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TO THE NEW OWNER

By selecting a Honda CB1100R as your new motorcycle, you have placed yourself in a distinguished family of motorcycle owners and riders.

The CB1100R is designed and built by Honda engineers who spent as much time riding as at the drawing board, and it offers outstanding features.

The CB1100R is a high performance model utilizing the latest enduro technology. This motorcycle is intended for experienced riders only.

The purpose of this manual is to acquaint you with the operation and maintenance of your new Honda CB1100R.

Please take the time to read this manual carefully. Proper care and maintenance are essential to trouble-free operation and optimum performance.

Your authorized Honda dealer will be glad to provide further information and is fully equipped to handle your service needs.

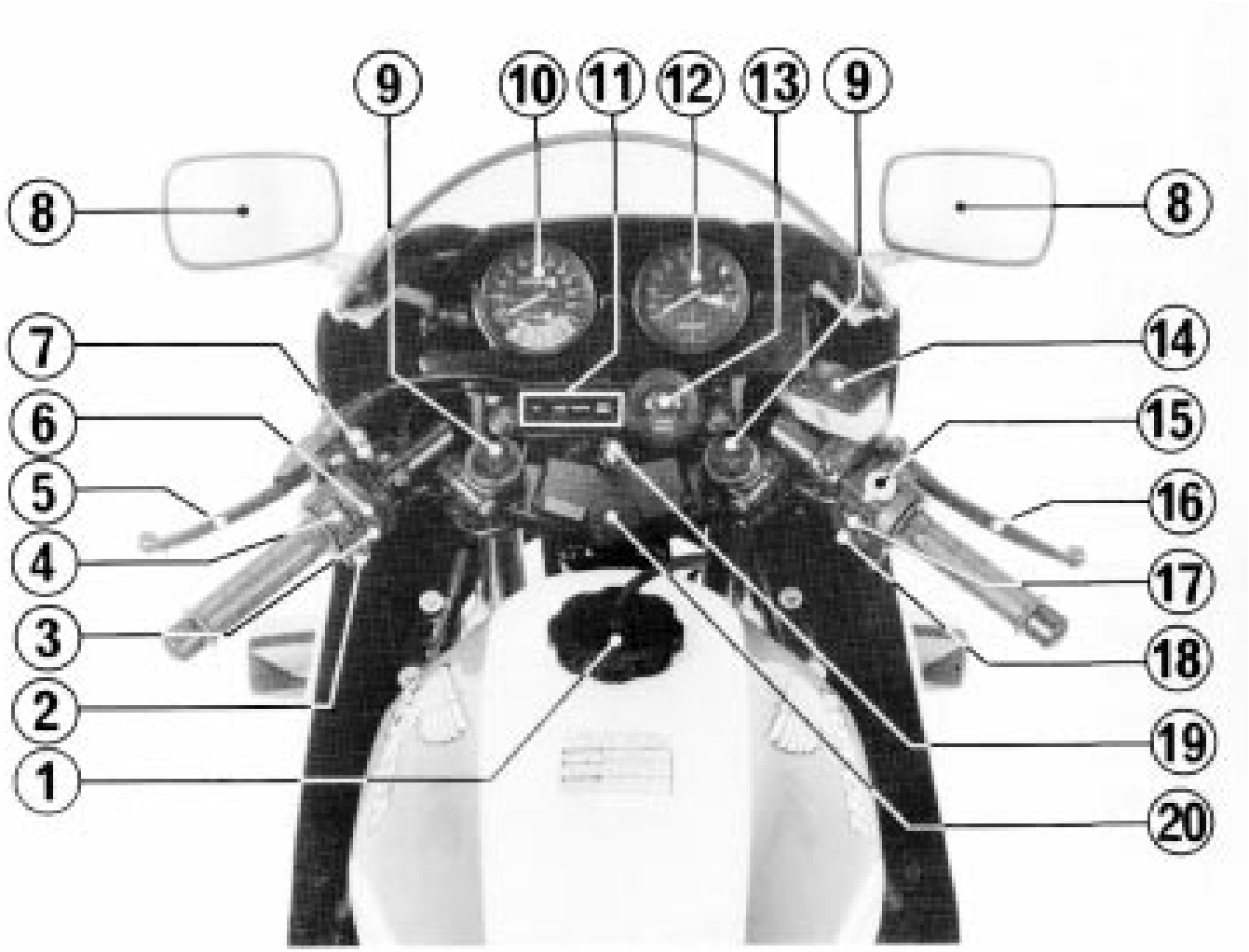
All information in this publication is based on the latest product information available at the time of approval for printing. HONDA MOTOR CO., LTD. reserves the right to make change at any time without notice and without incurring any obligation.

NOTE: Following codes in this manual indicate each country.

E: U.K.
F: France
G: Germany
H: Netherlands
U: Australia
SA: South Africa
D: Except above countries

1. PARTS LOCATION

(1) Fuel tank filler cap
(2) Horn button
(3) Turn signal switch
(4) Headlight dimmer switch
(5) Clutch lever
(6) Passing light switch
(7) Choke lever
(8) Rear view mirrors
(9) Valve cap
(10) Speedometer
(11) Warning and indicator lights
(12) Tachometer
(13) Engine oil temperature gauge
(14) Front brake fluid reservoir
(15) Engine stop switch
(16) Front brake lever
(17) Headlight switch
(18) Starter button
(19) Ignition switch
(20) Fuse box



(21) Fuel valve
(22) Engine oil filler cap
(23) Side stand
(24) Gear change pedal
(25) Documment and tool compartment

(26) Rear seat cover
(27) Rear brake fluid reservoir
(28) Foot peg
(29) Rear brake pedal

(1) Odometer

Odometer

The odometer shows accumulated mileage.

(1) Tripmeter (2) Reset knob

Tripmeter

The tripmeter indicates mileage per trip. To reset, turn the knob in the arrow direction to zero (0).

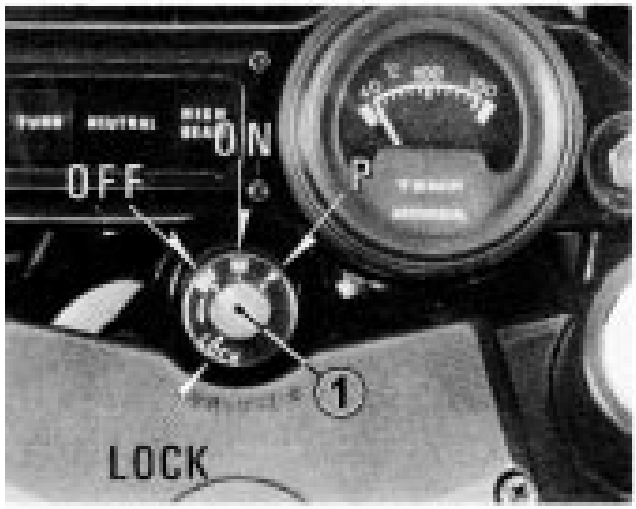
(1) Engine oil temperature gauge
(2) Red zone

Engine Oil Temperature Gauge

If the needle enters the red zone, stop the engine and check the oil level (Page 18). If the oil level is normal, diagnose and correct the problem. Do not ride the motorcycle until the problem has been corrected. During extended idling in very hot weather, needle may enter in the red zone. In this case, cool the engine by riding the motorcycle to force air through the oil cooler, or stop the engine until it cools.

CAUTION:

* ***Running in the red zone temperature limit may cause serious engine damage.***



(1) Ignition switch

Ignition switch

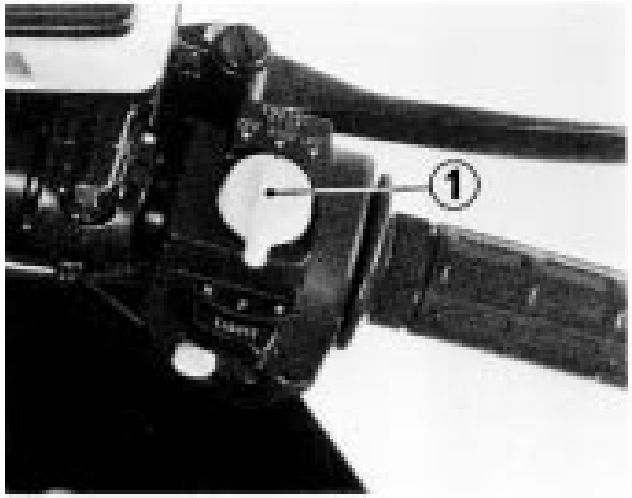
The ignition switch is below the indicator panel.

Key position	Function	Key removal
LOCK (steering lock) E, F, U and D types only	Steering is locked. all electrical circuits are off. Engine cannot be started. To lock, turn handlebars all the way to the left or right and turn ignition key to "LOCK" while pushing in. To unlock, turn ignition key only clockwise.	Remove key
OFF	Engine and lights cannot be operated.	Remove key
ON	All lights are on. Engine can be started.	Key cannot be removed
P (parking)	For parking motorcycle. Position lamp and taillight are on, but all other lights are off.	Remove key

Ignition switch positions and functions

NOTE:

* The lock position is not equipped for G and H types, refer to page 10 for lock.



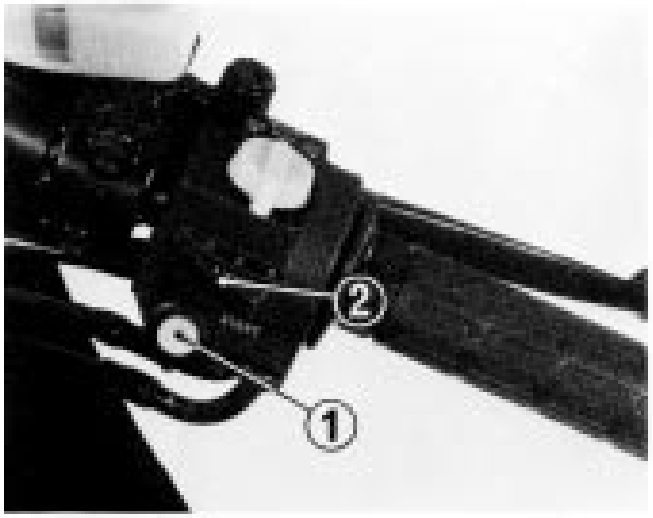
(1) Engine stop switch

Engine Stop Switch

The three position engine stop switch (1) is next to the throttle grip. In "RUN", the engine will operate. In either "OFF" position the engine will not operate. This switch is intended primarily as a safety or emergency switch and should normally remain in "RUN".

NOTE:

If your motorcycle is stopped with the ignition switch "ON" and the engine stop switch "OFF", the headlight and taillight will still be on, resulting in battery discharge.



(1) Starter button
(2) Headlight switch

Starter Button

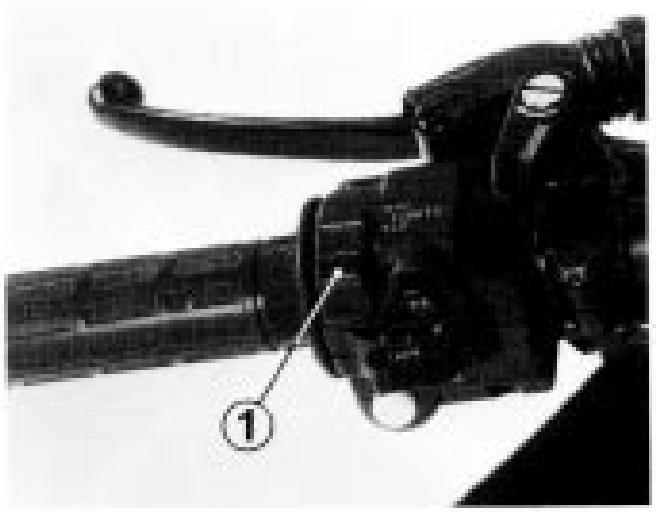
The starter button (1) is below the engine stop switch. When the starter button is pressed the starter motor will crank the engine.

NOTE:

Do not use the electric starter for longer than 5 seconds at a time.

Headlight Switch

Operate the headlight switch with the ignition switch on.



(1) Headlight dimmer switch

H : Headlight and taillight on

P : Position light and taillight on

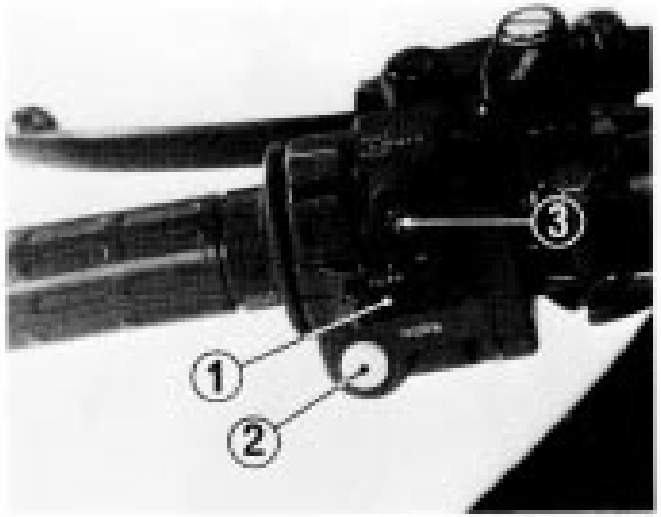
● : Headlight, position light and taillight off

The position light makes the motorcycle more visible to traffic or approaching driver in the dusk or at crossings without blinding the driver.

Headlight Dimmer Switch

Operate this switch with the headlight on. Select "HI" for high beam, "LO" for low beam.

The high beam pilot lamp is on when this switch is set to "HI".



(1) Turn signal switch
(2) Horn button
(3) Passing light button

Turn Signal Switch

To signal a left turn, move the switch to the "L" position. To signal a right turn, move the switch to the "R" position.

Horn Button

Press the button to sound the horn.

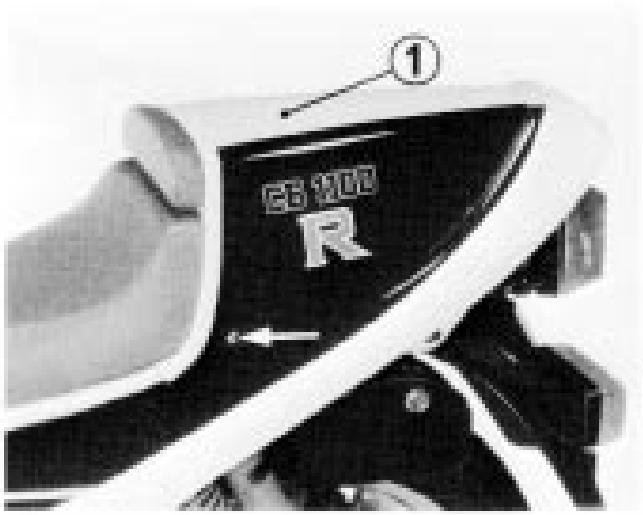
Passing Light Button

Press the button when passing or overtaking other cars.

(1) Documment and tool compartment

Document and Tool Compartment

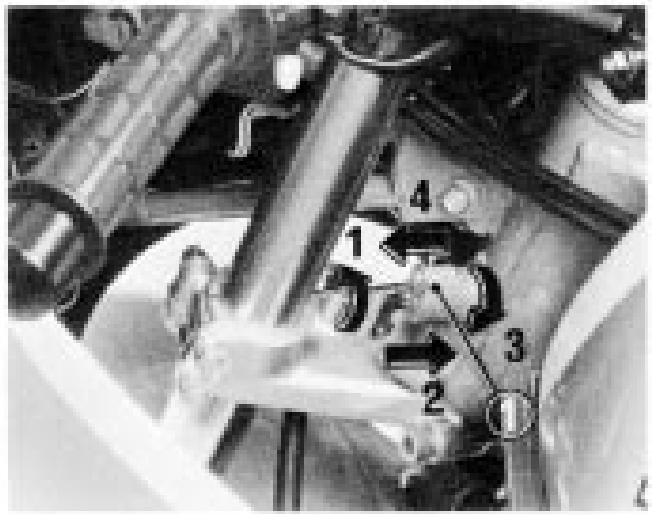
Insert the ignition key and turn it clockwise to open the compartment cover. The owner's manual and tool kit should be stored in this compartment.
When washing your motorcycle, be careful not to flood this area with water.



(1) Rear seat cover

Rear Seat

Remove the screws and rear seat cover when riding with a passenger.

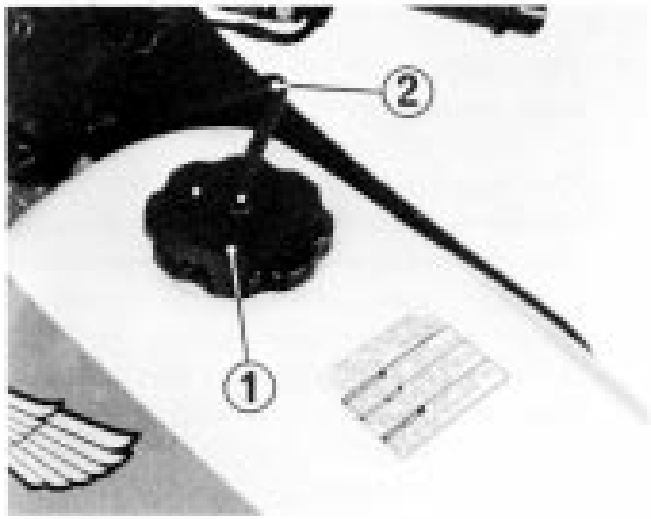


(1) Steering lock

Steering Lock

G and H types:

The motorcycle has a steering lock on the left side of the steering column. To lock the steering, turn the handlebar all the way to the right, insert the steering key in the lock, turn the key 60 degrees to the left, and push the lock all the way in. Turn the key back to the original position and remove. To unlock the steering, perform the locking sequence in the reverse order.



(1) Fuel filler cap (2) Breather pipe

Refueling

CAUTION:

* ***Use only premium, leaded gasoline of high octane rating. Fuel tank capacity is 26 liters (6.8 U. S. gal, 5.7 Imp. gal).***

The filler cap can be removed by turning it counterclockwise without removing the fuel tank cap breather pipe. Do not overfill the tank. After refueling, make sure the fuel level is just below the level plate under the filler opening.

(1) Fuel valve

CAUTION:

* ***Gasoline is extremely flammable and is explosive under certain conditions. Refuel in a well-ventilated area with the engine stopped. Do not smoke or allow flames or sparks in the area where the motorcycle is refueled or stored.***
  After refueling, make sure the filler cap is closed securely.

Fuel Valve

The three way fuel valve is located on the left side near the carburetor.

"ON"

At "ON", fuel will flow from the main fuel supply to the carburetors.

