



| 《ENGINE》                      | 《CHASSIS》                        |
|-------------------------------|----------------------------------|
| SERVICE INFORMATION           | 3-1 DRIVE CHAIN 3-12             |
| CRANKCASE BREATHER (USA only) | 3-2 BATTERY 3-13                 |
| AIR CLEANER                   | 3-2 BRAKE FLUID 3-13             |
| FUEL LINES                    | 3-3 BRAKE PADS/SHOES 3-14        |
| SPARK PLUGS                   | 3-3 BRAKE SYSTEM 3-14            |
| IGNITION TIMING               | 3-4 BRAKELIGHT SWITCH 3-15       |
| SPARK ADVANCER                | 3-5 HEADLIGHT AIM 3-15           |
| VALVE CLEARANCE               | 3-6 CLUTCH FREE PLAY 3-16        |
| CAM CHAIN TENSION             | 3-7 SIDE STAND 3-17              |
| THROTTLE OPERATION            | 3-7 SUSPENSION 3-18              |
| CHOKE MECHANISM               | 3-8 WHEELS 3-19                  |
| CARBURETOR SYNCHRONIZATION    | 3-9 STEERING HEAD BEARING 3-19   |
| IDLE SPEED                    | 3-11 NUTS, BOLTS, FASTENERS 3-19 |
| COMPRESSION TEST              | 3-11                             |

## SERVICE INFORMATION

### GENERAL INSTRUCTIONS

- Engine oil level check See page 2-2
- Engine oil change See page 2-2
- Engine oil filter change See page 2-2

### SPECIAL TOOLS

|                        |                               |
|------------------------|-------------------------------|
| Carb. Throttle Wrench  | 07908-4220100                 |
| Vacuum Gauge           | 07404-0020000<br>or H/C 20176 |
| Valve Adjusting Wrench | 07908-3230000                 |
| Spark Plug Wrench      | 07909-3000000                 |

### TORQUE VALUES

|                                   |                             |
|-----------------------------------|-----------------------------|
| Breather cover                    | 0.8-1.2 kg-m (6-9 ft-lb)    |
| Valve adjusting nut               | 1.2-1.6 kg-m (9-12 ft-lb)   |
| Spark plug                        | 1.2-1.6 kg-m (9-12 ft-lb)   |
| Cam chain tensioner               | 1.0-1.4 kg-m (7-10 ft-lb)   |
| Oil filter case                   | 2.7-3.3 kg-m (20-24 ft-lb)  |
| Throttle cable adjusting lock nut | 0.6-0.8 kg-m (4-6 ft-lb)    |
| Rear axle nut                     | 8.0-10.0 kg-m (58-72 ft-lb) |

### SPECIFICATIONS

#### 《ENGINE》

|                 |                             |
|-----------------|-----------------------------|
| Spark plug gap  | 0.6-0.7 mm (0.024-0.028 in) |
| Spark plug type |                             |

(USA model)

| Usage<br>Manu-<br>facturer | For cold climate<br>(below 5°C, 41°F) | Standard | For extended<br>high speed<br>driving |
|----------------------------|---------------------------------------|----------|---------------------------------------|
| ND                         | X22ES-U                               | X24ES-U  | X27ES-U                               |
| NGK                        | D7EA                                  | D8EA     | D9EA                                  |

(CANADA model)

ND X24ESR-U  
NGK DR8ES-L

Manufacturer

ND: Nippondenso Co., Ltd.  
NGK: NGK Spark Plug Co., Ltd.

|                 |  |
|-----------------|--|
| Ignition timing | Initial 10° (BTDC)                             |
| Valve clearance | IN 0.05 mm (0.002 in)<br>EX 0.08 mm (0.003 in) |
| Idle speed      | 1,050 ± 100 rpm                                |
| Synchronization | Difference of each cylinder                    |
| vacuum          | 60 mmHg (2.4 inHg) or less                     |
| Compression     | 12 ± 2 kg/cm <sup>2</sup> (170 ± 28 psi)       |

#### 《CHASSIS》

|                       |                         |
|-----------------------|-------------------------|
| Brake pedal free play | 20-30 mm (3/4-1-1/4 in) |
| Drive chain free play | 15-25 mm (5/8-1 in)     |
| Clutch free play      | 10-20 mm (3/8-3/4 in)   |

Tire

|   |  |                                  |
|---|--|----------------------------------|
| Cold tire pressures<br>Kg/cm <sup>2</sup> (psi) | Up to 90 kg (200 lb) load  | Front 2.0 (28)<br>Rear 2.25 (32) |
|   | Up to vehicle capacity load  | Front 2.0 (28)<br>Rear 2.8 (40)  |
| Vehicle capacity load limit                     | 163 kg (360 lbs)   |                                  |
| Tire size                                       | Front 3.50H19-4PR<br>Rear 4.50H17-4PR  |                                  |
| Tire brand                                      | Front BRIDGESTONE MaG. MOPUS-S703<br>DUNLOP GOLD SEAL F11<br>Rear BRIDGESTONE SUPER SPEED S21 R2<br>DUNLOP GOLD SEAL K87 MARK II |                                  |



## CRANKCASE BREATHER

USA model

Remove the drain plug from the tube and allow deposits to drain.  
Install the drain plug.

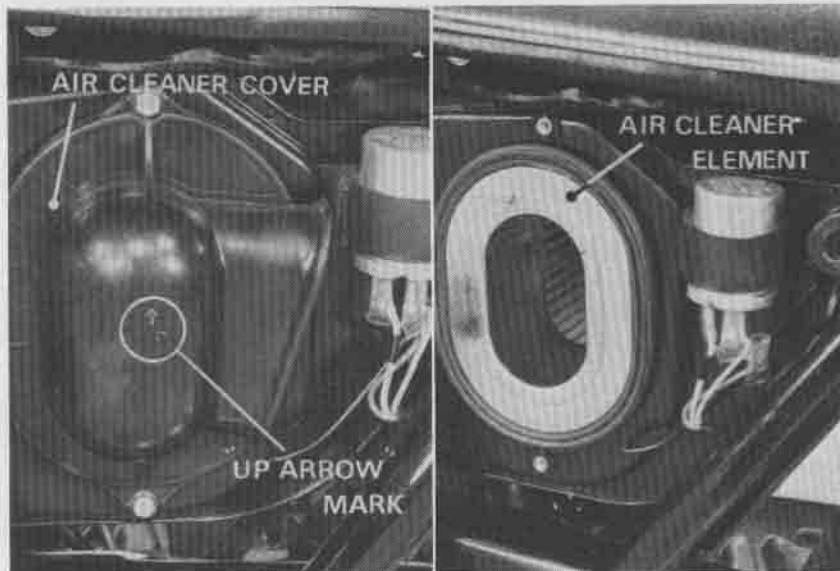
### NOTE

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



## AIR CLEANER

Remove the left side cover.  
Remove the two air cleaner cover screws and cover.  
Remove the element.

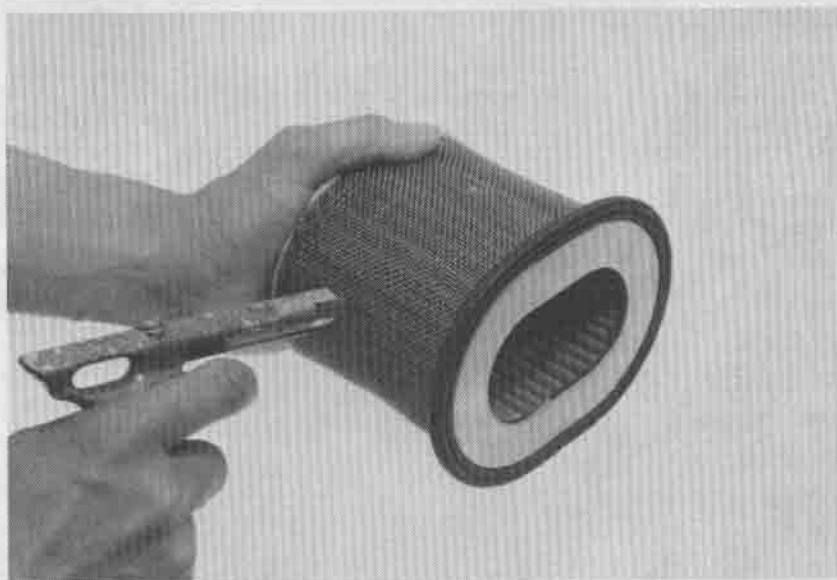


Clean the element by tapping it lightly to loosen dust. Blow away the remaining dust using compressed air from outside the element.

Replace the element if it is excessively dirty, broken or damaged.  
Install the element, air cleaner cover and left side cover.

### NOTE

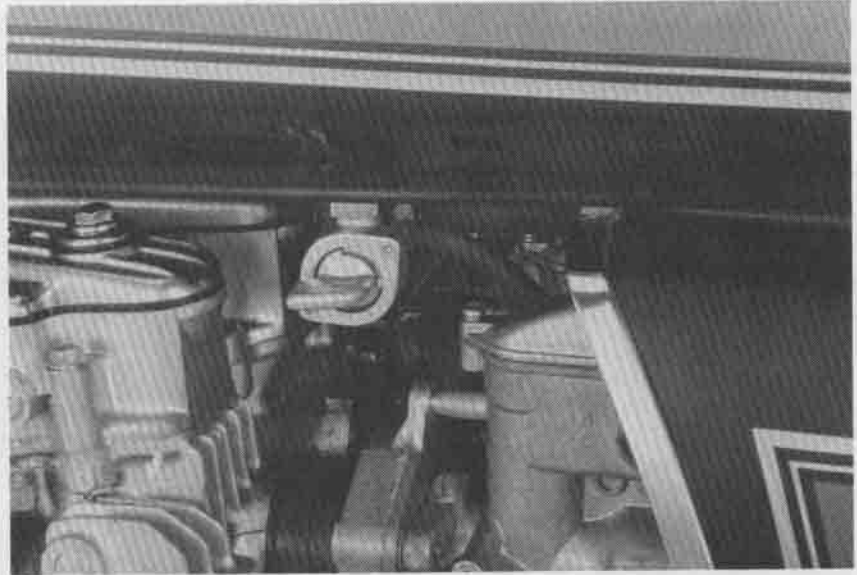
Note the "UP Arrow" mark on the air cleaner cover.





## FUEL LINES

Replace any parts which show deterioration, damage or leakage.



