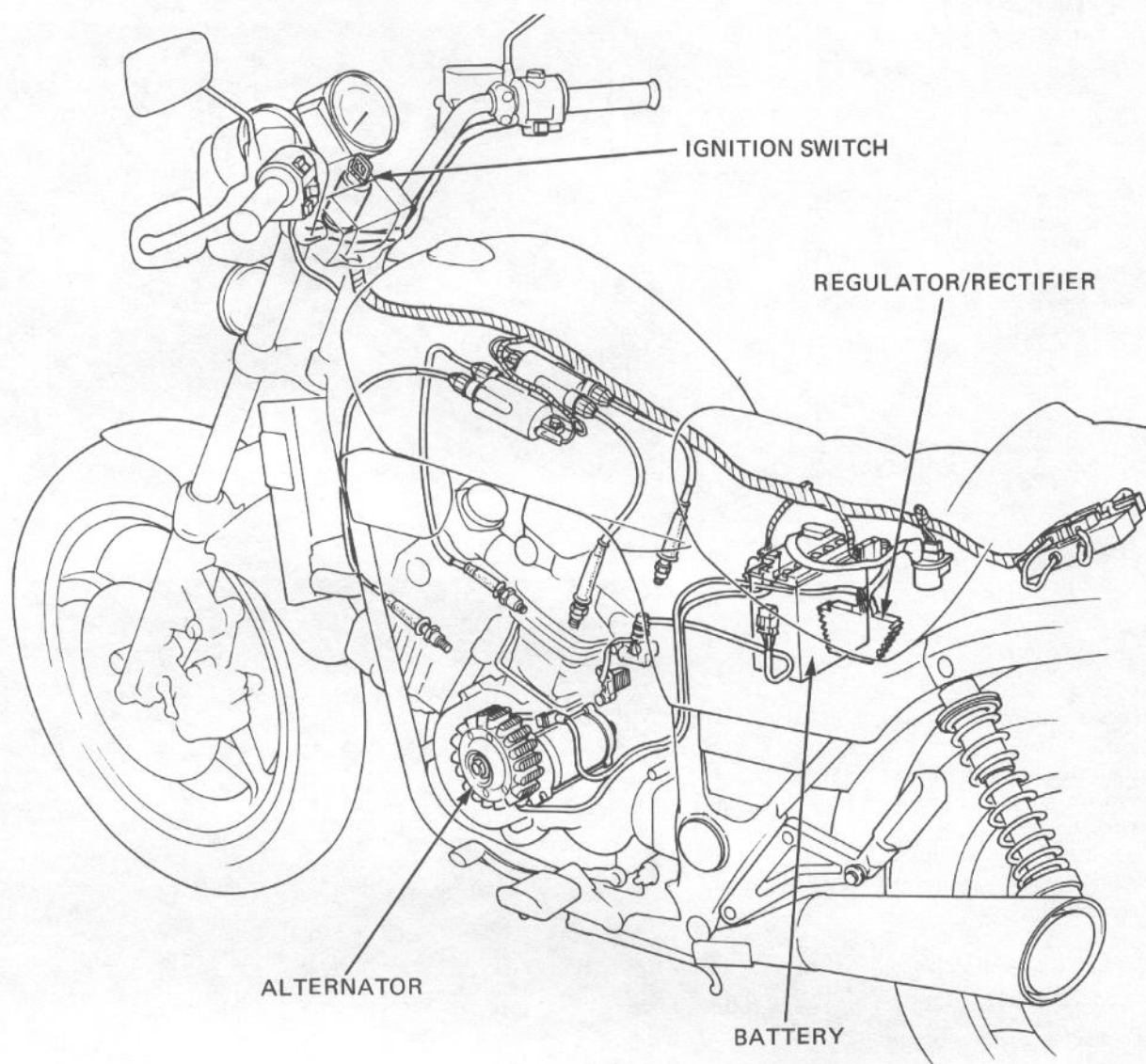
Tighten the brake pedal bolt.

TORQUE: 24–30 N·m (2.4–3.0 kg-m, 17–22 ft-lb)

Hook the brake light switch spring.



BATTERY/CHARGING SYSTEM



BATTERY/CHARGING SYSTEM

18. BATTERY/CHARGING SYSTEM

| | |
|---------------------|------|
| SERVICE INFORMATION | 18-1 |
| TROUBLESHOOTING | 18-2 |
| BATTERY | 18-3 |
| CHARGING SYSTEM | 18-4 |

SERVICE INFORMATION

GENERAL

- Battery fluid level should be checked regularly. Fill with distilled water when necessary.
- Quick charge a battery, only in an emergency. Slow-charging is preferred.
- Remove the battery from the motorcycle for charging. If the battery must be charged on the motorcycle, disconnect the battery cables.

WARNING

Do not smoke, and keep flames away from a charging battery. The gas produced by a battery will explode if flames or sparks are brought near.

- All charging system components can be tested on the motorcycle.
- Alternator removal is in Section 9.

SPECIFICATIONS

| | | | |
|---------------------|------------------|---|--------------------|
| Battery | Capacity | 12V 18AH | |
| | Specific gravity | 1.280/20°C (68°F) | |
| | Charging rate | 1.8 amperes maximum | |
| Alternator Capacity | | 1,000 rpm | 5,000 rpm |
| | | 10.2A min. (No load) | 25A min. (No load) |
| Voltage regulator | | Transistorized non-adjustable regulator | |

TROUBLESHOOTING

No power — key turned on:

1. Main fuse burned out
2. Dead battery
 - Low fluid level
 - Low specific gravity
 - Charging system failure
3. Disconnected battery cable
4. Faulty ignition switch

Low power — key turned on:

1. Weak battery
 - Low fluid level
 - Low specific gravity
 - Charging system failure
2. Loose battery connection

Low power — engine running:

1. Battery undercharged
 - Low fluid 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/rectifier
3. Faulty alternator

BATTERY

REMOVAL

Remove the right side cover.

Remove the battery holder bolt.

Pull the battery out, and disconnect the ground cable at the battery terminal then disconnect the positive cable.

Remove the battery.

TESTING SPECIFIC GRAVITY

Test each cell with a hydrometer.

SPECIFIC GRAVITY: 1.270–1.290 (20°C, 68°F)

| | |
|-------------|---------------|
| 1.270–1.290 | Fully charged |
| Below 1.260 | Undercharged |

NOTES

- The battery must be recharged if the specific gravity is below 1.230.
- The specific gravity varies with the temperature as shown in the accompanying table.
- Replace the battery if sulfation is evident or if the space below the cell plates is filled with sediment.

WARNING

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

CHARGING

Remove the battery cell caps.

Fill the battery cells with distilled water to the upper level line, if necessary.

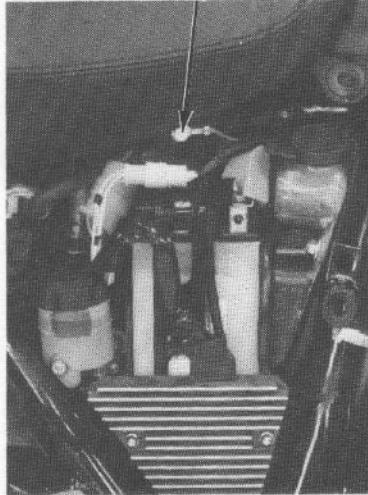
Connect the charger positive (+) cable to the battery positive (+) terminal.

Connect the charger negative (–) cable to the battery negative (–) terminal.

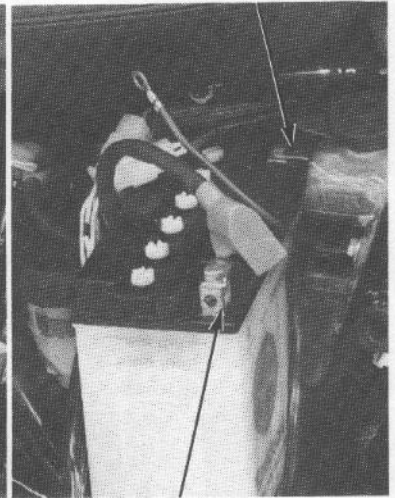
Charging current: 1.8 amperes max.

Charge the battery until specific gravity is 1.270–1.290 at 20°C (68°F).

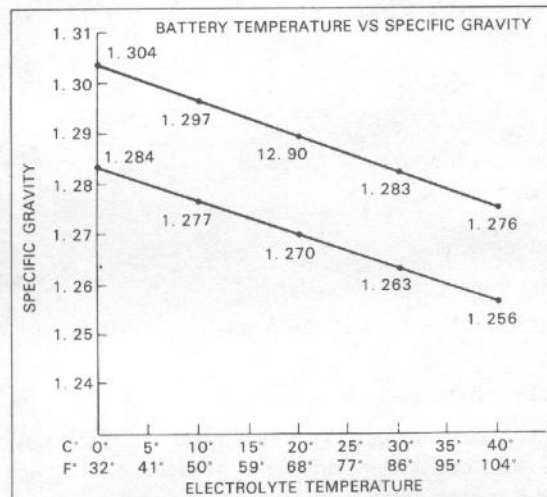
BATTERY HOLDER BOLT



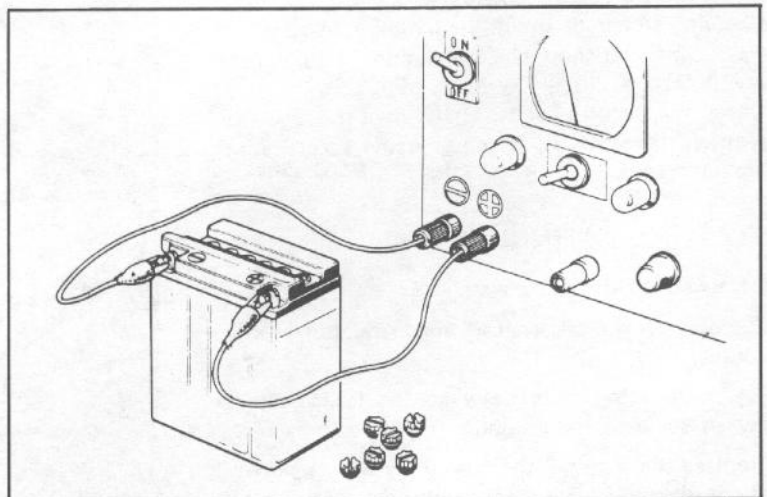
GROUND CABLE



POSITIVE CABLE



Specific gravity changes by 0.007 for every 10°C.



BATTERY/CHARGING SYSTEM

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 to prevent sparks.
- Discontinue charging if the electrolyte temperature exceeds 45°C (113°F).

CAUTION:

- Quick-charging should only be done in an emergency; slow-charging is preferred.
- Route the breather tube as shown on the battery caution label.

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

CHARGING SYSTEM

CURRENT TEST

NOTE

Be sure the battery is in good condition before performing this test.

Warm up the engine.

Remove the frame right side cover.

Disconnect the black wire at the regulator/rectifier coupler.

Disconnect the headlight.

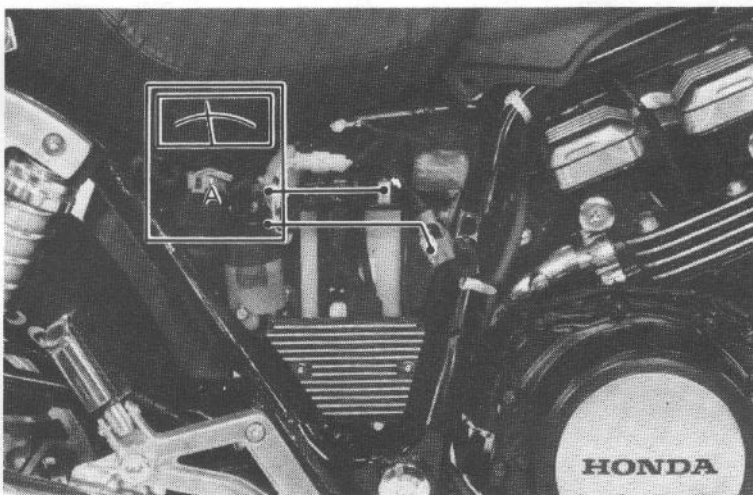
Disconnect the battery positive cable at the battery terminal and connect an ammeter between the battery cable and terminal.

Allow engine to idle.

Increase engine speed slowly.

Charging amperage should be a minimum of 10.2 at 1,000 rpm and should be a minimum of 25 amperes at 5,000 rpm.

Check the stator (page 18-4) and then the regulator/rectifier (page 18-5), if the charging specifications are not met.



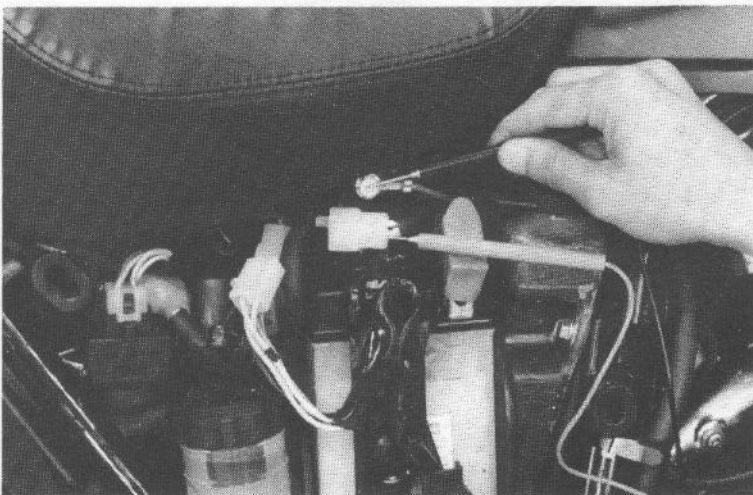
STATOR CONTINUITY TEST

Remove the right side cover.

Disconnect the alternator and regulator/rectifier coupler.

Check for continuity between the leads, and between the leads and ground.

Replace the stator if there is no continuity between the leads, or if there is continuity between the leads and ground.



VOLTAGE REGULATOR/RECTIFIER TEST

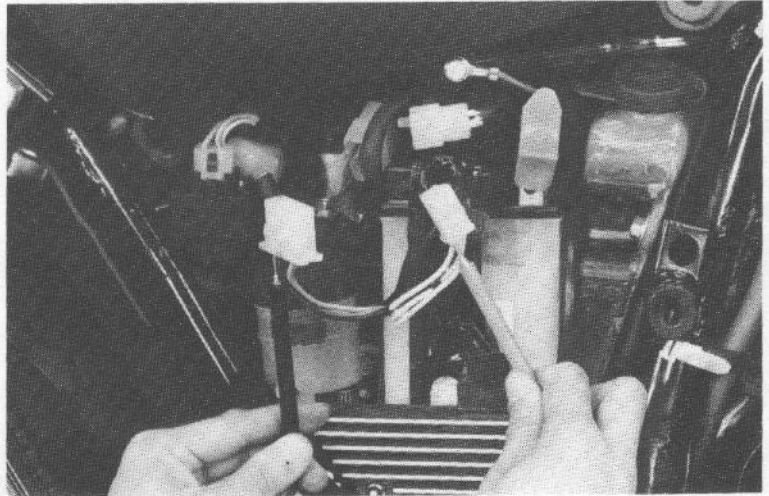
Remove the right side cover.

Disconnect the regulator/rectifier couplers.

Check for continuity between the leads with an ohmmeter.

NOTE

The test results shown are for a positive ground ohmmeter and the opposite results will be obtained when a negative ground ohmmeter is used.

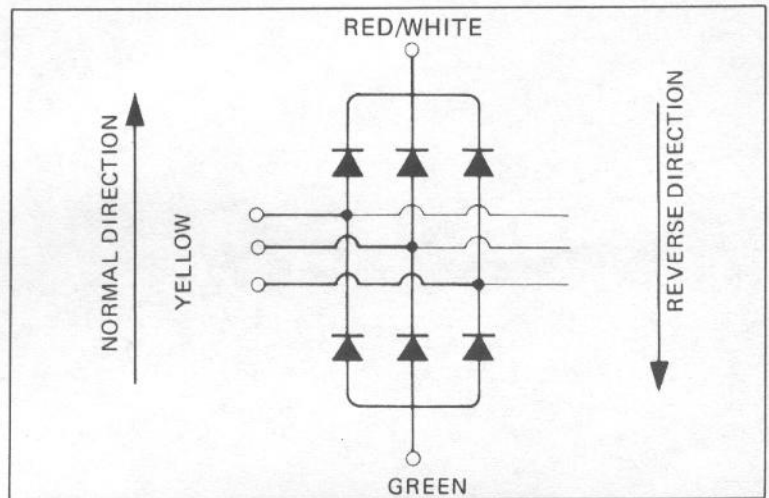


NORMAL DIRECTION: CONTINUITY

| | ⊕ probe | ⊖ probe |
|----|-----------|---------|
| I | YELLOW | GREEN |
| II | RED/WHITE | YELLOW |

REVERSE DIRECTION: NO CONTINUITY

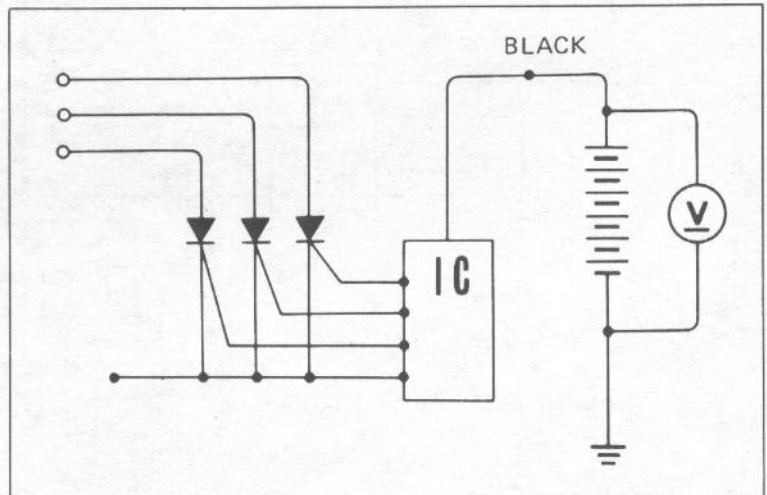
| | ⊕ probe | ⊖ probe |
|----|---------|-----------|
| I | GREEN | YELLOW |
| II | YELLOW | RED/WHITE |



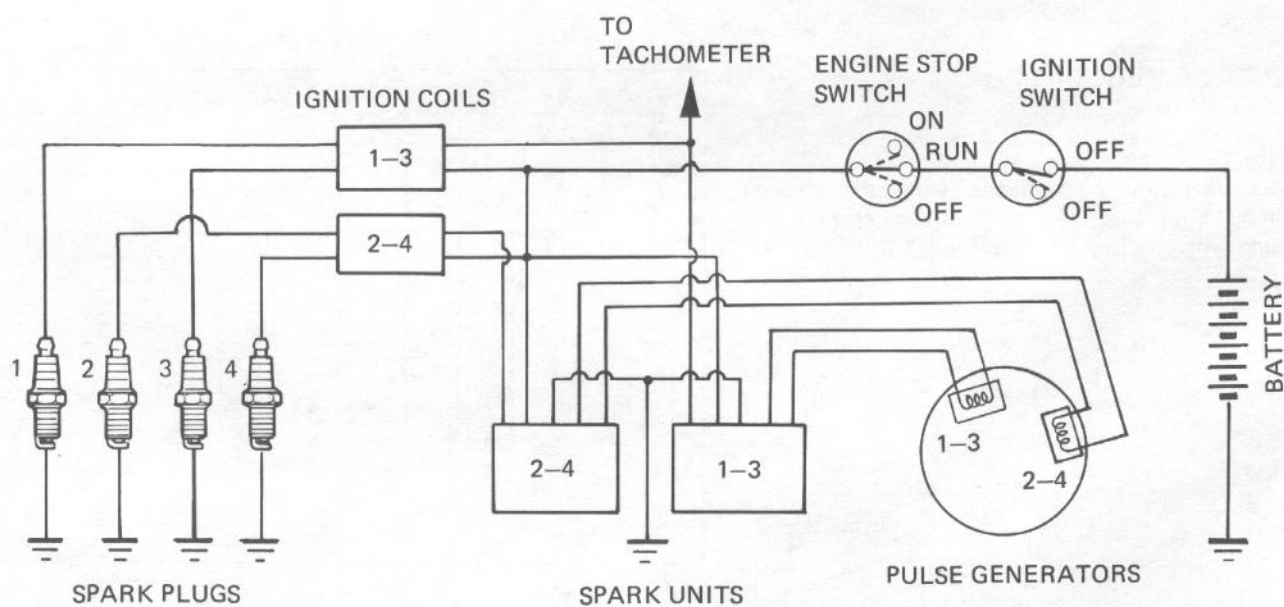
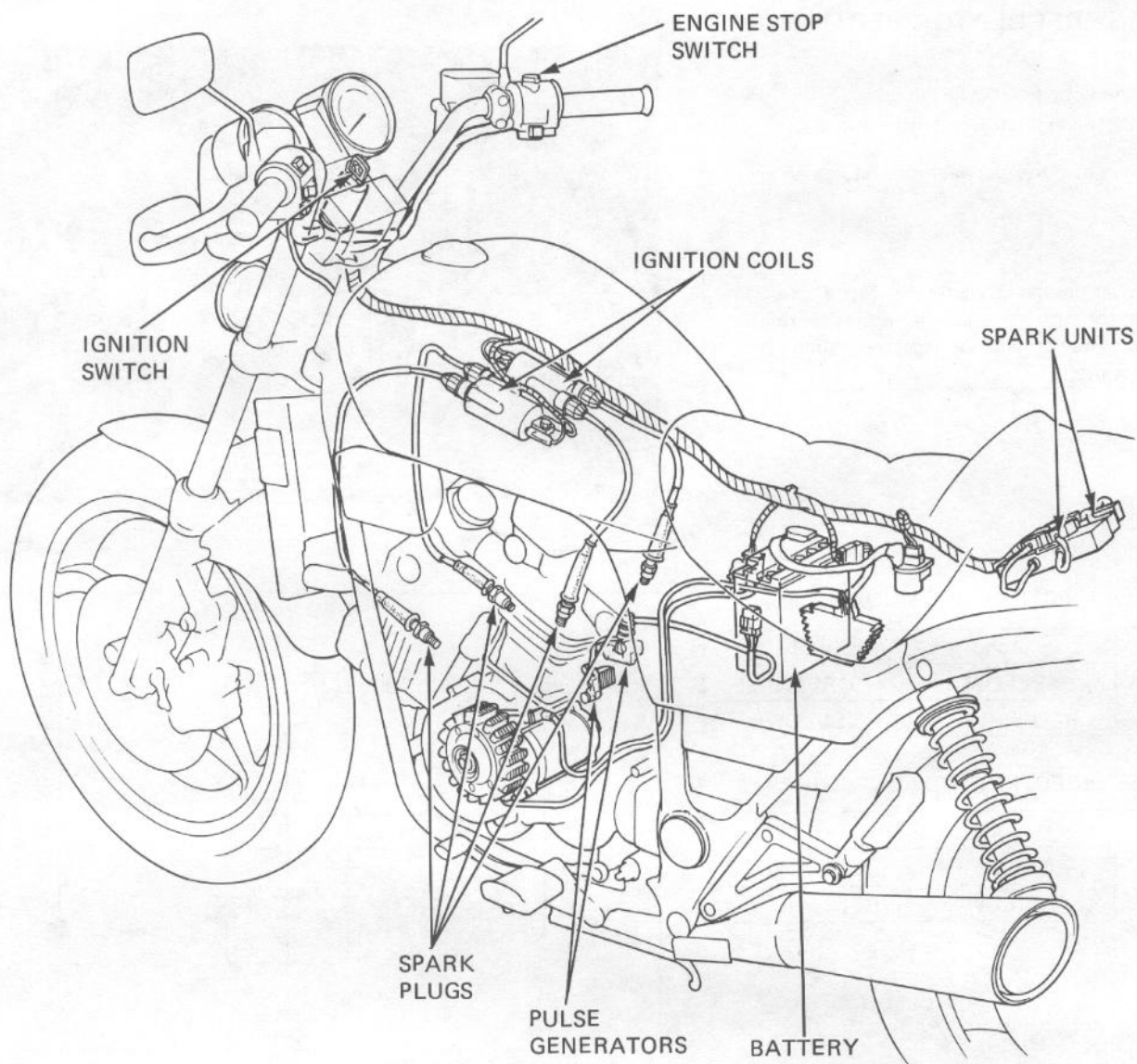
VOLTAGE REGULATOR PERFORMANCE TEST

Connect a voltmeter across the battery.