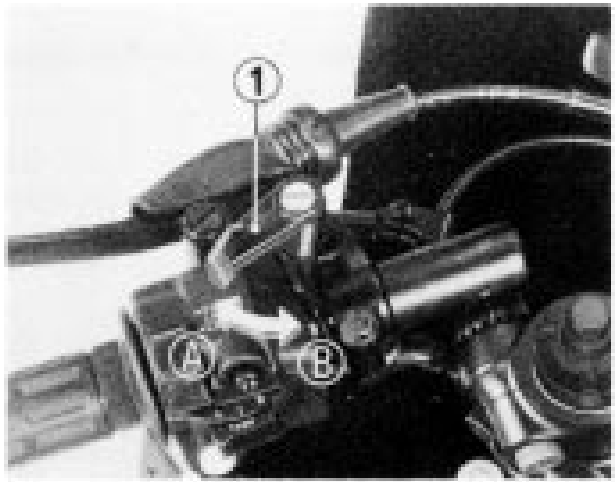
"OFF"

At "OFF", fuel cannot flow from the tank to the carburetors. Turn the valve "OFF" whenever the motorcycle is not in use.

"RES"

At "RES", fuel will flow from the reserve fuel supply to the carburetors. Use the reserve fuel only when the main supply is gone. Refuel the tank as soon as possible after switching to RES. The reserve fuel supply is approximately 4.5 liters (1.18 US gal, 0.9 Imp gal).

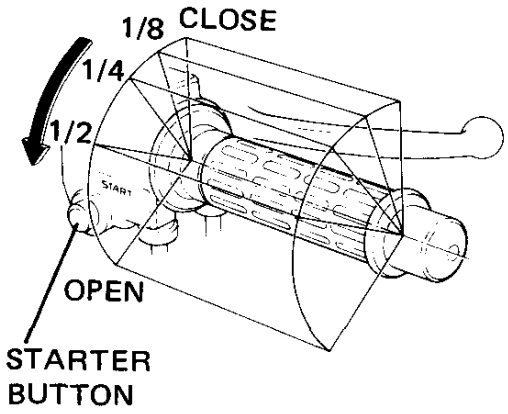
3. OPERATING INSTRUCTIONS



(1) Choke lever
(A) Fully closed (B) Fully open

Starting the engine

1. Make sure that the engine stop switch is at "RUN".
2. Turn the fuel valve "ON".
3. Turn the ignition switch "ON".
4. Shift the transmission in NEUTRAL. Check that the neutral indicator lamp comes on.
5. Push the choke lever forward all the way to "Fully Closed" (A).
   Do not use the choke when the engine is warm.
6. Start the engine, leaving the throttle 1/8–1/4 open.



7. When engine rpm begins to pick up, operate the choke knob to keep fast idle at 1,600–2,000 min^{-1} (rpm). To speed warm up, open and close the throttle, keeping engine rpm below 2,000. Continue warming up the engine by opening and closing the throttle until it will idle (1,000 min^{-1}) (rpm) smoothly.

NOTE:

* **The machine will be ready to run when engine oil temperature gauge shows 40°C.**

CAUTION:

* *The engine is a high compression, high output engine. If it is not warmed, oil or gas leak will result.*
* *The machine is designed with special emphasis attached to performance. For this reason, the exhaust pipe uses a single pipe construction to ensure easiest escape of spent gases.*
  Do not race the engine at stationary as such practice causes higher exhaust pipe temperature, resulting in burnt paint on the pipe.

NOTE:

* **This motorcycle is equipped with a safety starter mechanism, and the engine cannot be started when the transmission is in gear with the clutch engaged.**

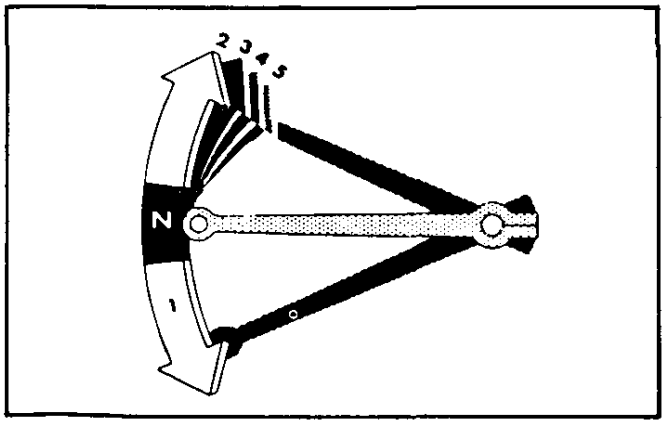
WARNING

* *Never run the engine in a closed area. The exhaust contains poisonous carbon monoxide.*

Breaking-in operation

During intial break-in, newly machined surfaces will be in contact with each other and these surfaces will wear in quickly. During the first 1,500 km (900 miles), engine speeds must not exceed the following RPM limits:

0–500 km (0–300 mil):
4,000 min^{-1} (rpm) max
500–1,000 km (300–600 mil):
5,000 min^{-1} (rpm) max.
1,000–1,500 km (600–900 mil):
6,000 min^{-1} (rpm) max.



Shifting

The transmission is a 5-speed "1–N–2–3–4–5" constant mesh type that is foot operated as shown.

Starting

Make sure the side stand is fully retracted before riding the motorcycle.

Riding

When changing gears under normal conditions, follow the instructions in the diagram on page 143 – 145.

WARNING

* ***Do not downshift when traveling at a speed that would force the engine to overrev in the next lower gear, or cause the rear wheel to lose traction.***
* ***Do not allow engine speed to exceed the RED ZONE RPM limit in any gear.***

Braking

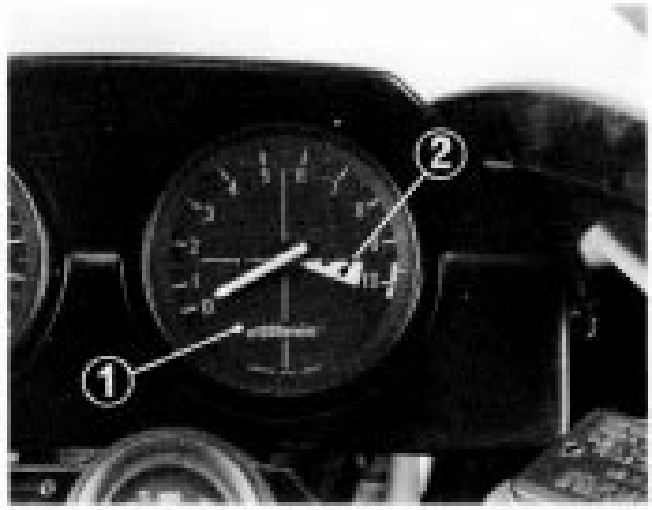
- For maximum deceleration, close the throttle and apply the front and rear brakes firmly.
- Avoid extreme braking.
- When descending a long, steep grade, use engine compression braking by downshifting, with intermittent use of both brakes.

WARNING

* ***Independent use of only the front or rear brake reduces stopping performance. Extreme braking may cause either wheel to lock, reducing control of the motorcycle.***

Parking

- Turn the fuel valve "OFF".
- Lock the steering.



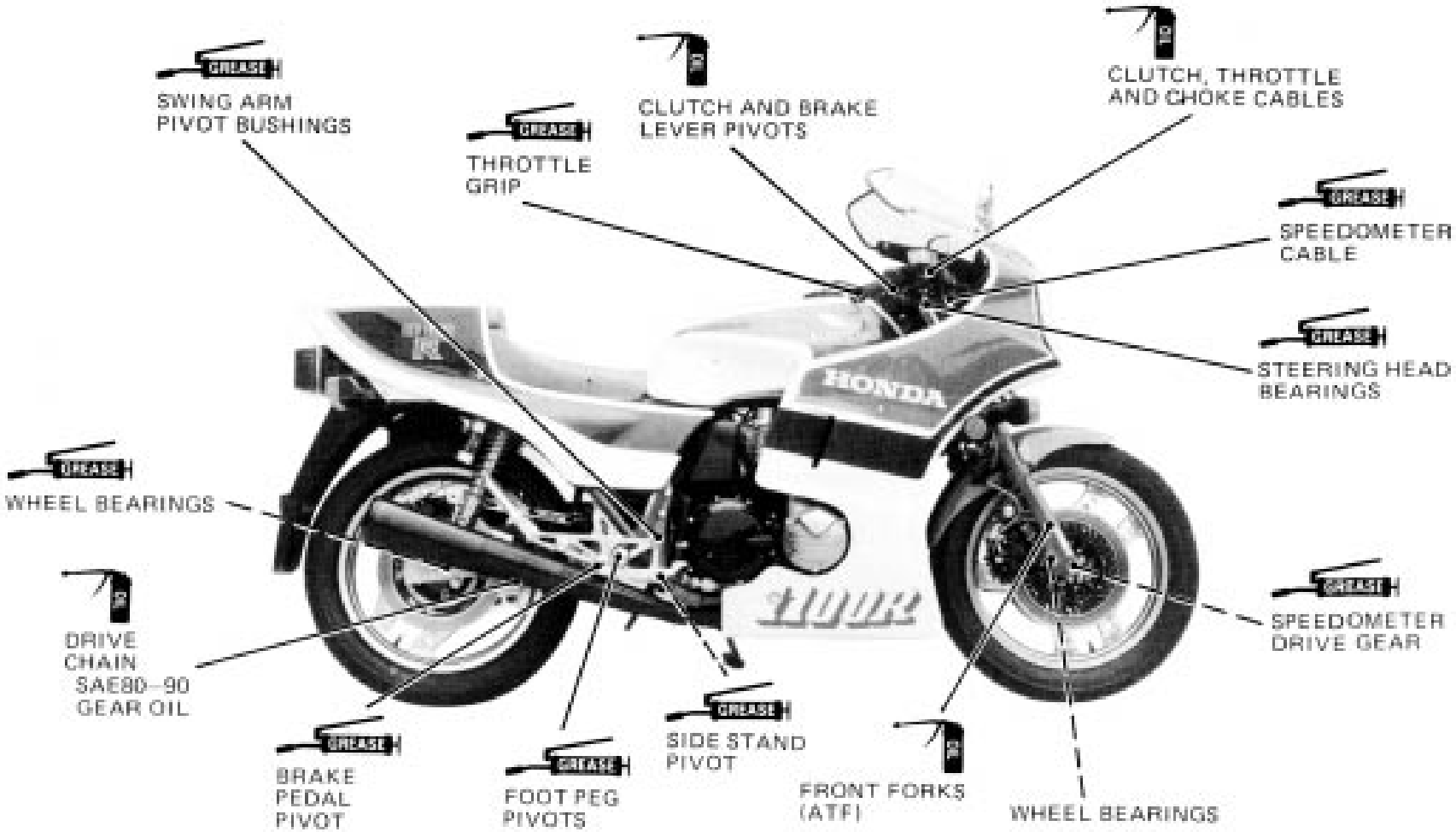
(1) Tachometer (2) Tachometer red zone

- Support the motorcycle on the side stand and shift the transmission in 1st when parked on grades. Hold either wheel against the curb as an extra precaution.
- When stopping for a short time near traffic at night, the ignition switch may be turned to "P" and the key removed. This will turn on the tail-light to make the motorcycle more visible to traffic.

NOTE:

* **The battery will discharge if the ignition switch is left at "P" for too long a time.**

1. LUBRICATION POINTS



2. PRE-RIDE INSPECTION

Items to be checked

- **Engine oil level**—add engine oil if required. Check for leaks.
- **Front and rear brake**—check operation; make sure there is no brake fluid leakage.
- **Tires**—check condition and pressure.
- **Clutch**—check operation. Adjust free play if necessary.
- **Drive chain**—check condition and slack. Adjust and lubricate if necessary.
- **Throttle**—check for smooth opening and closing in all steering positions.
- **Rearview mirrors**—check for cleanliness and proper installation.
- **Fairing**—check for condition. Clean if necessary.
- **Headlight**—check for proper aiming. Adjust if necessary.
- **Others**—check for loose or missing bolts, nuts and other fasteners.

3. MAINTENANCE SCHEDULE

Perform the PRE-RIDE INSPECTION (Page 15) at each maintenance period.

I: INSPECT AND CLEAN, ADJUST, LUBRICATE, OR REPLACE IF NECESSARY
C: CLEAN R: REPLACE A: ADJUST L: LUBRICATE T: TIGHTEN

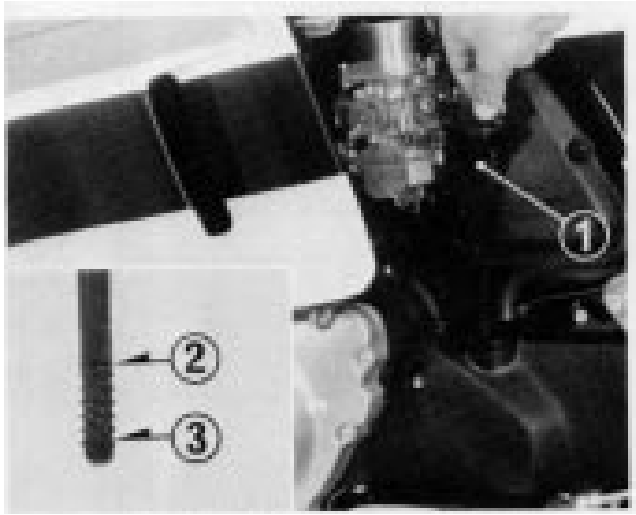
	FREQUENCY / ITEM	WHICHEVER COMES FIRST ↓ EVERY	ODOMETER READING (NOTE 2) 500 km (300 mil.)	3,000 km (1,800 mil.)	6,000 km (3,600 mil.)	9,000 km (4,500 mil.)	12,000 km (7,200 mil.)	15,000 km (9,000 mil.)	18,000 km (10,800 mil.)	Ref. No.
	ENGINE OIL	YEAR	R	R	R	R	R	R	R	18
	ENGINE OIL FILTER		R		R		R		R	19
	OIL SCREEN								C	19
	AIR CLEANER				C		R		C	20
*	FUEL LINE	NOTE 1			I		I		I	–
	SPARK PLUG				I		R		I	20
*	VALVE CLEARANCE		I		I		I		I	22
*	CAM CHAIN TENSIONER		A	A	A	A	A	A	A	26
*	CYLINDER STUD BOLT	NOTE 3	T							55
*	IGNITION TIMING		I		I		I		I	21
*	THROTTLE OPERATION		I		I		I		I	26
*	CARBURETOR CHOKE				I		I		I	27
*	CARBURETOR SYNCHRONIZATION		I		I		I		I	27
*	CARBURETOR IDLE SPEED		I		I		I		I	28
	BREATHER CHAMBER				C		C		C	–

	ITEM / FREQUENCY	WHICHEVER COMES FIRST ➡ / EVERY ⬇	ODOMETER READING (NOTE 2) 500 km (300 mil.)	3,000 km (1,800 mil.)	6,000 km (3,600 mil.)	9,000 km (4,500 mil.)	12,000 km (7,200 mil.)	15,000 km (9,000 mil.)	18,000 km (10,800 mil.)	Ref. No.
	DRIVE CHAIN		I, L EVERY 1,000 km (600 mil)							29
	DRIVE SPROCKET						I			–
	DRIVEN SPROCKET						I			–
	REAR WHEEL DAMPER						I			102
	BATTERY	MONTH	I	I	I	I	I	I	I	30
	BRAKE FLUID	MONTH I 2 YEARS R	I	I	I	I	I	I	*R	31
	BRAKE SYSTEM		I	I	I	I	I	I	I	106–108
	BRAKE PADS			I	I	I	I	I	I	31
*	BRAKELIGHT SWITCH		I	I	I	I	I	I	I	32
*	HEADLIGHT AIM		I	I	I	I	I	I	I	32
	CLUTCH FREE PLAY		I	I	I	I	I	I	I	33
	SIDE STAND			I	I	I	I	I	I	–
*	SUSPENSION		I	I	I	I	I	I	I	35–37
*	NUTS, BOLTS		I	I	I	I	I	I	I	–
**	WHEEL		I		I		I		I	38–39
**	STEERING HEAD BEARING		I		I		I		I	–

** IN THE INTEREST OF SAFETY, WE RECOMMEND THESE ITEMS BE SERVICED BY AN AUTHORIZED HONDA DEALER.
* SHOULD BE SERVICED BY AN AUTHORIZED HONDA DEALER, UNLESS THE OWNER HAS PROPER TOOLS AND SERVICE DATA AND IS MECHANICALLY QUALIFIED.

NOTES: (1) SERVICE MORE FREQUENTLY IF OPERATED IN DUSTY AREAS.
(2) FOR HIGHER ODOMETER READINGS, REPEAT AT THE FREQUENCY INTERVALES-TABLISHED HERE.
(3) FIRST LOOSEN THE NUTS, THEN RETIGHTEN TO THE SPECIFIED TORQUE IN THE SEQUENCE DESCRIBED IN PAGE 55. ALSO RETIGHTEN THE TWO BOLTS AT THE CAM CHAIN HOUSING.

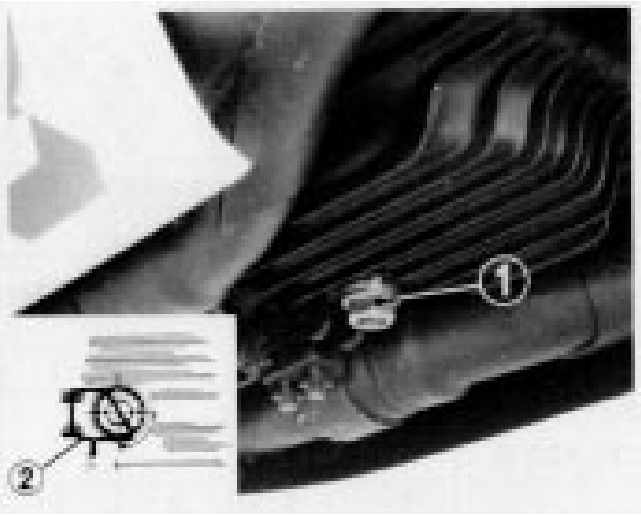
4. INSPECTION AND ADJUSTMENT



(1) Filler cap/dipstick (2) Upper level mark (3) Lower level mark

ENGINE OIL LEVEL

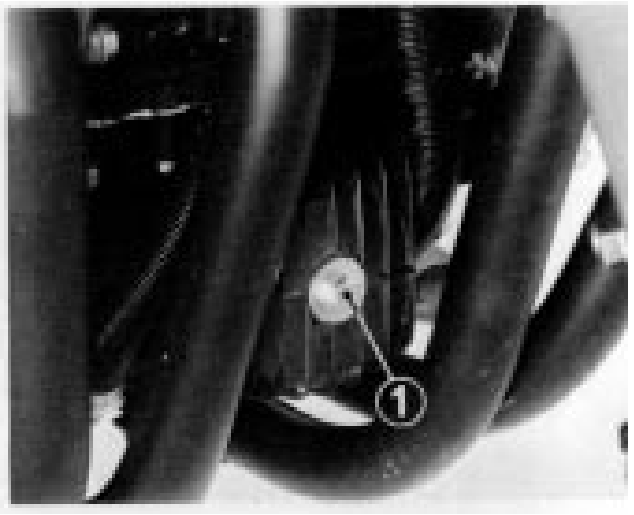
1. Run the engine and allow to idle for a few minutes.
2. Stop the engine and place the motorcycle on its center stand (Tool No. 07965–MA30001). Check the oil level with the filler cap/dipstick after a few minutes. Do not screw in the cap when making this check.
3. If the level nears the lower level mark on the dipstick, fill to the upper level mark.