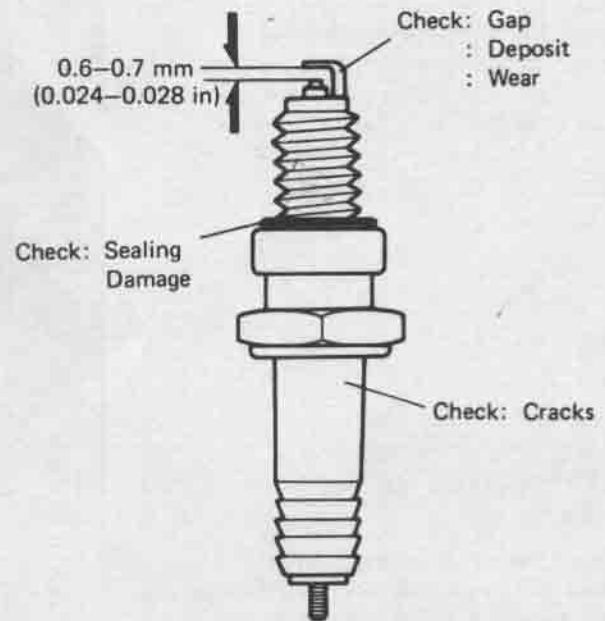
## SPARK PLUGS

Disconnect the spark plug caps and remove the spark plugs.

Visually inspect each spark plug. Discard the spark plug if the insulator is cracked or chipped.

Measure the spark plug gap with a wire-type feeler gauge.

Adjust the spark plug gap by bending the side electrode carefully.



### SPARK PLUG GAP:

0.6–0.7 mm (0.024–0.028 in.)

### RECOMMENDED SPARK PLUG

USA model

| For cold climate<br>(Below 5°C, 41°F) |      | Standard |      | For extended<br>high speed riding |      |
|---------------------------------------|------|----------|------|-----------------------------------|------|
| ND                                    | NGK  | ND       | NGK  | ND                                | NGK  |
| X22ES-U                               | D7EA | X24ES-U  | D8EA | X27ES-U                           | D9EA |

CANADA model only

ND X24ESR-U  
NGK DR8ES-L

Make sure the sealing washers are in good condition.

Install the spark plugs, tighten them by hand, then tighten them with a spark plug wrench. Connect the spark plug caps.

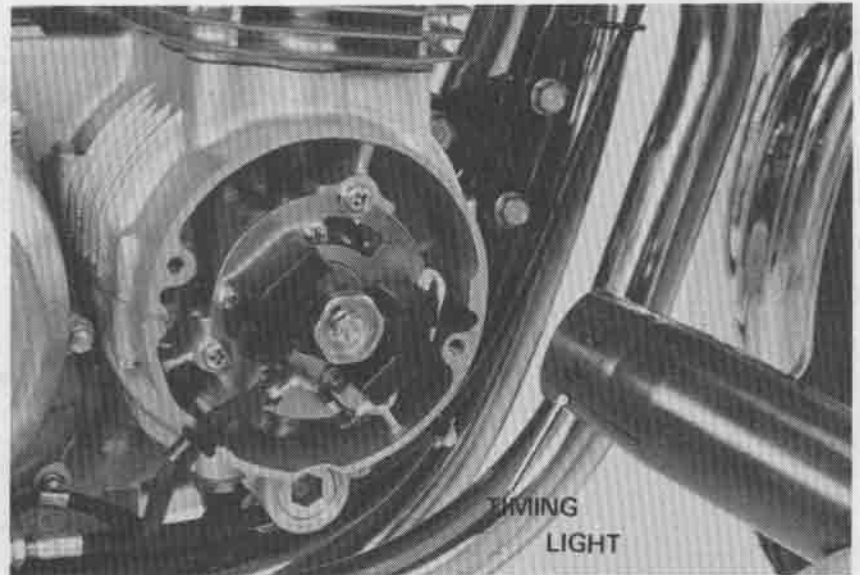


## IGNITION TIMING

### · DYNAMIC

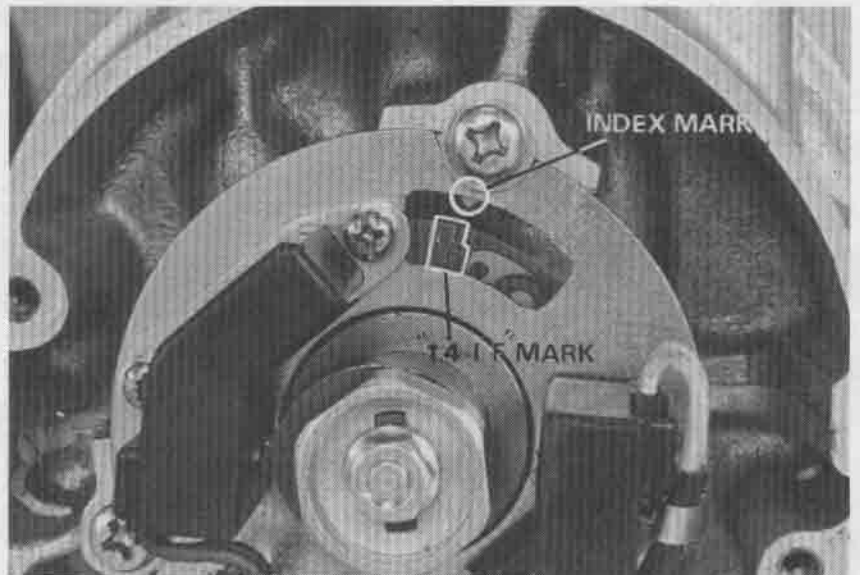
Remove the pulser generator cover.  
 Connect a stroboscopic timing-light to the No. 4 cylinder's high tension cord.  
 Start the engine and let it idle.  
**IDLE SPEED: 1,050 ± 100 rpm**

Aim the timing light at the timing mark.  
 The "1.4 F-I" mark should align with the index mark.



### ADJUSTMENT

Adjust by loosening the three pulser base plate screws and rotating the plate.  
 Tighten the screws and recheck the timing.  
 Disconnect the timing light and install the pulser generator cover.



### ALTERNATIVE METHOD

#### · STATIC

Remove the pulser generator cover.  
 Rotate the crankshaft counterclockwise and align the "1.4 S-F" mark with the index mark.

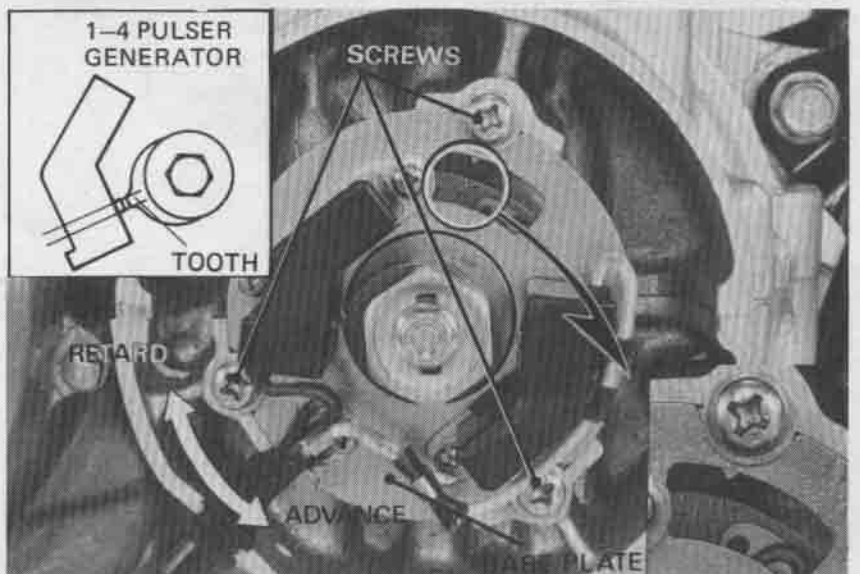
#### NOTE

Either No.1 or No.4 piston must be near T.D.C. of the compression stroke at this time.

The timing is correct if the narrow projection of the "1.4" pulser generator aligns with the rotor tooth.

### ADJUSTMENT

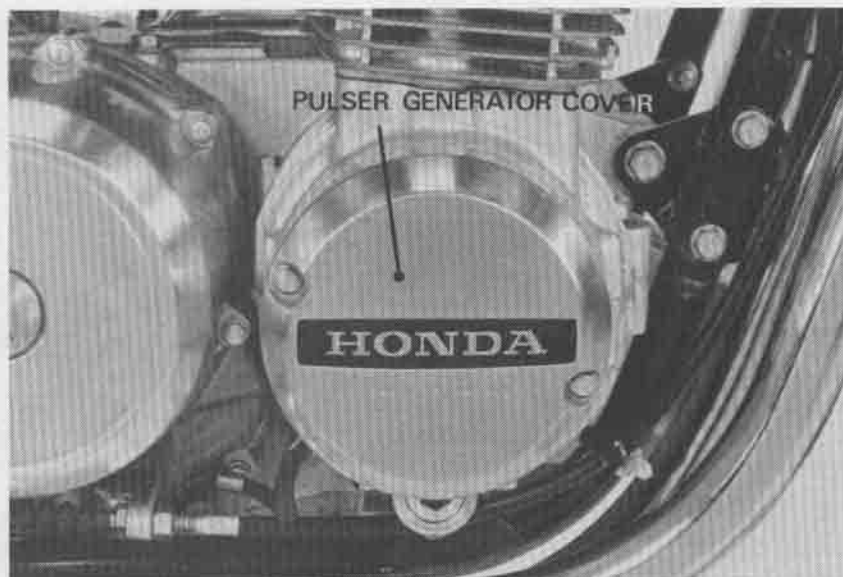
Loosen the three pulser base plate screws and rotate the plate until aligned as stated above.  
 Tighten the screws.  
 Install the pulser generator cover.





## SPARK ADVANCER

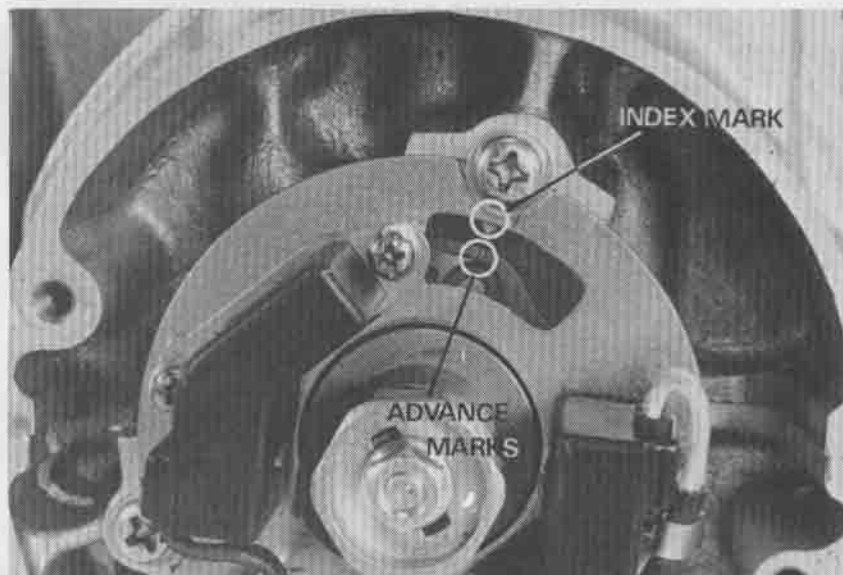
Remove the pulser generator cover.  
Connect a timing light to the No.4 high tension cord.