Check regulator performance with the engine running. The regulator must divert current to ground when battery voltage reaches 14.0 ~ 15.0 V.



IGNITION SYSTEM



19. IGNITION SYSTEM

| | |
|--------------------------------|------|
| SERVICE INFORMATION | 19-1 |
| TROUBLESHOOTING | 19-2 |
| IGNITION COIL | 19-3 |
| TRANSISTORIZED IGNITION SYSTEM | 19-4 |

SERVICE INFORMATION

GENERAL

- A TRANSISTORIZED IGNITION SYSTEM is used and no adjustments can be made.

SPECIFICATIONS

| | | ND | NGK |
|-------------------------|-----------------------------------|-----------|----------|
| Spark plug | Standard | X24EPR-U9 | DPR8EA-9 |
| | For cold climate Below 5°C (41°F) | X22EPR-U9 | DPR7EA-9 |
| | For extended high speed driving | X27EPR-U9 | DPR9EA-9 |
| Spark plug gap | 0.8–0.9 mm (0.031–0.035 in) | | |
| Ignition timing | At idle 10° BTDC | | |
| | Full advance 37° BTDC/3,800 rpm | | |
| Pulse generator air gap | 0.4–0.6 mm (0.016–0.024 in) | | |

TROUBLESHOOTING

The ignition system has two sub-systems; one for the No. 1 and No. 3 cylinders and one for the No. 2 and No. 4 cylinders. Determine which sub-system is faulty, then proceed to the detailed tests below.

Engine cranks but will not start

- Engine stop switch OFF
- No spark at plugs
- Faulty transistorized spark unit
- Faulty pulse generator

No spark at plug

- Engine stop switch OFF
- Poorly connected, broken, or shorted wires
 - Between ignition switch and engine stop switch
 - Between spark unit and engine stop switch
 - Between spark unit and ignition coil
 - Between ignition coil and plug
 - Between spark unit and pulse generator
- Faulty ignition coil
- Faulty ignition switch
- Faulty spark unit
- Faulty pulse generator

Engine starts but runs poorly

- Ignition primary circuit
 - Faulty ignition coil
 - Loose or bare wire
 - Intermittent short circuit
- Secondary circuit
 - Faulty plug
 - Faulty high tension wire

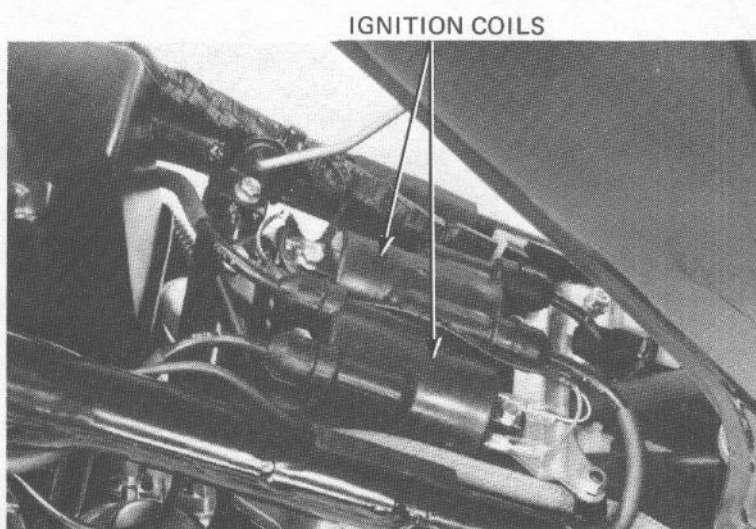
Timing advance incorrect

- Faulty pulse generator
- Faulty spark unit

IGNITION COIL

REMOVAL

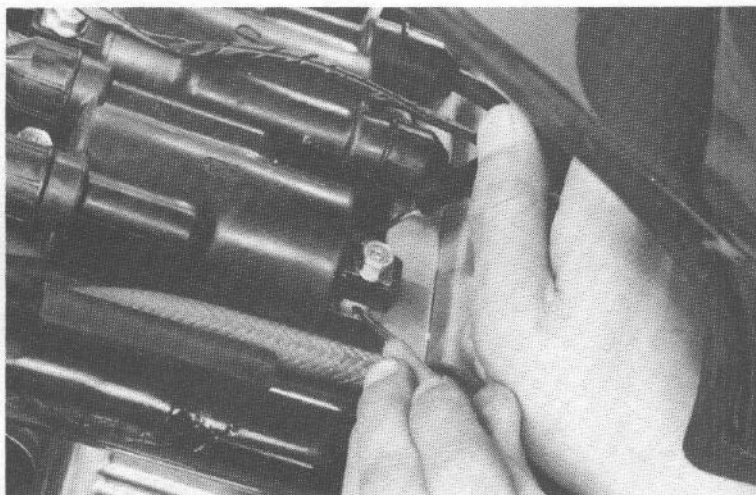
Remove the side covers and seat.
Make sure the fuel tank is less than half-full. Drain it, if it is more than half-full. Remove the tank mounting bolts, lift the fuel tank up, and hold it in place with the tank support rod.
Disconnect the ignition wire leads.
Remove the coils by removing the attaching bolts.



CONTINUITY TEST

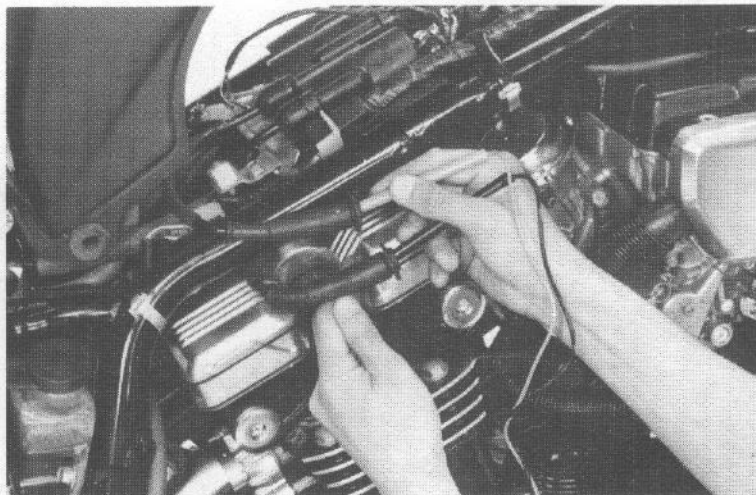
Measure the primary coil resistance.

RESISTANCE: 2.8 Ω



Measure the secondary coil resistance with the spark plug caps in place.

RESISTANCE: 21–28 k Ω

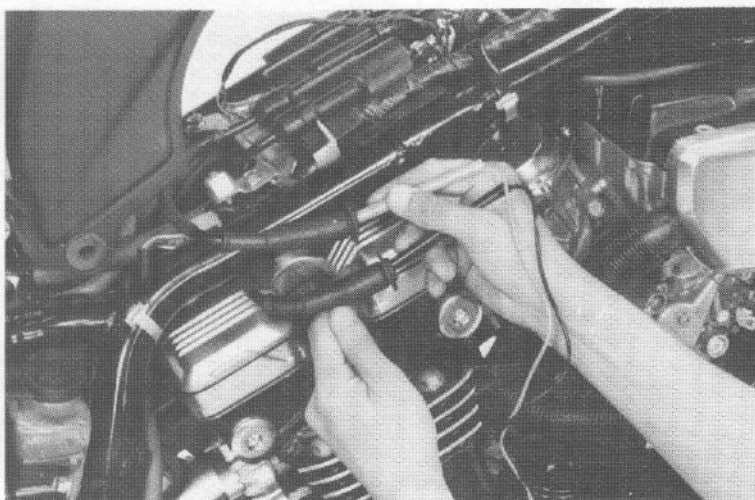


IGNITION SYSTEM

Remove the spark plug cap resistor retainers and resistors from the caps.

Measure the secondary coil resistance.

RESISTANCE: 13.6–15.5 k Ω



TRANSISTORIZED IGNITION SYSTEM

PULSE GENERATOR TEST

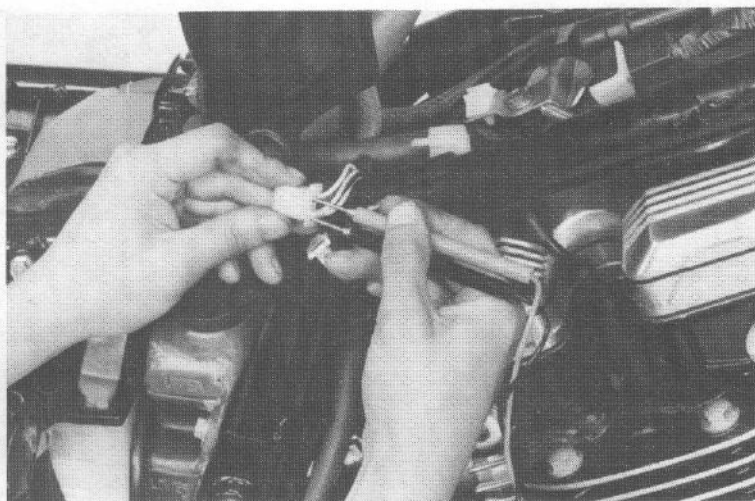
Lift the fuel tank up and hold it in place with the support rod. Be sure that the tank is less than half-full.

Disconnect the pulse generator coupler and measure the coil resistance.

RESISTANCE: Approximately 480 Ω

Between white/yellow and yellow leads (1, 3 cylinders)

Between white/blue and blue leads (2, 4 cylinders)



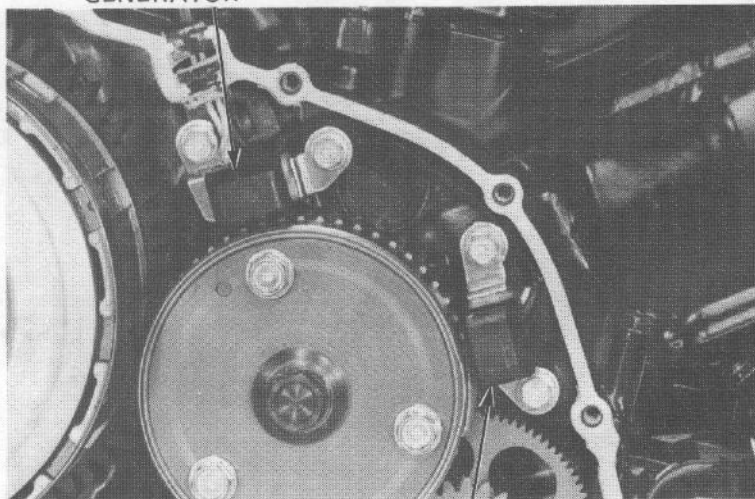
1–3 CYLINDER PULSE
GENERATOR

PULSE GENERATOR REPLACEMENT

Remove the clutch cover (page 7-11).

Remove the pulse generator mounting bolts, and pulse generators.

Install new pulse generators.



2–4 CYLINDER PULSE
GENERATOR

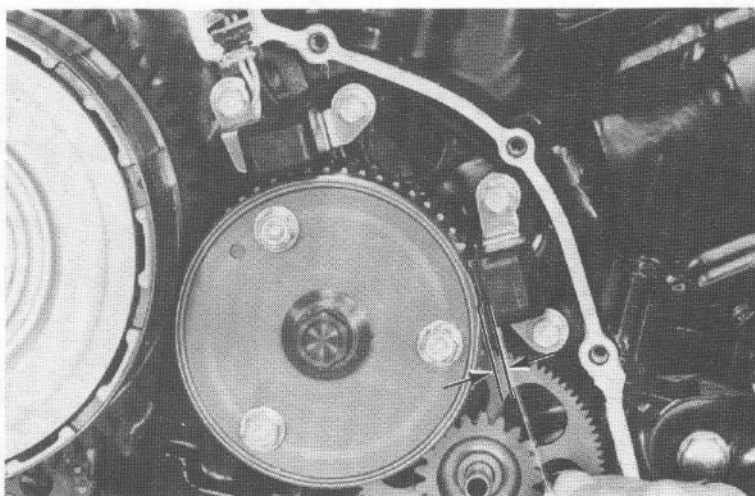
Check the air gap with a feeler gauge.

STANDARD AIR GAP:

0.4–0.6 mm (0.016–0.024 in)

Install the clutch cover (page 7-24).

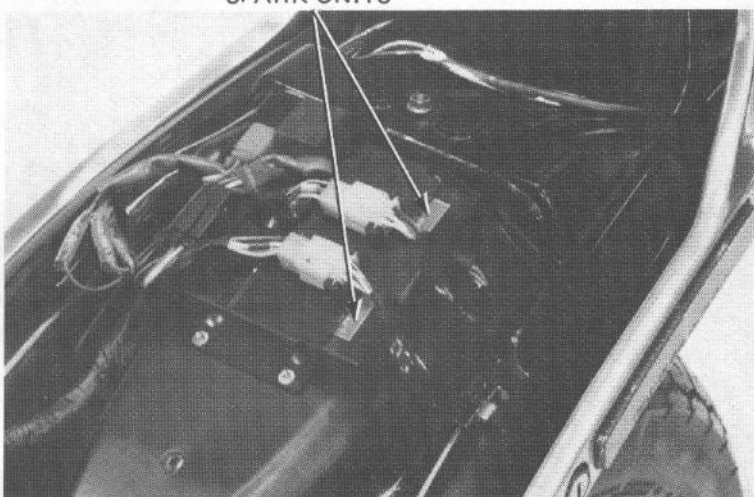
Recheck the ignition timing (page 3-8).



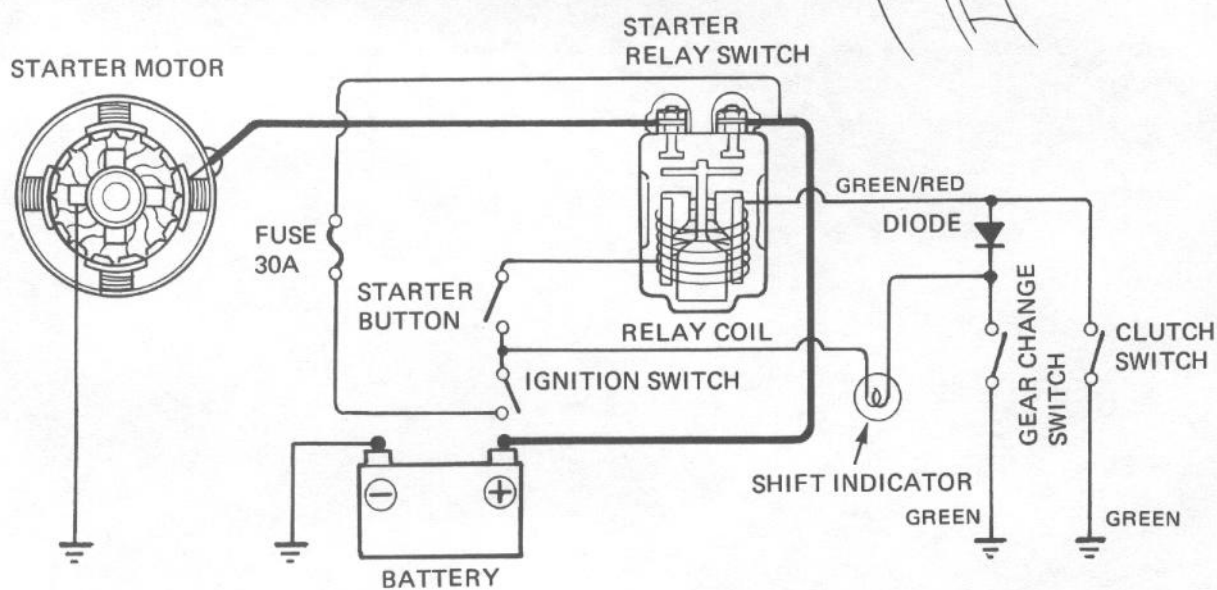
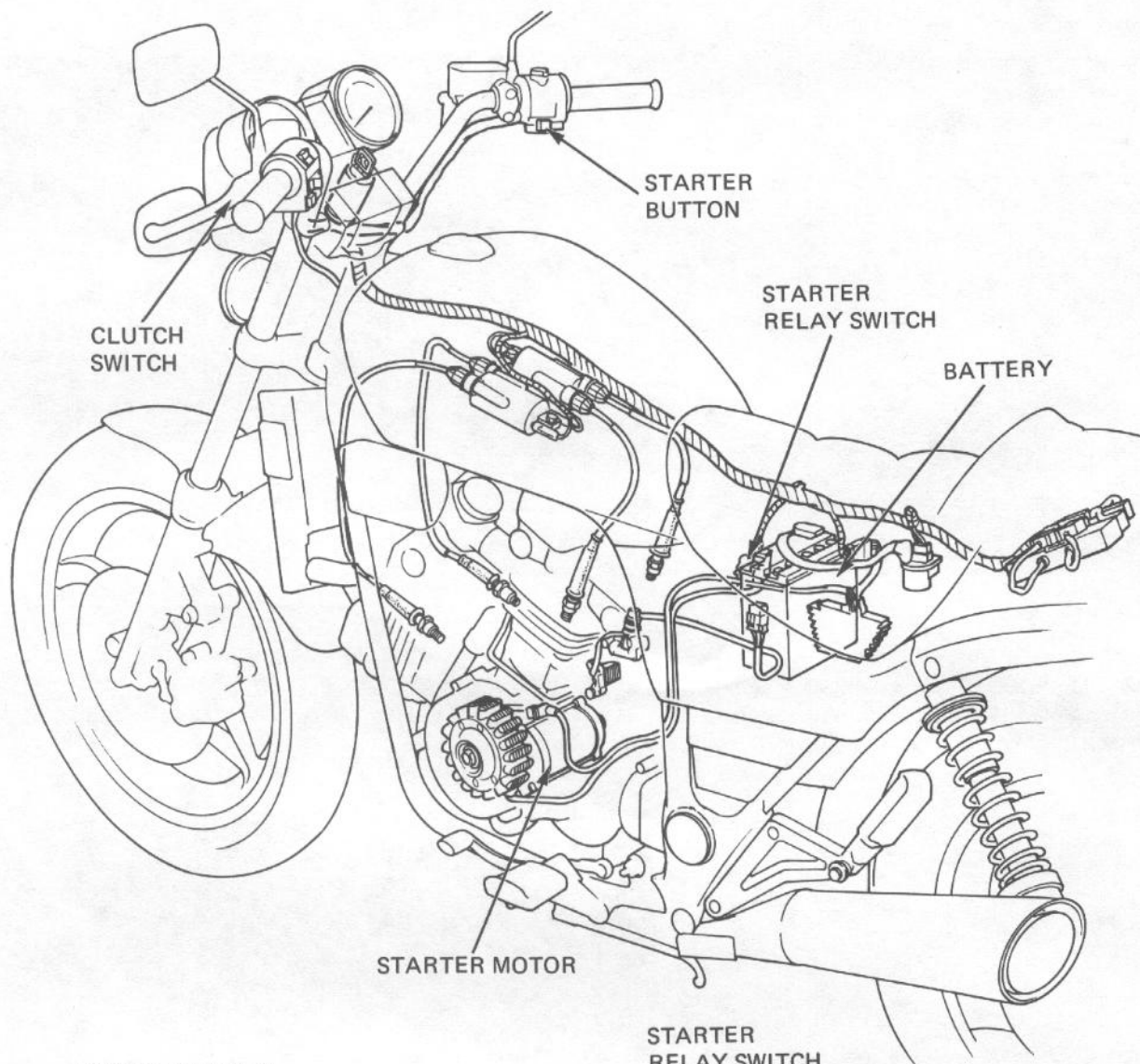
SPARK UNIT

If the pulse generators, ignition coils, and wiring are good, and the ignition timing is not within specification, replace the spark units with new ones and recheck the ignition timing.

SPARK UNITS



ELECTRIC STARTER



20. ELECTRIC STARTER

| | |
|----------------------|------|
| SERVICE INFORMATION | 20-1 |
| TROUBLESHOOTING | 20-1 |
| STARTER MOTOR | 20-2 |
| STARTER RELAY SWITCH | 20-5 |
| CLUTCH DIODE | 20-5 |

SERVICE INFORMATION

GENERAL

- The starter motor can be removed with the engine in the frame.