(1) Drain plug (2) Lock wire

ENGINE OIL CHANGE

1. Run the engine and allow it to idle for a few minutes.
2. Stop the engine and place the motorcycle on center stand (special tool). Remove the lower fairing (see page 82). Remove the filler cap/dipstick after a few minutes, cut the lock wire (where used), and remove the oil drain plug. Start the engine and allow to rotate about 30 seconds to drain the oil thoroughly.
3. Reinstall the drain plug and secure the plug with the lock wire if the motorcycle was used for racing. Refill the crankcase up to the proper level.

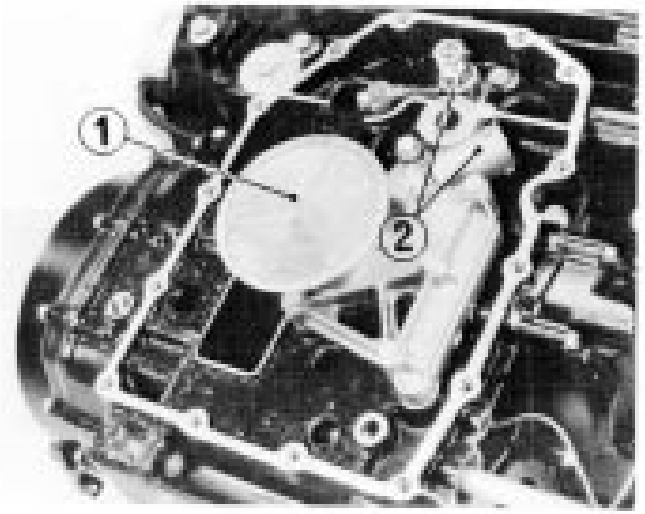


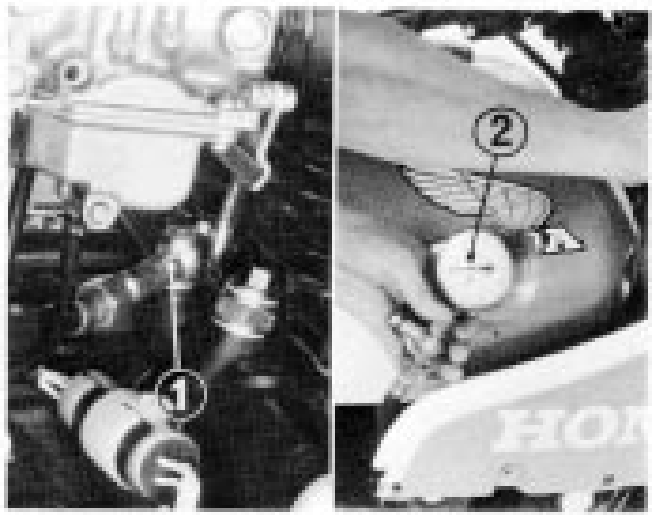
(1) Oil filter bolt

CAPACITY: 3.5 liters (3.7 US qt)
RECOMMENDED OIL: SAE 10W–30 or 10W–40
For races:
RECOMMENDED OIL: Racing Oil (mineral oil) Equivalent to SE #40
NOTE:

* **Do not mix different kinds of oil in an engine. Before filling the crankcase with racing oil, drain the existing oil thoroughly.**

4. Start the engine and idle it for a few minutes. Stop the engine and check the oil level. If the oil level is low, add the recommended oil to the upper level mark.





OIL FILTER REPLACEMENT

1. Remove the lower fairing.
2. Perform the Items 1 and 2 under ENGINE OIL CHANGE. Remove the oil filter bolt and replace the oil filter with a new one.

   TORQUE: 28–33 N·m (2.8–3.3 kg-m)

OIL STRAINER CLEANING

NOTE:

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

1. Remove the oil filler cap, drain plug and oil filter. Remove the exhaust pipes and disconnect the oil cooler hoses. Remove the oil pan bolts and oil pan.

(1) Oil strainer screen
(2) Pressure relief valves

2. Remove and clean the oil strainer. Check the operation of the pressure relief valves. Install the oil strainer and oil pan.
3. Connect the oil hoses and install the oil filter and exhaust pipes.
4. Fill the crankcase with recommended oil (Page 18).

OIL PRESSURE CHECK

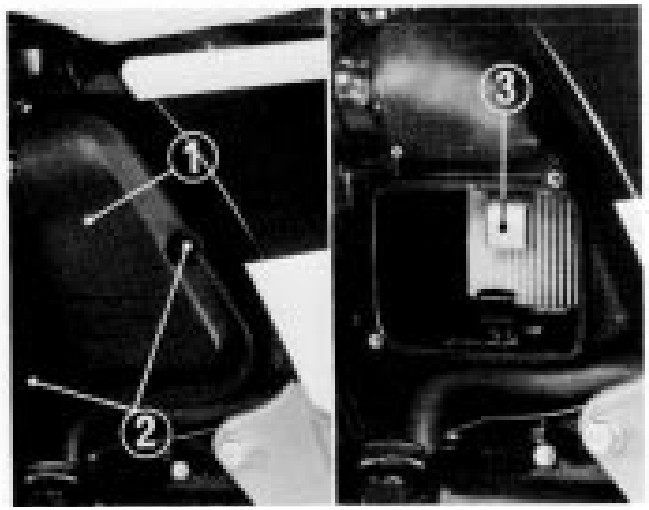
1. Warm the engine up to the normal operating temperature (approx. 80° C/ 176°F). Stop the engine and remove the oil pressure switch. Connect an oil pressure gauge to the pressure switch hole. Check the oil level.

(1) Oil pressure gauge attachment
(2) Oil pressure gauge

2. Start the engine and check the oil pressure at 7,000 min^{-1} (rpm.)

   OIL PRESSURE: 6 kg/cm^2 (79 psi) at 7,000 min^{-1} (rpm) (80°C/176°F)
3. Stop the engine. Apply Loctite ® to the pressure switch threads and install.

   TORQUE: 15–20 N·m (1.5–2.0 kg-m)
4. Connect the oil pressure switch wire. Start the engine. Check that the oil pressure warning light goes out. If the warning light stays on, stop the engine immediately and determine the cause.



(1) Air cleaner cover (2) Screws
(3) Set spring

AIR CLEANER

1. Remove the screws and air cleaner cover.
2. Remove the set spring and air cleaner element.
3. Loosen dust accumulated on the air cleaner element by lightly tapping it.
4. Blow dust off the element by directing a jet of air from the inside.
5. Replace the element with a new one if fouled excessively.
6. Install the air cleaner element, set spring and air cleaner cover.

(4) Air cleaner element

SPARK PLUGS

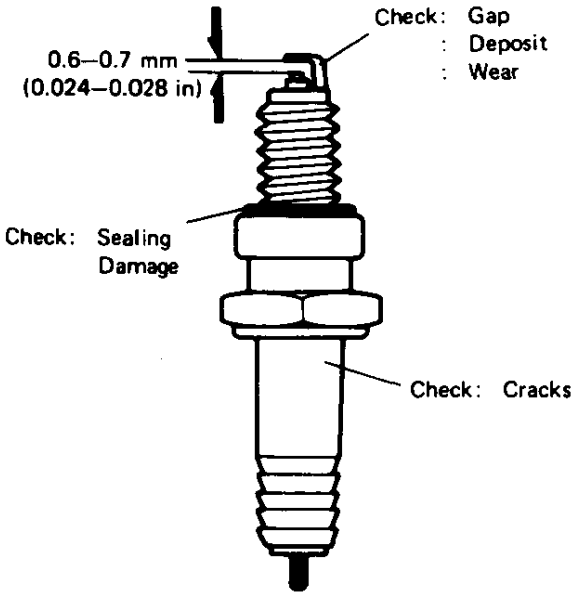
1. Turn the fuel valve OFF, disconnect the fuel line, and remove the fuel tank.
2. Clean any dirt from around the spark plug base.
3. Remove the spark plug caps and spark plugs.
4. Check the electrode for wear or deposits; the gasket for damage, and the insulator for cracks.

(1) Spark plug wrench

5. Make sure the spark plug gap is 0.6–0.7 mm (0.024–0.028 in) using a wire type feeler gauge.
6. Inspect the firing tip of the spark plug. If the electrodes appear burnt or insulated nose is white or very light gray:

Recommended plugs:

	F, G, E, H	U, D
NGK:	DR–8ES	D9EA
ND:	X27ESR–U	X27ES–U
OP	(X31ESR–U)	
For races:	X31ES–U,	D10EA



* Spark plug heat range too hot
* Ignition timing excessively advanced
* Fuel mixture too lean

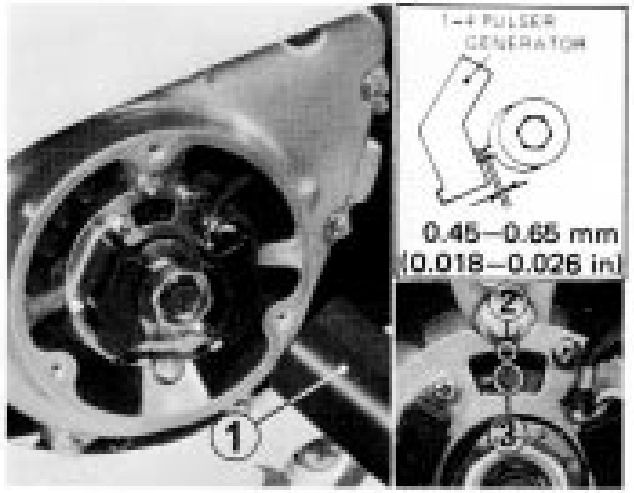
If the electrodes and insulator nose are black or fouled:

* Spark plug heat range too cold
* Ignition timing retarded
* Fuel mixture too rich

7. Install the spark plug by hand until finger tight, then tighten with a spark plug wrench until the sealing gasket is compressed.

CAUTION:

* ***The use of a spark plug of the incorrect reach or heat range can cause engine damage.***



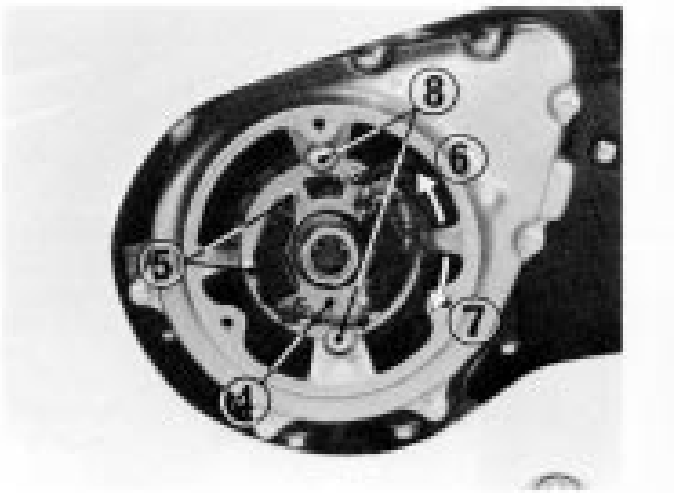
(1) Timing light (2) Index mark
(3) "1.4F–I" MARK

IGNITION TIMING

NOTE:

* **A high quality stroboscopic timing light designed for transistorized ignition systems must be used.**

1. Remove the pulser generator cover.
2. Make sure that the clearance between the pulser pole and rotor tooth is 0.45–0.65 mm (0.018–0.026 in).
3. To adjust the clearance, loosen the screw (5).
4. Connect the stroboscopic timing light to the No. 1 high tension cord.

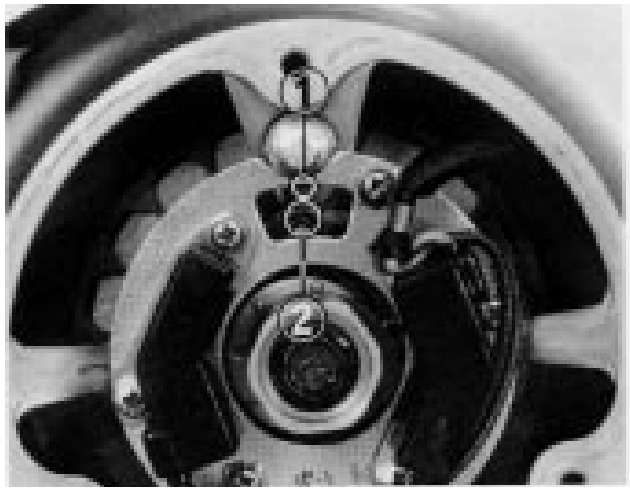


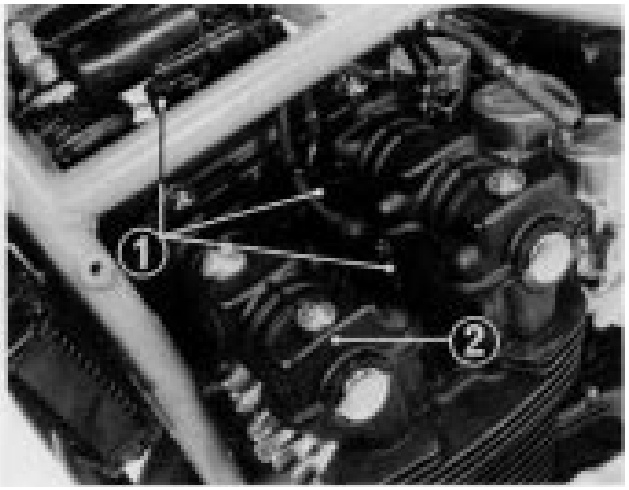
(4) Base plate (5) Screws (6) Retard
(7) Advance (8) Screws

5. Start the engine and run it at idle speed.
   IDLE SPEED: 1,000±100 min^{-1} (rpm)
6. Check that the mark "1.4F–I" is aligned with the index mark.
7. Connect the stroboscopic timing light to the No. 2 high tension cord.
8. Make sure that the mark "2.3 F–I" is aligned with the index mark.

ADJUSTMENT:

1. To adjust the ignition timing, loosen the screw (8) and turn the base plate. To advance the timing, rotate the base plate in direction (6). To retard





(1) Index mark (2) Advance marks

the timing, turn the plate in direction (7).

2. After tightening the screw (8), recheck the timing.

SPARK ADVANCER

1. Remove the pulser generator cover and connect the stroboscopic timing light to the No. 1 high tension cord.
2. Start the engine. Check that the index mark is between the advance marks above 3,600 min^{-1} (rpm).

NOTE:

* **Do not run the engine over 9.500 min^{-1} (rpm) as this may cause engine damage.**

3. Install the pulser generator cover.

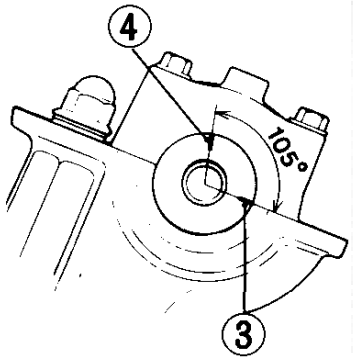
(1) Spark plug caps
(2) Cylinder head cover

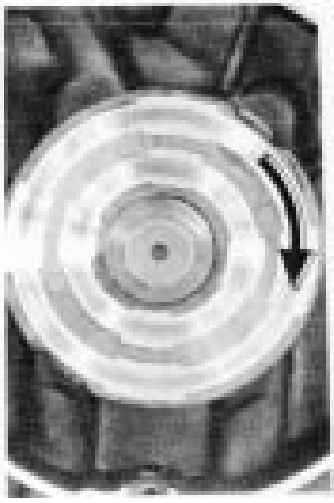
VALVE CLEARANCE

NOTE:

Inspect and adjust valve clearance while the engine is cold. Before removing the cylinder head, allow oil to drain from the cylinder head into the crankcase by rocking the motorcycle side to side.

1. Turn the fuel valve OFF, disconnect the fuel line and remove the fuel tank.
2. Remove the front fairing.
3. Disconnect the spark plug caps. Remove the cylinder head cover.
4. Remove the A. C. generator cover.





(3) No. 1 Index mark
(4) No. 2 Index mark

INSPECTION:

Measure intake and exhaust valve clearances by inserting a feeler gauge between the camshaft and valve lifter shim.

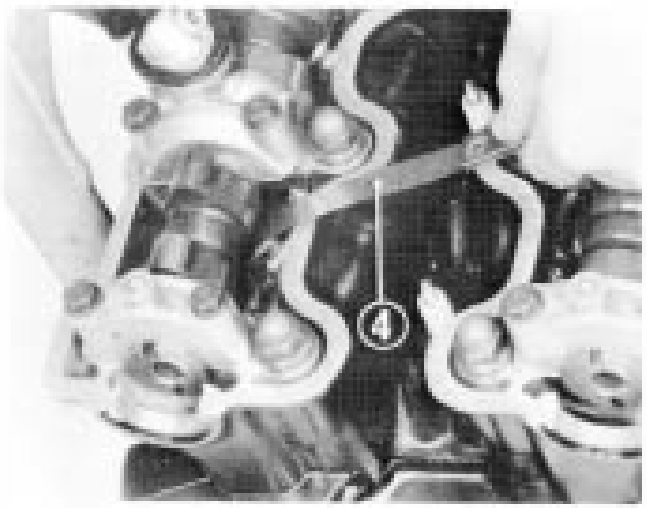
VALVE CLEARANCE:

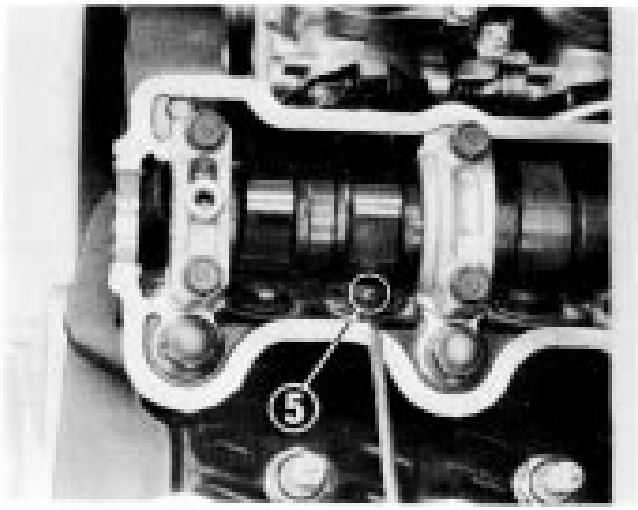
0.06–0.13 mm (0.0024–0.0051 in)

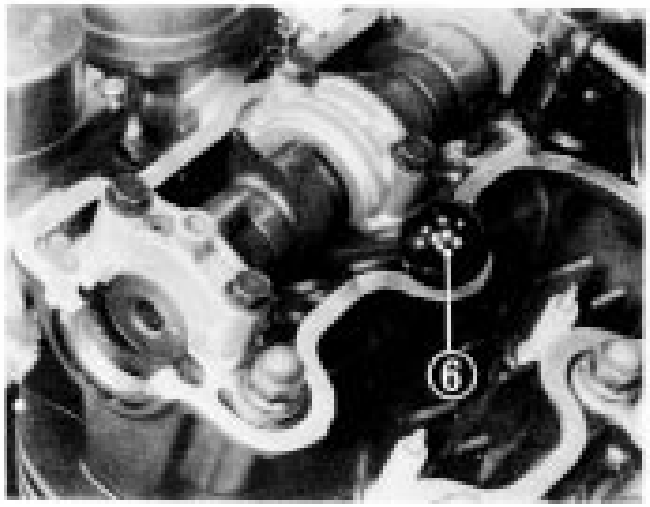
For race:

0.09–0.13 mm (0.0035–0.0051 in)

1. Rotate the crankshaft clockwise and align No. 1 index mark on the exhaust camshaft right end with the forward cylinder head mating surface.