Start the engine.  
Bring engine speed to 2,725 rpm or above  
and check that the index mark is between the  
full advance marks.

Replace the advancer assembly if it is not  
functioning properly.

Install the pulser generator cover.





## VALVE CLEARANCE

### NOTE

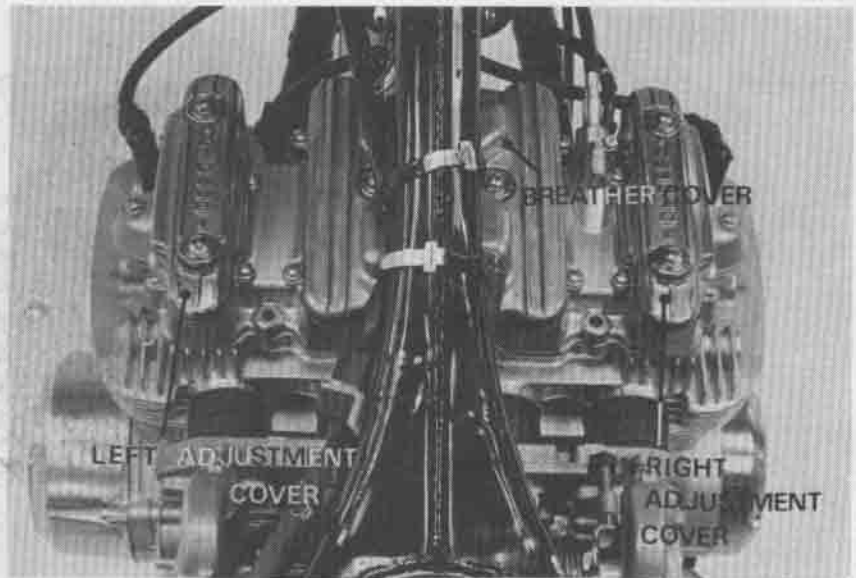
Inspect and adjust the valve clearance while the engine is cold (Below 35° C, 95°F).

Raise the seat.

Turn the fuel valve OFF and remove the fuel line and fuel tank.

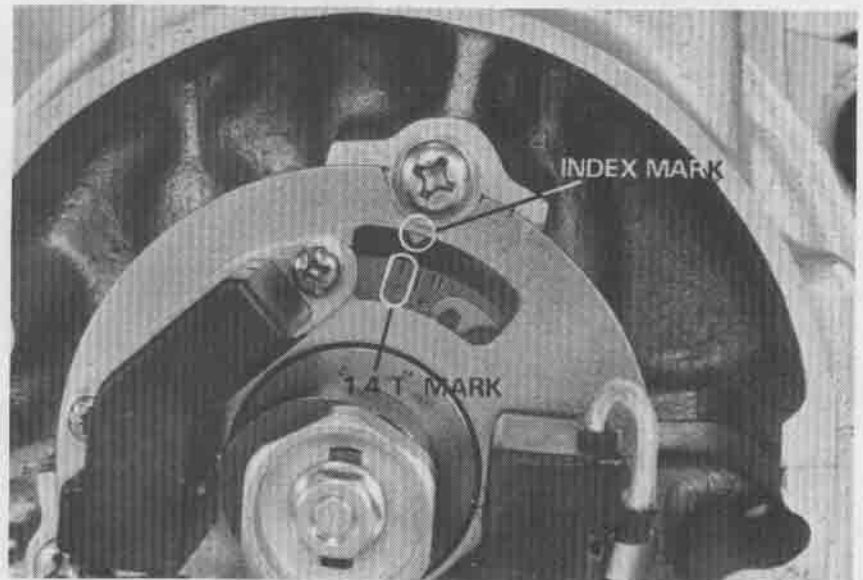
Remove the breather tube from the breather cover.

Remove the right and left adjustment covers and breather cover.



Remove the pulser generator cover.

Rotate the crankshaft clockwise and align the "1.4 T" mark with the index mark. Make sure the No.1 piston is at T.D.C. (Top Dead Center) of the compression stroke. (Both No. 1 rocker arms should have free play.)



Measure the valve clearance for the valves marked "●" in the chart below, by inserting a feeler gauge between the camshaft and each rocker arm slipper.

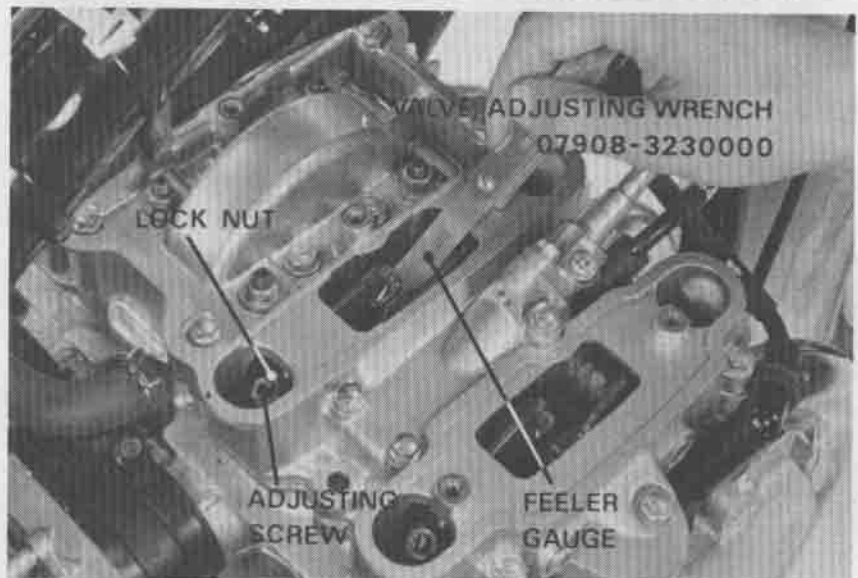
| Cylinder No. | 1 | 2 | 3 | 4 |
|--------------|---|---|---|---|
| IN           | ● | ○ | ● | ○ |
| EX           | ● | ● | ○ | ○ |

### VALVE CLEARANCES:

IN: 0.05 mm (0.002 in)

EX: 0.08 mm (0.003 in)

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



**TORQUE: 1.2–1.6 kg-m (9–12 ft-lb)**

Recheck the valve clearance.

Rotate the crankshaft one full turn (360°) clockwise and align the "1.4T" mark with the index mark.

Check and adjust the valve clearance as stated above, for valves marked "○" in the chart.

Install the pulser generator cover, right and left adjustment covers, breather cover, fuel tank and fuel line.



## CAM CHAIN TENSION

### NOTE

Adjust the cam chain tension with ignition switch off, transmission in neutral and the motorcycle on its center stand.

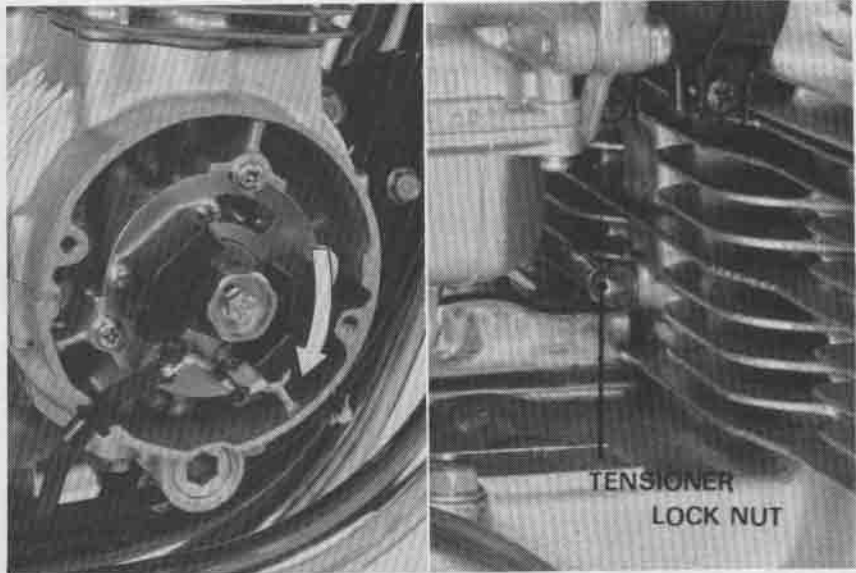
Remove the pulser generator cover.  
Loosen the cam chain tensioner lock nut.  
Tighten the cam chain lock nut while slowly rotating the crankshaft clockwise.

**TORQUE: 1.0–1.4 kg-m (7–10 ft-lb)**

### NOTE

The tensioner will automatically position itself to provide the correct tension when the lock nut is loosened.

Install the pulser generator cover.



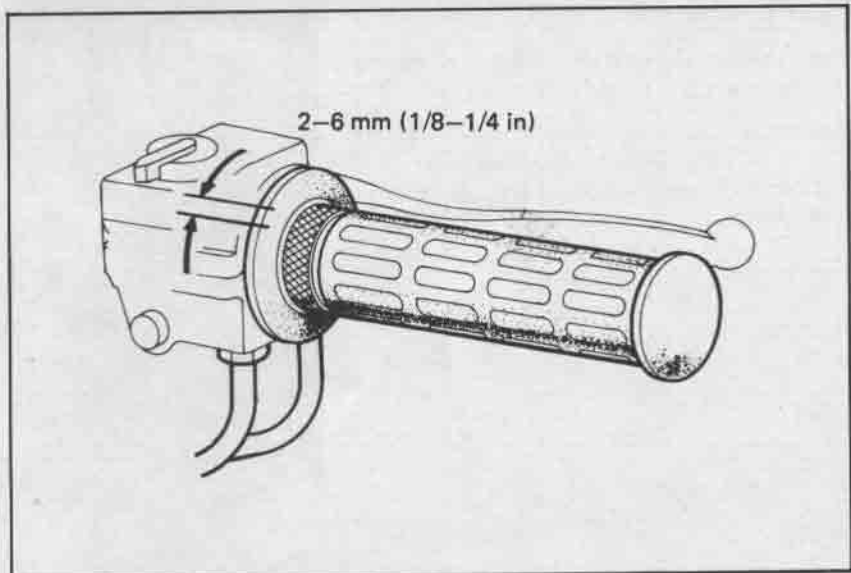
## THROTTLE OPERATION

Make sure that there is no deterioration, damage, or kinks in the throttle cable. Check that the throttle grip free play is 2–6 mm (1/8–1/4 in) on the throttle grip flange. Check for smooth throttling grip full opening and automatic full closing in all steering positions.