SPECIFICATIONS

| | | STANDARD | SERVICE LIMIT |
|---------------|----------------------|-----------------------------|------------------|
| Starter motor | Brush spring tension | 680-920 g (24.0-32.5 oz) | 545 g (19.2 oz) |
| | Brush length | 12.0-13.0 mm (0.47-0.51 in) | 6.5 mm (0.26 in) |

TROUBLESHOOTING

Starter motor will not turn:

- Battery discharged
- Faulty ignition switch
- Faulty starter switch
- Faulty gear change switch
- Faulty starter relay switch
- Loose or disconnected wire or cable
- Clutch diode open

Starter motor turns engine slowly

- Low specific gravity
- Excessive resistance in circuit
- Binding in starter motor

Starter motor turns, but engine does not turn:

- Faulty starter clutch
- Faulty starter motor gears
- Faulty starter motor or idler gear

Starter motor and engine turns, but engine does not start

- Faulty ignition system
- Engine problems

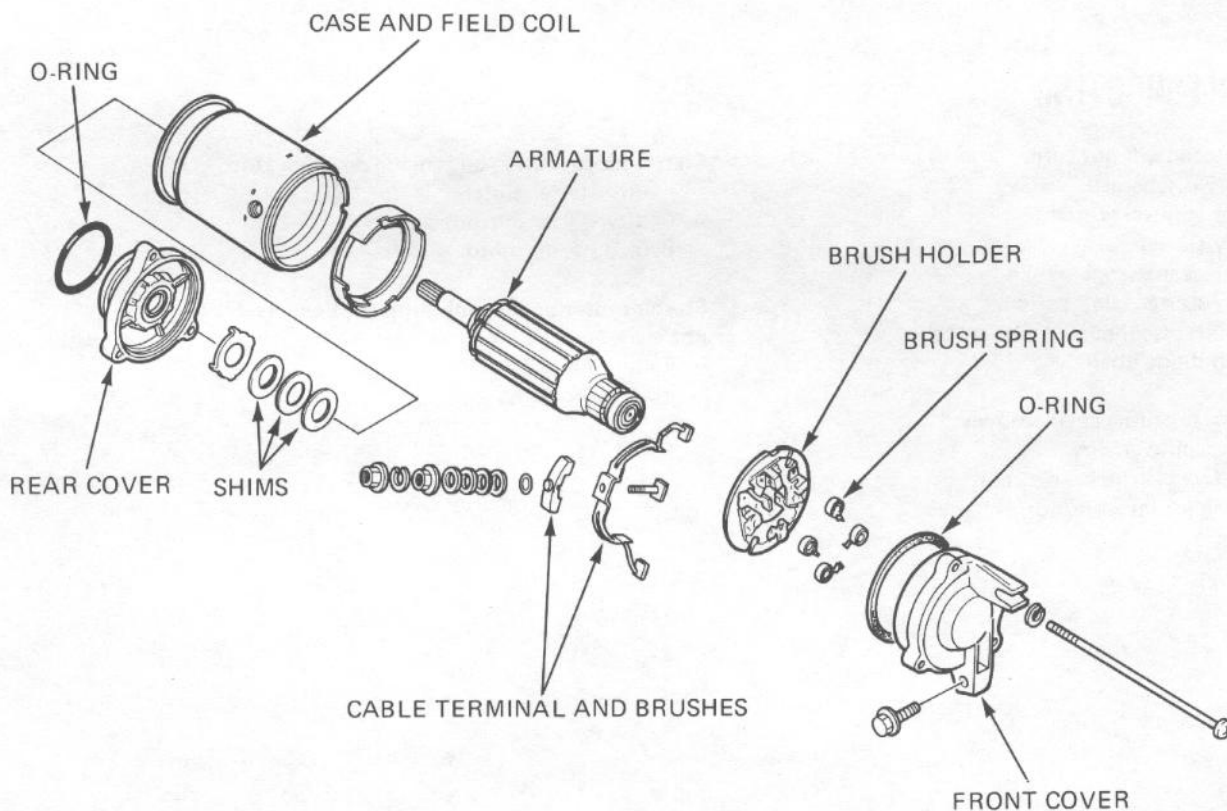
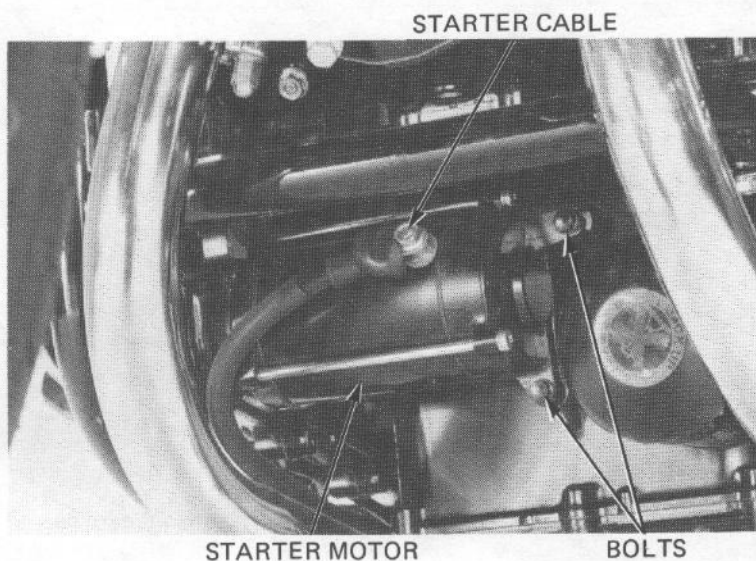
STARTER MOTOR

REMOVAL

WARNING

With the ignition switch OFF, remove the negative cable at the battery before servicing the starter motor.

Disconnect the starter motor cable at the motor. Remove the starter motor mounting bolts, and the starter motor.

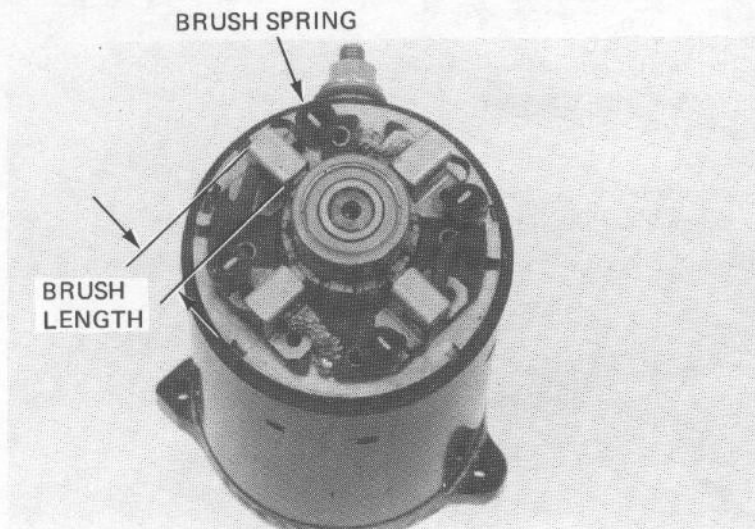


BRUSH INSPECTION

Remove the starter motor case screws.
Inspect the brushes and measure the brush length.
Measure brush spring tension with a spring scale.

SERVICE LIMITS:

Brush length: 6.5 mm (0.26 in)
Brush spring tension: 545 g (19.2 oz)



COMMUTATOR INSPECTION

Remove the starter motor case.

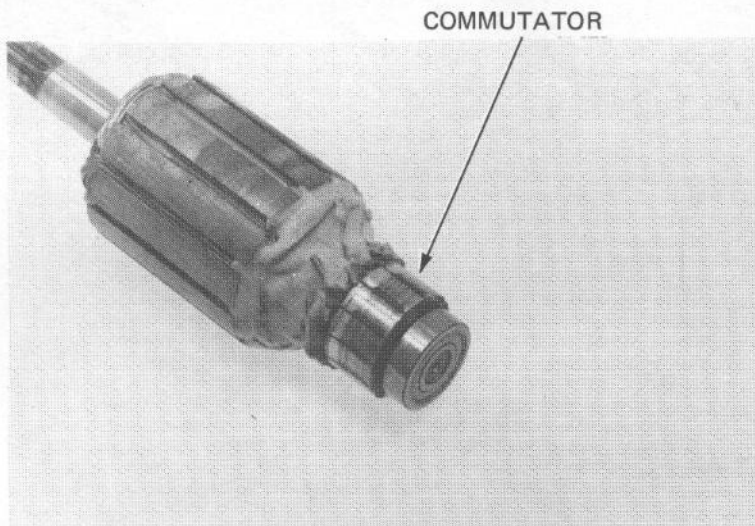
NOTE:

Record the location and number of thrust washers.

Inspect the commutator bars for discoloration.
Bars discolored in pairs indicate grounded armature coils.

NOTE:

Do not use emery or sand paper on the commutator.

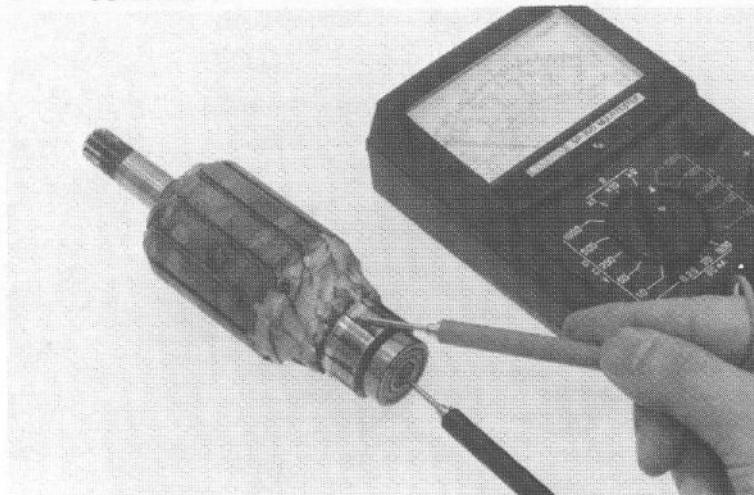


Check for continuity between pairs of commutator bars.

Also, make a resistance check between individual commutator bars and the armature shaft.

There should be no continuity.

COMMUTATOR BAR PAIRS
CONTINUITY: NORMAL



COMMUTATOR BARS AND ARMATURE SHAFT
NO CONTINUITY: NORMAL

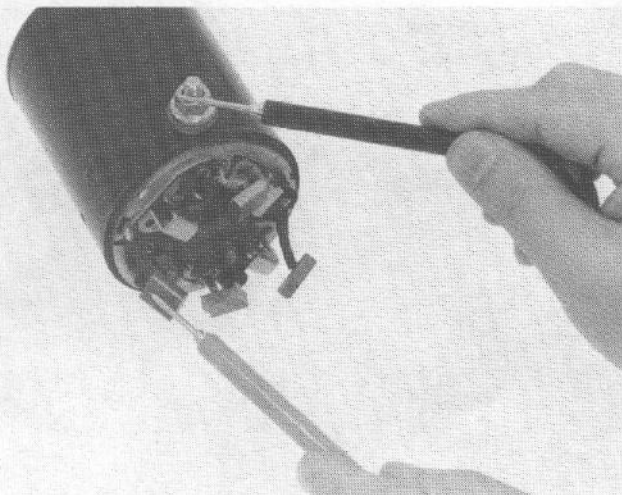
ELECTRIC STARTER

FIELD COIL INSPECTION

Check for continuity from the cable terminal to the motor case and from the cable terminal to the brush wire.

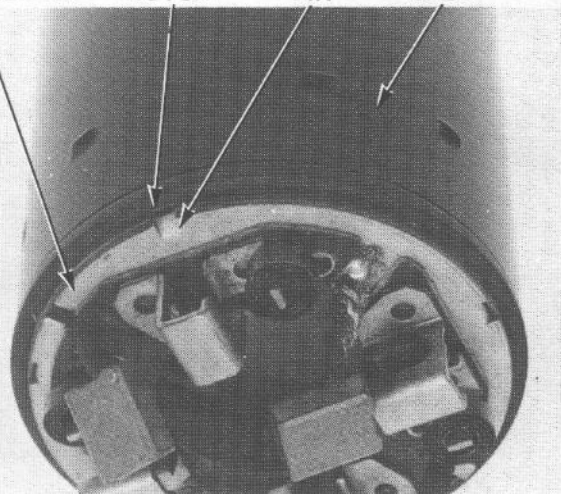
Replace the starter motor if the field coil is not continuous or if it is shorted to the motor case.

CABLE TERMINAL-MOTOR CASE
NO CONTINUITY: NORMAL



CABLE TERMINAL-BRUSH WIRE (BLACK)
CONTINUITY: NORMAL

BRUSH HOLDER NOTCH PIN CASE

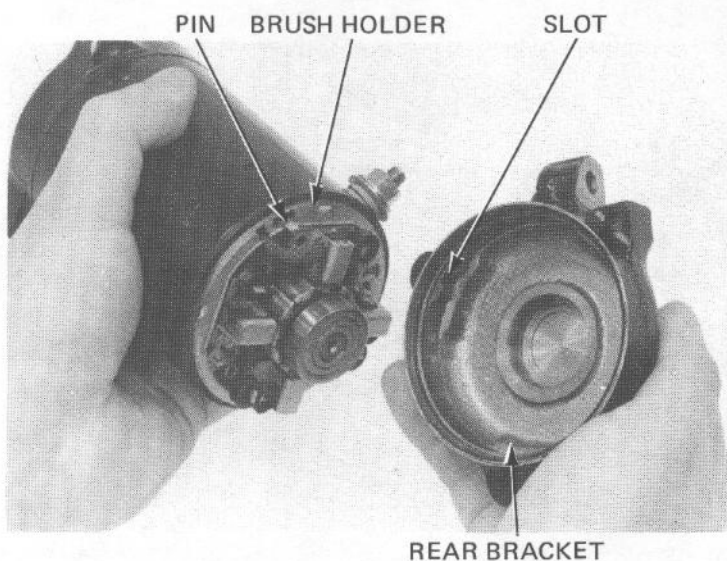


ASSEMBLY/INSTALLATION

Align the case notch with the brush holder pin.

Install the rear cover aligning its slot with the brush holder pin.

Install the starter motor in the reverse order of removal.



STARTER RELAY SWITCH

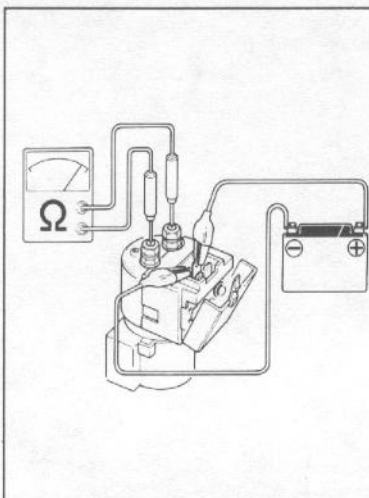
INSPECTION

Depress the starter switch button with the ignition ON. The coil is normal if the starter relay switch clicks.

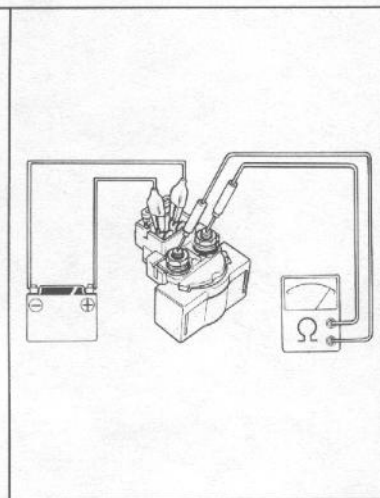
Connect an ohmmeter to the starter relay switch terminals.

Connect a 12V battery to the switch cable terminals. The switch is normal if there is continuity.

'83, '84, '85:



After '85:

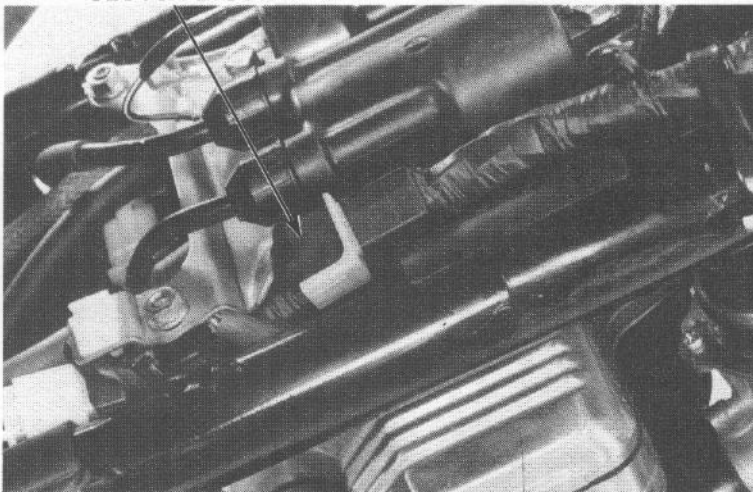


CLUTCH DIODE

REMOVAL

Lift the fuel tank up and hold it in place with the support rod. Be sure the tank is less than half-full. Remove the clutch diode from the wire harness.

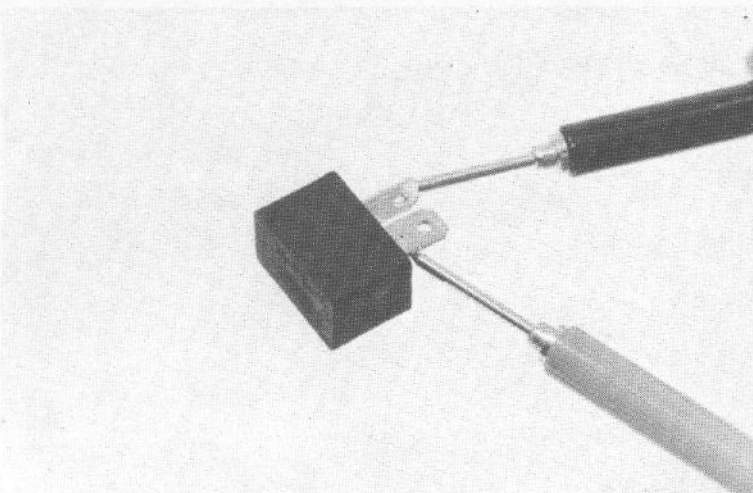
CLUTCH DIODE



IN ONE DIRECTION: CONTINUITY
IN THE REVERSE DIRECTION: NO CONTINUITY

INSPECTION

Check for continuity with an ohmmeter.



21. SWITCHES

| | | | |
|---------------------|------|-----------------------------|-------|
| SERVICE INFORMATION | 21-1 | THERMOSTATIC SWITCH | 21-8 |
| OIL PRESSURE SWITCH | 21-2 | TEMPERATURE SENSOR | 21-9 |
| BRAKE LIGHT SWITCH | 21-2 | TEMPERATURE GAUGE | 21-10 |
| GEAR CHANGE SWITCH | 21-3 | TACHOMETER | 21-10 |
| HANDLEBAR SWITCHES | 21-4 | BRAKE AND TAIL LIGHT SENSOR | 21-11 |
| IGNITION SWITCH | 21-6 | WARNING LAMP CHECK UNIT | 21-11 |
| CLUTCH SWITCH | 21-6 | TURN SIGNAL CANCEL SYSTEM | 21-11 |
| FUEL PUMP | 21-7 | LOW FUEL WARNING LIGHT | 21-17 |
| FUEL PUMP RELAY | 21-8 | | |

SERVICE INFORMATION

GENERAL

- Some wires have different colored bands around them near the connector. These are connected to other wires which correspond with the band color.
- All plastic plugs have locking tabs that must be released before disconnecting, and must be aligned when reconnecting.
- The following color codes are used throughout this section and on the wiring diagram.

'83, '84:

B = Black
Y = Yellow
L = Blue

G = Green
R = Red
W = White

Br = Brown
O = Orange
Lb = Light Blue

Lg = Light Green
P = Pink
Gr = Gray

After '84:

Bl = Black
Y = Yellow
Bu = Blue

G = Green
R = Red
W = White

Br = Brown
O = Orange
Lb = Light Blue

Lg = Light Green
P = Pink
Gr = Gray

- 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. Simply disconnect the wires and connect a continuity tester or volt-ohmmeter to the terminals or connections.
- A continuity tester is useful when checking to find out whether or not there is an electrical connection between the two points. An ohmmeter is needed to measure the resistance of a circuit, such as when there is a specific coil resistance involved, or when checking for high resistance caused by corroded connections.

SWITCHES

OIL PRESSURE SWITCH

Drain the engine oil.

Disconnect the oil pressure switch lead and remove the switch.

Check for continuity while applying pressure to the switch.

Replace the switch if necessary.

Apply a liquid sealant to the switch threads before installing the switch.

Screw the switch into the crankcase and leave two threads from the bottom. Then tighten it to the specified torque.

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

NOTE:

Do not overtighten the switch, or the crankcase may be damaged.

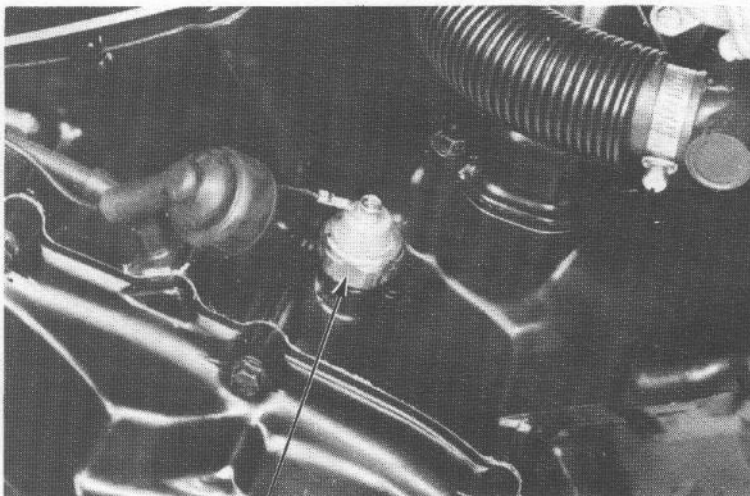
BRAKE LIGHT SWITCH

Check the rear brake light switch for continuity with the rear brake applied.

Check the front brake light switch for continuity with the front brake applied.

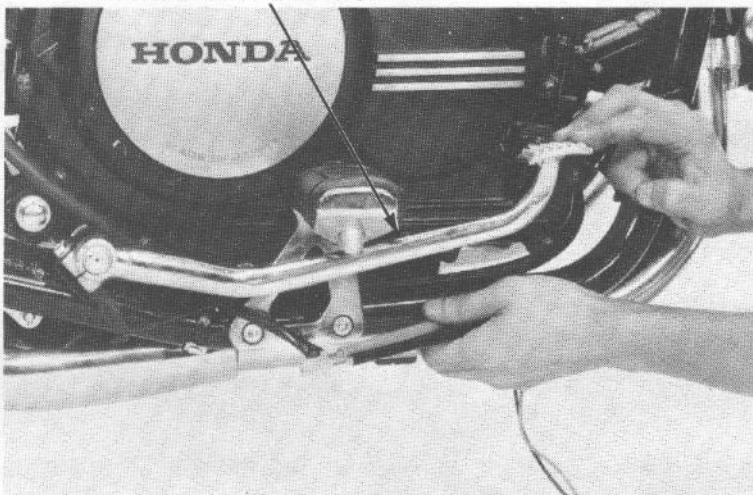
Replace the switches if necessary.

CONTINUITY: BELOW
 $0.3 \pm 0.1 \text{ kg/cm}^2$ ($4.3 \pm 1.4 \text{ psi}$)

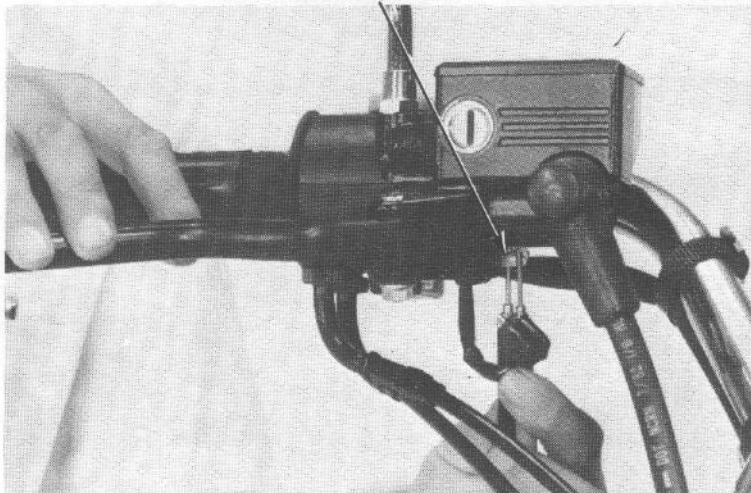


OIL PRESSURE SWITCH

REAR BRAKE LIGHT SWITCH



FRONT BRAKE LIGHT SWITCH



GEAR CHANGE SWITCH

Lift the fuel tank up and hold it in place with the support rod. Be sure the tank is less than half-full.

Disconnect the change switch coupler.

Check for continuity between each terminal and ground in each gear position.