(5) Feeler gauge

Check the valve clearance of the:
No. 1 EX. and No. 3 EX.

2. Rotate the camshaft 105° clockwise to align No. 2 index mark with the forward cylinder head mating surface. Check the:
No. 1 IN. and No. 3 IN.
3. Rotate the camshaft 75° clockwise to align No. 1 index mark with the rear cylinder head mating surface. Check the:
No. 2 EX. and No. 4 EX.
4. Rotate the camshaft 105° clockwise to align No. 2 index mark with the rear cylinder head mating surface. Check the:
No. 2 IN. and No. 4 IN.

(6) Notch

ADJUSTMENT:

NOTE:

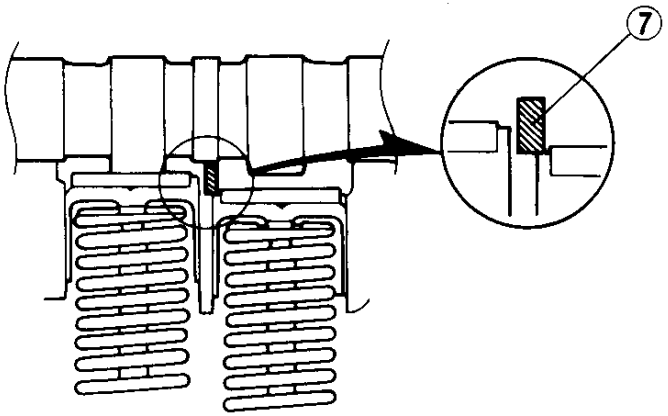
* **Adjustment shims are available in 25 different sizes from 2.30 mm to 3.50 mm in every 0.05 mm.**
* **The No.2 EX shim must be removed through the front.**

Select a replacement shim to achieve the specified valve clearance using the following procedure.

1. Rotate the valve lifter until the notch of the lifter is on the spark plug side.

(7) Valve compressor

2. Rotate the crankshaft so that the lobes point up toward the lifter.
3. Insert the special tool (Valve Compressor) between the cam and shim, and it should be pushed into place.



(7) Valve lifter holder

4. Insert the special tool (Valve Lifter Holder) between the camshaft and valve lifter.
5. Remove the valve compressor.

(8) Shim (9) Tweezers

6. Remove the shim with a tweezers.

NOTE:

* **Lift the shim with the Valve Compressor and remove with magnet or tweezers.**

7. Select a replacement shim from the table on Page 25.
8. Install the replacement shim.
9. Remove the valve lifter holder using the Valve Compressor.
10. Rotate the crankshaft 2–3 times to seat the shim.
11. Recheck the valve clearance.

EXAMPLE: 1. Measure valve clearance = 0.16 mm
2. Measure present shim size = 2.50 mm
3. Refer to chart. (See shaded columns)
4. Replacement shim size = 2.55 mm

VALVE SHIM SELECTION CHART

STANDARD VALVE CLEARANCE = 0.08 $^{+0.05}_{-0.02}$ mm

EX ⇩

PRESENT SHIM SIZE mm

VALVE CLEARANCE mm	SHIM mm	2.30	2.35	2.40	2.45	**2.50**	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50
0.01–0.05			2.30	2.35	2.40	**2.45**	2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45
0.06–0.13		SPECIFIED CLEARANCE														NO CHANGE REQUIRED										
EX ⇨ **0.14–0.16**		**2.35**	**2.40**	**2.45**	**2.50**	**2.55**	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50	
0.17–0.21		2.40	2.45	2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50		
0.22–0.26		2.45	2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50			
0.27–0.31		2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50				
0.32–0.36		2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50					
0.37–0.41		2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50						
0.42–0.46		2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50							
0.47–0.51		2.70	2.75	2.80	2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50								
0.52–0.56		2.75	2.80	2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50									
0.57–0.61		2.80	2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50										
0.62–0.66		2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50											
0.67–0.71		2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50												
0.72–0.76		2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50													
0.77–0.81		3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50														
0.82–0.86		3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50															
0.87–0.91		3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50																
0.92–0.96		3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50																	
0.97–1.01		3.20	3.25	3.30	3.35	3.40	3.45	3.50																		
1.02–1.06		3.25	3.30	3.35	3.40	3.45	3.50																			
1.07–1.11		3.30	3.35	3.40	3.45	3.50																				
1.12–1.16		3.35	3.40	3.45	3.50																					
1.17–1.21		3.40	3.45	3.50																						
1.22–1.26		3.45	3.50																							
1.27–1.31		3.50																								

REPLACE WITH THIS SHIM

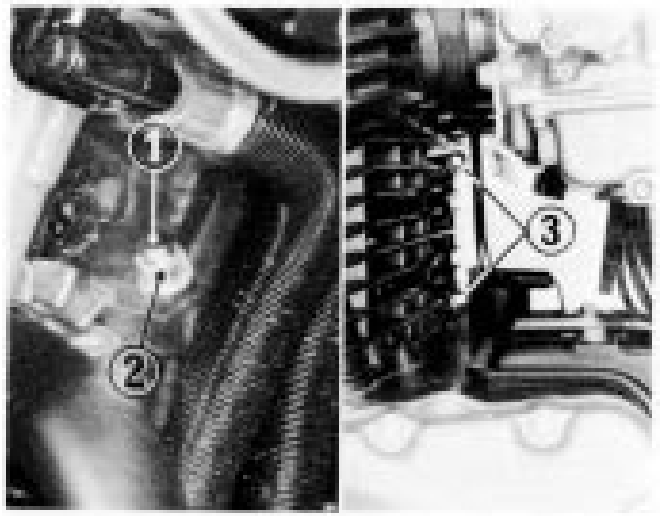
NOTE

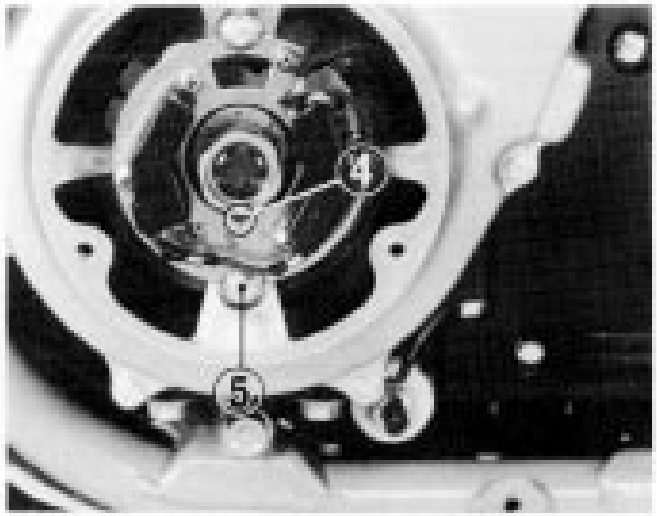
(1) Measure the valve clearance while the engine is cold.

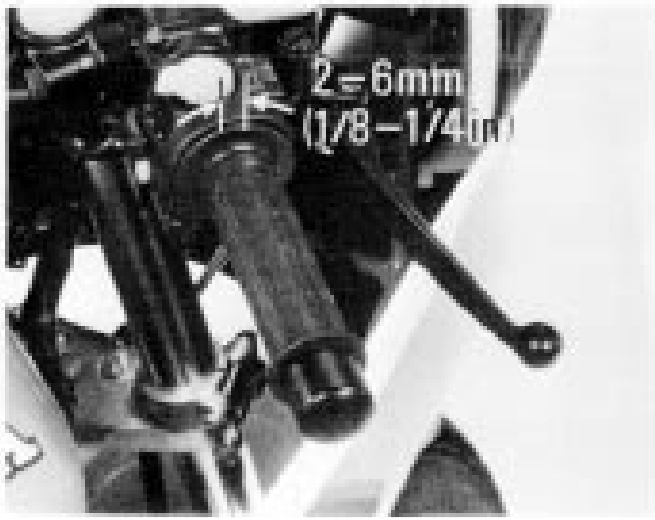
(2) Measure old and new shims with a micrometer.

(3) The chart is for reference purpose only. After installing new shims, recheck the valve clearance and adjust if necessary. Before rechecking, rotate the camshafts several times to seat the shims in the lifters.

(4) If the shim thickness required exceeds 3.5 mm, there is carbon build-up on the valve seat. Remove the carbon and reface the seat.







(1) Front lock bolt (3) Rear lock nuts
(2) Front lock nut

CAM CHAIN

NOTE:

* **The cam chain should be adjusted while the engine is cold.**

1. Remove the A. C. generator cover.
2. Loosen the front cam chain tensioner lock nut (2) and rear cam chain tensioner lock nuts (3) and turn the lock bolt out one turn.
3. Rotate the crankshaft in the normal direction of rotation and align the protrusion of the rotor with the base plate locking screw (50 degrees After Top Dead Center).

(4) Protrusion (5) Screw

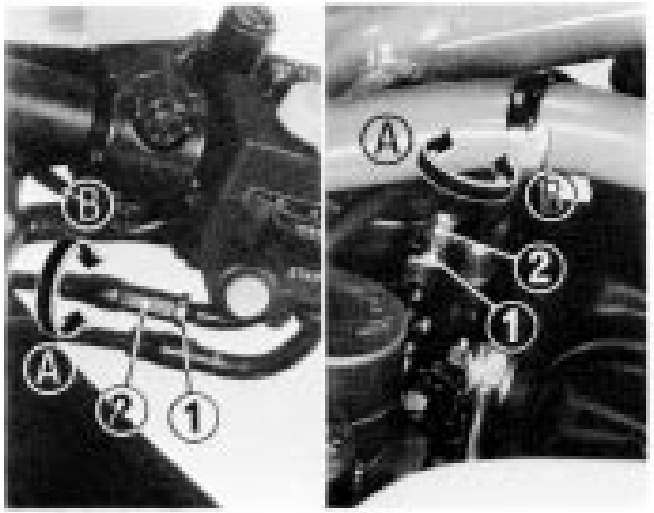
4. Tighten the lock nuts.

NOTE:

* **The tensioner will automatically position itself to provide the correct tension, when loosening the bolt and lock nut.**

THROTTLE OPERATION

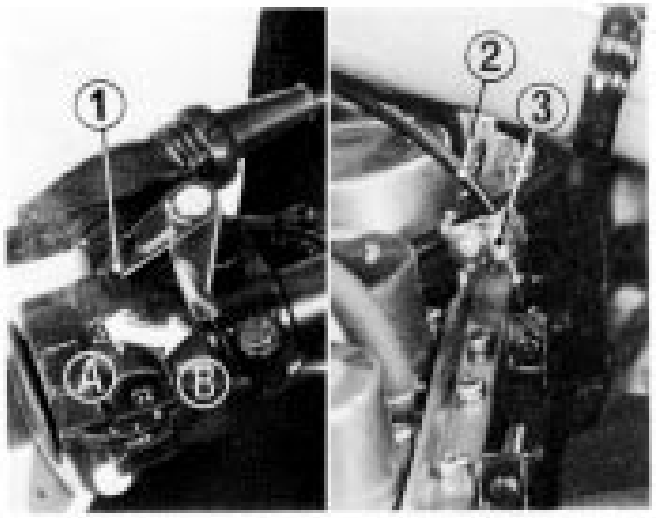
1. Make sure that there is no deterioration, damage, or kinks in the throttle cables, and that the throttle grip free play is 2–6 mm (1/8–1/4 in) on the outer edge of the throttle grip flange.
2. Check for smooth throttle grip full opening and automatic full closing in all steering positions.
3. Adjust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



(1) Lock nut (2) Adjuster
(A) Increase (B) Decrease

ADJUSTMENT:

1. 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. Tighten the lock nut.
2. Minor adjustments are performed at the upper adjuster.
3. Recheck the throttle operation.
4. Replace any damaged parts.



(1) Choke lever (2) Choke cable
(3) Clamp (A) Close (B) Open

CHOKE MACHANISM

1. Operate the choke lever and check for smooth operation.
2. Pull the choke to "fully closed" and make sure that the choke lever is fully closed at the carburetors.
3. Adjust by loosening the choke wire clamp and moving the choke wire.
4. Retighten the clamp, holding the choke lever fully closed.

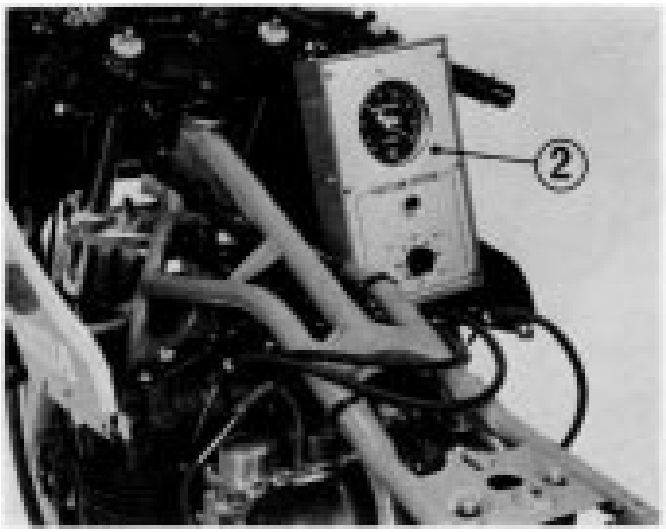
(1) Adapters

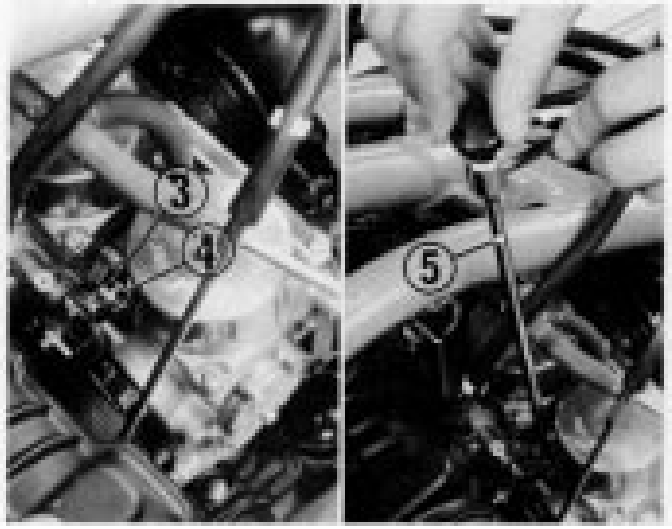
CARBURETOR SYNCHRONIZATION

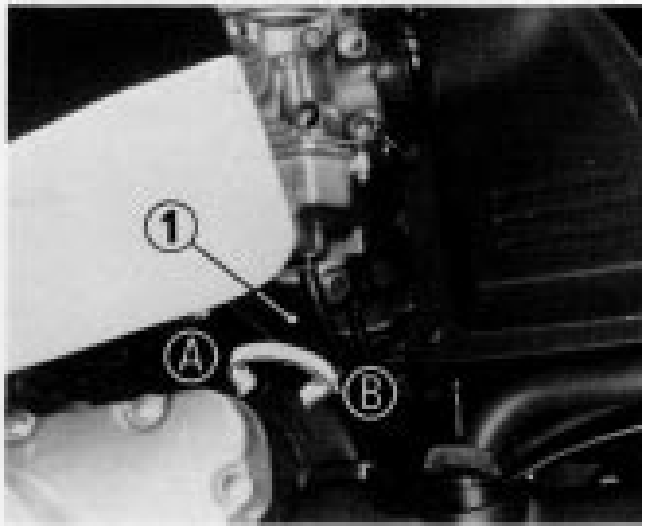
NOTE:

* **Perform carburetor synchronization with the engine at normal operating temperature, transmission in neutral and motorcycle on a center stand.**

1. Turn the fuel valve OFF and remove the fuel tube and fuel tank.
2. Prepare a longer fuel tube and reconnect it to the fuel tank and carburetor. Position the fuel tank higher than its normal position.
3. Remove vacuum plugs from the intake ports and install vacuum gauge adapters.







(2) Vacuum gauge

4. Connect the vacuum gauges (07404–0020000).
5. Start the engine and adjust the idle speed to 1,000 ± 100 min^{-1} (rpm). Make sure that the maximum difference in vacuum readings is within 60 mmHg.

NOTE:

* **The No.2 carburetor cannot be adjusted; it is the base.**

(3) Adjusting screw (4) Lock nut
(5) Carburetor throttle wrench

6. To adjust, loosen the lock nuts with the special tool "Carburetor Throttle wrench (07908–4220100)" and turn the adjusting screws to achieve a maximum difference in vacuum readings between cylinders of less than 60 mmHg.
7. Tighten the lock nuts and recheck the idle speed and synchronization.

(1) Throttle stop screw
(A) Decrease speed (B) Increase speed

IDLE SPEED ADJUSTMENT

NOTE:

* **Adjust idle speed after synchronizing carburetors.**
* **Refer to Page 79 for adjustment of pilot screw.**
* **The engine must be warm for accurate idle adjustment. Ten . minutes of stop-and-go driving is sufficient.**

1. Warm up the engine, shift to NEUTRAL, and place the motorcycle on its side stand.
2. Turn the throttle stop screw as required to obtain the specified idle speed.

IDLE SPEED: 1,000 ± 100 min^{-1} (rpm)

(1) Compression gauge

COMPRESSION TEST

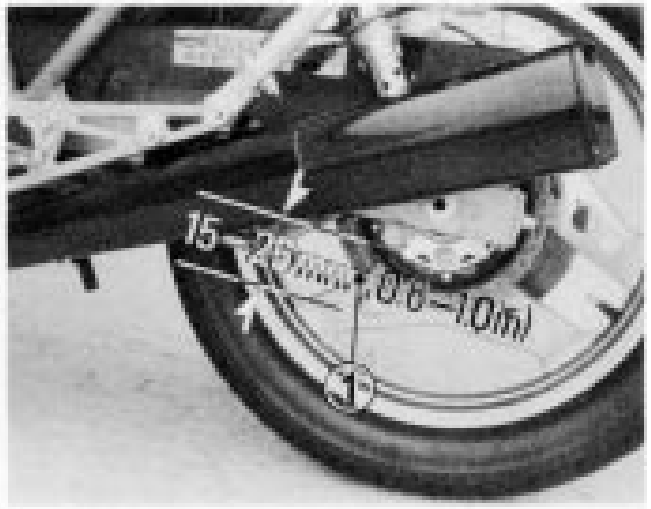
1. Warm up the engine and remove all spark plugs. Insert the compression gauge.
2. Open the choke and throttle valve fully. Crank the engine with the starter motor.