### NOTE

The accelerator pump may flood the carburetors during this inspection.

Adjust or replace the throttle cable if necessary.  
Free play can be adjusted at either end of the throttle cable.



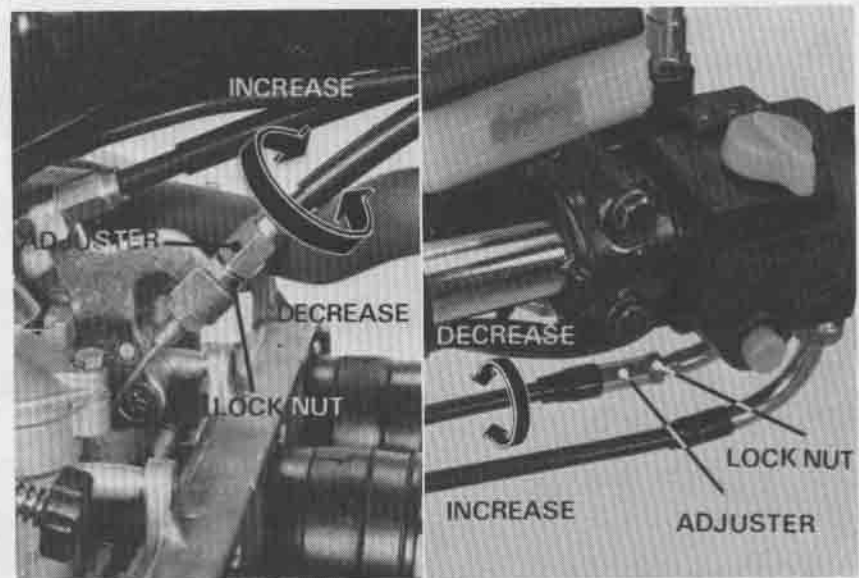
Major adjustments are made at the lower adjuster. To adjust, remove the fuel tank, loosen the grip free play adjuster lock nut and turn the adjuster.

Hold the adjuster and tighten the lock nut.

Minor adjustments are made at the upper adjuster. Adjust by loosening the lock nut and turning the adjuster.

Hold the adjuster and tighten the lock nut.

Recheck the throttle operation.  
Replace any damaged parts.



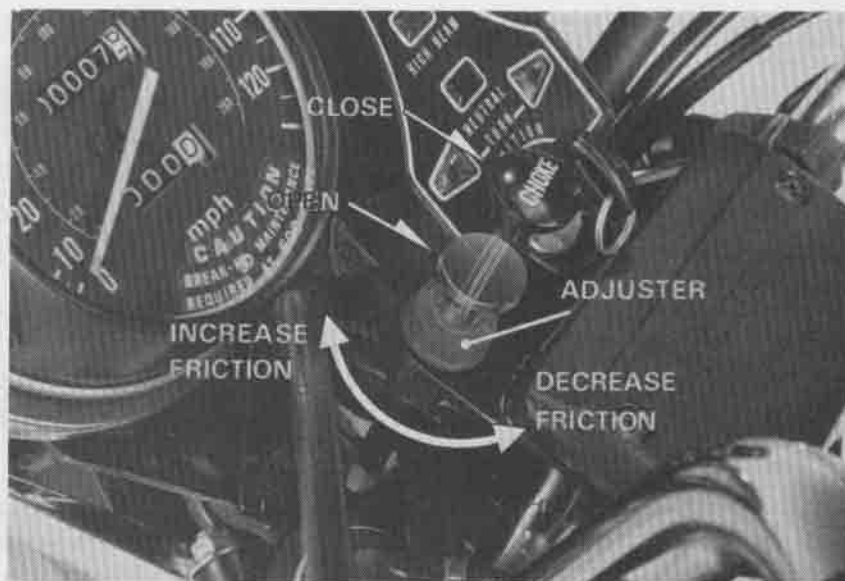


## CHOKE MECHANISM

Operate the choke knob and check for choke knob free play and smooth operation of the choke knob, choke lever and choke shaft.

Adjust the choke operating friction by turning the adjuster.

The choke knob must move smoothly and stay where positioned.

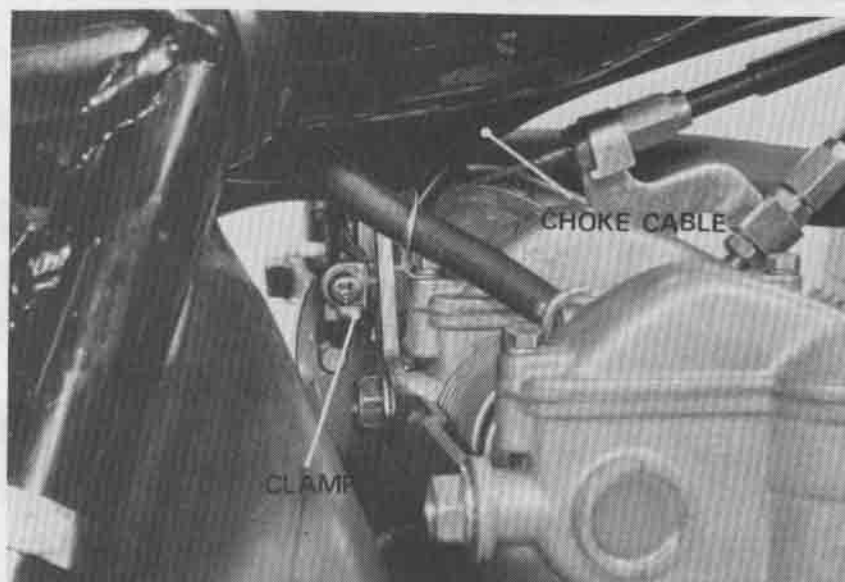


Remove the fuel tank.

Make sure the choke lever is fully closed when the choke knob is pulled all the way out.

Adjust by loosening the choke cable clamp and moving the choke cable as required.

Tighten the clamp, holding the choke lever fully closed.







## CARBURETOR SYNCHRONIZATION

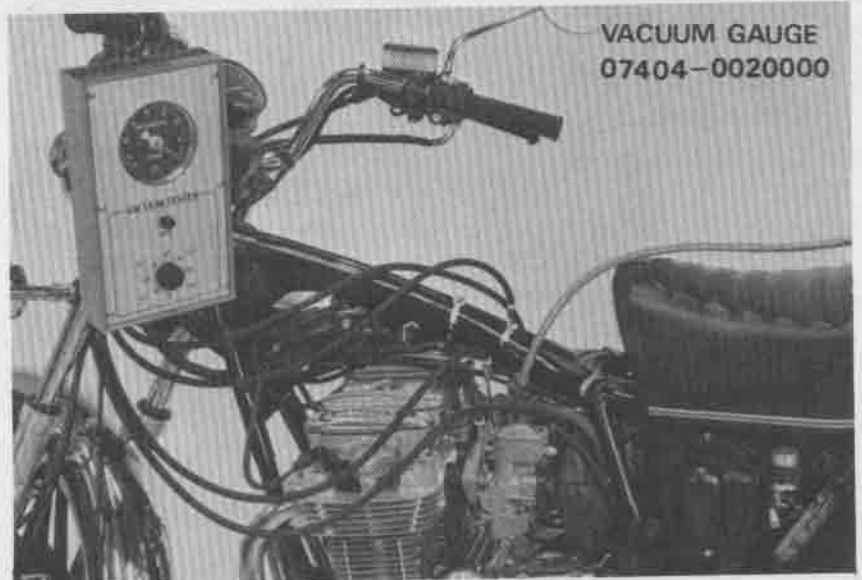
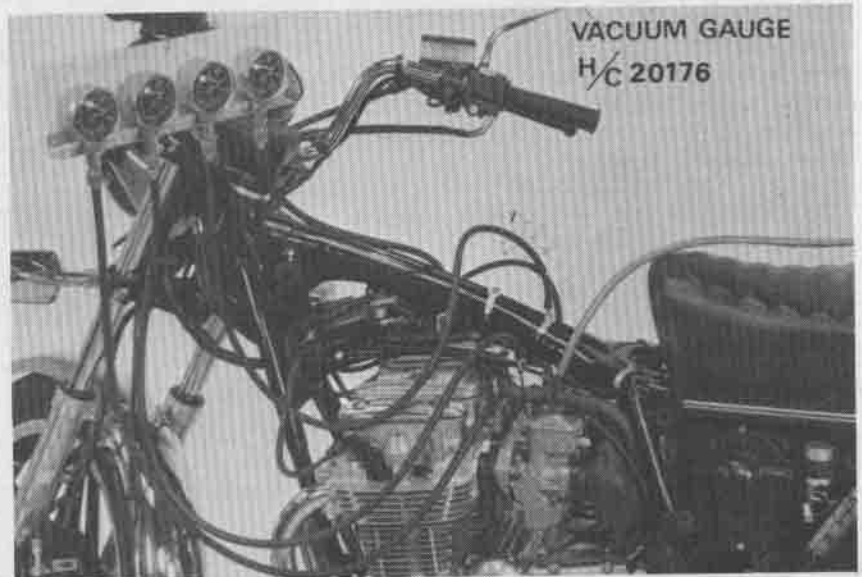
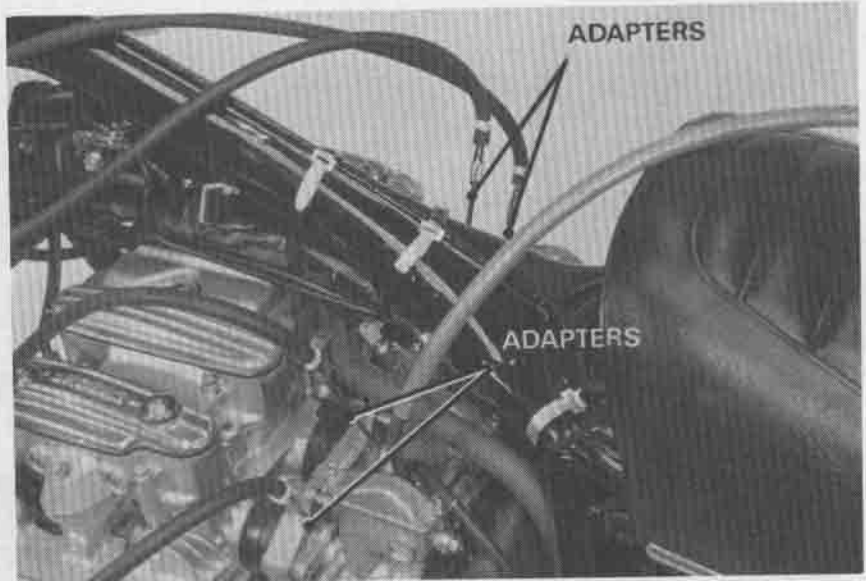
### NOTE

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

Remove both side covers and raise the seat. Turn the fuel valve OFF and remove the fuel line and fuel tank.