'83, '84:

| Color code | Y | Lg/R | B/Y | W/L | R/W | Br/Y | G/O | GROUND |
|------------|---|------|-----|-----|-----|------|-----|--------|
| Position | | | | | | | | |
| 1st | ○ | --- | --- | --- | --- | --- | --- | ○ |
| N | | ○ | --- | --- | --- | --- | --- | ○ |
| 2nd | | | ○ | --- | --- | --- | --- | ○ |
| 3rd | | | | ○ | --- | --- | --- | ○ |
| 4th | | | | | ○ | --- | --- | ○ |
| 5th | | | | | | ○ | --- | ○ |
| OD | | | | | | | ○ | ○ |

After '84:

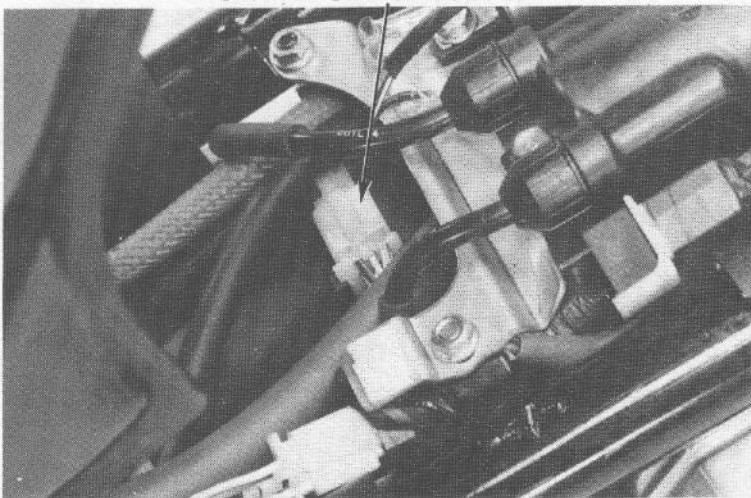
| Color code | Y | Lg/R | Bl/Y | W/Bu | R/W | Br/Y | G/O | GROUND |
|------------|---|------|------|------|-----|------|-----|--------|
| Position | | | | | | | | |
| 1st | ○ | --- | --- | --- | --- | --- | --- | ○ |
| N | | ○ | --- | --- | --- | --- | --- | ○ |
| 2nd | | | ○ | --- | --- | --- | --- | ○ |
| 3rd | | | | ○ | --- | --- | --- | ○ |
| 4th | | | | | ○ | --- | --- | ○ |
| 5th | | | | | | ○ | --- | ○ |
| OD | | | | | | | ○ | ○ |

REMOVAL

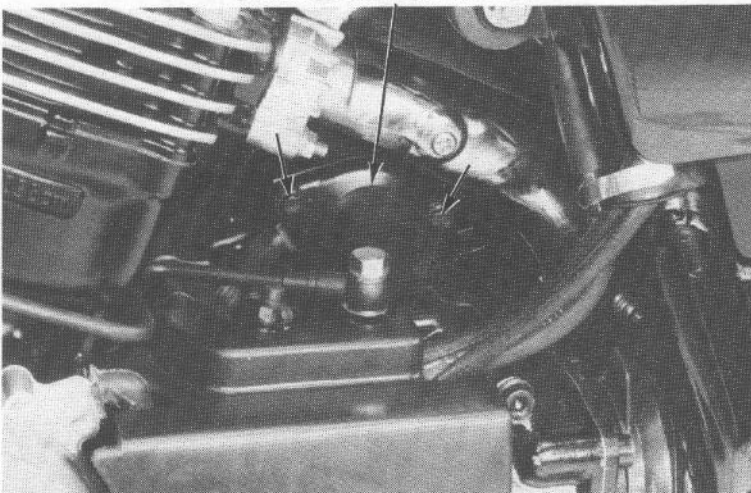
Remove the gear change switch cover.

Remove the gear change switch attaching screws, and the switch.

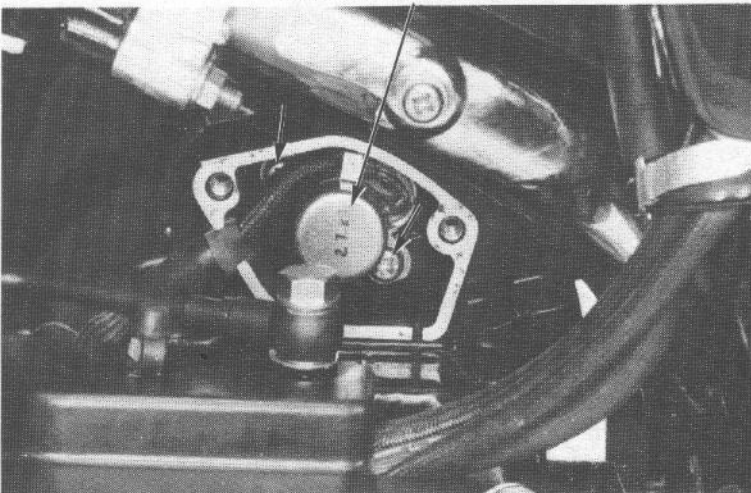
CHANGE SWITCH COUPLER



CHANGE SWITCH COVER



GEAR CHANGE SWITCH



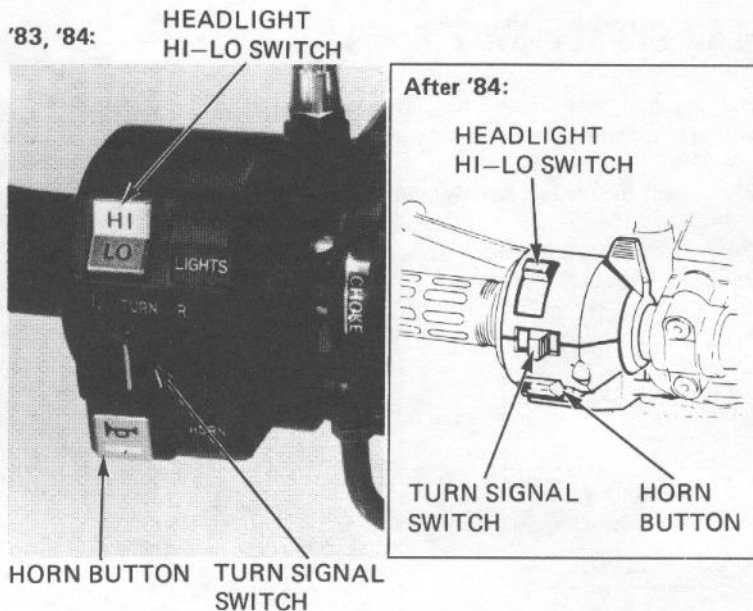
SWITCHES

HANDLEBAR SWITCHES

The handlebar cluster switches (lights, turn signals, horn, etc.) must be replaced as assemblies.

Continuity tests for the components of the handlebar cluster switches follow:

Continuity should exist between the color coded wires in each chart.



HEADLIGHT HI-LOW SWITCH

'83, '84:

HI: L/W to L
MIDDLE (N): L/W to W to L
LO: L/W to W

After '84:

HI: Bu/W to Bu
MIDDLE (N): Bu/W to W to Bu
LO: Bu/W to W

'83, '84:

Headlight Hi-Low Switch

| | HL2 | Hi | Lo |
|------------|-----------------------|-----------------------|-----------------------|
| Hi | <input type="radio"/> | <input type="radio"/> | |
| (N) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Lo | <input type="radio"/> | | <input type="radio"/> |
| Color code | L/W | L | W |

After '84:

Headlight Hi-Low Switch

| | HL2 | Hi | Lo |
|------------|-----------------------|-----------------------|-----------------------|
| Hi | <input type="radio"/> | <input type="radio"/> | |
| (N) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Lo | <input type="radio"/> | | <input type="radio"/> |
| Color code | Bu/W | Bu | W |

TURN SIGNAL SWITCH

'83, '84:

LEFT: Gr to O, Br/W to LB/W
OFF: Br/W to LB/W and O/W
RIGHT: Gr to LB, Br/W to O/W

'83, '84:

Turn Signal Switch

| | W | L | R | P1 | PR | PL |
|------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| LEFT | <input type="radio"/> | <input type="radio"/> | | <input type="radio"/> | <input type="radio"/> | |
| OFF | | | | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| RIGHT | <input type="radio"/> | | <input type="radio"/> | <input type="radio"/> | | <input type="radio"/> |
| Color code | Gr | O | LB | Br/W | LB/W | O/W |

After '84:

LEFT: Br/Bu to Lb/W and Gr to O
RIGHT: Br/Bu to O/W and Gr to Lb

After '84:

Turn Signal Switch

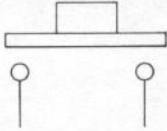
| | W | R | L | PI | PR | PL | E | W.ON | E | W.OFF |
|------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| PUSH LEFT | <input type="radio"/> | | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | | <input type="radio"/> | <input type="radio"/> | | |
| PUSH RIGHT | <input type="radio"/> | <input type="radio"/> | | <input type="radio"/> | | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | | |
| PUSH | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | | | <input type="radio"/> | <input type="radio"/> |
| Color code | Gr | Lb | O | Br/Bu | Lb/W | O/W | G | P | G | Lg/W |

HOLD the knob to left or right: P to G.
PUSH the knob: Lg/W to G

HORN BUTTON

LG to W/G with button depressed.
NO continuity with button released

'83, '84:
Horn Button

| | Ho | BAT 3 |
|------------|---|-------|
| |  | |
| Color code | LG | W/G |

After '84:
Horn Button

| | HO | E |
|------------|----|-----|
| FREE | | |
| PUSH | ○ | ○ |
| Color code | Lg | W/G |

STARTER BUTTON

'83, '84:
B to Y/R with button pushed in.
B/R to L/W with out.

Starter Button

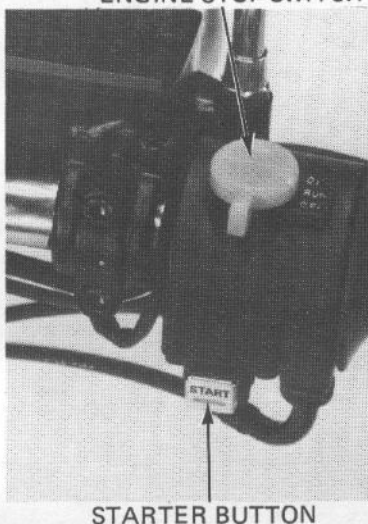
| | IG | ST | HL1 | HL2 |
|------------|----|-----|-----|-----|
| FREE | | | ○ | ○ |
| PUSH | ○ | ○ | | |
| Color code | B | Y/R | B/R | L/W |

After '84:
BI to Y/R with button pushed in.
BI/R to Bu/W with out.

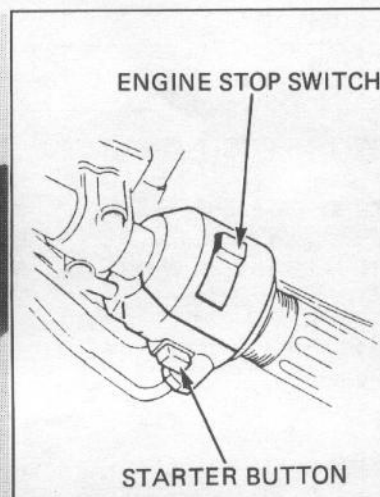
Starter Button

| | IG | ST | HL1 | HL2 |
|------------|----|-----|------|------|
| FREE | | | ○ | ○ |
| PUSH | ○ | ○ | | |
| Color code | BI | Y/R | BI/R | Bu/W |

'83, '84:
ENGINE STOP SWITCH



After '84:



ENGINE STOP SWITCH

'83, '84
RUN: B to B/W
OFF: No continuity

Engine Stop Switch

| | BAT2 | IG |
|------------|------|-----|
| OFF | | |
| RUN | ○ | ○ |
| OFF | | |
| Color code | B | B/W |

After '84:
RUN: BI to BI/W
OFF: No continuity

Engine Stop Switch

| | BAT2 | IG |
|------------|------|------|
| RUN | ○ | ○ |
| OFF | | |
| Color code | BI | BI/W |

SWITCHES

IGNITION SWITCH

Remove the fuel tank and disconnect the ignition switch coupler.

Check continuity of terminals on the ignition switch coupler in each switch position.

SWITCH POSITION

- '83:
- LOCK: No continuity
- OFF: No continuity
- ON: R to B, Br/W to Br—continuity
- PARK: Br to R—continuity

| Terminal Position | PA | BAT1 | IG | TL1 | TL2 |
|-------------------|----|------|----|------|-----|
| P | ○ | ○ | | | |
| ON | | ○ | ○ | ○ | ○ |
| OFF | | | | | |
| LOCK | | | | | |
| Color code | Br | R | B | Br/W | Br |

SWITCH POSITION

- '84:
- LOCK: No continuity
- OFF: No continuity
- ON: R to B, Br/W to Br—continuity
- PARK: Br to R—continuity

| Terminal Position | PA | BAT1 | IG | FAN | TL1 | TL2 |
|-------------------|----|------|----|-----|------|-----|
| P | ○ | ○ | | | | |
| ON | | ○ | ○ | ○ | ○ | ○ |
| OFF | | | | | | |
| LOCK | | | | | | |
| Color code | Br | R | B | L/O | Br/W | Br |

CLUTCH SWITCH

Check continuity of the clutch lever (safety) switch with the clutch released and applied.
Replace if necessary.

IGNITION SWITCH

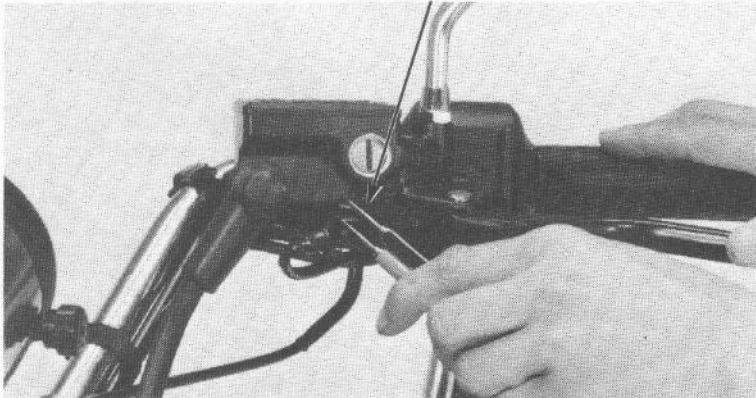


SWITCH POSITION

- After '84:
- LOCK: No continuity
- OFF: No continuity
- ON: R to Bl and Bu/O, Br/W to Br—continuity
- PARK: Br to R—continuity

| Terminal Position | PA | BAT | IG | FAN | TL1 | TL2 |
|-------------------|----|-----|----|------|------|-----|
| P | ○ | ○ | | | | |
| ON | | ○ | ○ | ○ | ○ | ○ |
| OFF | | | | | | |
| LOCK | | | | | | |
| Color code | Br | R | Bl | Bu/O | Br/W | Br |

CLUTCH SWITCH



CLUTCH APPLIED: CONTINUITY
CLUTCH RELEASES: NO CONTINUITY

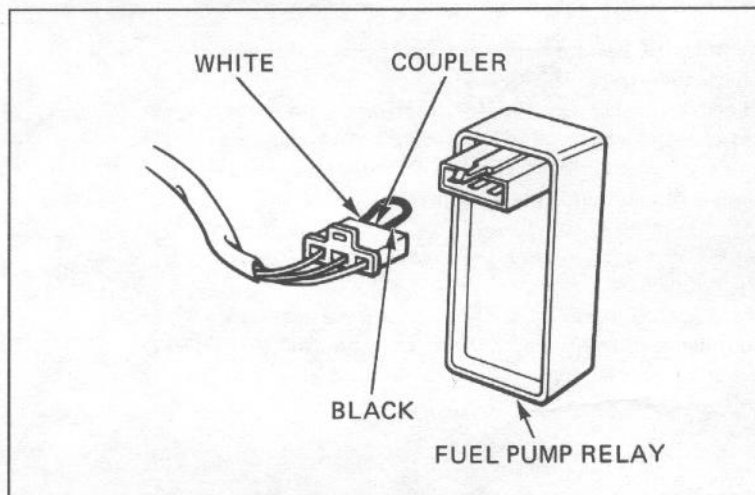
FUEL PUMP

Remove the seat and side covers.

Turn the ignition switch to "OFF". Disconnect the fuel pump relay coupler and short the black and white leads of the harness side coupler with a jumper wire.

WARNING

- *Keep flames or sparks away from the working area.*
- *Wipe up the spilled gasoline at once.*



Disconnect the fuel tube from the carburetor and put the end of the tube in the beaker.

Turn the ignition switch to "ON" and drain the gasoline for 5 seconds into the beaker.

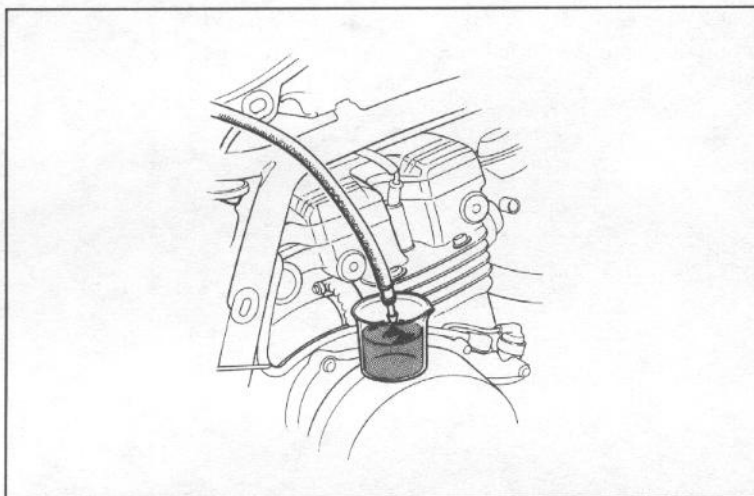
Measure the drained gasoline and multiply it by 12. Multiplied measurement should be in the specified fuel pump standard delivery.

STANDARD DELIVERY:

614 cc (22 oz) $\pm 10\%$ min.

CAUTION:

- *Voltage at the battery terminal should be above 12.5V.*
- *Low battery voltage causes insufficient fuel pump delivery.*

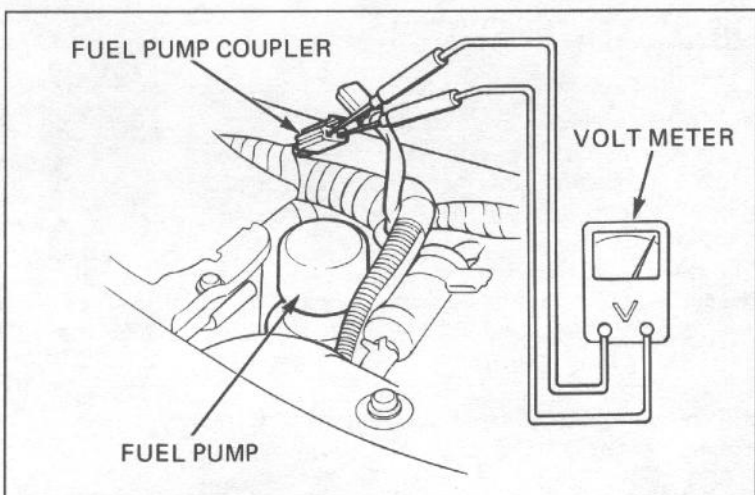


Voltage at the battery terminal should be above 12.5V.

If the fuel pump delivery is below the standard delivery, check the voltage at the fuel pump coupler.

Short the black and white lead of the fuel pump relay coupler and turn the main switch to "ON".

Replace the fuel pump if the voltage is above 12.5V. Inspect for the loose wire or poor contact if the voltage is below 12.5V.



SWITCHES

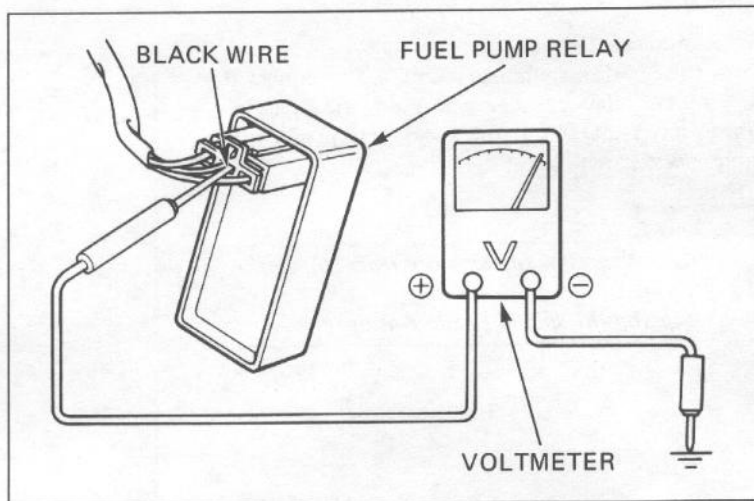
FUEL PUMP RELAY

Remove the fuel pump relay from the mount bracket. Check for a burnt sub-fuse.

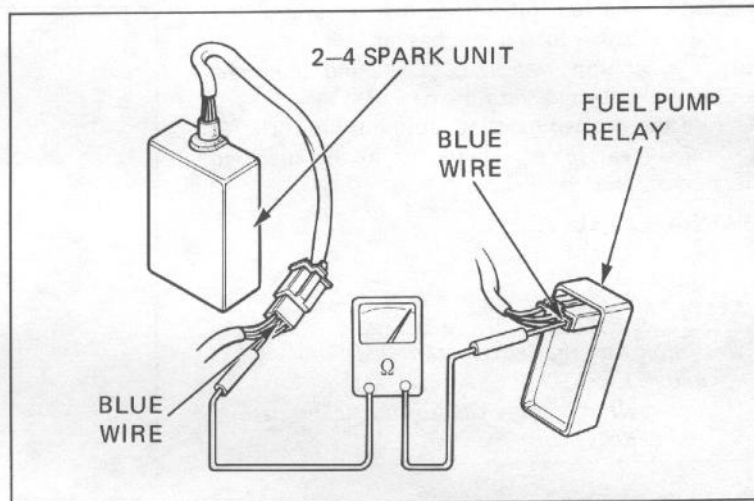
Check the relay coupler for improper contact and looseness. Measure the voltage between the relay black wire and a body ground. The battery voltage should register with the ignition switch ON.

Make sure that the fuel pump operates while the relay coupler black and white wires are shorted and the ignition switch is ON.

If the pump does not operate, check the fuel pump coupler for improper contact and the fuel pump (page 21-7).



Check for continuity between the ignition control unit blue wire and fuel pump relay coupler blue wire. If there is continuity, replace the fuel pump relay. If there is no continuity, replace the wire harness.



THERMOSTATIC SWITCH

The cooling fan motor is actuated by the thermostatic switch located in lower the radiator.

If the fan motor does not start, disconnect the switch coupler from the thermostatic switch and short coupler terminals together with a jumper wire as shown.

Turn the ignition switch on.

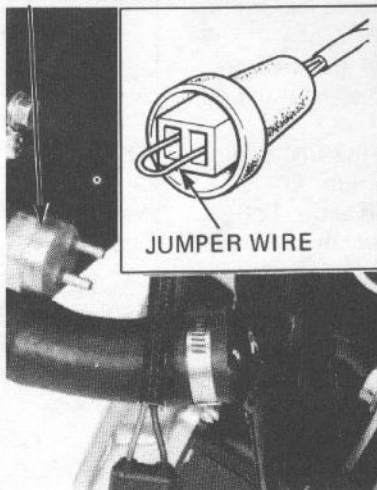
The cooling fan motor should start running.

If it does not start, check for battery voltage from the black lead (positive) to black/blue (negative) of the fan motor coupler.

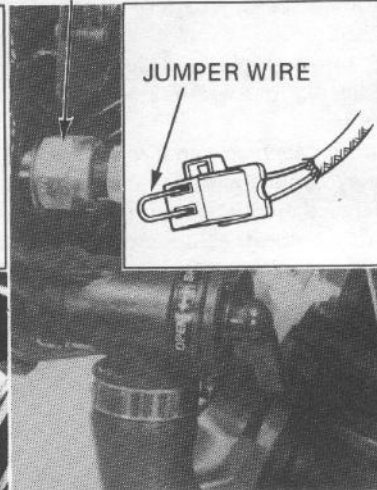
If there is no voltage, check for a blown or faulty fuse, loose terminals or connectors, or an open circuit.