NOTE:

* **Do not crank the engine for more than 7 seconds at a time.**

COMPRESSION PRESSURE: 1470.9 ± 196.2 kPa (15.0 ± 2 kg/cm²)

If compression is low, check the following items:



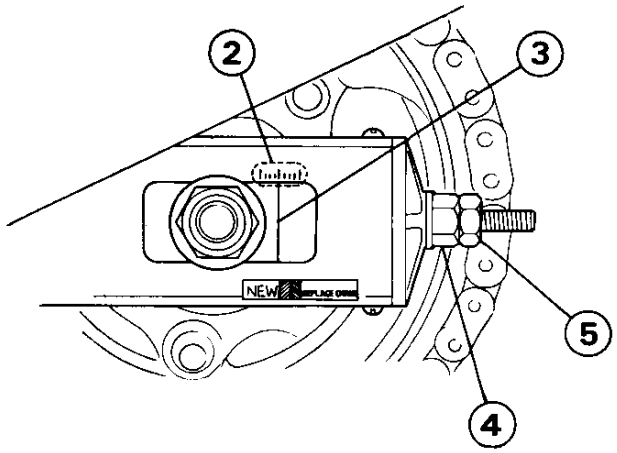
(1) Drive chain

- Leaky valves
- Improper valve clearance
- Blown cylinder head gasket
- Worn piston/rings/cylinder

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

DRIVE CHAIN

1. Place the vehicle on its side stand or main stand (Special tool) and shift the transmission into neutral.



(2) Scale (3) Index mark
(4) Adjuster (5) Lock nut

2. Check slack in the lower drive chain run midway between the sprockets.
   SLACK: 15–25 mm (0.6–1.0 in)

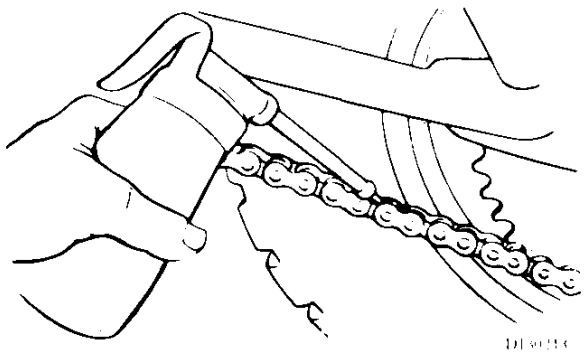
CAUTION:

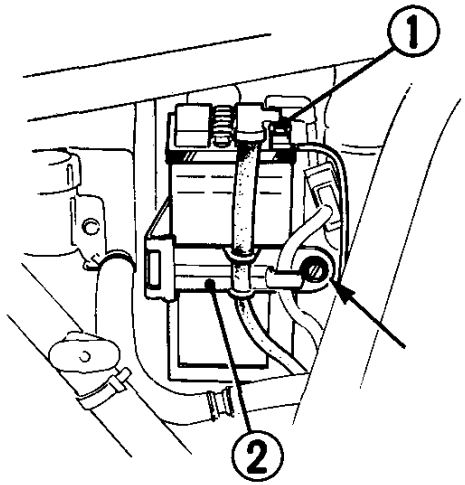
* ***Excessive chain slack 50 mm (2.0 in) or more, may damage the frame.***

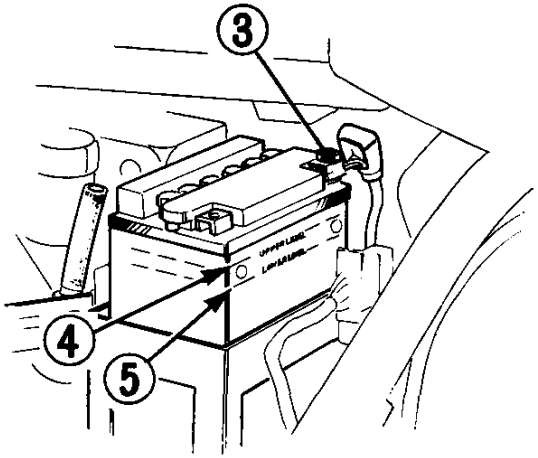
WEAR INSPECTION:

Check the chain wear label when adjusting the chain. If the red zone on the label aligns with the long index line after the chain has been adjusted to 15–25 mm (0.6–1.0 in) slack, the chain is excessively worn and must be replaced.

REPLACEMENT CHAIN:
D.I.D. 50ZL or RK 50LO.







ADJUSTMENT:

1. Loosen the rear axle nut and loosen the lock nuts on both adjusters.
2. Turn both adjusting nuts an equal number of turns until the correct drive chain slack is obtained.

CAUTION:

* ***Make sure the chain adjuster index marks align with the corresponding scale graduation on both sides of the swing arm.***

3. Tighten the lock nuts.
4. Tighten the rear axle nut.
   TORQUE: 80–100 N·m
   (8.0–10.0 kg-m)

(1) Ground cable
(2) Battery holder

5. Recheck chain slack and free wheel rotation.

DRIVE CHAIN LUBRICATION

1. Clean with kerosene, wipe and dry with a clean rag. Then, apply SAE #80–90 gear oil.

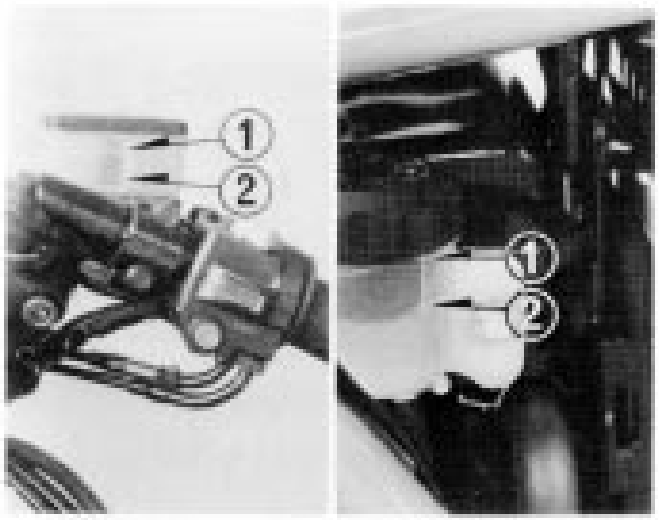
CAUTION:

* ***The O-rings in this chain can be damaged by steam cleaning, high pressure washers, and certain solvents. Commercial chain lubricants may contains solvents which could damage the rubber O-rings.***

(3) Positive cable (4) Upper level
(5) Lower level

BATTERY

1. Disconnect the positive cable at the battery terminal.
2. Remove the battery holder bolt and remove the battery.
3. Disconnect the ground cable at the battery terminal.
4. Inspect the battery fluid level. When the fluid level nears the lower level, refill with distilled water to the upper level.



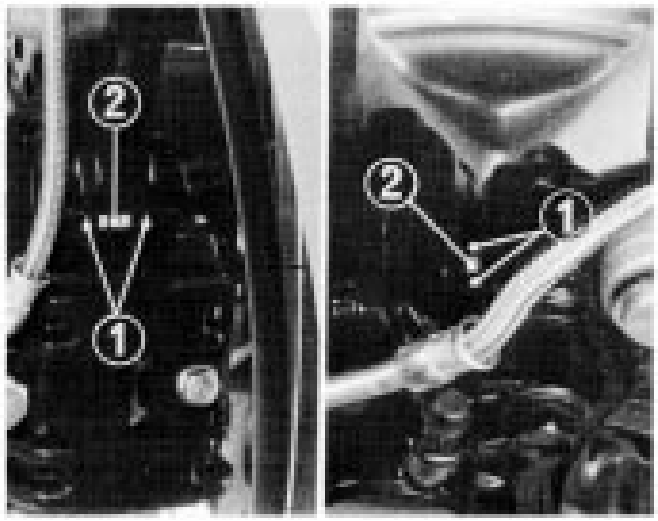
(1) Upper level mark
(2) Lower level mark

BRAKE FLUID

1. Check the front and rear brake fluid reservoirs are filled to the upper level mark with the top of the reservoirs level.
2. If the level is low, check the entire system for leaks.
3. If the level nears the lower level mark, fill the reservoir with SAE J1703 or DOT–3 BRAKE FLUID to the upper level mark.

CAUTION:

* ***Do not mix different brands of fluid as they may not be compatible.***



(1) Pads (2) Disc

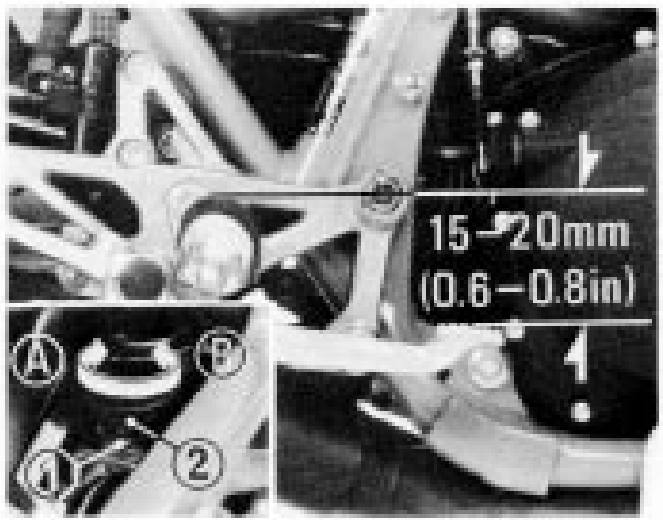
* ***Avoid operating the brake lever with the cap removed. Brake fluid will flow out if the lever or pedal is applied.***

BRAKE PAD WEAR

1. Check for brake pad wear from the direction of arrow on the caliper.
2. Replace the brake pads if the groove on the top of the pads reaches the edge of the brake disc.

CAUTION:

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



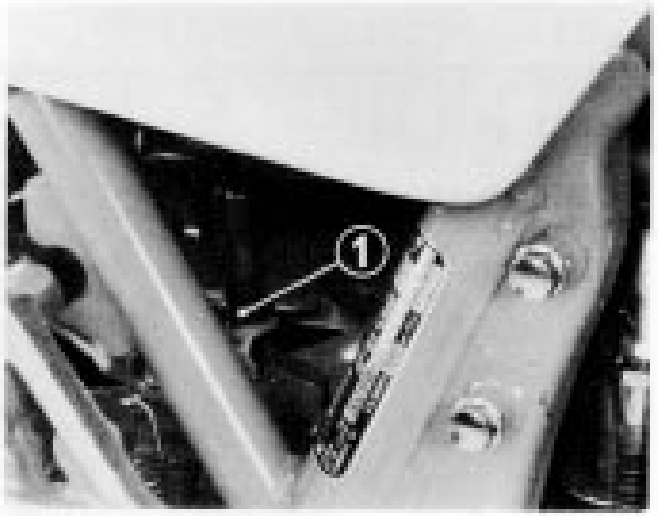
(1) Lock nut (2) Adjuster
(A) Decrease (B) Increase

REAR BRAKE PEDAL HEIGHT

1. To adjust brake pedal height, loosen the adjuster lock nut and turn the adjuster until the correct pedal height is obtained.

   PEDAL HEIGHT:
   15–20 mm (0.6–0.8 in)

2. Tighten the adjuster lock nut.
   After adjusting pedal height, adjust the brakelight switch.



(1) Adjusting nut

BRAKELIGHT SWITCH

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

NOTE:

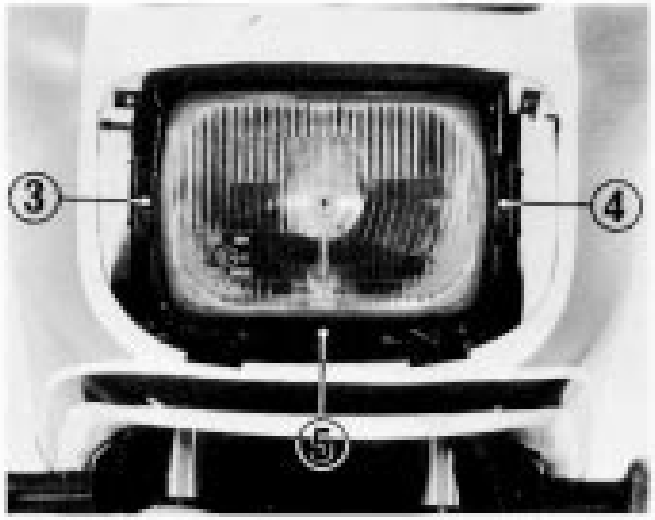
* **Do not turn the switch body. The front brakelight switch does not require adjustment.**

2. Adjust by turning the switch adjusting nut.

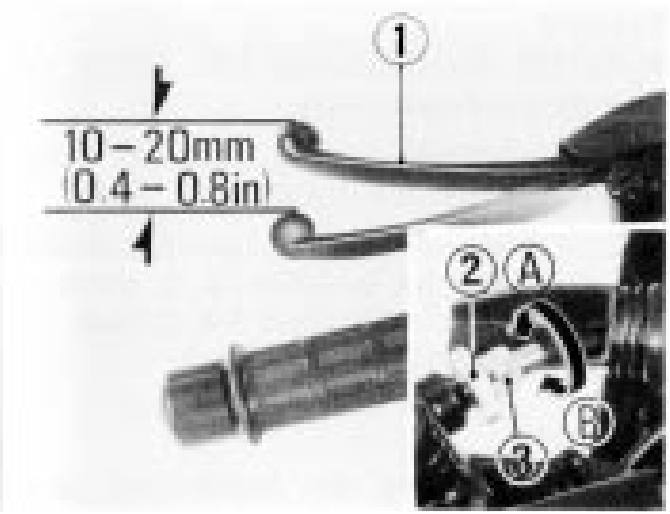
(1) Headlight garnish
(2) Screws

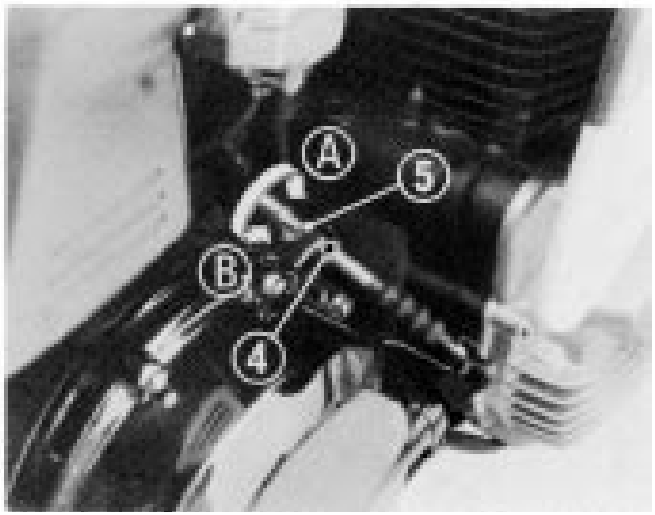
HEADLIGHT AIM

1. Remove the headlidht garnish screws and garnish.
2. Adjust vertically by turning adjusting screw C.
3. Adjust holizontally by turning adjusting screws A and B.



(3) Adjusting screw A
(4) Adjusting screw B
(5) Adjusting screw C





(1) Clutch lever
(2) Lock nut (3) Adjuster
(A) Increase (B) Decrease

CLUTCH FREE PLAY

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

   FREE PLAY: 10–20 mm (0.4–0.8 in)

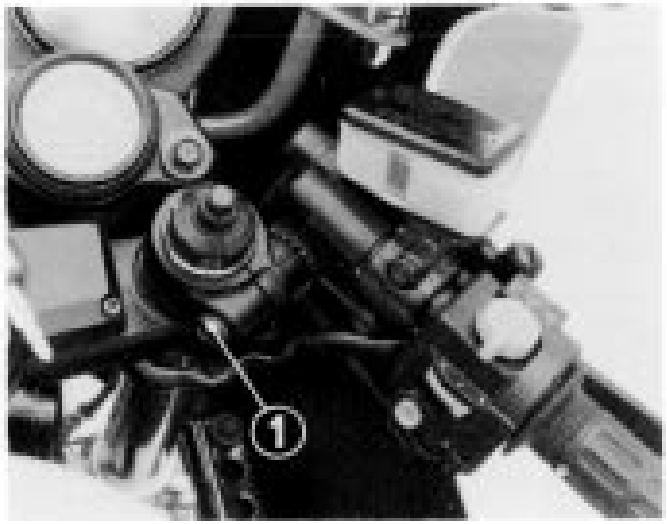
2. To adjust clutch lever free play, loosen the upper adjuster's lock nut (2) and turn the adjuster (3) until the correct free play is obtained.

NOTE:

* **Do not expose the adjuster threads more than 8 mm (0.31 in).**

(4) Lock nut (5) Adjusting nut
(A) Increase (B) Decrease

3. If adjustment cannot be made with the clutch lever adjuster, screw the adjuster all the way in and back it out 1 turn.
4. Loosen the lower adjusting lock nut and turn the 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.
5. After adjustment, be sure all lock nuts are tightened securely.
6. Check to see that the clutch is not slipping and is properly disengaging.



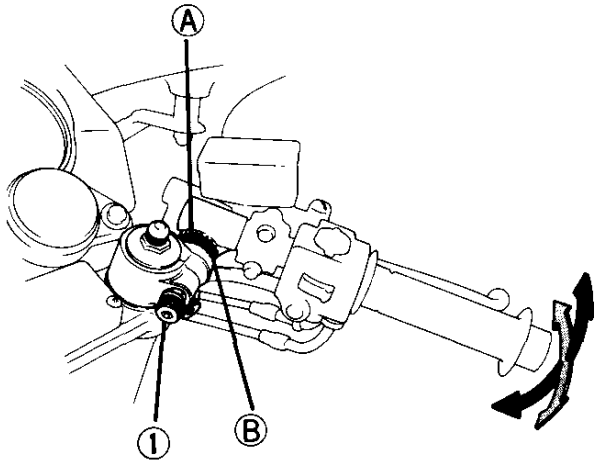
(1) Attaching bolt

HANDLEBAR

The handlebars can be adjusted in two manners.