Connect a longer full line between the fuel tank and carburetor.

Position the fuel tank higher than normal. Remove the plugs from the carburetor manifolds and install the vacuum gauge adapters. Connect the vacuum gauge.





## ADJUSTMENT

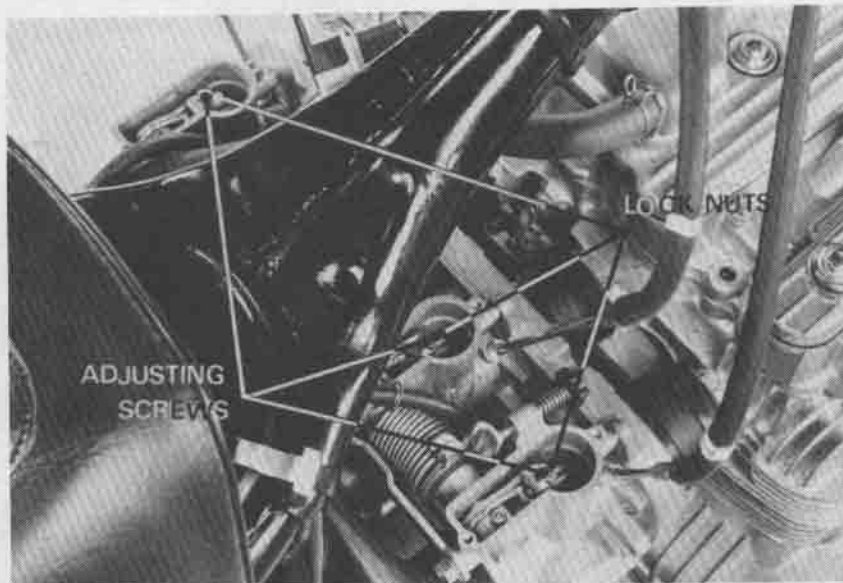
### NOTE

The No.2 carburetor cannot be adjusted; it is the base for adjustment of the other carburetors.

Start the engine and adjust the idle speed.

**IDLE SPEED: 1,050 ± 100 rpm**

Check that the difference in vacuum readings is 60 mmHg (2.4 inHg) or less.



If the difference in readings is too great, adjust as follows:

Remove the No. 1, 3 and 4 carburetor top covers. Loosen the lock nuts and turn the adjusting screws with the "Carburetor Throttle Wrench" tool.

Tighten the lock nuts and recheck the idle speed and vacuum readings.

Install the carburetor top covers.  
Install the carburetor manifold plugs, fuel tank, fuel line and side covers.





## ● IDLE SPEED

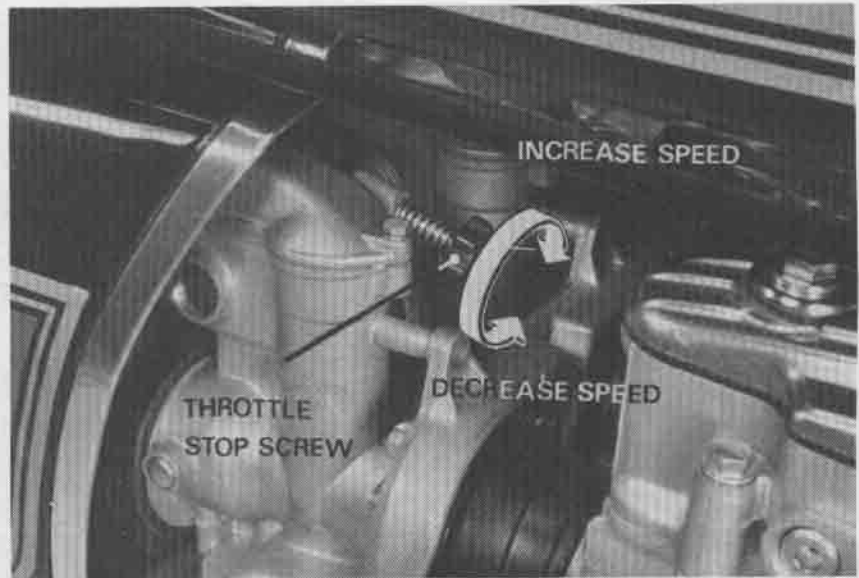
### NOTE

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

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

Adjust idle speed with the throttle stop screw.

**IDLE SPEED: 1,050 ± 100 rpm**



## ● COMPRESSION TEST

Warm up the engine.  
Remove all spark plugs.  
Insert the compression gauge.

Open the choke and throttle valves fully.  
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:**  
**12 ± 2 kg/cm<sup>2</sup> (170 ± 28 psi)**



If compression is low, check for the following:

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

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



## DRIVE CHAIN

Place the vehicle on its center stand and shift the transmission into neutral.  
Turn the ignition switch OFF.

Measure drive chain free play midway between the sprockets on the lower chain run.

**FREE PLAY: 15–25 mm (5/8 – 1 in)**

### CAUTION

*Excessive chain free play; 40 mm (1-5/8 in) or more, may damage the frame.*

Inspect the drive chain and sprockets for damage and wear. Replace the drive chain if the rollers are damaged or the pins are loose. Replace the sprocket if damaged or excessively worn.

## CHAIN REPLACEMENT

### NOTE

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

## ADJUSTMENT

Remove the rear axle cotter pin and loosen the axle nut.

Loosen the adjuster bolt lock nuts.

Turn the adjuster bolts an equal number of turns to obtain the specified free play.

### CAUTION

*Be sure that the index mark on the chain adjuster aligns with the same scale reading on both sides.*

Tighten the adjuster bolt lock nuts.

Tighten the axle nut and install a new cotter pin.

**AXLE NUT TORQUE: 8.0–10.0 kg-m  
(58–72 ft-lb)**

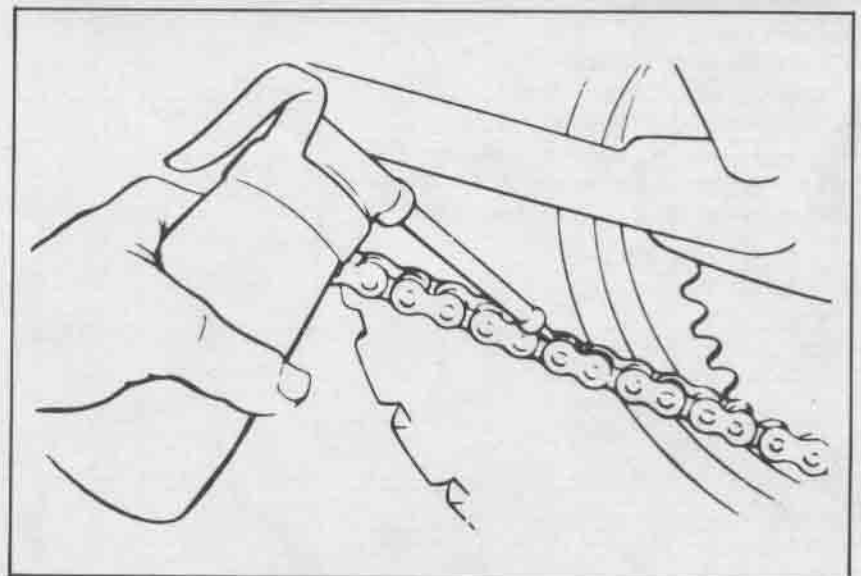
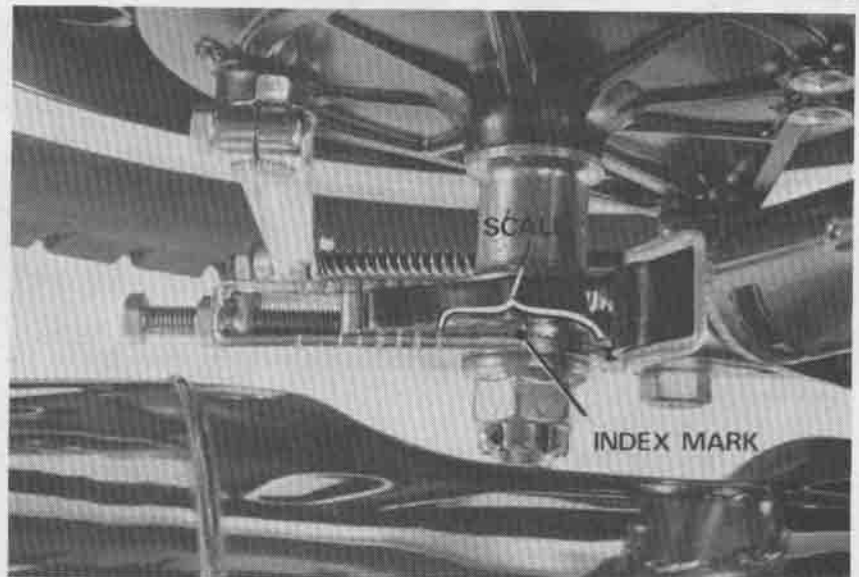
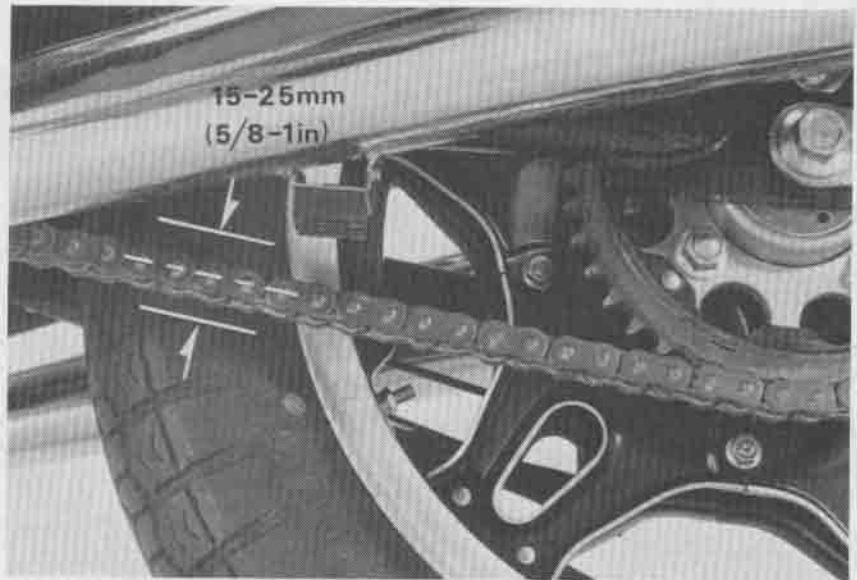
Check that the rear wheel rotates freely when turned by hand.

### NOTE

After this adjustment, check the rear brake pedal free play and adjust as necessary.

## LUBRICATION

Lubricate the drive chain with SAE 80 or 90 gear oil.