If it starts, inspect the fan thermostatic switch as follows:

'83, '84, '85:
THERMOSTATIC SWITCH



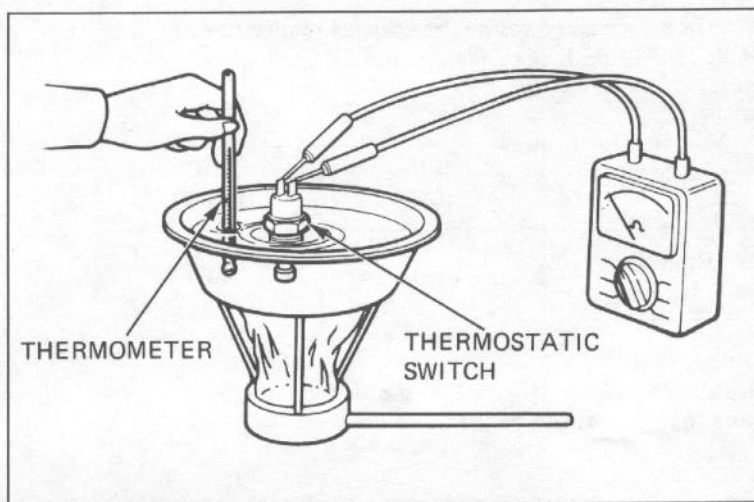
AFTER '85:
THERMOSTATIC SWITCH



Suspend the switch in a pan of coolant (50–50 mixture) and check the temperatures at which the switch opens and closes. Make sure that there is no switch continuity with room temperature and gradually raise the coolant temperature. The switch should have continuity (close) at 98–102°C (208–215°F).

NOTE

- Keep temperature for 3 minutes before testing continuity. A sudden change of temperature will cause error of temperature reading between the thermometer and the switch.
- Do not let the thermometer or switch touch the pan as it will give a false reading.
- Soak the switch in coolant up to its threads.

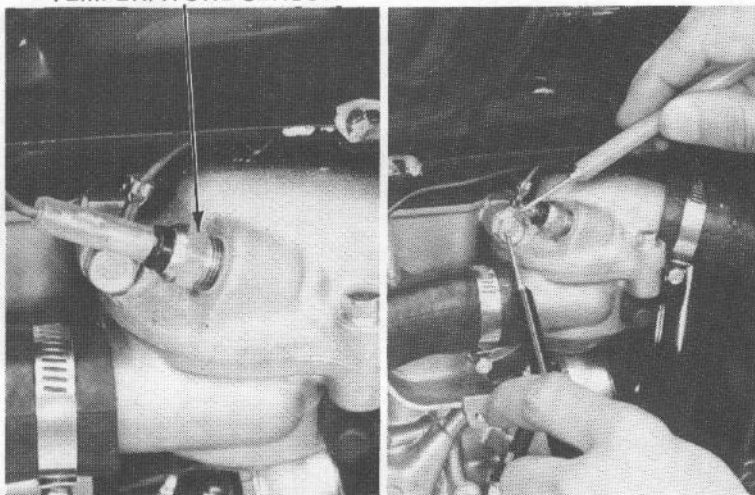


TEMPERATURE SENSOR

Disconnect the green/blue wire from the temperature sensor.

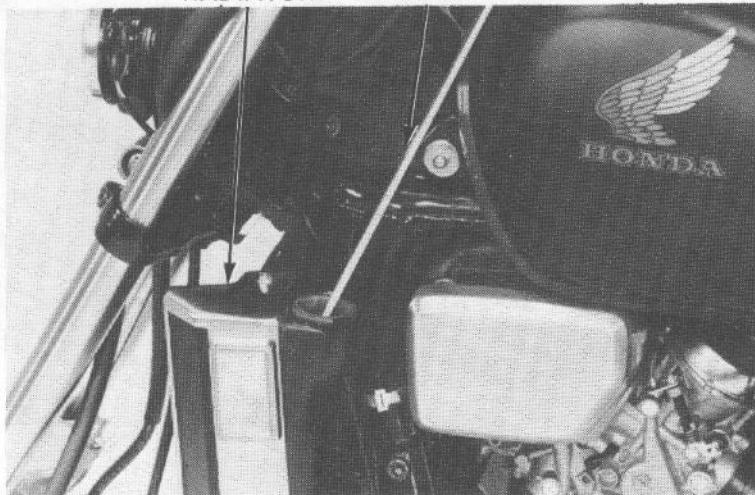
With the engine cold, use an ohmmeter to measure resistance between the temperature sensor terminal and the engine.

TEMPERATURE SENSOR



Check the temperature of the coolant.

RADIATOR THERMOMETER



SWITCHES

Run the engine and measure the change in resistance of the sensor with the engine at operating temperature.

| Temperature | 60°C (140°F) | 85°C (185°F) |
|----------------------|-----------------|-----------------|
| Resistance (Ohms) | 104.0 | 43.9 |

Replace the sensor if it is out of specifications by more than 10% at any temperature listed.

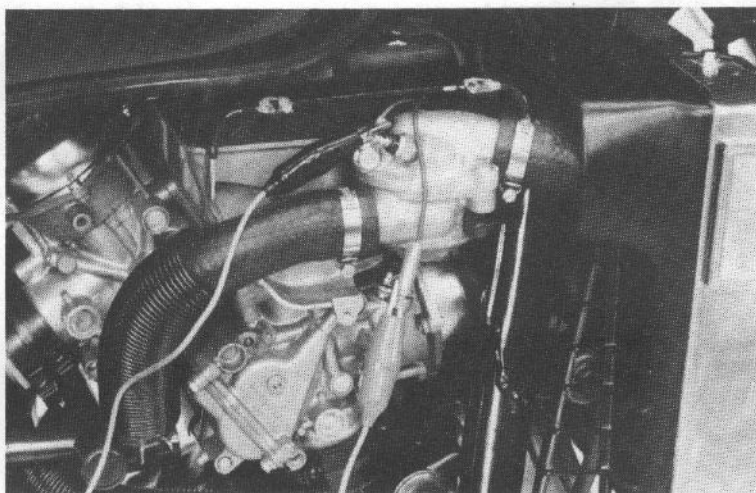
TEMPERATURE GAUGE

Disconnect the wire from the temperature sensor and short it to ground.

Turn the ignition switch ON. The temperature gauge segments should move all the way to the right.

CAUTION:

Do not leave the temperature sensor wire grounded for longer than a few seconds or the temperature gauge will be damaged.

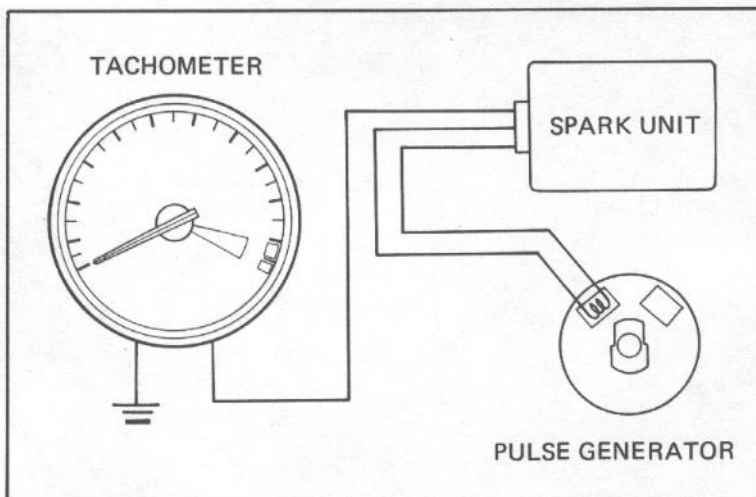


TACHOMETER

If the tachometer does not indicate properly, check and repair the No.1 cylinder ignition system.

If the problem still appears, check continuity between the yellow wire terminal of the wire harness tachometer coupler and the yellow wire terminal of the No. 1 cylinder ignition coil and repair the circuit if necessary.

If there is continuity, replace the tachometer with a new one.



BRAKE AND TAIL LIGHT SENSOR

Turn the ignition switch on.

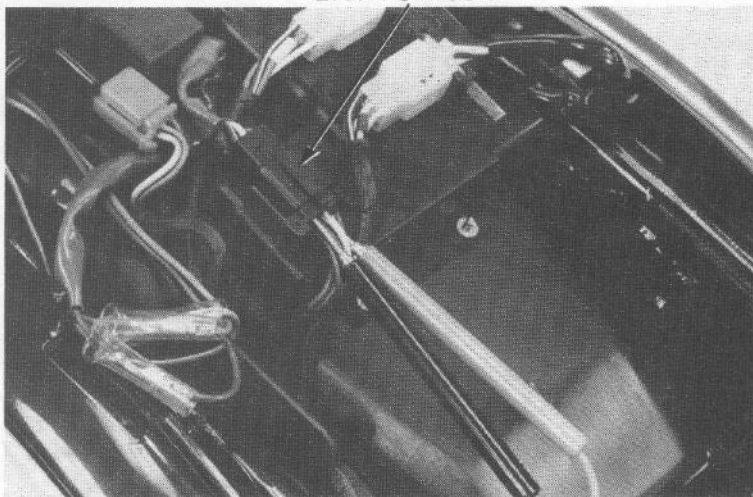
Check the source voltage at the black/brown lead. If there is no voltage, check and repair the source circuit.

If there is voltage, measure the voltage at the white/yellow (positive) and green/yellow (negative) wires.

VOLTAGE: 5 V

If there is no voltage, replace the sensor unit.

BRAKE AND TAIL
LIGHT SENSOR



WARNING LAMP CHECK UNIT

The tail/stoplight warning lamp and low fuel warning lamp should light for a few seconds and go out when the ignition switch is turned on.

If the light does not operate properly, turn the ignition switch on.

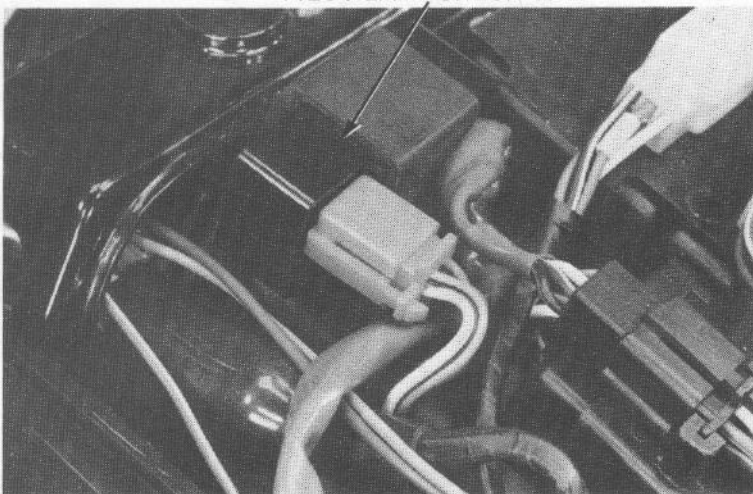
Check the source voltage at the black/brown lead. If there is no voltage, check and repair the source circuit.

If there is voltage, check the warning lamp bulb and wiring between the unit and warning lamp.

If the bulb and wiring are OK, check the ground circuit.

If the ground circuit is OK, replace the check unit.

PILOT LAMP CHECK UNIT



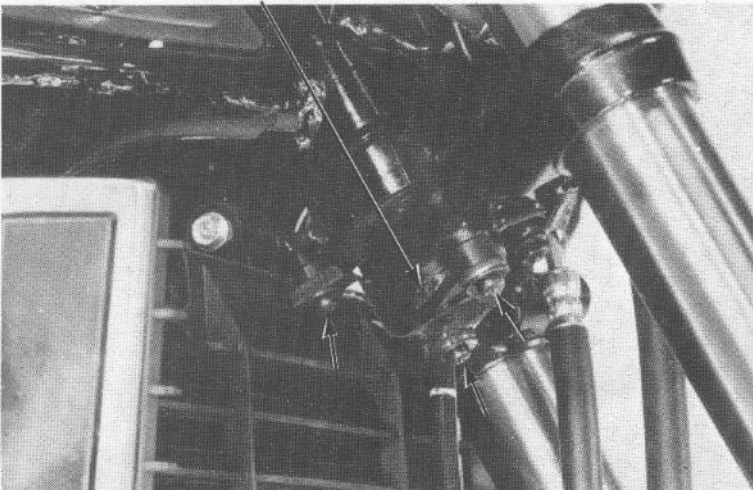
TURN SIGNAL CANCEL SYSTEM

'83, '84:

ANGLE SENSOR

Turn the handlebar right and left and check the angle sensor for wear, damage, or looseness.

ANGLE SENSOR

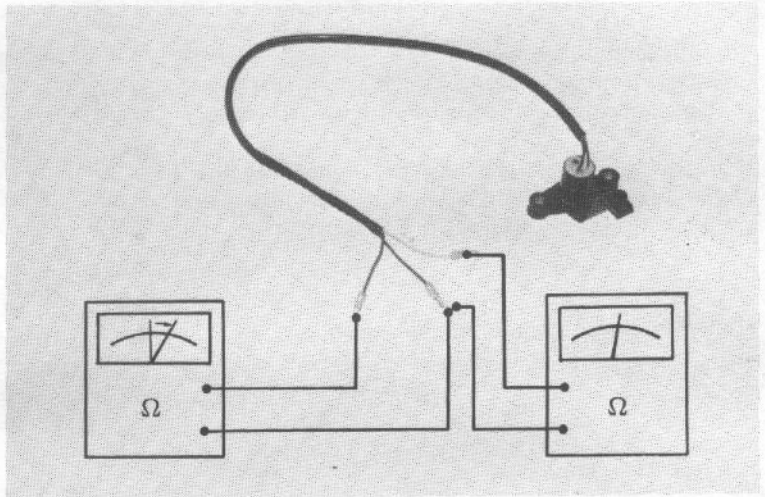


SWITCHES

Remove the angle sensor (page 21-11).
Measure the resistance between the B/Y and the G/W leads.

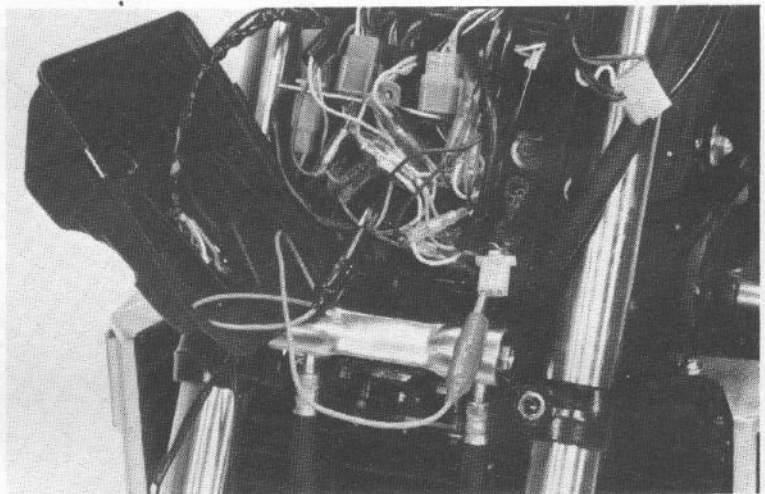
RESISTANCE: 10–19 k ohms

Check the resistance between the W and G/W leads while turning the sensor arm slowly from the left to the right. The resistance should increase smoothly.



TURN SIGNAL SWITCH

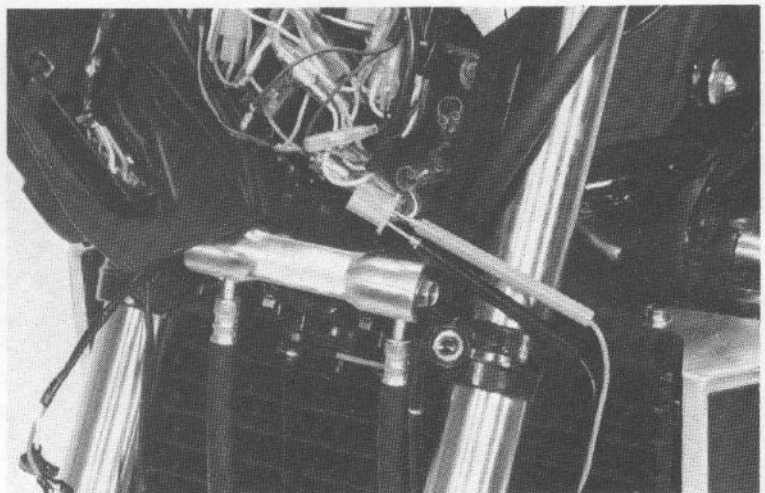
Disconnect the cancel unit coupler.
Turn the turn signal switch to the left position and connect a jumper wire to the B/Bk and Br/B leads.
The turn signal switch should return to the neutral position.
Perform the same test for the right turn position.



SPEED SENSOR

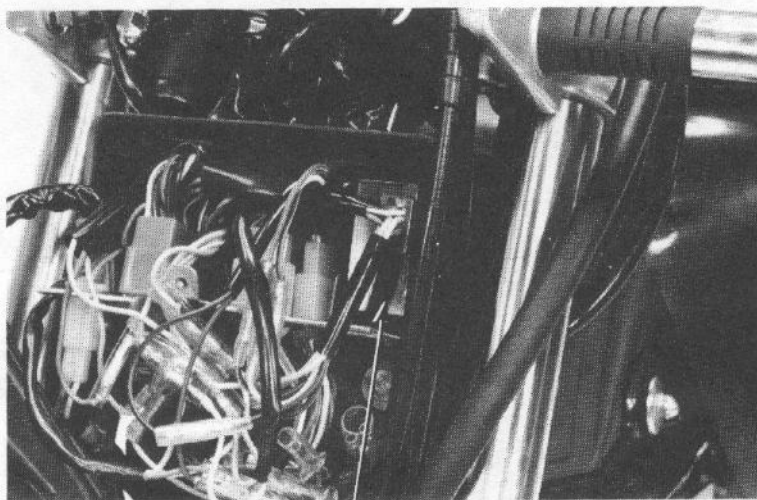
Disconnect the cancel unit coupler.
Check for continuity between the W/Bk and the G lead terminals at the wire harness coupler while turning the front wheel slowly.

RESISTANCE: 0 \leftrightarrow ∞ Alternately



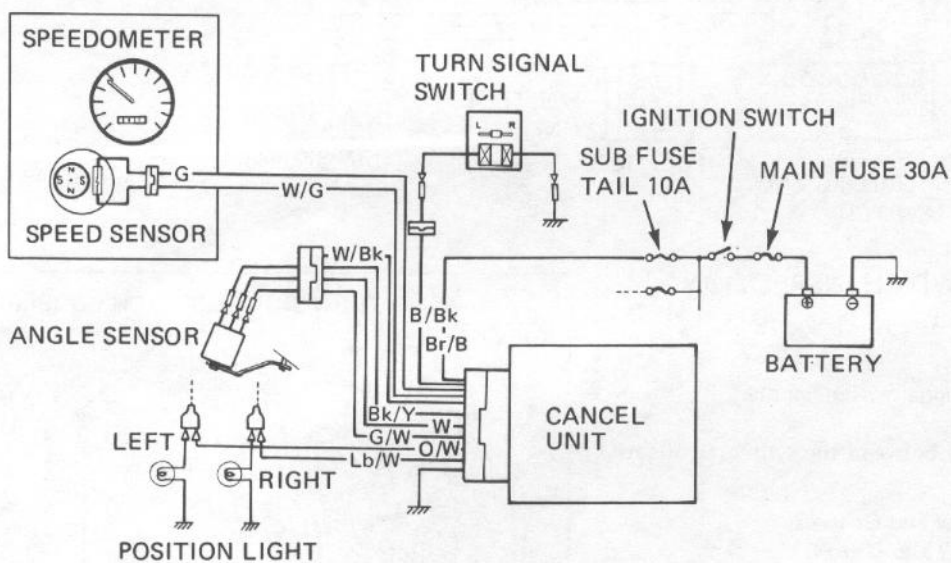
CANCEL UNIT

If the angle sensor, turn signal switch, and speed sensor are normal, and there is no open or short circuit, replace the cancel unit with a new one.



CANCEL UNIT

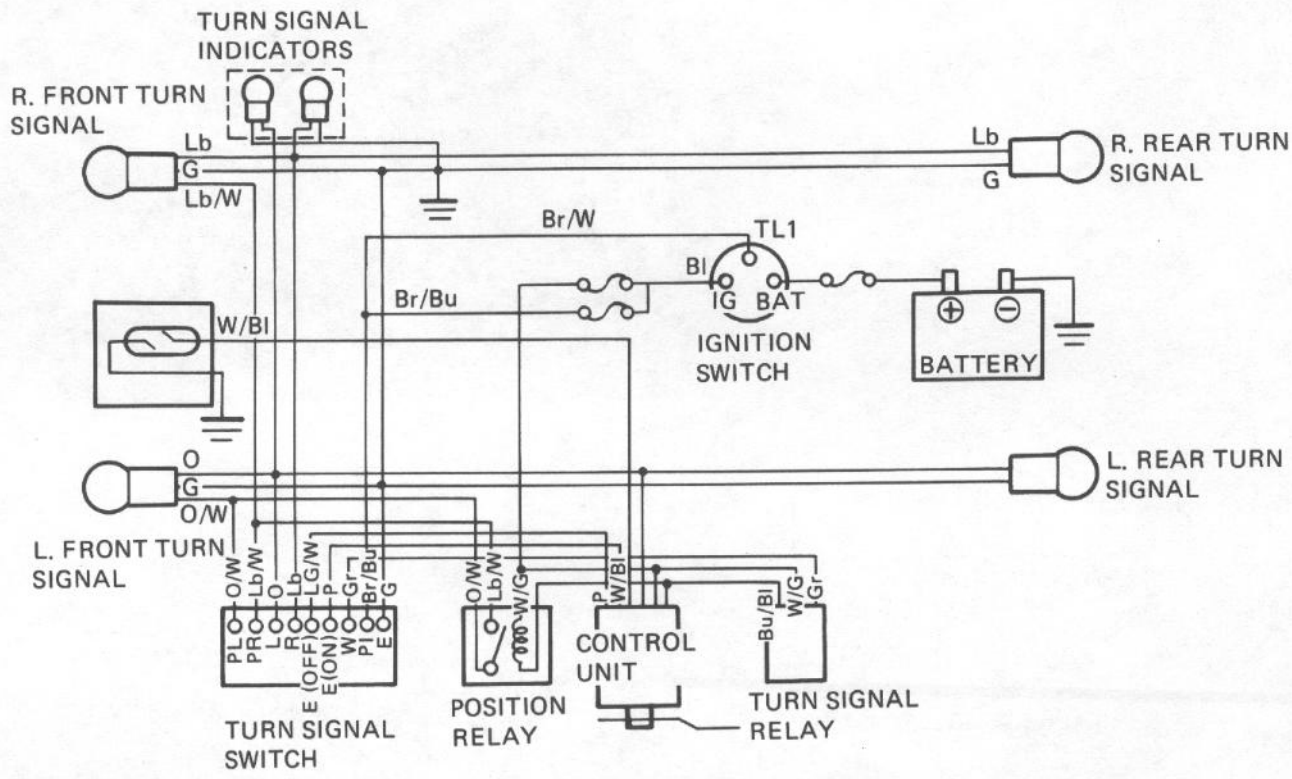
TURN SIGNAL CIRCUIT



TURN SIGNAL CANCEL SYSTEM

After '84:

TURN SIGNAL CIRCUIT



TURN SIGNAL SWITCH INSPECTION

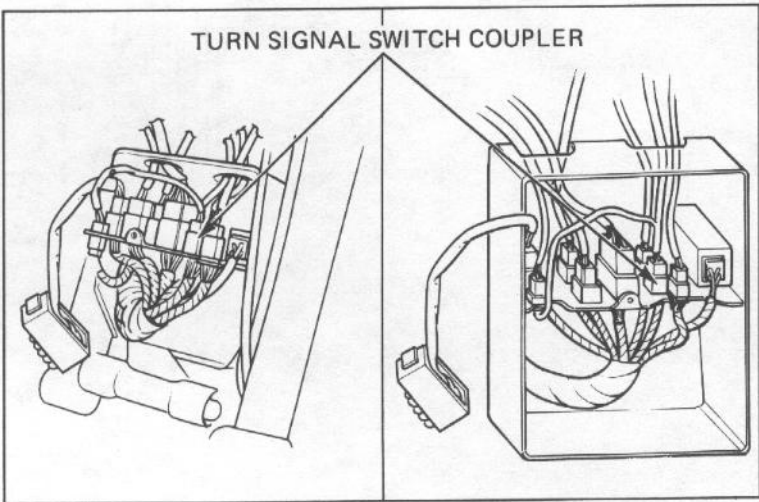
Remove the coupler box cover (page 15-3).