Opening angle adjustment:

1. Loosen the handlebar attaching bolts and rotate the handebars on the fork pipes until the optimum opening is obtained.
2. Tighten the bolts to the specified torque.
   TORQUE: 20–25 N·m (2.0–2.5 kg-m)



(1) Attaching bolt
(A) Serration A
(B) Serration B

Tilt adjustment:

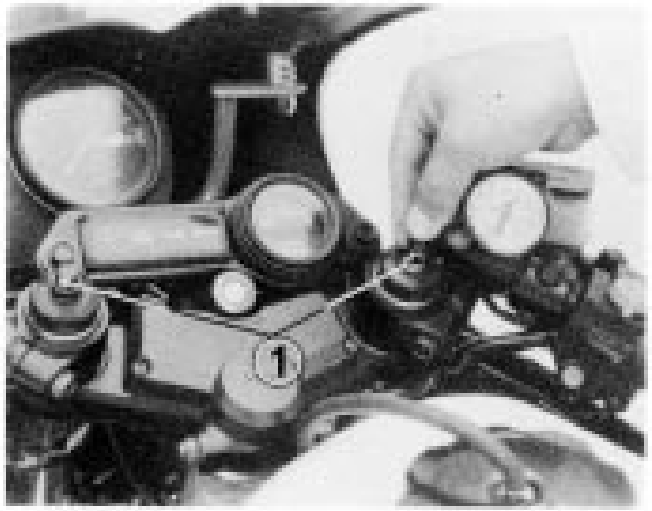
1. Loosen the attaching bolts.
2. Rotate the serration A one pitch.
3. Rotate the serration B one pitch in the opposite direction.
   Serration A: 20°/pitch
   Serration B: 18°/pitch
   Thus, reletive movement between the serrations by one pitch causes the handlebar to be raised or lowered by 2°. To tilt the handlebar by 4° rotate the serrations A and B two pitches in the reverse direction of each other.

Example:

- To tilt the handlebar 18°, rotate the serration B one pitch.
- The handlebar can be tilted 20° when the serration A is rotated one pitch.
- To raise or lower the handlebar 12°, rotate the serration A 6 pitches and return the serration B 6 pitches.
  (20° x 6) – (18° x 6) = 12°

CAUTION:

* ***After adjusting the handlebars, turn them full right and left to make sure that they are not interferring with the fuel tank and fairing.***
* ***Also check to be certain that the wires and cables are not kinked or pulled taught in all steering positions.***



(1) Air valves

FRONT SUSPENSION

Air Pressure

The front fork uses a semi-air suspension.

AIR PRESSURE:

0–60 kPa (0–0.6 kg/cm^2, 0–8 psi)

The air pressures should be checked while the system is cold.

1. Place the motorcycle on center stand (special tool). Jack up the engine and raise the front wheel off the ground.
2. Remove the air valve cap and measure air pressure in each fork tube with an air gauge.

NOTE:

* **Excessive pressure cause the front suspension to become too firm and performance to decline.**

Anti-dive damper adjuster

The front forks have anti-dive damper adjuster to prevent nose diving during braking.

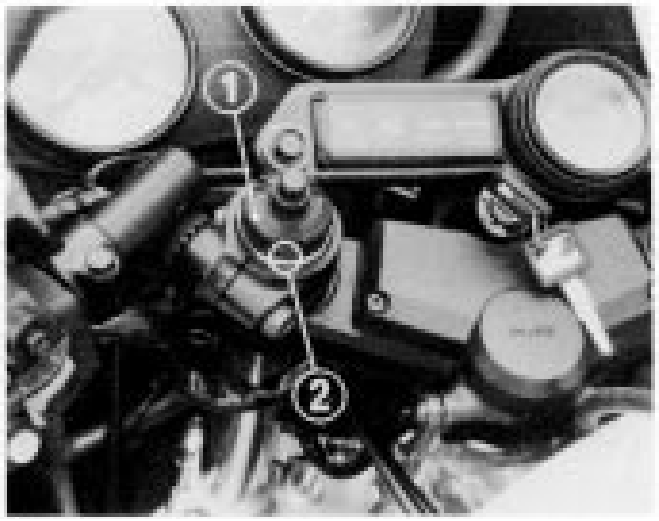
Each adjuster has four positions and changes the damping force when the brake is applied.

(1) Adjuster

Position	Anti-dive damper force
1	Soft
2	Medium
3	Hard
4	Extra hard

CAUTION:

* ***Adjust the right and left adjusters to the same positions.***



(1) Damping adjuster (2) Adjusting mark

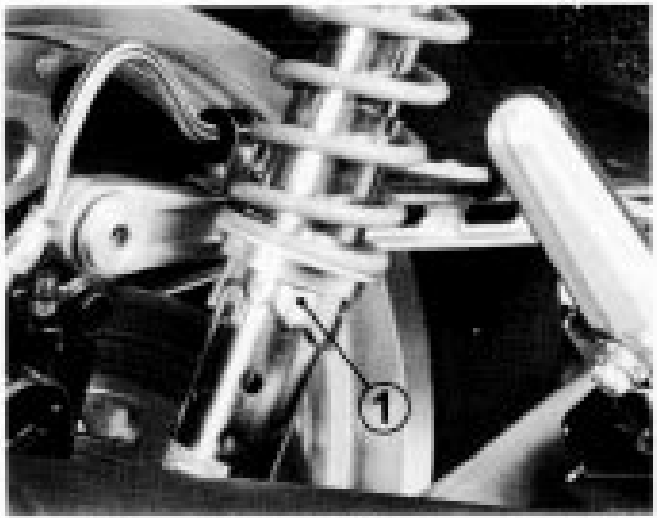
REBOUND DAMPING ADJUSTER

Set the damping adjuster to a position so that the selected number of damping force faces outward.

NOTE:

* **Be sure the damping adjuster is not between positions but is firmly located in a detent.**
* **Adjust both damping adjusters to the same positions.**

Rebound Damping Adjuster	Riding Conditions
1	Around town
2	Highways or winding roads
3	Rough or uneven

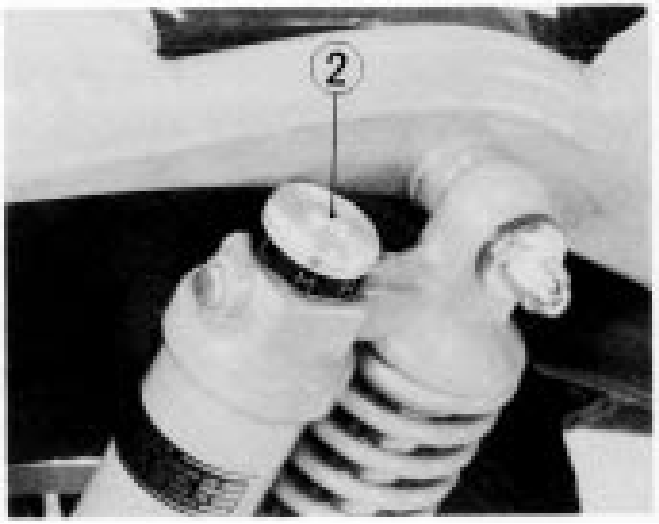


(1) Spring adjuster

REAR SUSPENSION

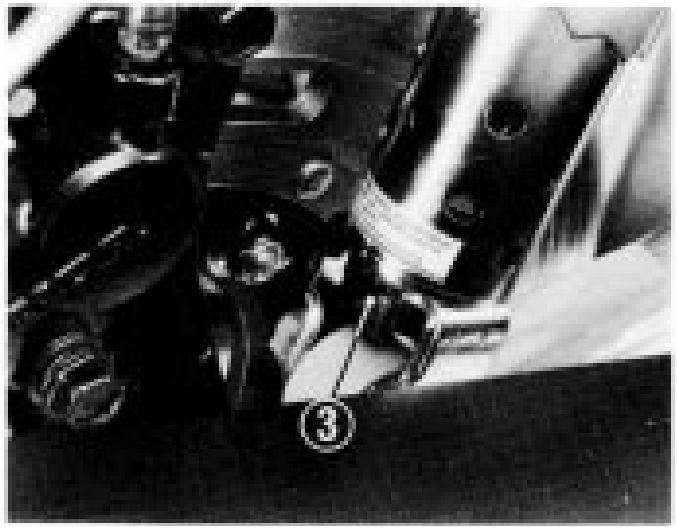
The rear suspension can be adjusted at three locations according to your preference or riding conditions.

1. The spring adjusters have five positions. The position "II" is for standard. Advancing the number causes the rear suspension to become stiffer.



(2) Compression damping force adjuster

2. The upper adjuster has three positions and changes the damping force on compression.



(3) Extension damping force adjuster

3. The lower adjusters are used to change the damping force of the rear suspension on extension. Adjustment can be made by turning the wheels. Advancing the number increases the damping force on extension.

NOTE:

* **Adjust the right and left adjusters to the same locations.**

STANDARD PRESSURE:

1,000 kPa (10.0 kg/cm², 142 psi)

WARNING

* ***The rear shock absorbers contain nitrogen gas under high pressure.***

Extension damping adjuster	Compression damping adjuster	Spring adjuster	Conditions
1–2	L–M	2	Rider only on general public road
2–3	L–M	3	Rider and passenger on general public road
3–4	L–M	2	Rider weight below 70 kg (154 lbs) on racing circuit
3–4	M–H	4	Rider weight above 70 kg (154 lbs) on racing circuit

4. Use the adjusters according to the instructions given in the above chart.

TUBELESS TIRES

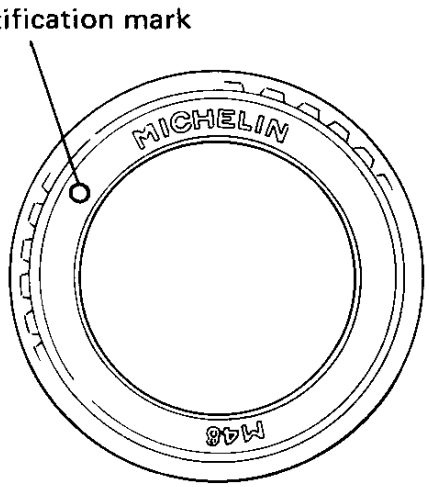
This motorcycle is equipped with tubeless tires, valves, and wheel rims. Use only tires marked "TUBELESS" and tubeless valves on rims marked "TUBELESS TIRE APPLICABLE".

Proper air pressure will provide maximum stability, riding comfort and tire life.

Check tire pressures frequently and adjust if necessary.

NOTE:

* **Check tire pressures when the tires are "cold," before you ride.**
* **Tubeless tires have some degree of selfsealing ability if they are punctured, and leakage is often very slow. Inspect very closely for punctures, especially if the tire is not fully inflated.**
* **MICHELIN TIRES for CB1100R have a identification mark as shown to distinguish them from the conventional tires that have the same pattern as the CB1100R's tire and different inside construction.**
  To bring out the best performance in the CB1100R, always use the tires with the identification mark.



Dry weight kg	233
Curb weight (wet) kg	256
Gross vehicle weight rating kg	406

		Front	Rear
Tire size		100/90 V18	130/80 V18
Cold tire pressures kPa (kg/cm², psi)	Driver only	250 (2.5, 36)	250 (2.5, 36)
	Driver and passenger	250 (2.5, 36)	290 (2.9, 42)
Tire brand TUBELESS ONLY MICHELIN DUNLOP		 A48 F11	 M48 K527
YOKOHAMA		Y994	Y995 (except E,F,U)

Check the tires for cuts, imbedded nails or other sharp objects. Check the rims for dents or deformation. If there is any damage, see your authorized Honda dealer for repair, replacement, and balancing.

WARNING

* ***Improper tire inflation will cause abnormal tread wear and create a safety hazard. Underinflation may result in the tire slipping on, or coming off of the rim.***
* ***Operation with excessively worn tires is hazardous and will adversely affect traction and handling.***

Replace tires before tread depth at the center of the tire reaches the following limit:

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

Repair/Replacement

See your authorized Honda dealer.

WARNING

* *The use of tires other than those listed on the tire information label may adversely affect handling.*
* *Do not install tube-type tires on tubeless rims. The beads may not seat and the tires could slip on the rims, causing tire deflation.*
* *Do not install a tube inside a tubeless tire. Excessive heat build-up may cause the tube to burst resulting in rapid tire deflation.*
* *Proper wheel balance is necessary for safe, stable handling of the motorcycle. Do not remove or change any wheel balance weights. When wheel balancing is required, see your authorized Honda dealer. Wheel balancing is required after tire repair or replacement.*
* *Do not exceed 50 mph (80 km/h) for the first 24 hours after tire repair, or repair failure and tire deflation may result. Never use a repaired tire for racing or speeds over 80 mph (120 km/h).*
* *Replace the tire if the sidewall is punctured or damaged. Sidewall flexing may cause repair failure and tire deflation.*

CAUTION:

* *Do not try to remove tubeless tires without special tools and rim protectors. You may damage the rim sealing surface or disfigure the rim.*

III. ENGINE

The information contained in the following sections is for an occasional racer. For ordinary users, have their nearest Honda dealer make all necessary servicing and repairs.

1. SERVICE PRECAUTIONS

- Always install new gaskets, O-rings, cotter pins, piston pin clips, circlips, etc., when reassembling.
- When tightening bolts, nuts or screws, start with the larger diameter or inner fasteners, and tighten them to the specified torque using a criss-cross pattern.
- Use genuine HONDA parts or their equivalent when servicing or replacing.
- Be sure to use special tools where specified.
- Clean the engine before disassembling.
- Clean parts in cleaning solvent when disassembling. Lubricate any sliding surface before reassembling.
- After reassembling, check all parts for proper installation and operation.
- Grease parts by coating or filling where specified.

WARNING

Gasoline or low flash point solvent are highly flammable or explosive and must never be used for cleaning parts. Fire or explosion could result.

2. PRE–RACE CHECKS

Items to be checked	Ref. page
• Pre-ride inspection	Page 15
• Cam chain tensioner A adjustment	Page 26
• Cam chain tensioner B adjustment	Page 26
• Valve clearance check/adjustment	Page 22–25
• Ignition timing adjustment	Page 21
• Spark plug inspection	Page 20–21

PERIODICAL REPLACEMENT PARTS (COMPETITION USE)

1 race: 12 hours

Part Name		Interval	Items to be checked	Service Limit
Cam chain A		Every 5,000 km (2 races)	Elongation, wear	
Cam chain B		Every 5,000 km (2 races)	Elongation, wear	
Cam chain tensioner A		Every 5,000 km (2 races)	Wear	
Cam chain tensioner B		Every 5,000 km (2 races)	Wear	
Primary chain/Primary chain guide		Every 5,000 km (2 races)	Elongation, wear	
Spark plug		Every 5,000 km (2 races)	Worn electrodes, gap	
Piston ring (oil)		Every 10,000 km (4 races)		1.0 mm (0.039 in)
Piston		Every 10,000 km (4 races)	Damage, wear, ID at skirt	69.94 mm (2.75 in)
Piston ring	TOP	Every 10,000 km (4 races	Wear or chipped end	0.45 mm (0.018 in)
	2ND	Every 10,000 km (4 races)	Wear or chipped end	0.45 mm (0.018 in)
Clutch plate B		Every 5,000 km (4 races)	Wear	
Bearing (primary, main, counter)		Every 10,000 km (4 races)	Seizure, wear	
Intake valve		Every 10,000 km (4 races)		
Exhaust valve		Every 10,000 km (4 races)		
Valve cotters		Every 10,000 km (4 races)		
Valve spring retainer		Every 10,000 km (4 races)		
Valve spring outer		Every 10,000 km (4 races)		
Valve spring inner		10, 000 km (4 races)		
Valve stem seal		10,000 km (4 races)		
Bank sensor		Every 5,000 km (2 races)		
Drive chain		Every 10,000 km (4 races)	Elongation, wear	
Front fork oil		Every 10,000 km (4 races)		
Engine oil		After brake-in, thereafter every races	Contamination, emulsion	
Oil filter element		After brake-in, thereafter every races	Fouling	

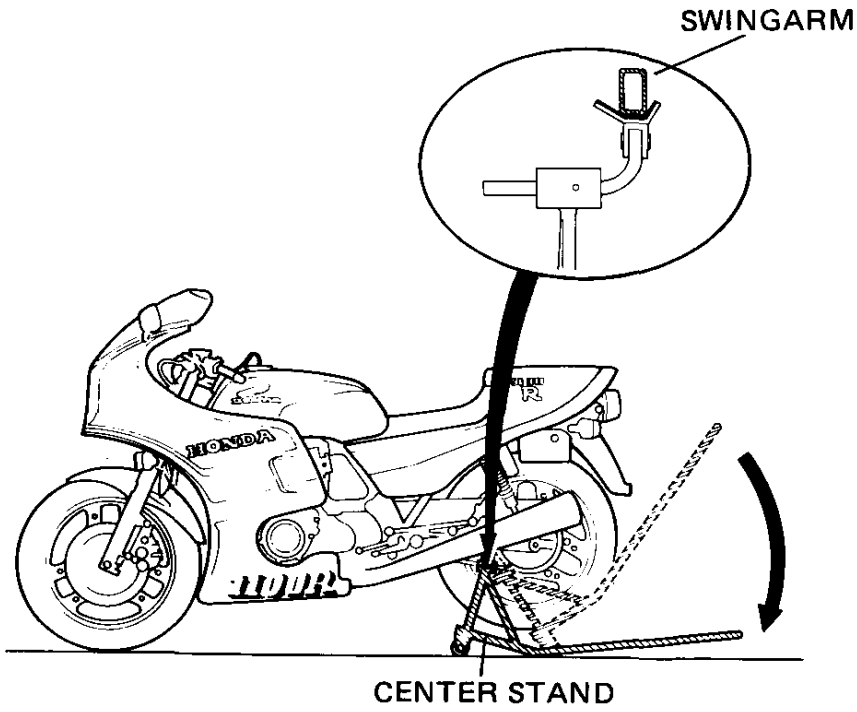
4. ON-FRAME SERVICE POINTS

Service Points:

The following parts can be serviced without removing the engine from the frame:

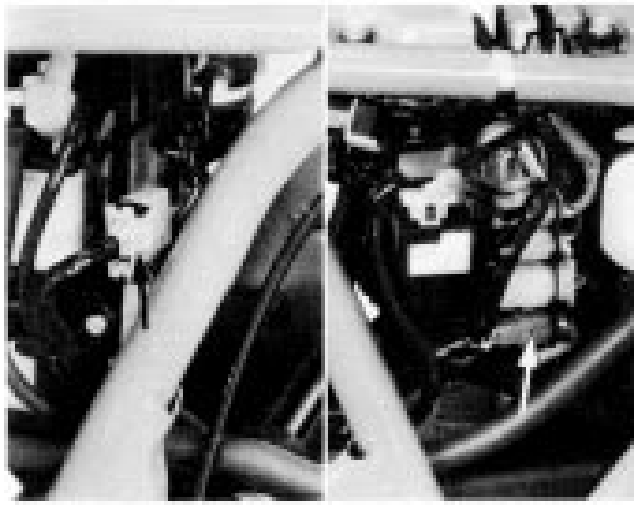
- **Clutch**
- **Gearshift linkage**
- **Camshaft**
- **A. C. generator**
- ***Starter motor***
- **Carburetors**

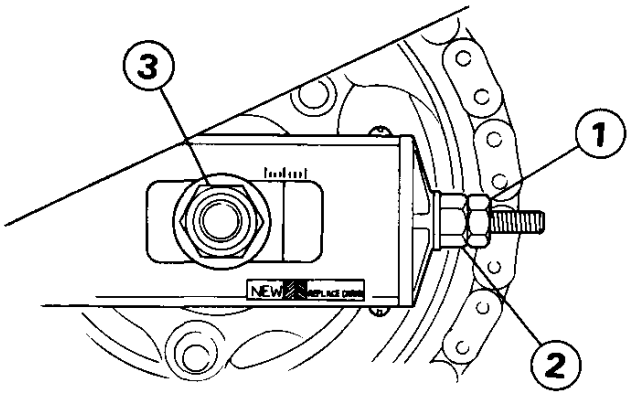
5. ENGINE REMOVAL

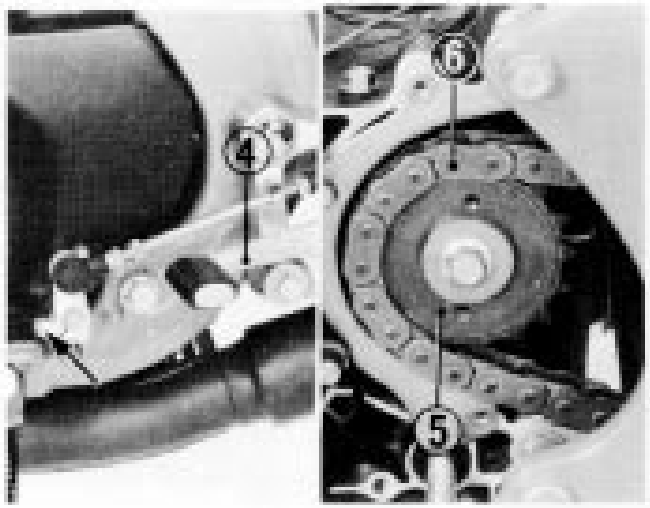


ENGINE REMOVAL

1. Place the motorcycle on the center stand (Tool No. 07965-MA30001). Drain oil from the engine. Turn the fuel valve "OFF".
2. Remove the fairing, seat, overflow tube, fuel tube and fuel tank.
3. Remove the oil filter, two engine oil hoses, oil pan and oil filter screen.
4. Remove the mufflers.
5. Protect the frame right down tube with rubber mat or vinyl hose.