## BATTERY

Remove the right side cover.  
Check the battery fluid level.

When the fluid level is near the lower level, remove the battery and fill with distilled water to the upper level.

### NOTE

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

### WARNING

*The battery electrolyte contains 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.*

Replace the battery, if sulfation forms or sediment accumulates on the bottom.

## BATTERY REMOVAL

Disconnect the ground and positive cables at the battery terminals.  
Remove the battery holder plate bolts.

Remove the battery.

## BRAKE FLUID

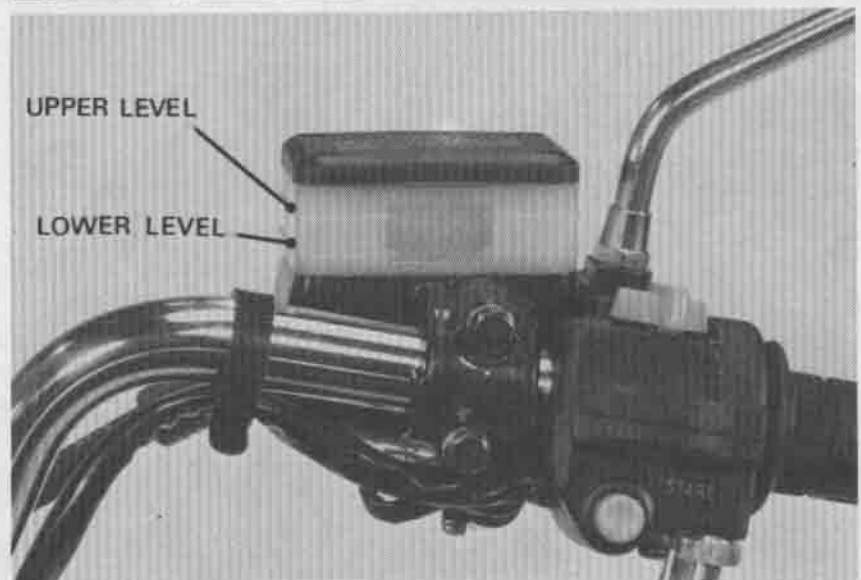
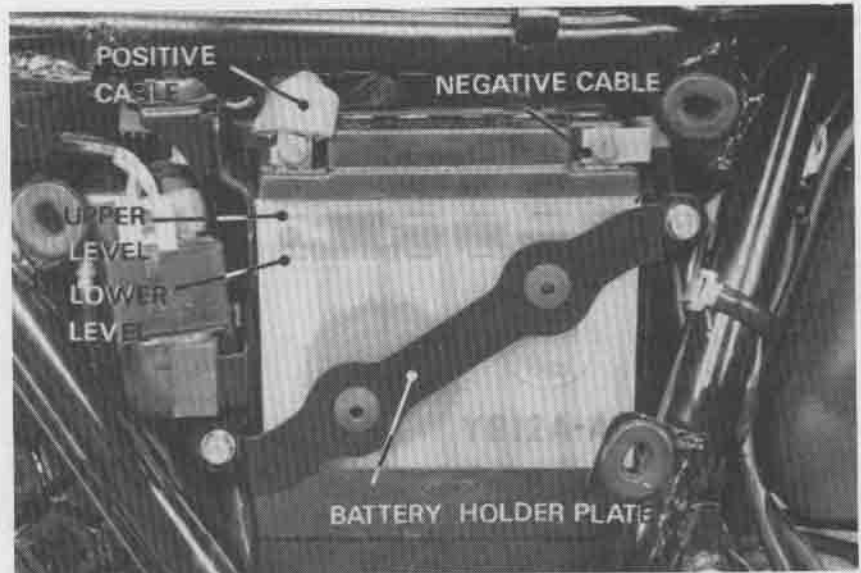
Check the front brake fluid reservoir level. If the level is near the lower level mark, fill the reservoir with DOT-3 BRAKE FLUID only to the upper level mark. Check the entire system for leaks, if the level is low.

### CAUTION

- Do not remove the reservoir cover until the handlebar has been turned so that the reservoir is level.
- Do not operate the brake lever with the cover removed or brake fluid will squirt out.

### NOTE

Use ONLY DOT-3 brake fluid from a sealed container.





## BRAKE PADS/SHOES

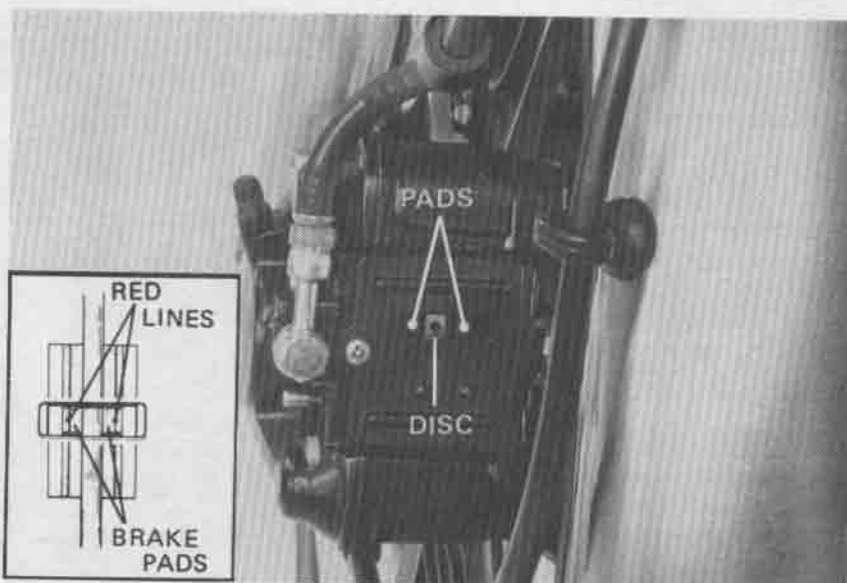
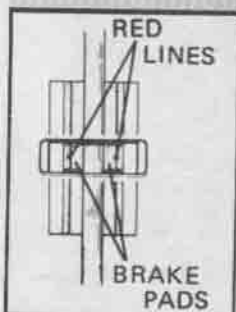
### BRAKE PAD WEAR

Remove the cap from the caliper and check the brake pad wear.

Replace the brake pads if the red line on the top of the pads reaches the edge of the brake disc (Refer to Section 15).

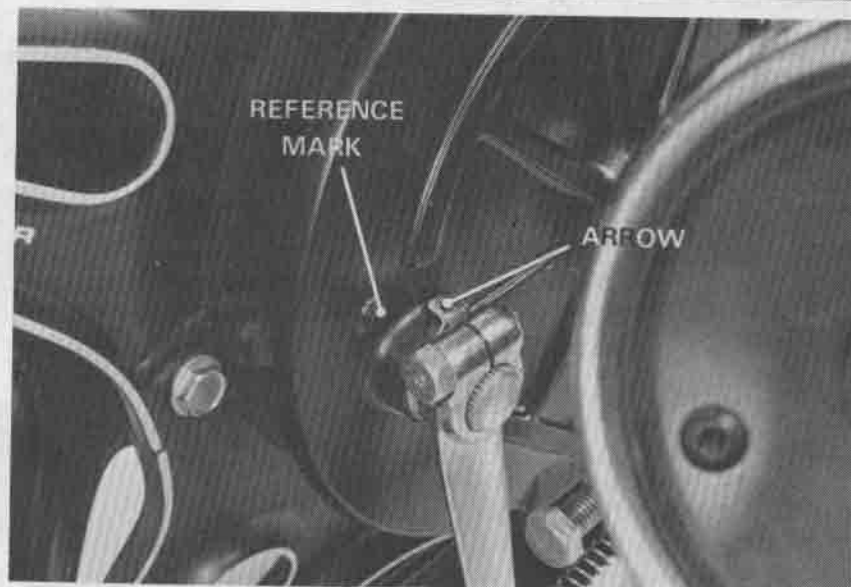
#### CAUTION

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



### BRAKE SHOE WEAR

Replace the brake shoes if the arrow on the brake arm aligns with the reference mark "▼" when the rear brake is fully applied.



## BRAKE SYSTEM

Check that there is no deterioration, damage or leaks in brake lines and fittings.

Check the brake rod for loose connections, excessive play or damage.

Inspect the mounting of the rear brake arm to the brake cam. Make sure the locking bolt is tight and the splines undamaged.

Check that the cotter pins are properly installed.

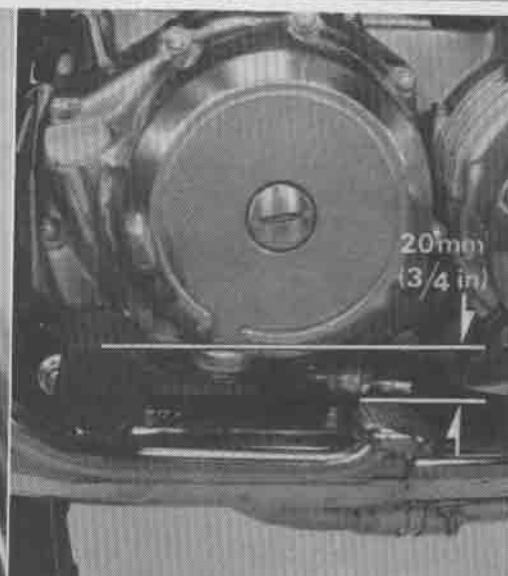
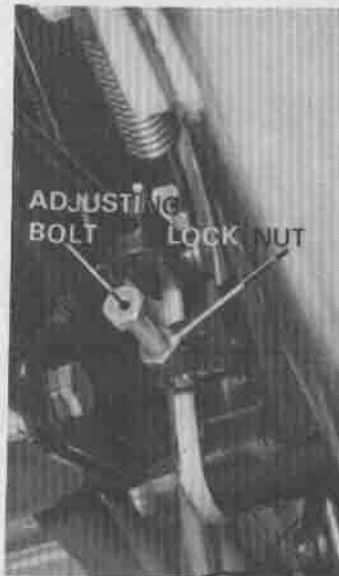
Replace or repair if necessary.

### BRAKE PEDAL HEIGHT

Loosen the lock nut.

Adjust the pedal height so that the distance between the pedal and upper face of the foot-peg is 20 mm (3/4 in) by turning the adjusting bolt.

Tighten the lock nut.