Disconnect the turn signal switch coupler.

Check for continuity between the switch terminals in each position.

RIGHT: Br/Bu to O/W and Gr to Lb
LEFT: Br/Bu to Lb/W and Gr to O

HOLD the knob to left or right: P to G
PUSH the knob: Lg/W to G



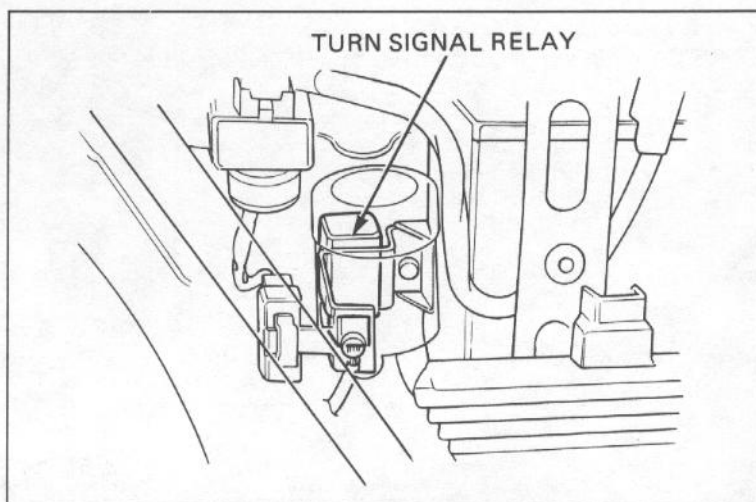
| | W | R | L | PI | P.R | P.L | E | W.ON | E | W.OFF |
|------------|----|----|---|-------|------|-----|---|------|---|-------|
| PUSH RIGHT | ○ | ○ | | ○ | ○ | ○ | ○ | ○ | | |
| PUSH LEFT | ○ | | ○ | ○ | ○ | | ○ | ○ | | |
| Color code | Gr | Lb | O | Br/Bu | Lb/W | O/W | G | P | G | Lg/W |

TURN SIGNAL RELAY INSPECTION

NOTE:

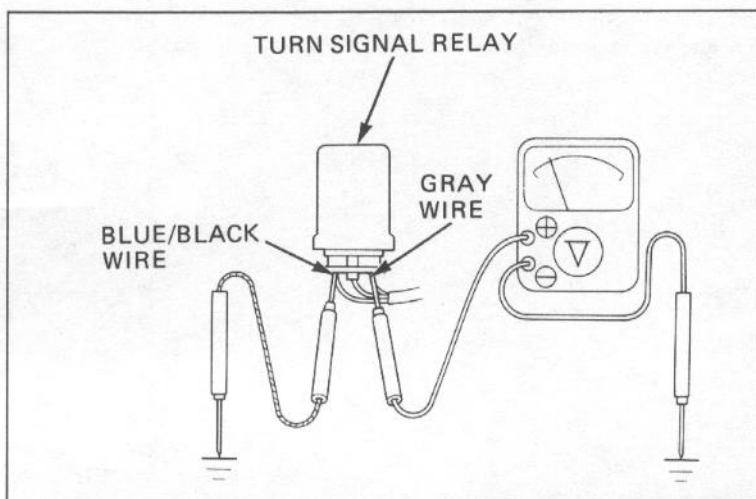
The turn signal light does not come on unless the turn signal switch is in neutral.

Remove the right frame side cover.
Connect a jumper wire between the blue/black wire of the turn signal relay and ground.
Turn the ignition switch ON.
The turn signal light should come on.



If the light does not come on, check the source voltage at the gray wire terminal while grounding the blue/black wire of the turn signal relay coupler.

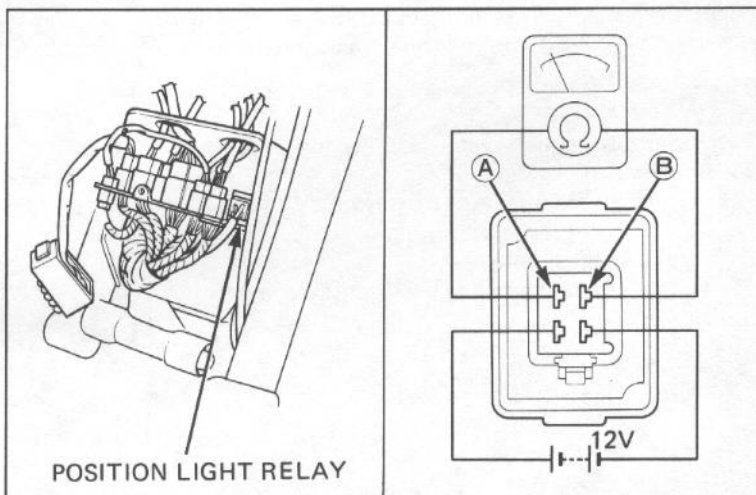
If there is no voltage, replace the turn signal relay.



POSITION LIGHT RELAY INSPECTION

Remove the coupler box cover (page 15-3).
Remove the position light relay.
Check for continuity between A and B terminals.
Connect a fully charged 12V battery to the relay terminals as shown.

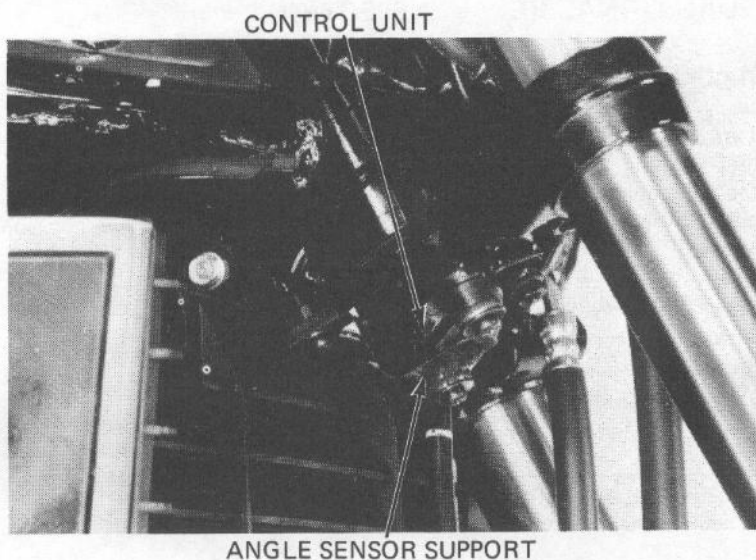
The position light relay is normal if there is no continuity with the battery connected.



SWITCHES

CONTROL UNIT INSPECTION

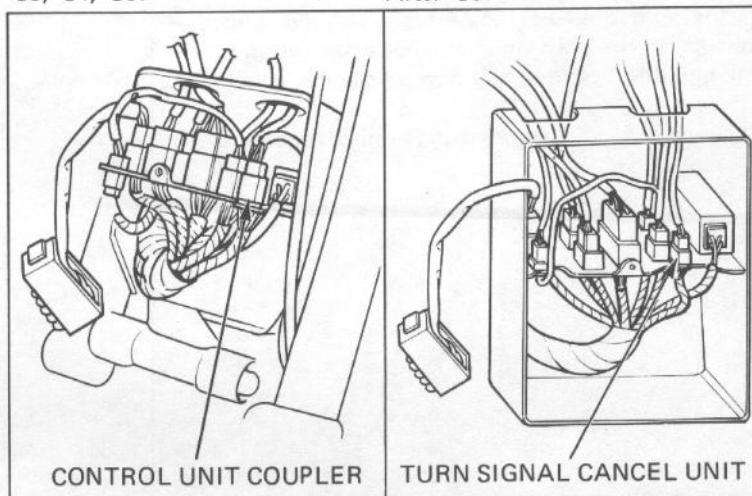
Turn the handlebar right and left.
Check the angle sensor support and control unit for wear, damage, or looseness.



Remove the coupler box cover (page15-3).
Turn the ignition switch ON.

'83, '84, '85:

After '85:



Check the voltage between the blue/black and green wire terminals of the control unit wire coupler.

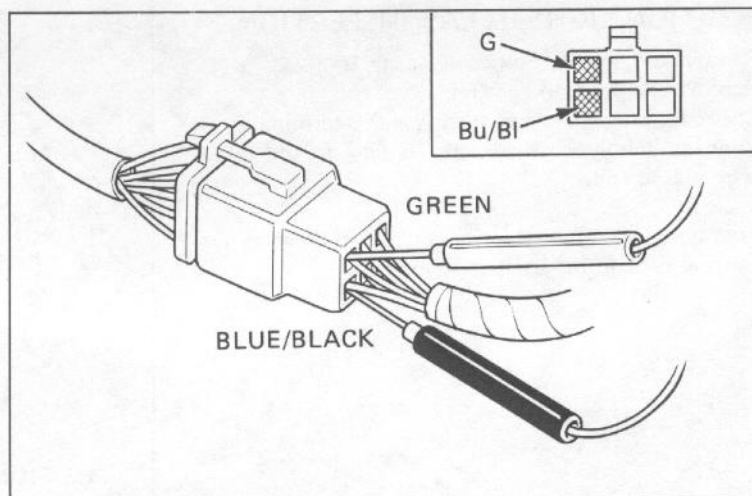
VOLTAGE: 8V min.

Turn the turn signal switch to the left or right position.

The voltmeter reading should drop from 8V to 1V.

Push the turn signal switch.

The voltmeter reading should rise from 1V to 8V.



LOW FUEL WARNING LIGHT

Place the motorcycle on its center stand.

Turn the ignition switch ON and check that the low fuel warning light comes on for 1 to 4 seconds. If the light does not go on, check for a blown fuse or bulb, loose connection, or open circuit in the wire harness.

Check that the low fuel warning light comes on within 60 seconds after the ignition switch has been turned ON with the amount of fuel in the fuel tank below 3 liters (0.8 US gal).

NOTE:

The light will not go on immediately after the ignition switch is turned ON.

If the light does not go on within 60 seconds, replace the sensor.

Check that the low fuel warning light will not light when the ignition switch is turned ON with the amount of fuel in the fuel tank is more than 3 liters (0.8 US gal).

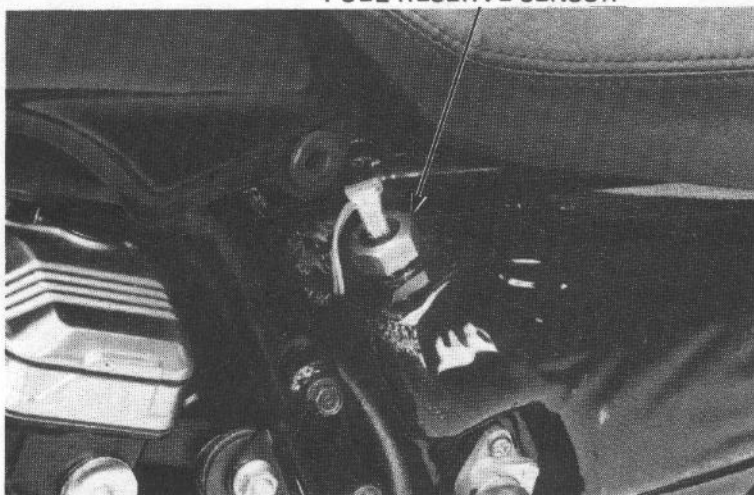
If the warning light goes on, check for a short circuit in the wire harness or coupler.

Replace the fuel reserve sensor if no shorts are found.



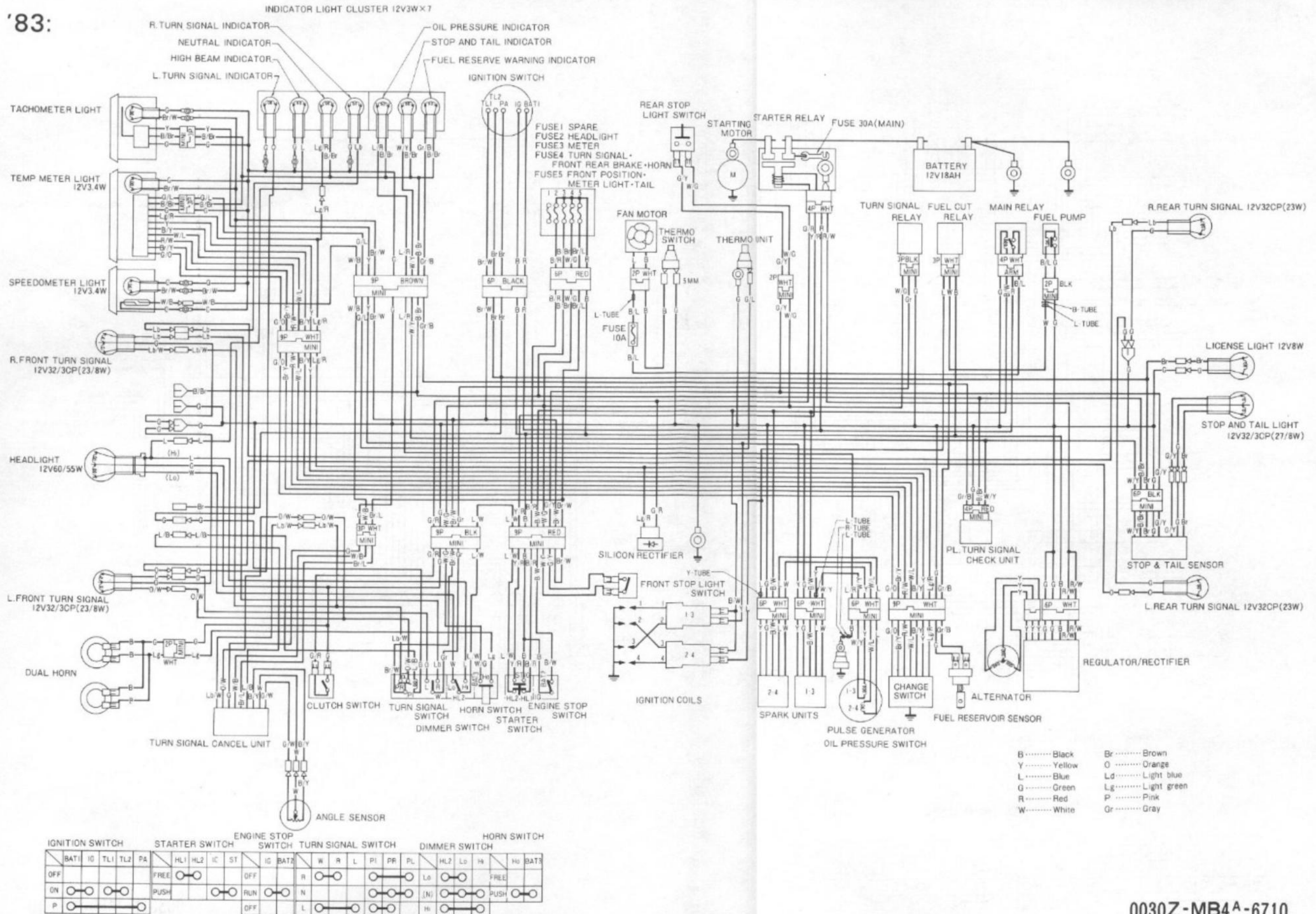
LOW FUEL WARNING LIGHT

FUEL RESERVE SENSOR

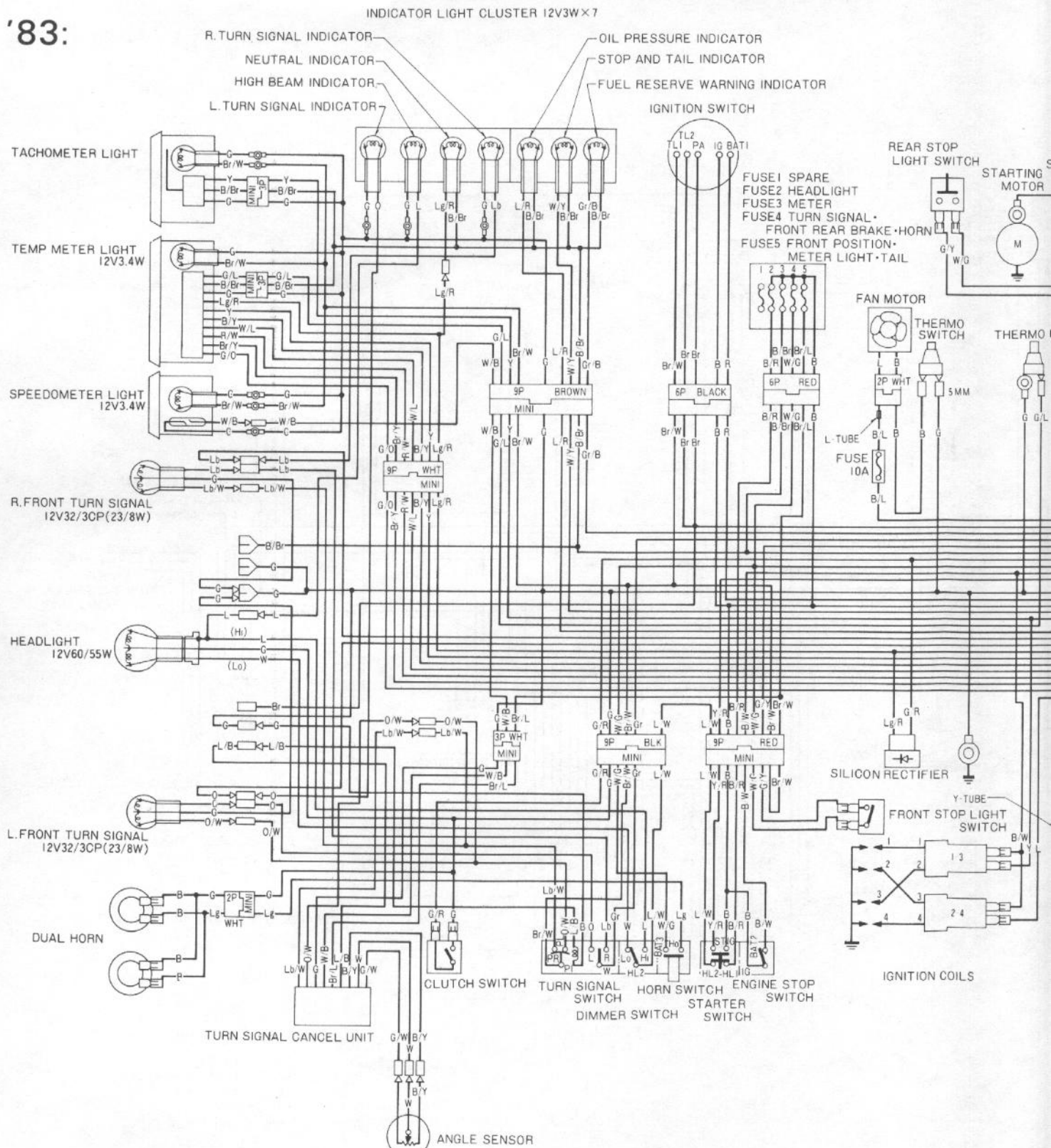





























22. WIRING DIAGRAM

'83:



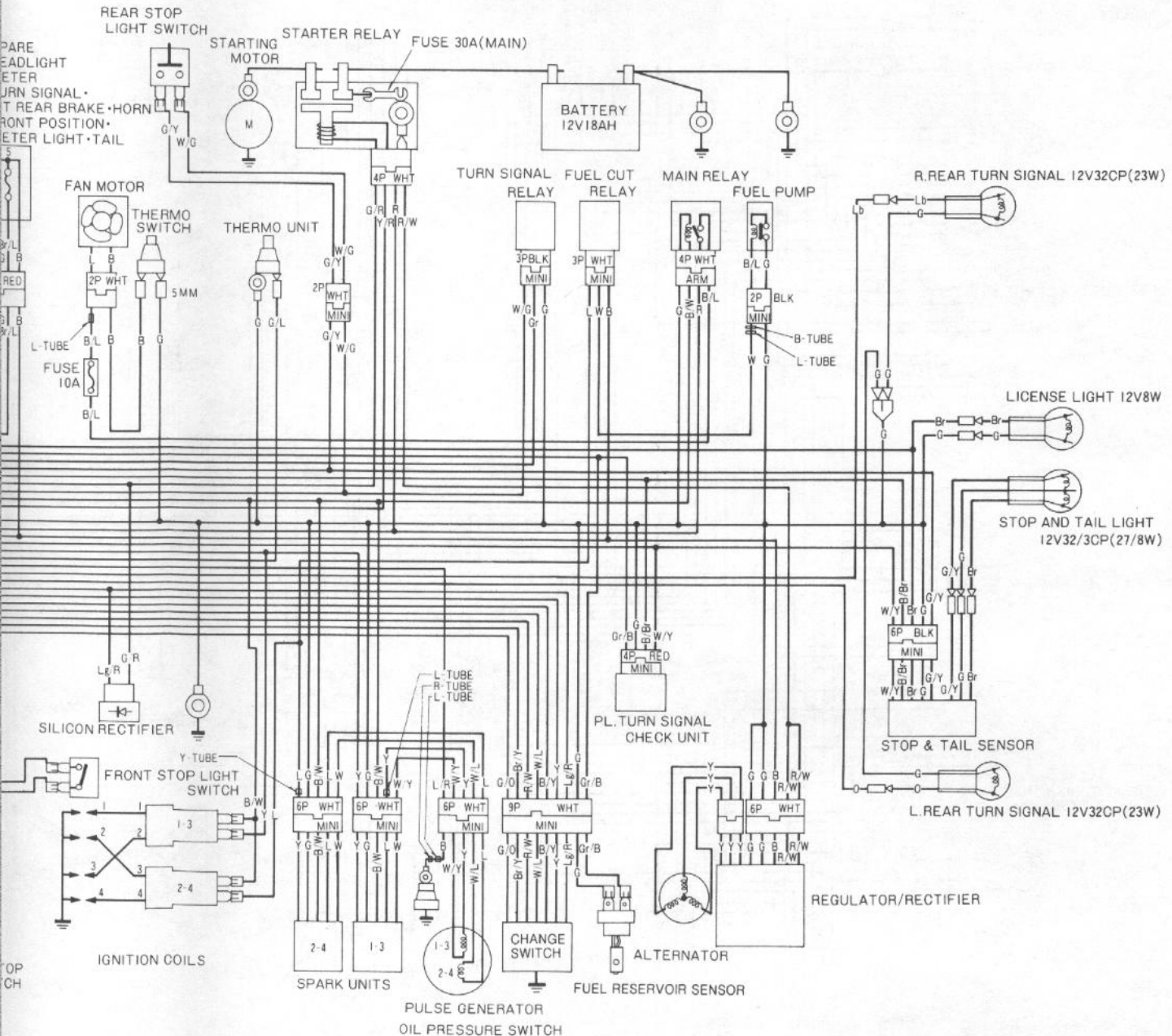
'83:



| IGNITION SWITCH | | | | | STARTER SWITCH | | | | ENGINE STOP SWITCH | | TURN SIGNAL SWITCH | | | | | | HORN SWITCH | | | | | | | | | | |
|-----------------|---|---|---|---|----------------|------|---|---|---|----|--------------------|---|------|---|---|---|-------------|---|---|---|--|-----|---|---|------|------|---|
| | BAT1 | IG | TL1 | TL2 | PA | | HL1 | HL2 | IC | ST | | IG | BAT2 | | W | R | L | PI | PR | PL | | HL2 | Lo | Hi | Ho | BAT3 | |
| OFF | | | | | | FREE |  |  | | | OFF | | | R |  | | |  |  | | | Lo | | | FREE | | |
| ON |  |  |  |  | | PUSH | | |  | | RUN |  | | N | | | |  |  |  | | (N) |  |  | | PUSH |  |
| P |  |  |  |  | | | | | | | OFF | | | L |  |  | |  |  | | | Hi |  |  | | | |