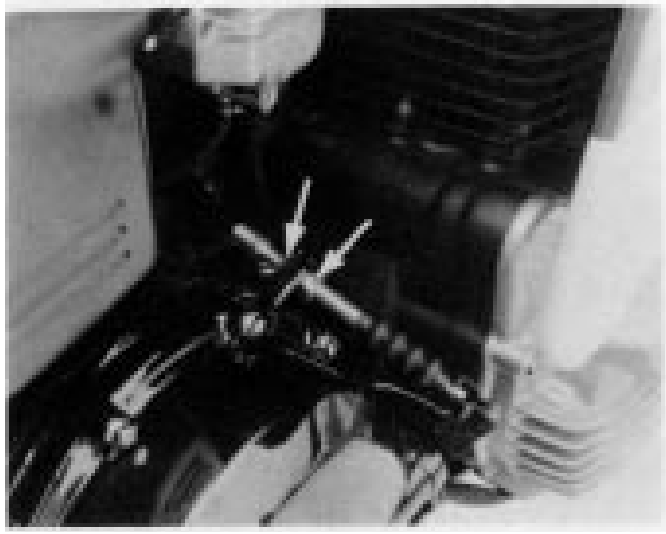


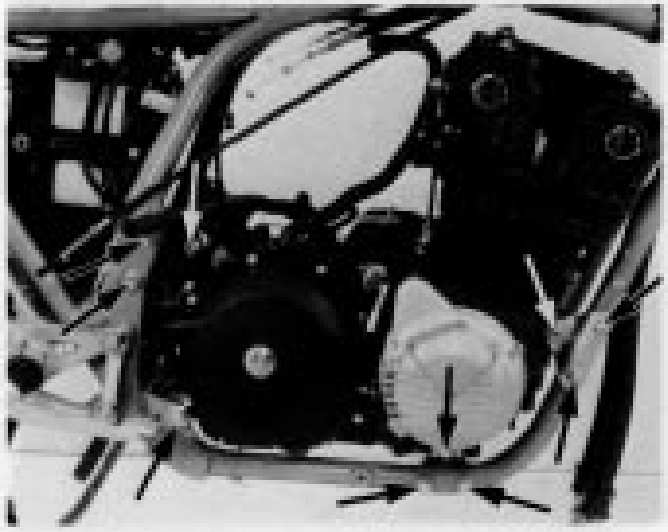




(1) Lock nut
(2) Adjuster
(3) Axle nut
(4) Gearshift pedal
(5) Drive sprocket
(6) Drive chain

6. Remove the carburetors and air cleaner.
7. Remove the spark plug caps.
8. Disconnect the starter motor cable, pulse generator coupler and breather tube.
9. Remove the lock pin and loosen the lock nuts on both adjusters.
10. Loosen the rear axle nut and push the rear wheel forward.
11. Remove the gearshift pedal and the drive sprocket cover.
12. Remove the drive sprocket and drive chain.





13. Disconnect the clutch cable from the clutch arm.
14. Remove the engine hanger brackets and bolts.
15. Remove the rear lower engine mount bolt.
16. Remove the engine through the right using an assistant.

ENGINE INSTALLATION

Installation sequence is essentially the reverse of removal.

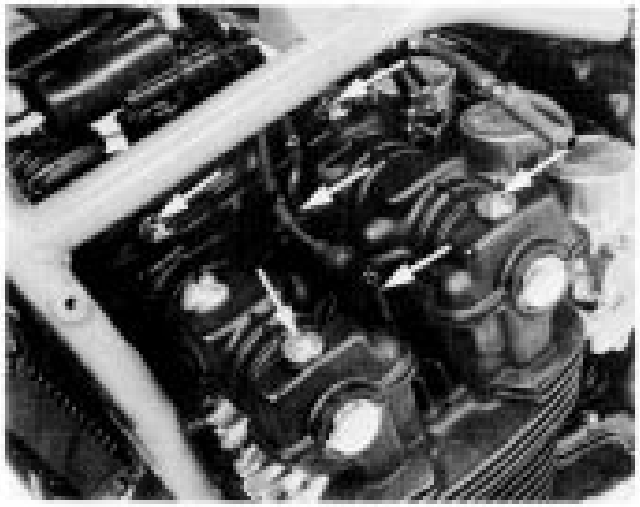
NOTE:

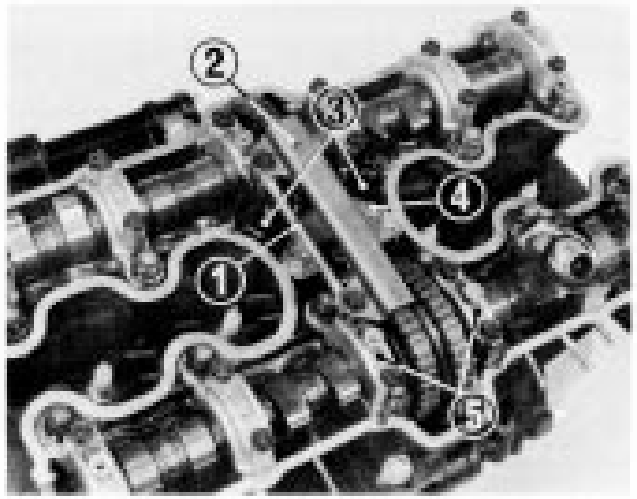
* **Do not forget to install copper washers under three oil pan bolts.**
* **Do not allow the oil-pass body O-ring to fall.**
* **Route the wires and cables properly.**
* **Refill the crankcase up to the proper level**
* **Perform the following inspections and adjustments:**
  - **Throttle cable free play**
  - **Clutch lever free play**
  - **Drive chain tension**
  - **Choke cable free play**

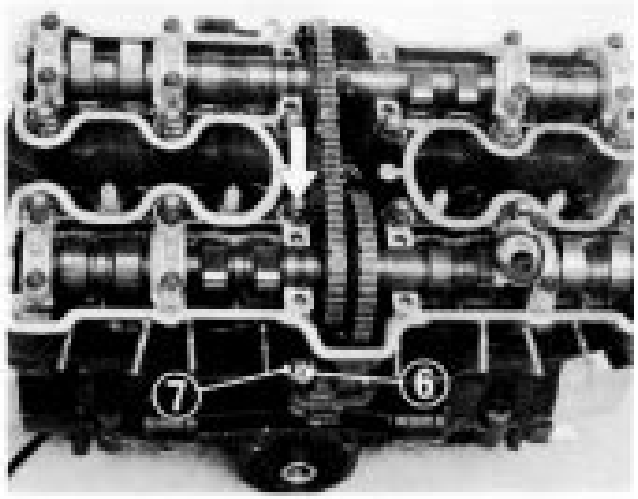
TORQUES:

6 mm bolt and nut:
8–12 N·m (0.8–1.2 kg-m)
10 mm bolt and nut:
30–40 N·m (3.0–4.0 kg-m)
12 mm bolt and nut:
55–65 N·m (5.5–6.5 kg-m)
Drive sprocket:
33–37 N·m (3.3–3.7 kg-m)

6. CYLINDER HEAD/VALVE





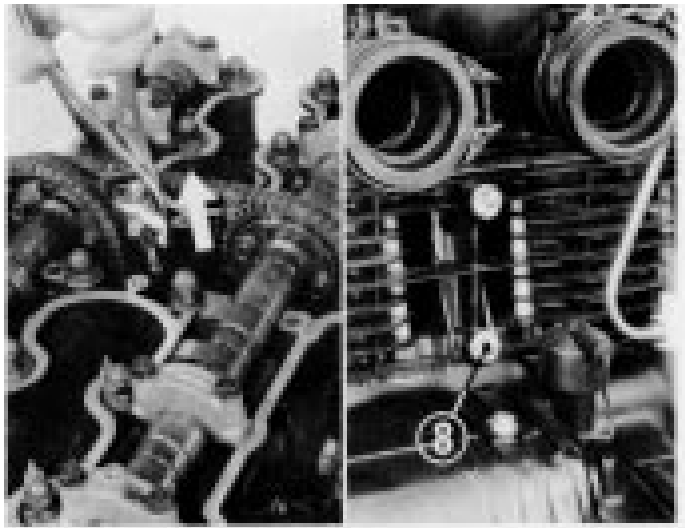


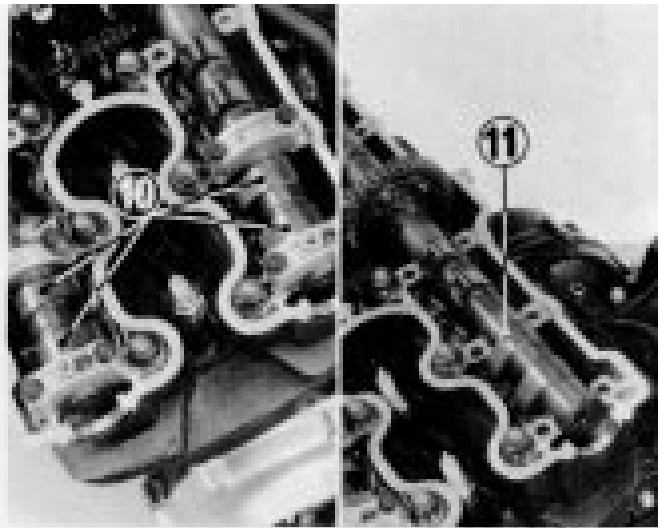
(1) Oil pipe (2) Cam chain guide
(3) Oil pool cap guide (4) Rear cam chain
(5) Camshaft holder
(6) Lock nut (7) Lock bolt

DISASSEMBLY

Camshaft

1. Place the motorcycle on the center stand (Tool No. 07965–MA30000).
2. Remove the front fairing and fuel tank.
3. Disconnect the spark plug caps.
4. Remove the cylinder head cover bolts and remove the cylinder head cover.
5. Remove the oil pipe and cam chain guide.
6. Remove the camshaft holders B, C, H and J.
7. Remove the oil pool cap and rear cam chain guide plate.
8. Remove the dowel pins.
9. Loosen the front cam chain tesnioner Press the cam chain tensioner down to reduce chain tension.
   Tighten the lock bolt and nut.





(8) Adjusting lock nut

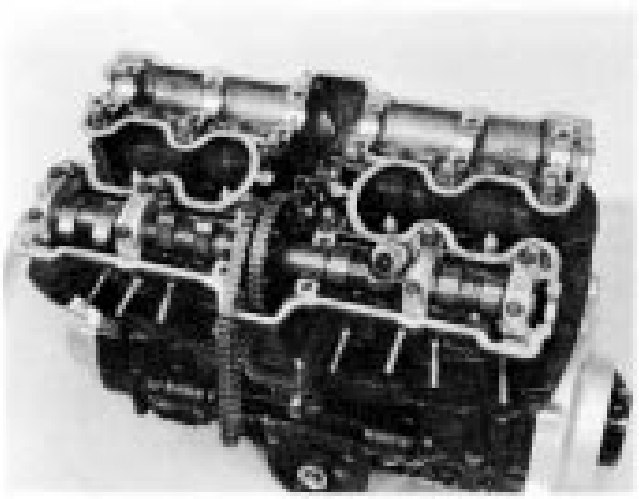
(9) "1.4T" mark

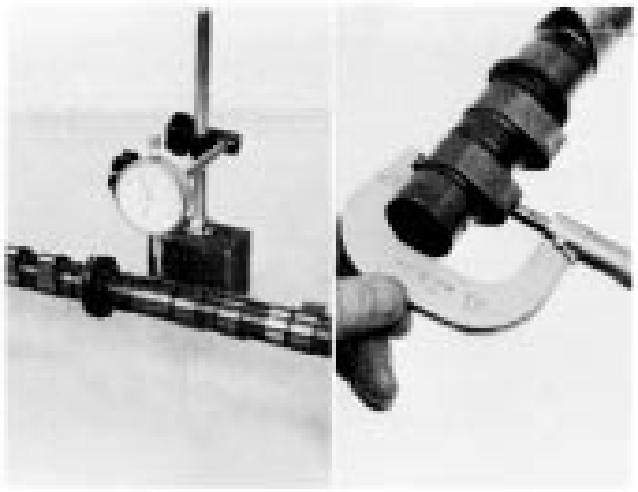
(10) No.1 cam lobes
(11) Intake camshaft

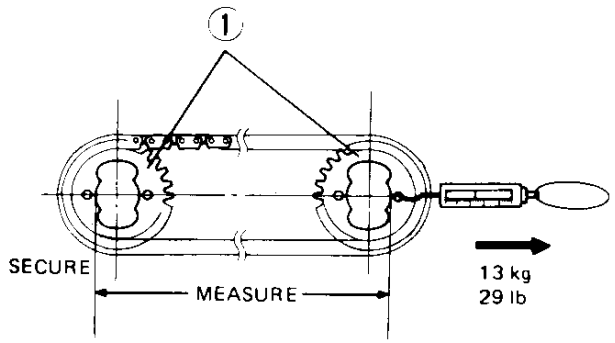
10. Loosen the rear cam chain tensioner adjust lock nut.
11. Pull the cam chain tensioner up to reduce chain tension and tighten the lock nut.

12. Remove the pulser generator cover. Turn the crankshaft counterclockwise until "1.4T" mark aligns with the index mark.

13. Make sure the No. 1 cylinder intake and exhaust cam lobes face the spark plugs.
4. Remove the G and K camshaft holders.
   Remove the F and L holders.
   Remove the dowel pins.
15. Remove the intake camshaft.
16. Remove the exhaust cam sprocket bolt and remove the gear camshaft holder and camshaft holders D, A and E in 2-3 steps.







17. Remove the camshaft holder A and E dowel pins.
18. Remove the exhaust camshaft.

NOTE:

* **Suspend the cam chain with a piece of wire to prevent it from falling into the crankcase.**

19. Remove the cam sprocket and cam chain.

NOTE:

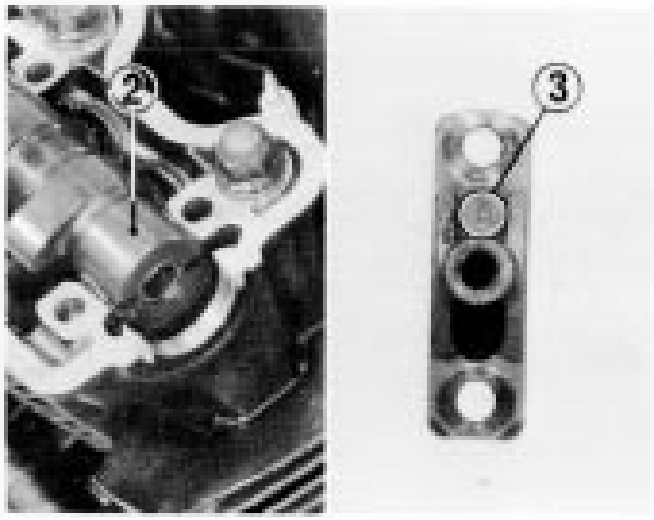
* **The valve adjusting shims and valve lifter can be removed after removing the camshaft.**

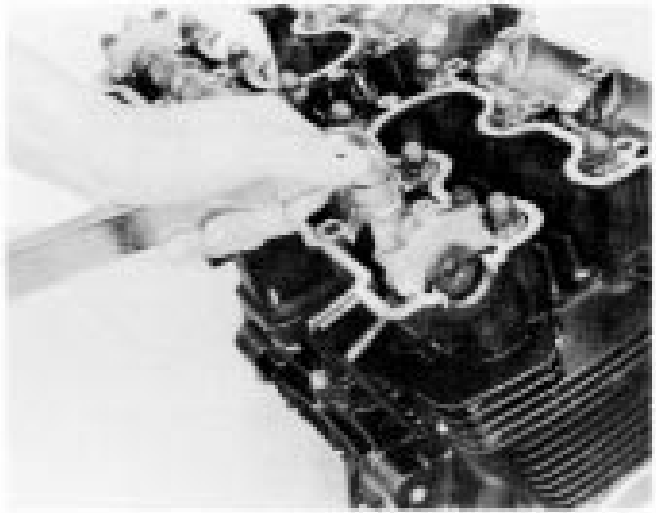
INSPECTION

1. **Cam bearing surface**
   Check the cam bearing surfaces of the camshaft holders and cylinder head for damage or excessive or local wear.
2. **Camshaft runout**
   Check the camshaft runout with a dial gauge. Support both ends of the camshaft with V-blocks.
   SERVICE LIMIT: 0.05 mm (0.0019 in)
3. **Cam lobe inspection**
   Inspect the cam lobes for wear or damage.
   Measure the height of each cam lobe.
   SERVICE LIMITS:
   IN: 37.9 mm (1.492 in)
   EX: 38.4 mm (1.511 in)

(1) Intake cam sprockets

4. **Cam chain**
   Place the cam chain over the intake camshaft sprockets. Secure one sprocket and apply 13 kg (29 lbs) of tension with a spring balance. Measure the distance between the points as shown.
   SERVICE LIMIT: 177.3 mm (6.97 in)
5. **Cam chain guide**
   Inspect the cam chain guide for damage or local or excessive wear.





(2) Plastigauge
(3) Identification mark

6. **Camshaft oil clearance**
   Remove the adjusting shims and the valve lifters.