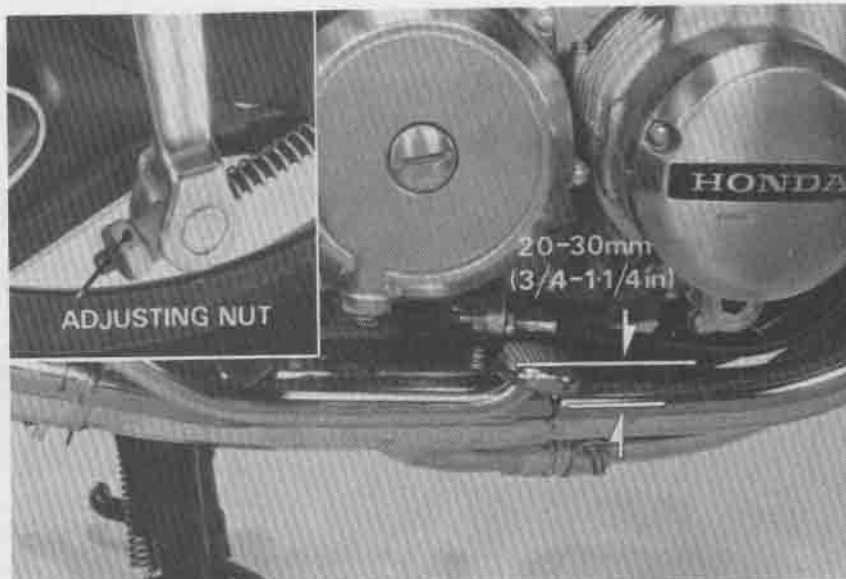


### BRAKE PEDAL FREE PLAY

Check the brake pedal free play.

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

Turn the rear brake adjusting nut, if necessary.



### BRAKELIGHT SWITCH

Adjust the brakelight switch so that the brakelight will light when the brake pedal is depressed and the brake begins engagement.

Adjust by turning the switch adjusting nut as shown.

#### NOTE

- Do not turn the switch body.
- The front brakelight switch can not be adjusted.



### HEADLIGHT AIM

Adjust vertically by loosening both headlight case mounting bolts.

Adjust horizontally by turning the adjusting screw on the headlight rim.

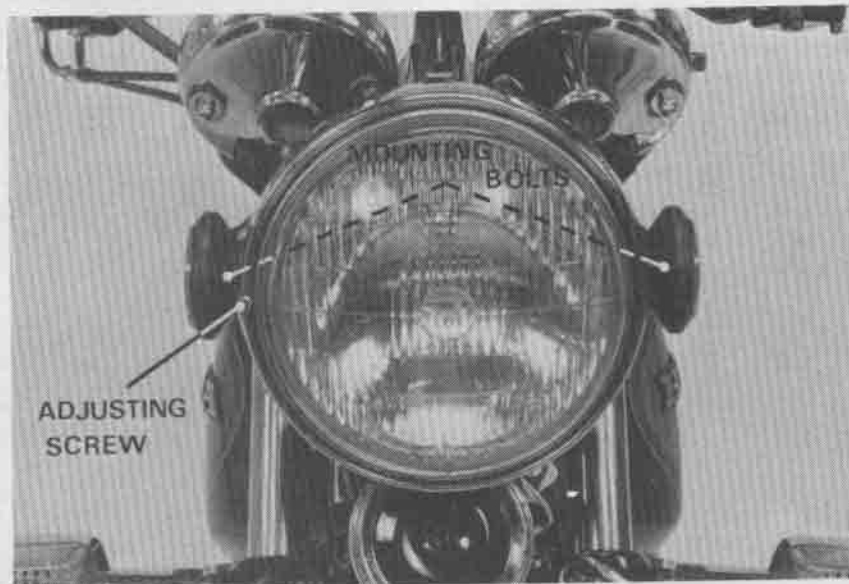
Turn the adjusting screw counterclockwise to direct the beam toward the right side of the rider.

#### NOTE

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

#### WARNING

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

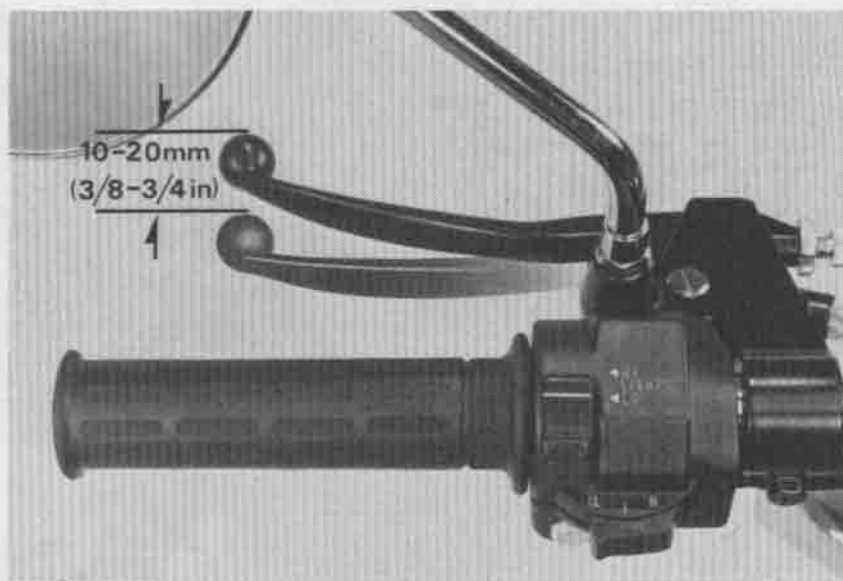




## CLUTCH FREE PLAY

Inspect the clutch lever free play at the end of the lever.

**FREE PLAY: 10–20 mm (3/8–3/4 in)**



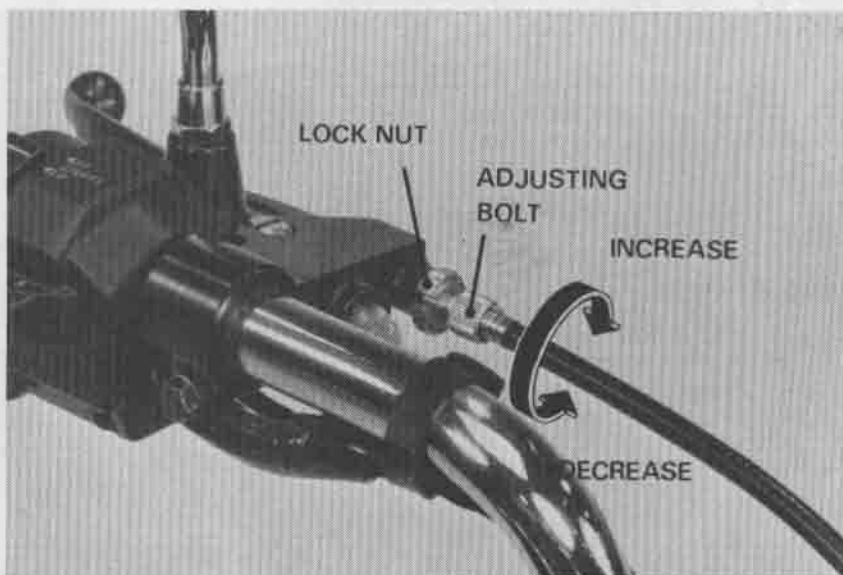
## ADJUSTMENT

Loosen the upper adjusting bolt's lock nut and turn the adjusting bolt until the correct free play is obtained.

Tighten the lock nut.

### NOTE

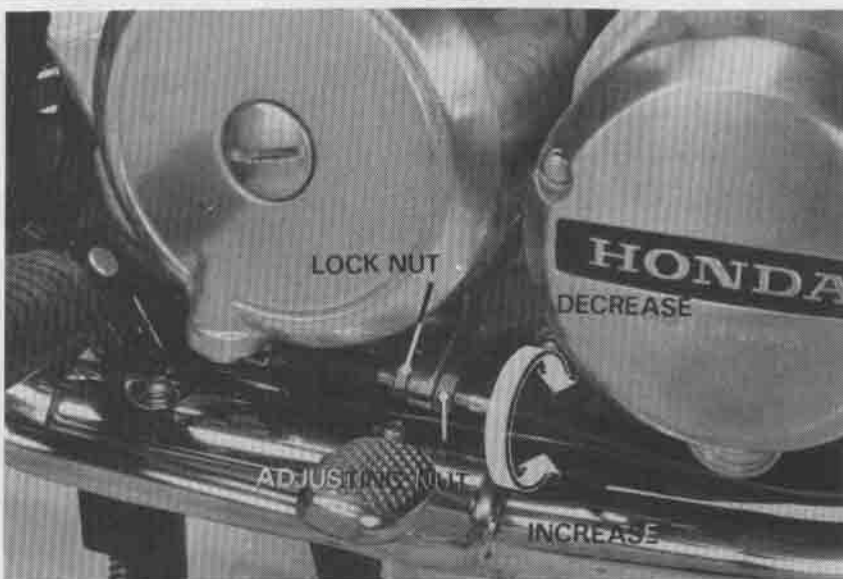
Do not expose the adjusting bolt threads more than 8 mm (5/16 in).



If proper adjustment cannot be made with the clutch lever adjusting bolt, screw the adjusting bolt all the way in.

Adjustment must be made at the clutch housing.

Loosen the lower cable lock nut and turn the adjusting nut all the way out to obtain maximum free play.







Remove the clutch lifter cap, loosen the clutch lifter lock nut. Then turn the adjusting screw clockwise until a slight resistance is felt. From this position, turn the clutch adjusting screw counterclockwise 3/4 turn, and tighten the lock nut.

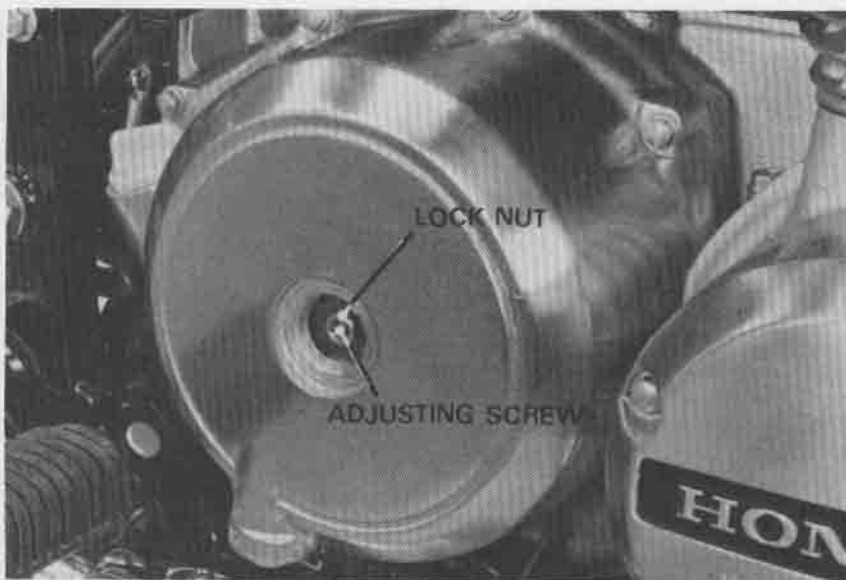
Install the lifter cap.