22. WIRING DIAGRAM

TOR



TOP
CH

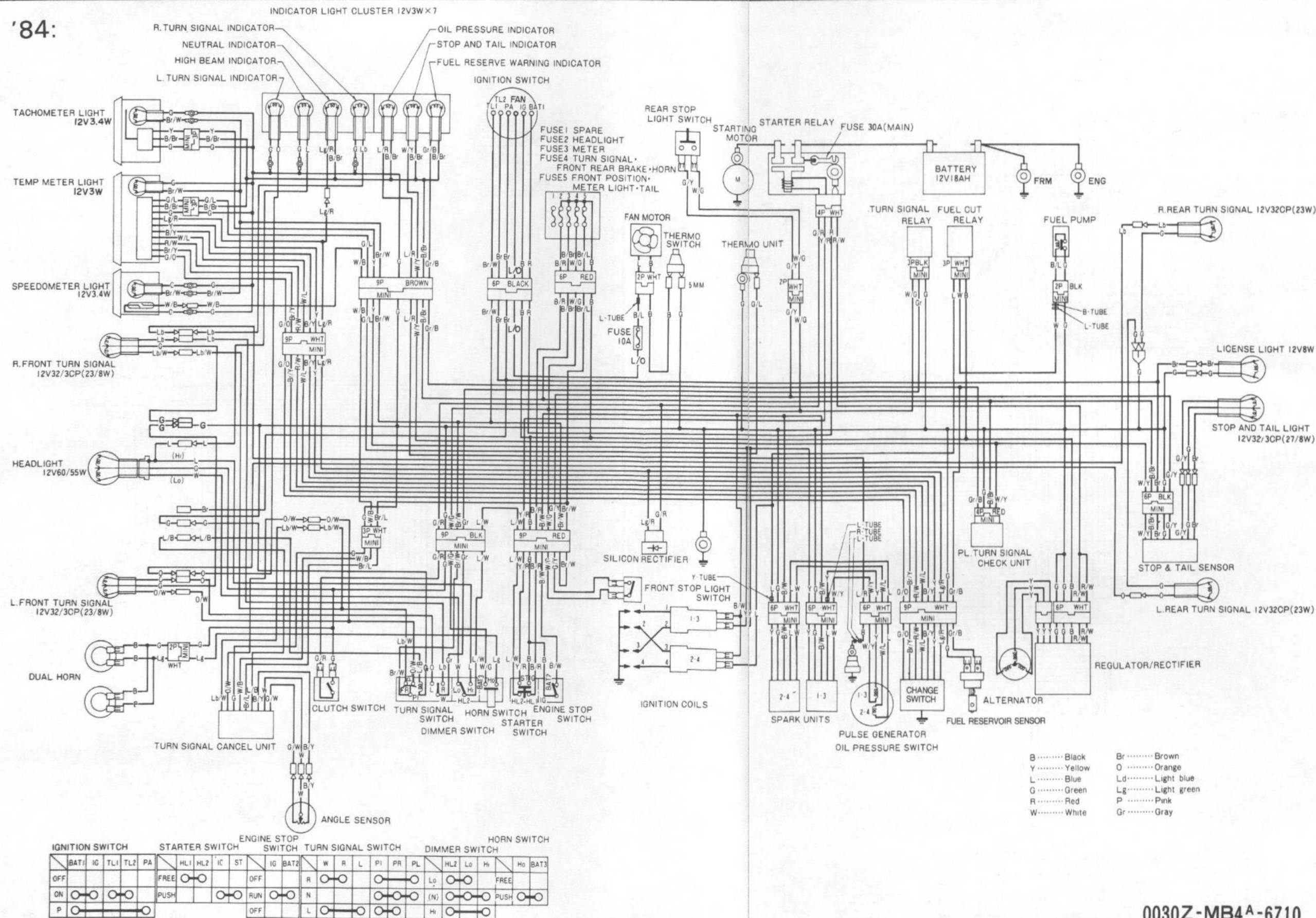
22

0030Z-MB4^A-6710

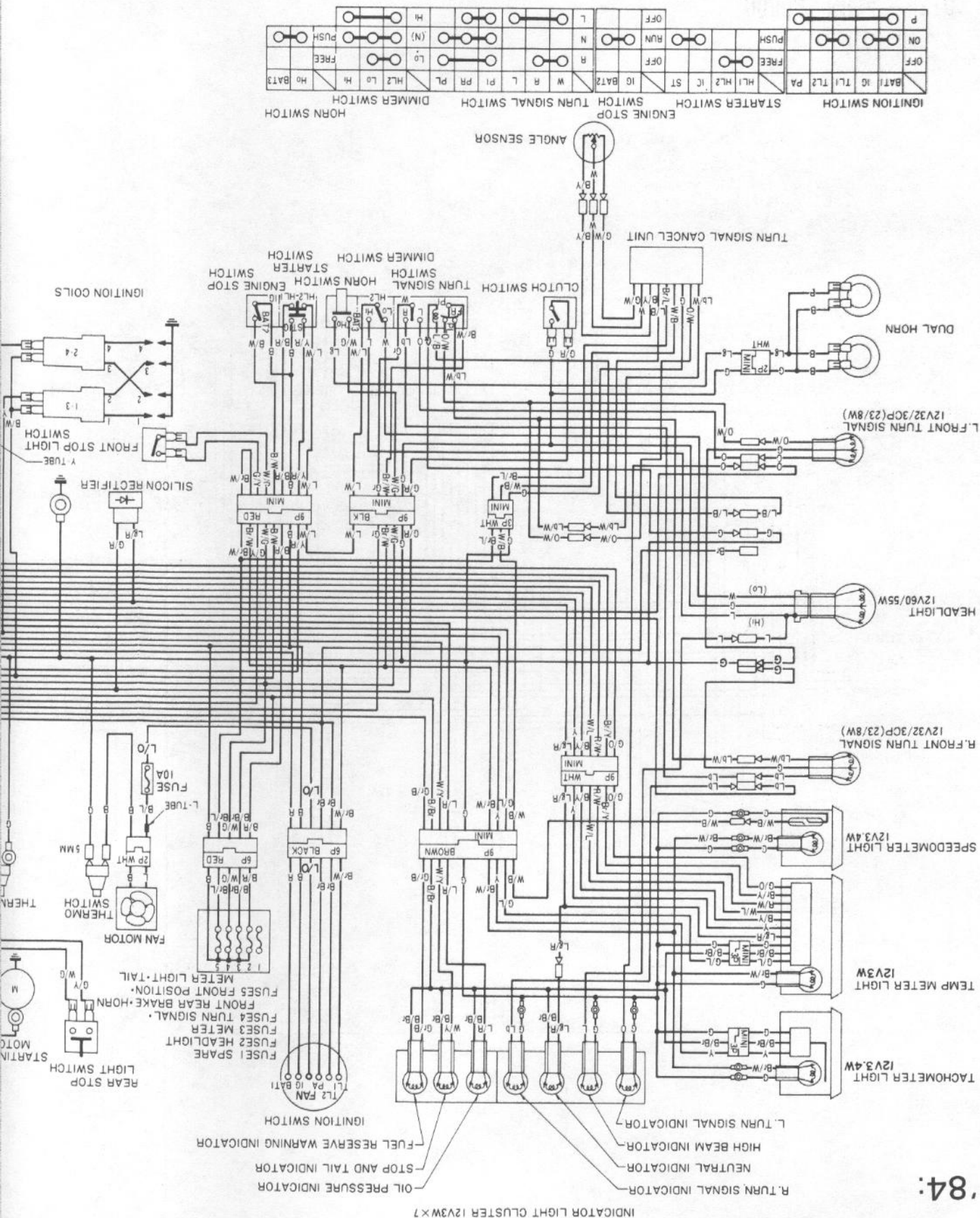
22-1

WIRING DIAGRAM

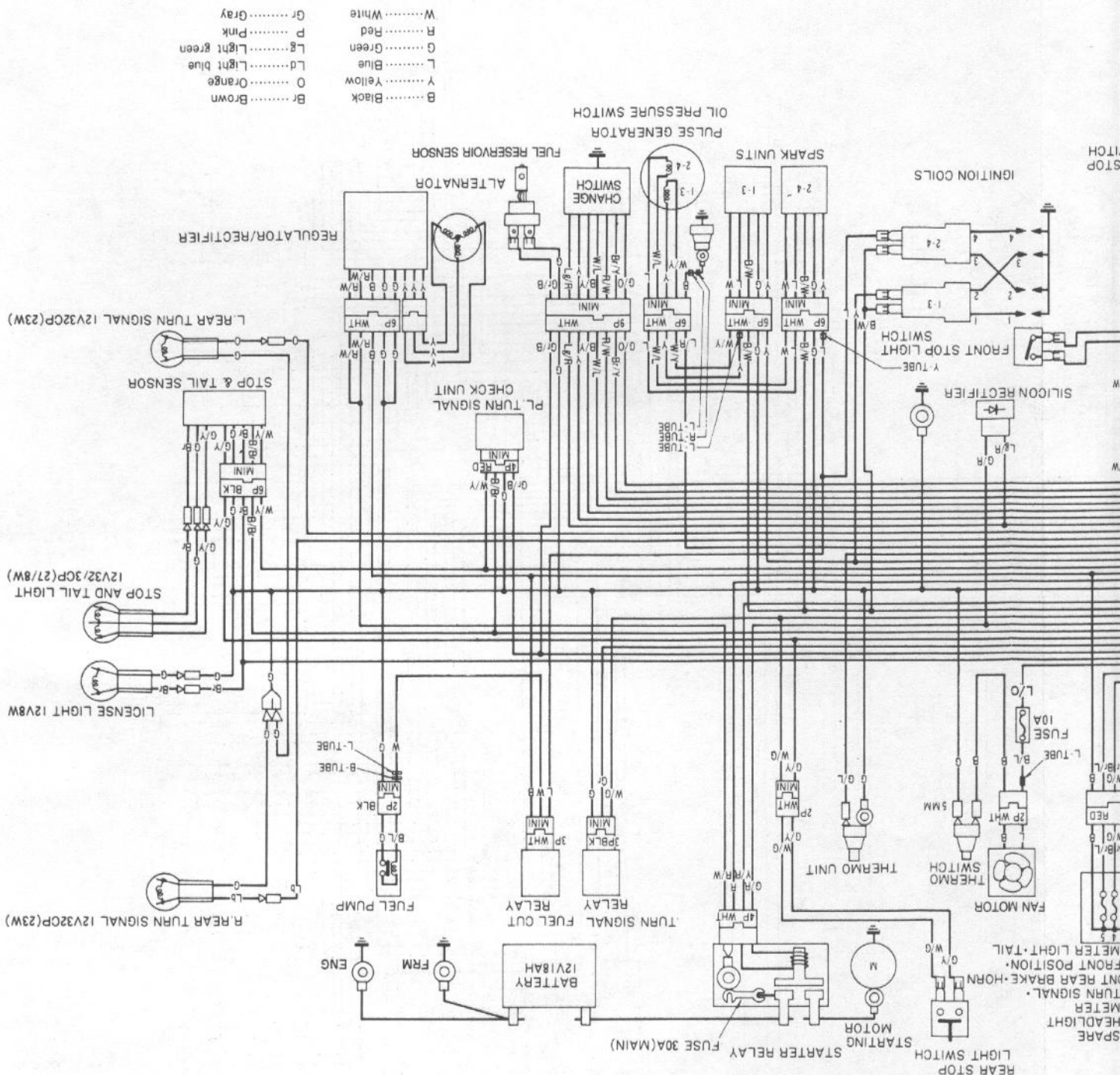
'84:



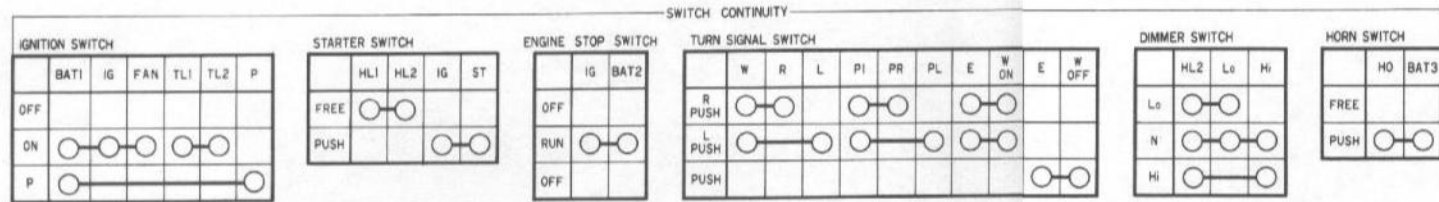
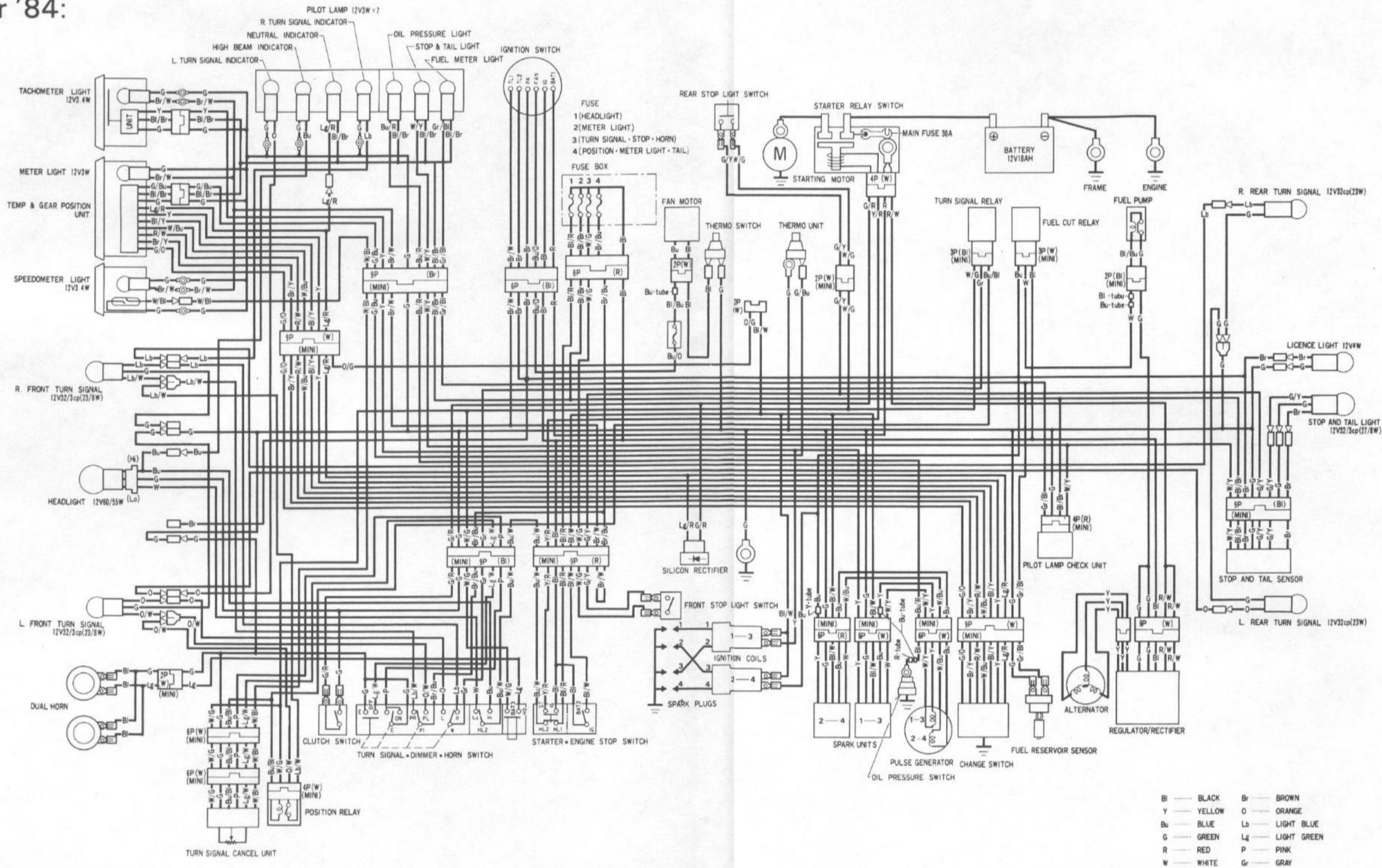
0030Z-MB4A-6710



84:

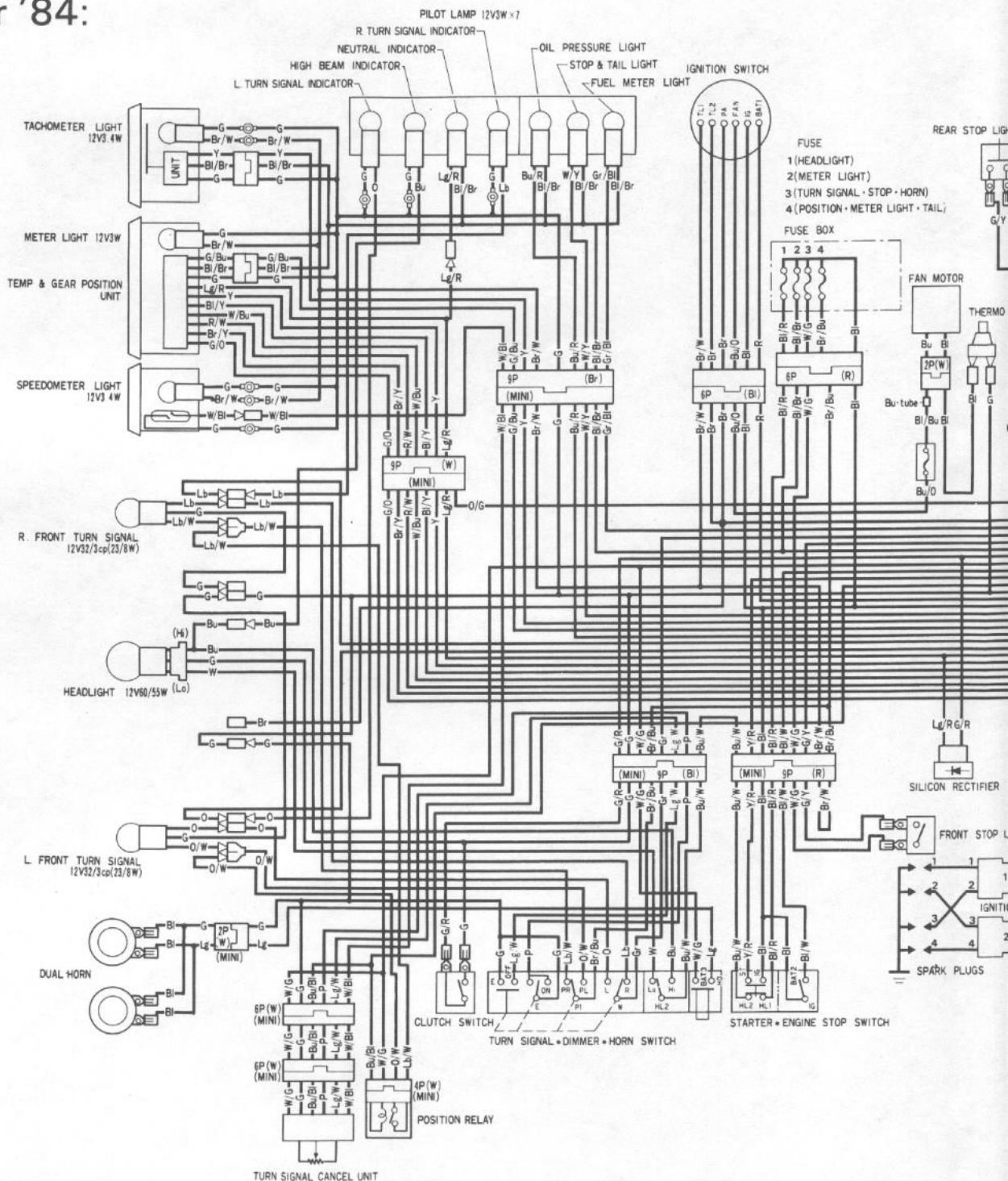


After '84:



0030Z—MB4—6800

After '84:



SWITCH CONTINUITY

IGNITION SWITCH

| | BAT1 | IG | FAN | TL1 | TL2 | P |
|-----|------|----|-----|-----|-----|---|
| OFF | | | | | | |
| ON | | | | | | |
| P | | | | | | |