Turn the clutch cable lower adjusting nut so that there is 10–20 mm (3/8 – 3/4 in) of free play at the end of the clutch lever. Tighten the lock nut.

Make any minor adjustment with the adjusting bolt and lock nut at the clutch level.

After adjustment, be sure all lock nuts are tightened securely.

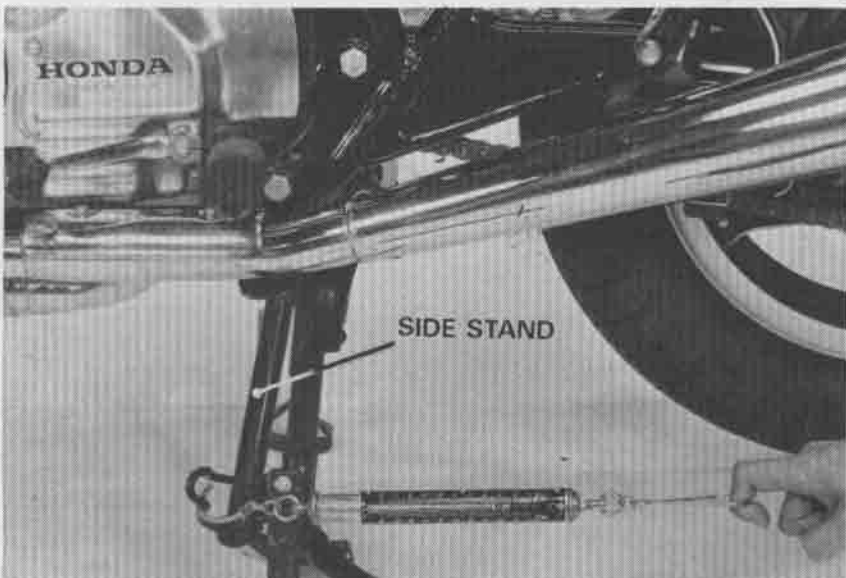
Check that the clutch is not slipping and is properly disengaging.



## SIDE STAND

Check the side stand spring for damage and loss of tension, and the side stand assembly for freedom of movement and bending.

Spring tension should be 1.5–2.5 kg (3.3–5.5 lb) when pulling the side stand lower end with a spring scale.

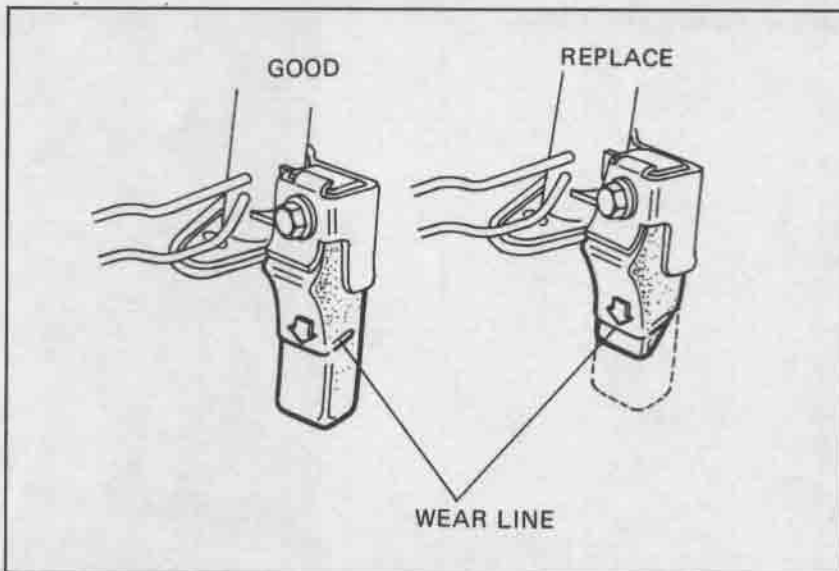


Check the rubber pad for deterioration or wear.

Replace if any wear exceeds to the wear line as shown.

### NOTE

When replacing, use a rubber pad with the mark "OVER 260 lbs ONLY".





## 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.

### REAR

Place the motorcycle on its center stand.

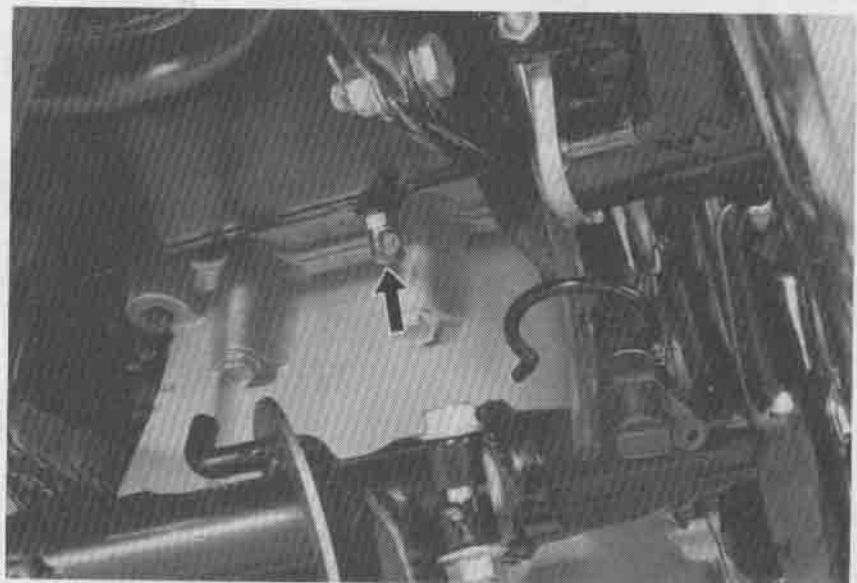
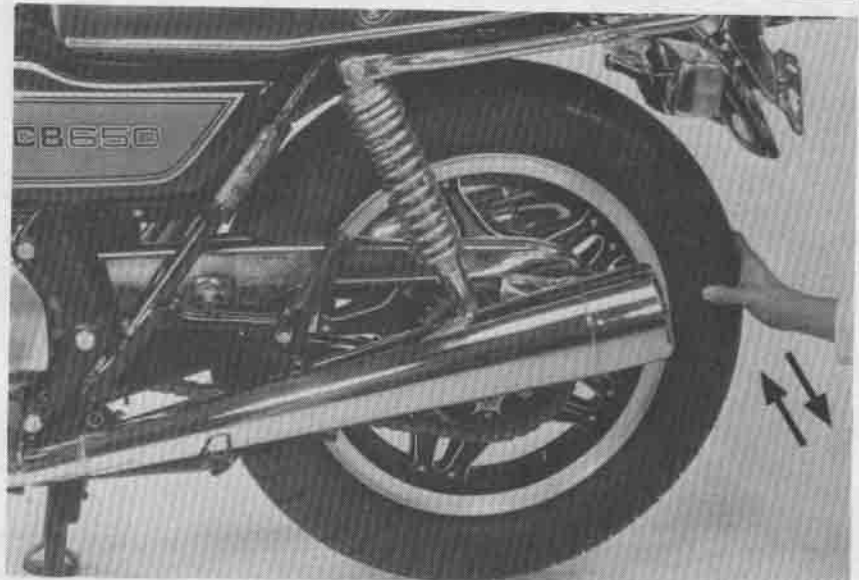
Move the rear wheel sideways with force to see if the swing arm bushings are worn.

Replace if excessively worn.

Check the entire suspension assembly to see if it is securely mounted, and not damaged or distorted.

Tighten all nuts and bolts.

Lubricate the swing arm bushings.





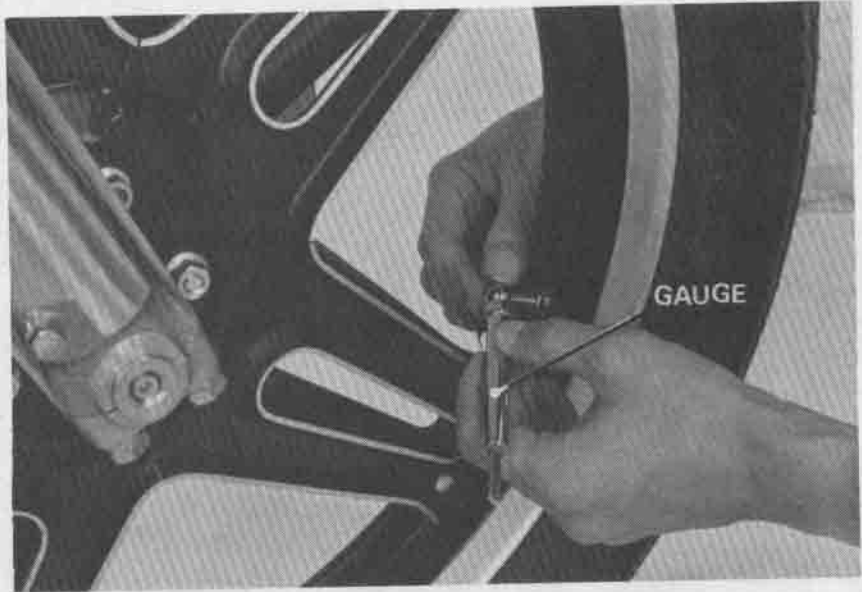
### WHEELS

#### TIRE PRESSURE

##### NOTE

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

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



Check the front and rear wheels for trueness.

Measure the tread depth at the center of the tires.  
Replace the tires if the tread depth is below minimum.

##### Minimum tread depth:

Front: 1.5 mm (1/16 in)

Rear: 2.0 mm (3/32 in)

#### RECOMMENDED TIRE PRESSURE AND TIRE SIZE:

|   |  |                                  |
|---|--|----------------------------------|
| Cold tire pressures<br>Kg/cm <sup>2</sup> (psi) | Up to 90 kg (200 lb) load  | Front 2.0 (28)<br>Rear 2.25 (32) |
|   | Up to vehicle capacity load  | Front 2.0 (28)<br>Rear 2.8 (40)  |
| Vehicle capacity load limit                     | 163 kg (360 lbs)   |                                  |
| Tire size                                       | Front 3.50H19-4PR<br>Rear 4.50H17-4PR  |                                  |
| Tire brand                                      | Front BRIDGESTONE MaG. MOPUS-S703<br>DUNLOP GOLD SEAL F11<br>Rear BRIDGESTONE SUPER-SPEED S21 R2<br>DUNLOP GOLD SEAL K87 MARK II |                                  |

### STEERING HEAD BEARINGS

##### NOTE

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

Raise the front wheel off the ground.  
Check that the handlebar rotates freely.

If the handlebar moves unevenly, binds, or has vertical movement, adjust the steering head bearing by turning the steering head adjusting nut with a pin spanner (Page 13-24).

### NUTS, BOLTS, FASTENERS

Check that all chassis nuts and bolts are tightened to correct torque values.

Check that all cotter pins and safety clips are in place.