STARTER SWITCH

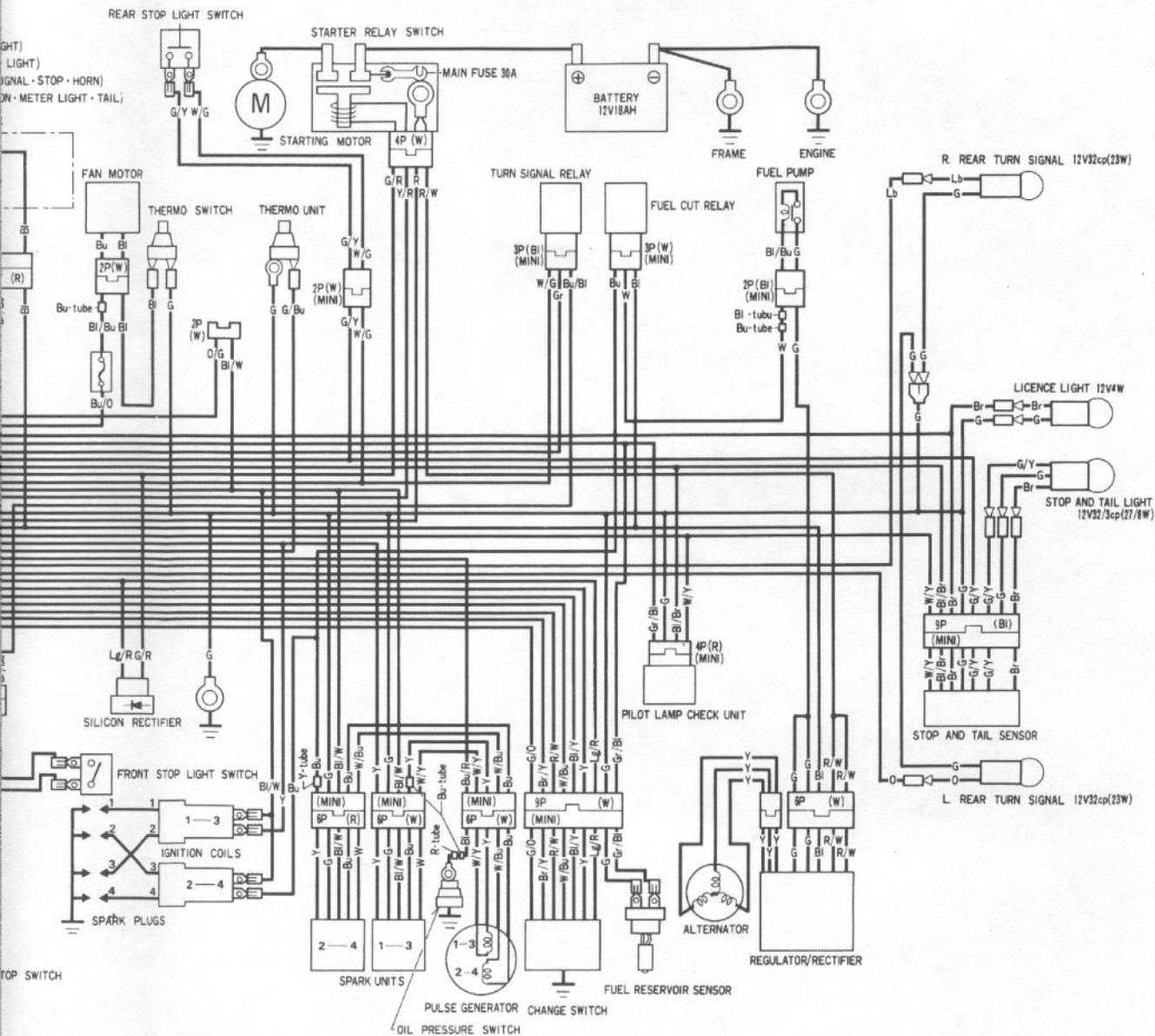
| | HL1 | HL2 | IG | ST |
|------|-----|-----|----|----|
| FREE | | | | |
| PUSH | | | | |

ENGINE STOP SWITCH

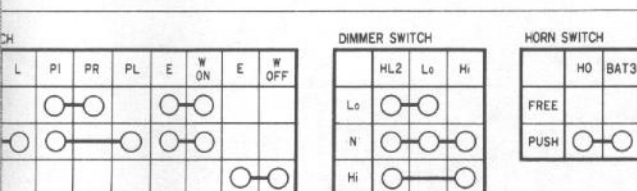
| | IG | BAT2 |
|-----|----|------|
| OFF | | |
| RUN | | |
| OFF | | |

TURN SIGNAL SWITCH

| | W | R | L | PI | PR | PL | E | W ON |
|--------|---|---|---|----|----|----|---|------|
| R PUSH | | | | | | | | |
| L PUSH | | | | | | | | |
| PUSH | | | | | | | | |



BI BLACK Br BROWN
 Y YELLOW O ORANGE
 Bu BLUE Lb LIGHT BLUE
 G GREEN Lg LIGHT GREEN
 R RED P PINK
 W WHITE Gr GRAY



0030Z—MB4—6800

23. TECHNICAL FEATURES

ONE-WAY CLUTCH SYSTEM

23-1

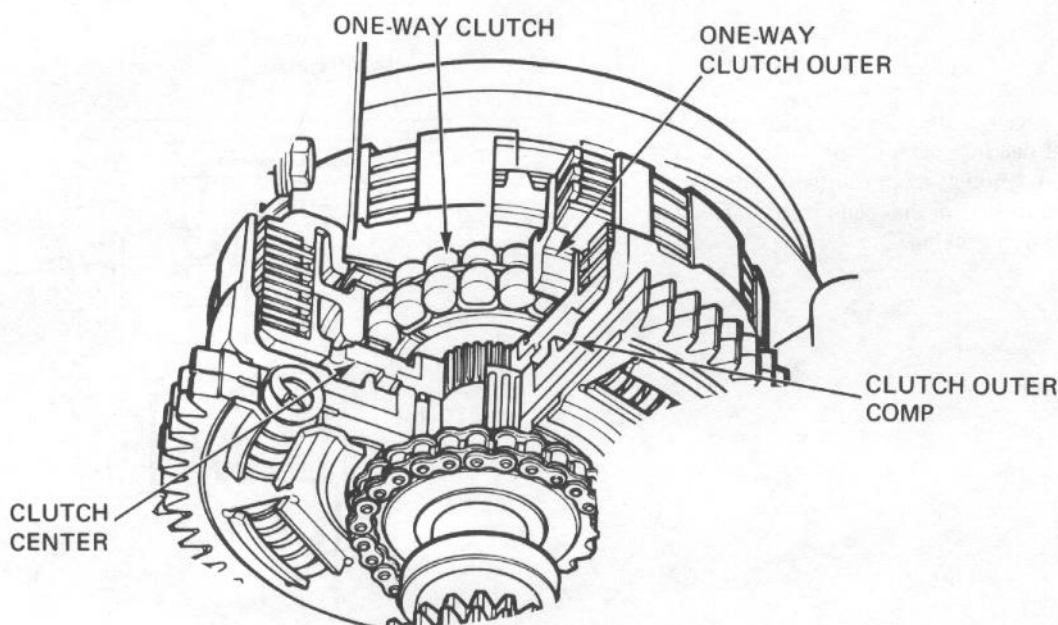
OPTICAL-FIBER ANTITHEFT DEVICE

23-3

ONE-WAY CLUTCH SYSTEM

First time on a production motorcycle, this system has been proven on the race circuits of Europe in Honda's Gran Prix road racers.

Rear wheel lock up caused by rapid downshifting and the resulting high engine compression braking force is prevented by the slippage of the one-way clutch.



● Construction

The one-way clutch is installed with the clutch center inside the clutch outer. Half the clutch plates are controlled by the one-way clutch. The one-way clutch allows those plates to slip when backloading force during deceleration might normally cause the rear wheel to lock-up.

Except for the one-way clutch, the primary driven gear/clutch assembly is a conventional design.

23

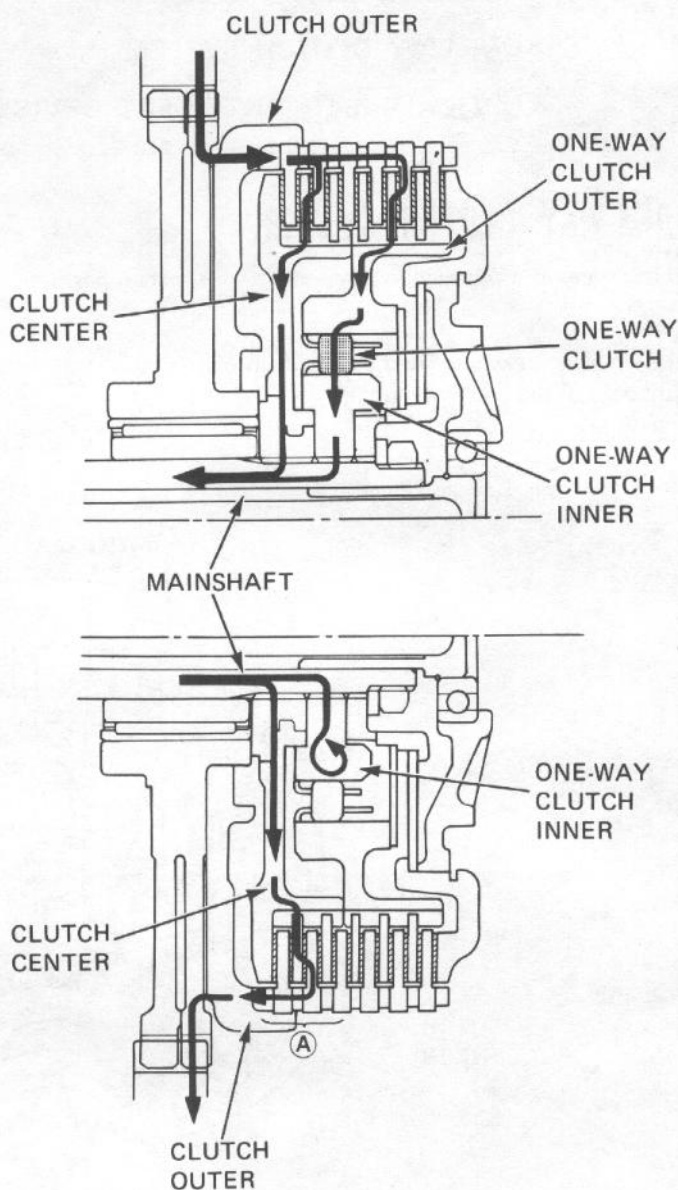
TECHNICAL FEATURES

● Operation

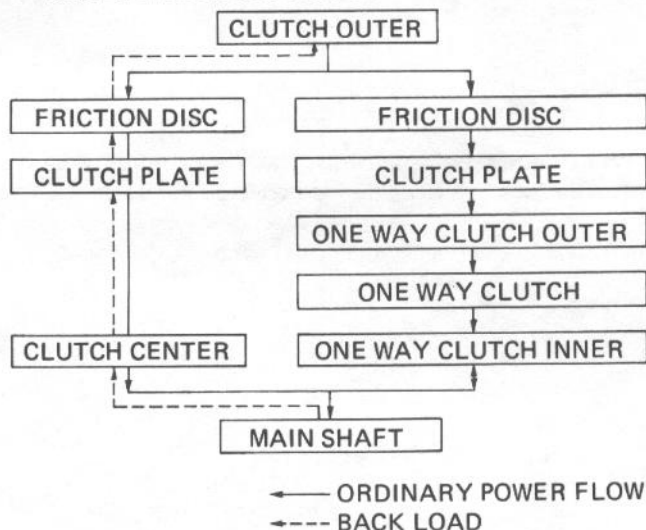
During acceleration, cruising, and deceleration, power is transmitted through the clutch in the normal manner:

Clutch outer → friction disc → plate → one-way clutch → mainshaft.

When there is a backloading on the clutch caused by the rear wheel nearing lock-up, the one-way clutch (A) will slip just enough to prevent the wheel from locking; without losing the benefit of maximum engine compression braking.



● POWER FLOW DIAGRAM

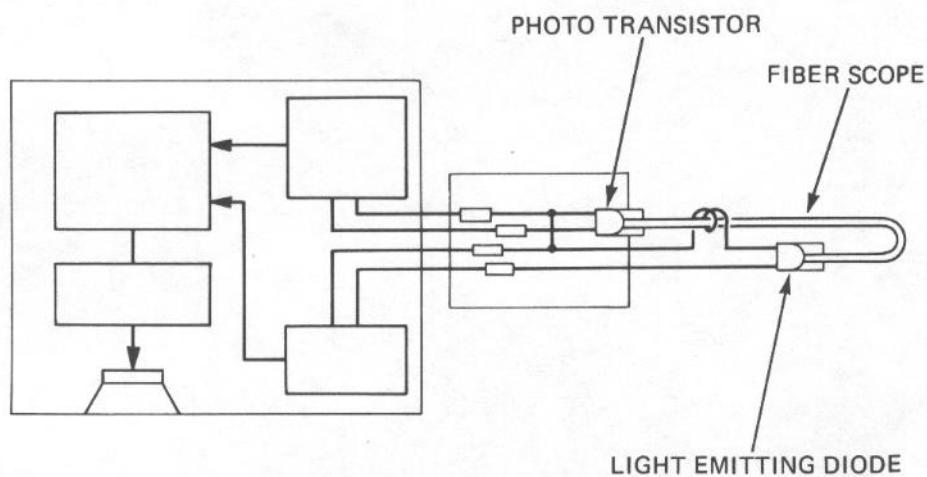


OPTICAL-FIBER ANTITHEFT DEVICE

The device consists of a built-in power source, buzzer, photo transistor light emitting diode (LED), and fiber scope locking wire.

Function

Braking the fiber scope causes the buzzer to sound due to interrupted transmission of light from the LED to the photo transistor. A 9V dry battery is used to operate the system. The wire can be connected and disconnected with the ignition key and is stored in a compartment at the rear of the seat.



24. TROUBLESHOOTING

ENGINE DOES NOT START OR IS HARD TO START

1. Check fuel flow to carburetor

REACHING CARBURETOR

2. Perform a 3-point spark test

GOOD SPARK

3. Test cylinder compression

COMPRESSION NORMAL

4. Start by following normal procedure

ENGINE DOES NOT FIRE

5. Remove and inspect spark plug

NOT REACHING CARBURETOR

POSSIBLE CAUSE

- (1) Fuel tank empty
- (2) Clogged fuel tube or fuel filter
- (3) Sticking float valve
- (4) Faulty fuel pump
- (5) Pinched fuel tank vent hose

WEAK OR NO SPARK

- (1) Faulty spark plugs
- (2) Fouled spark plugs
- (3) Faulty spark unit
- (4) Broken or shorted high tension wires
- (5) Faulty spark unit
- (6) Broken or shorted ignition coil
- (7) Faulty ignition switch
- (8) Faulty pulse generator

LOW COMPRESSION

- (1) Low battery charge
- (2) Improper valve clearance (too small)
- (3) Valve stuck open
- (4) Worn cylinder and piston rings
- (5) Damaged cylinder head gasket
- (6) Seized valve
- (7) Improper valve timing

ENGINE STARTS BUT STOPS

- (1) Improper choke operation
- (2) Carburetor incorrectly adjusted
- (3) Intake pipe leaking
- (4) Improper ignition timing (Spark unit or pulse generator)
- (5) Fuel contaminated

WET PLUG

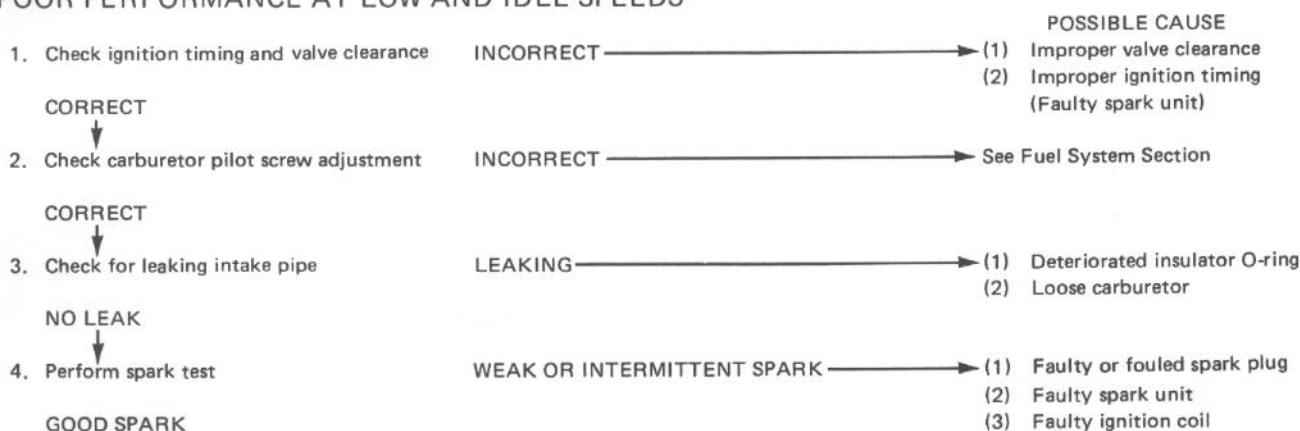
- (1) Carburetor flooded
- (2) Choke closed
- (3) Throttle valve open
- (4) Air cleaner dirty

TROUBLESHOOTING

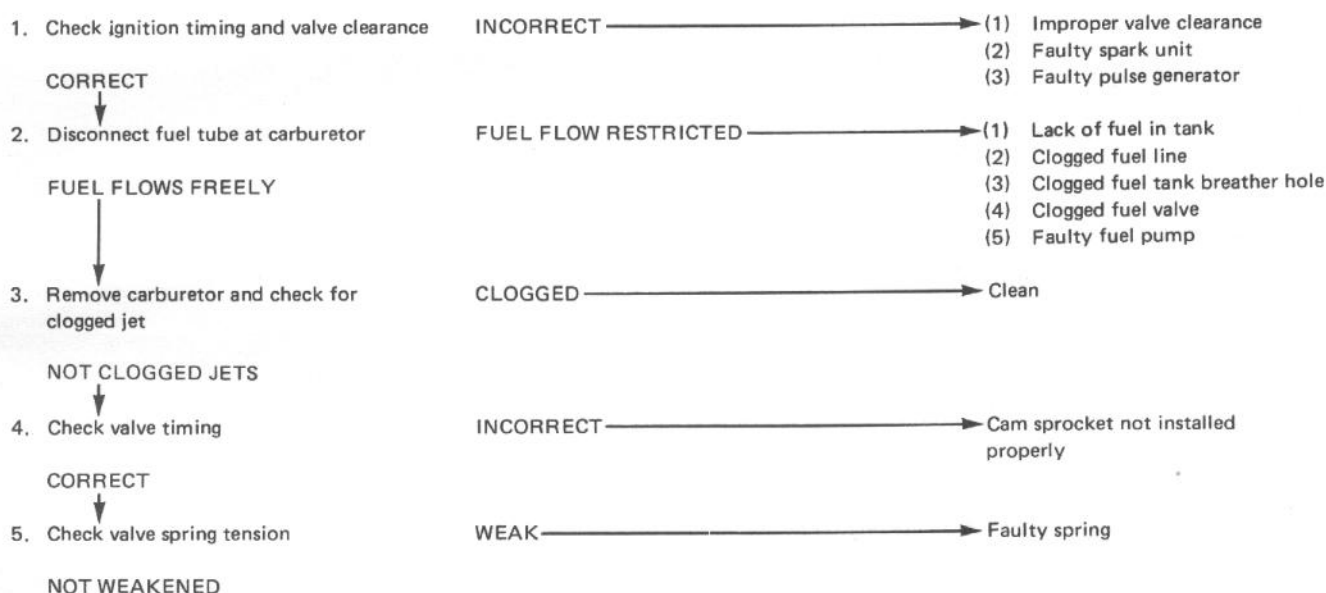
ENGINE LACKS POWER

| | | |
|---|---|---|
| 1. Raise wheels off ground and spin by hand | WHEELS DO NOT SPIN FREELY | POSSIBLE CAUSE |
| WHEEL SPINS FREELY | | (1) Brake dragging (2) Worn or damaged wheel bearings (3) Wheel bearing needs lubrication (4) Final gear bearing damaged |
| 2. Check tire pressure | PRESSURE LOW | (1) Punctured tire (2) Faulty tire valve |
| PRESSURE NORMAL | | |
| 3. Accelerate rapidly from low to second | ENGINE SPEED INCREASES BUT MOTOR-CYCLE DOES NOT ACCELERATE WELL WHEN CLUTCH IS RELEASED | (1) Clutch slipping (2) Worn clutch disc/plate (3) Warped clutch disc/plate |
| ENGINE SPEED INCREASES PROPORTIONALLY TO ACCELERATION WHEN CLUTCH IS RELEASED | | |
| 4. Accelerate lightly | ENGINE SPEED DOES NOT INCREASE | (1) Carburetor choke closed (2) Clogged air cleaner (3) Restricted fuel flow (4) Clogged muffler (5) Pinched fuel tank vent hose |
| ENGINE SPEED INCREASES | | |
| 5. Check ignition timing | INCORRECT | (1) Faulty spark unit (2) Faulty pulse generator |
| CORRECT | | |
| 6. Check valve clearance | INCORRECT | (1) Improper valve adjustment (2) Worn valve seat |
| CORRECT | | |
| 7. Test cylinder compression | TOO LOW | (1) Valve stuck open (2) Worn cylinder and piston rings (3) Leaking head gasket (4) Improper valve timing |
| NORMAL | | |
| 8. Check carburetor for clogging | CLOGGED | (1) Carburetor not serviced frequently enough |
| NOT CLOGGED | | |
| 9. Remove spark plug | FOULED OR DISCOLORED | (1) Plugs not serviced frequently enough (2) Spark plug with incorrect heat range (3) Air cleaner dirty |
| NOT FOULED OR DISCOLORED | | |
| 10. Check oil level and condition | INCORRECT | (1) Oil level too high (2) Oil level too low (3) Contaminated oil |
| CORRECT | | |
| 11. Remove cylinder head cover and inspect lubrication | VALVE TRAIN NOT LUBRICATED PROPERLY | (1) Clogged oil passage (2) Clogged oil control orifice |
| VALVE TRAIN LUBRICATED PROPERLY | | |
| 12. Check for engine overheating | OVERHEATING | (1) Excessive carbon build-up in combustion chamber (2) Use of poor quality fuel (3) Clutch slipping |
| NOT OVERHEATING | | |
| 13. Accelerate or run at high speed | ENGINE KNOCKS | (1) Worn piston and cylinder (2) Wrong type of fuel (3) Excessive carbon build-up in combustion chamber (4) Ignition timing too advanced (Faulty spark unit) |
| ENGINE DOES NOT KNOCK | | |

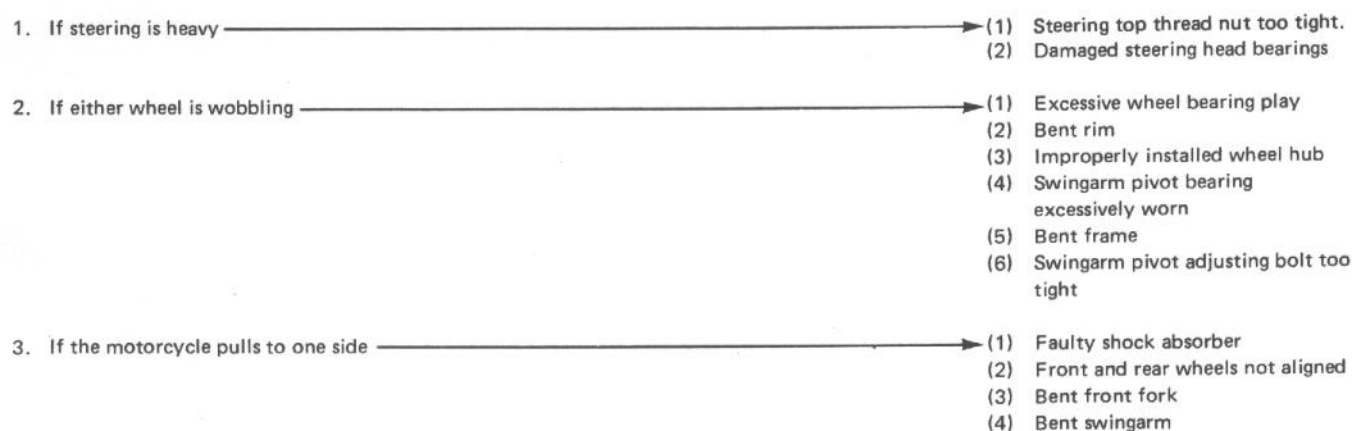
POOR PERFORMANCE AT LOW AND IDLE SPEEDS



POOR PERFORMANCE AT HIGH SPEED



POOR HANDLING → Check tire pressure





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