NOTE:

* **Mark each part to ensure original assembly.**

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

NOTE:

* **Wipe any oil from the journals before using plastigauge.**

   Determine the camshaft holder identification number before installing.

7. Install the camshaft holders and tighten to the specified torque in a crisscross pattern.

   TORQUE: 12–16 N·m (1.2–1.6 kg-m)

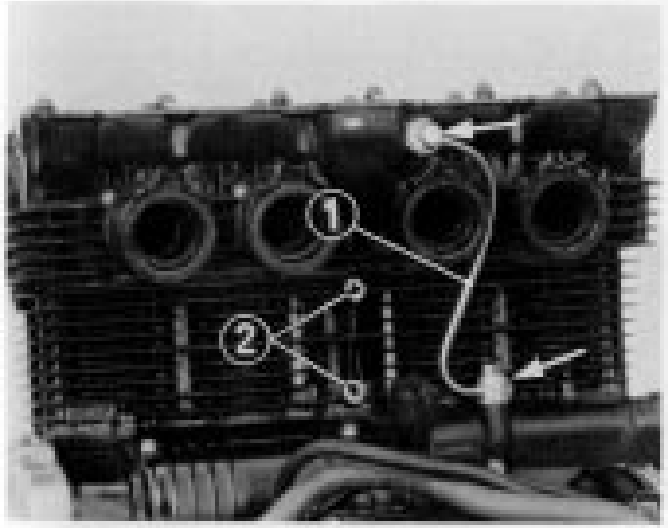
NOTE:

* **Do not rotate the camshaft when using plastigauge.**

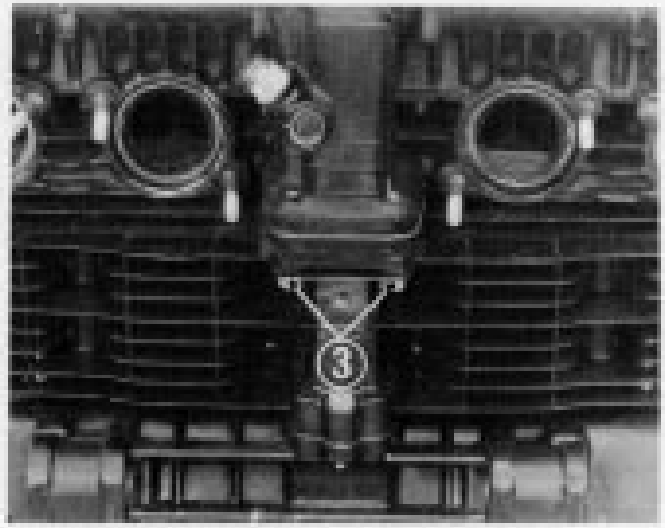
8. Remove the camshaft holders and measure the width of each plastigauge. The widest thickness determines the oil clearance.

   SERVICE LIMITS:
   A, E, F and L: 0.18 mm (0.007 in)
   Gear holders D, G and K: 0.21 mm (0.008 in)
   B, C, H and J: 0.24 mm (0.009 in)

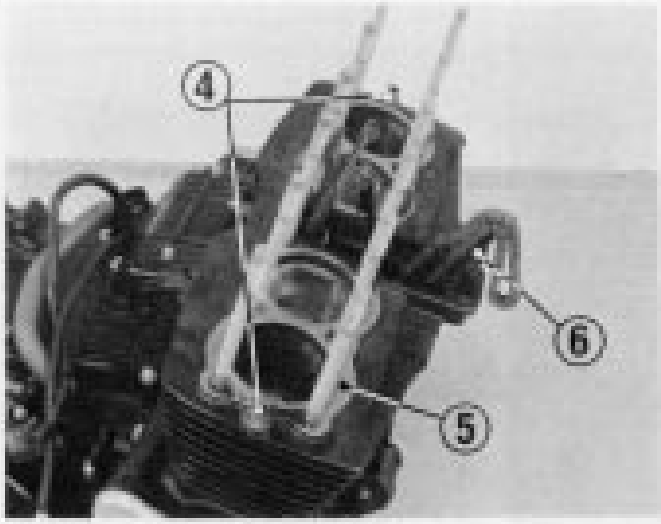
9. When the service limits are exceeded, replace the camshaft and recheck the oil clearance. Replace the cylinder head and camshaft holders if the clearance still exceeds service limits.



(1) Oil line (2) Lock nuts



(3) Cam chain housing bolts



(4) Dowel pins (5) Gasket
(6) Cam chain guide

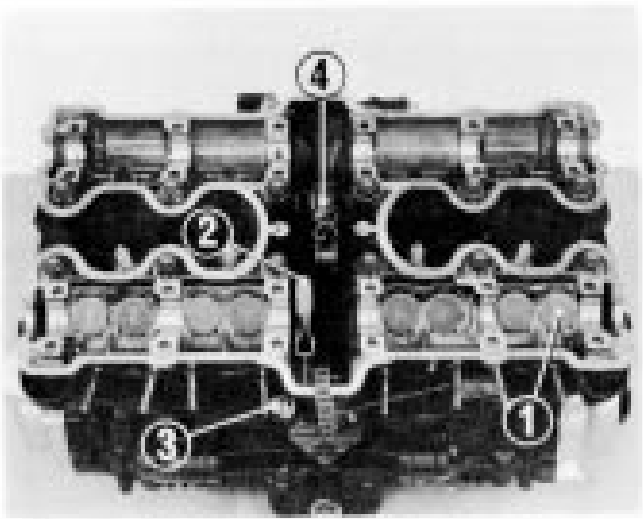
CYLINDER HEAD REMOVAL

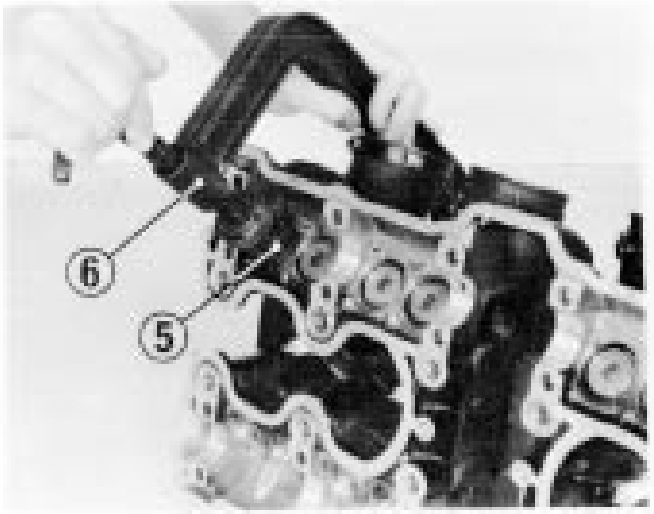
1. Remove the engine (Page 42).
2. Remove the camshafts.
3. Remove the oil line.
4. Remove the rear cam chain tensioner lock nuts.
5. Remove the two cam chain housing bolts.
6. Remove the 12 cylinder head nuts.

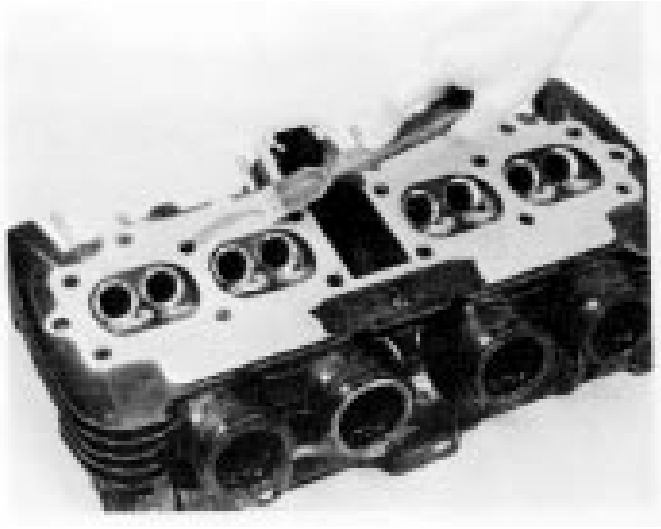
NOTE:

* **Loosen the nuts in a crisscross pattern in 2-3 steps.**

7. Remove the cylinder head.
8. Remove the cylinder head gasket, dowel pins and cam chain guide.







(1) Shim and lifters
(2) Chain tensioner
(3) Lock bolt (4) Bolt

CYLINDER HEAD DISASSEMBLY

1. Remove the valve shims and valve lifters.

NOTE:

* **Mark all disassembled parts to ensure original assembly.**

2. Loosen the cam chain tensioner lock nut and bolt.
3. Remove the cam chain tensioner bolt in the cylinder head. Remove the tensioner.

(5) Valve lifter bore protector
(6) Spring compressor

4. Remove the valve cotters, retainers, springs and valves using the special tool (Valve Spring Compressor and Valve Lifter Bore Protector).

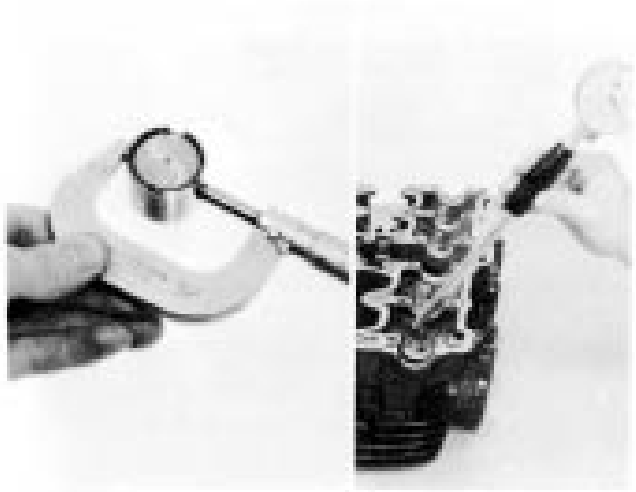
NOTE:

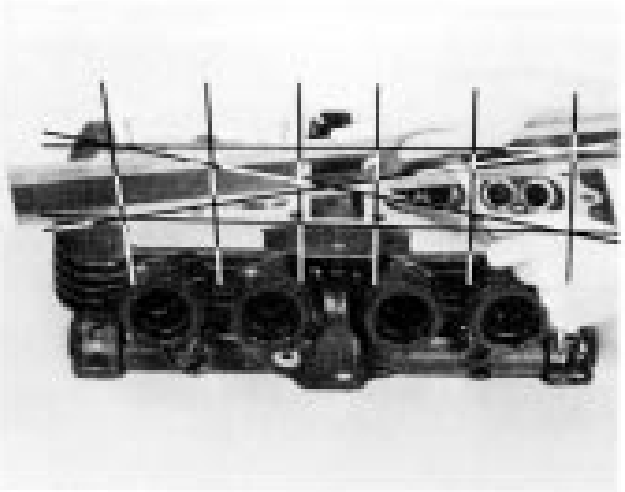
* **To prevent loss of tension, do not compress the valve springs more than necessary to remove the cotters.**
* **Avoid damaging the lifter sliding surfaces.**
* **Mark all disassembled parts to ensure original assembly.**

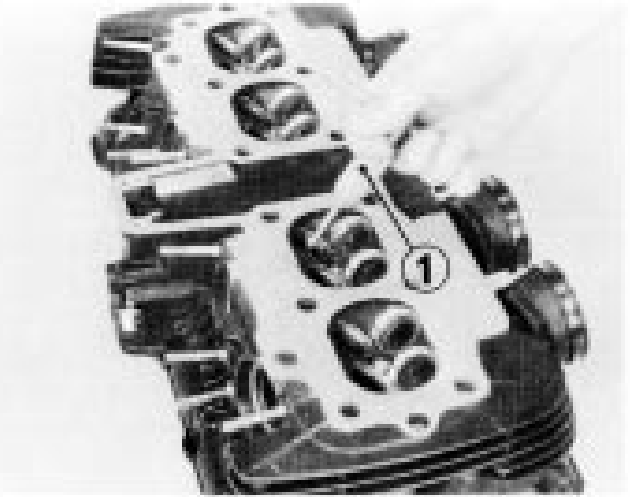
5. Remove the valve stem seals.
6. Remove all carbon deposits from the combustion chambers. Clean off the head gasket surfaces.

NOTE:

* **Avoid damaging the gasket surface.**
* **Gasket will come off easier if soaked in solvent.**







INSPECTION:

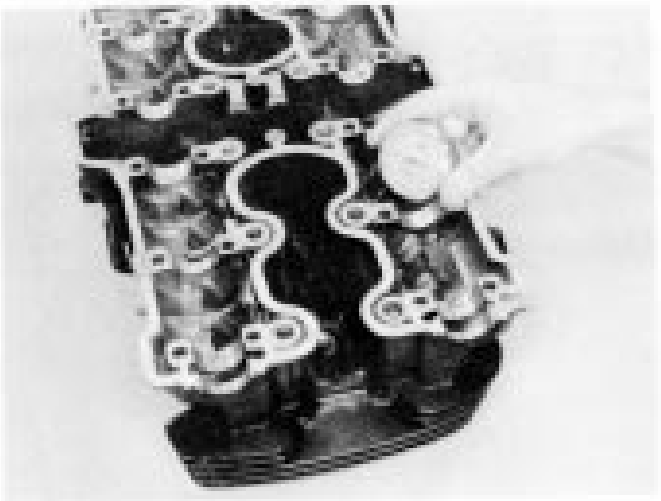
1. **Valve lifter O. D.**
   Inspect the valve lifters for damage or local or excessive wear. Measure the valve lifter O. D.
   SERVICE LIMIT: 27.96 mm (1.100 in)
2. **Valve lifter bore I. D.**
   Check the valve lifter bores for damage or local or excessive wear. Measure the valve lifter bore I. D.
   SERVICE LIMIT: 28.04 mm (1.1039 in)
3. **Cylinder head inspection**
   Check the cylinder head for warpage with a straight edge and a feeler gauge.
   SERVICE LIMIT:0.10 mm (0.0039 in)
4. **Valve spring free length**
   Measure the length of the inner and outer valve springs.
   SERVICE LIMITS:
   Inner (IN/EX): 38.5 mm (1.515 in)
   Outer (IN/EX): 42.7 mm (1.681 in)
5. **Valve stem and valve guide**
   Inspect each valve for bending, burning, scratches or abnormal wear. Measure each valve stem O. D.
   SERVICE LIMIT:
   IN: 5.46 mm (0.2149 in)
   EX: 5.44 mm (0.2141 in)

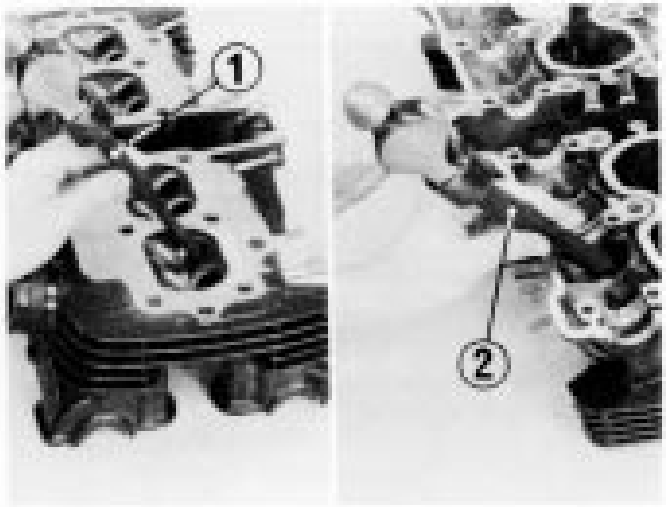
NOTE:

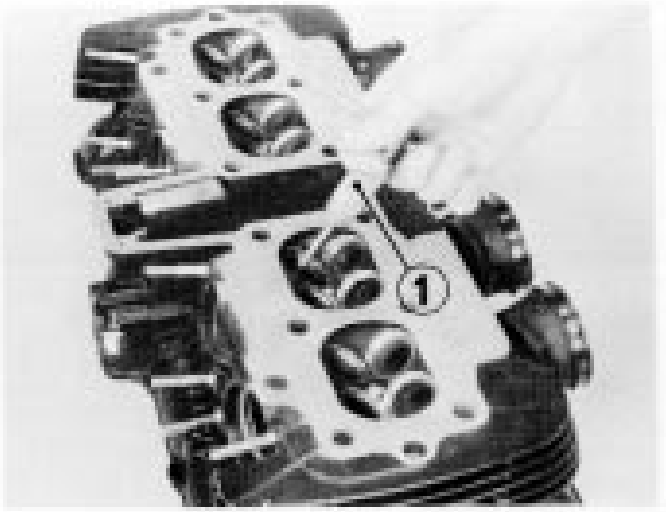
*** Ream the guides to remove any carbon build-up before checking valve clearance.**

(1) Valve guide reamer

6. Measure and record each valve guide I. D. using a ball gauge or inside micrometer.
   SERVICE LIMITS:
   IN: 5.54 mm (0.2181 in)
   EX: 5.54 mm (0.2181 in)
7. Subtract each valve stem O. D. from the corresponding guide I. D. to obtain the stem to guide clearance.
   SERVICE LIMITS:
   IN: 0.07 mm (0.0027 in)
   EX: 0.09 mm (0.0035 in)







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.**

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

NOTE:

* **Reface the valve seats whenever the valve guides are replaced.**

9. Check the cam chain guide, tensioner, tensioner slipper and spring for wear, damage or weakness.

(1) Valve guide remover
(2) Valve guide driver

VALVE GUIDE REPLACEMENT

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

NOTE:

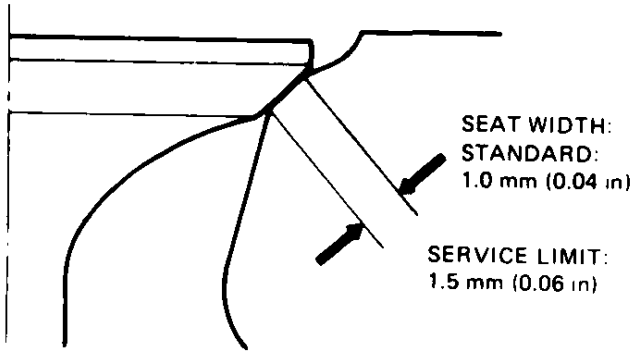
* **When driving out the valve guide, do not damage the head.**

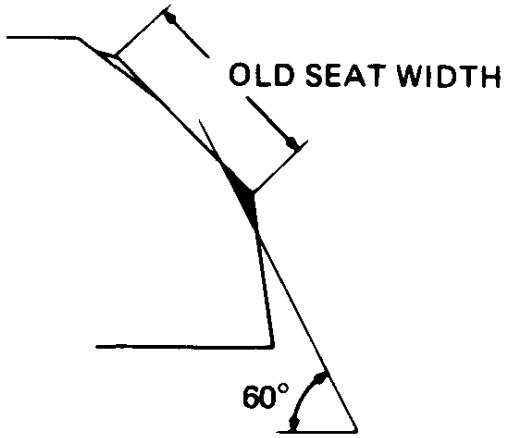
2. Install new oversize valve guide from the top of the head.
3. Ream the new valve guide after installation.

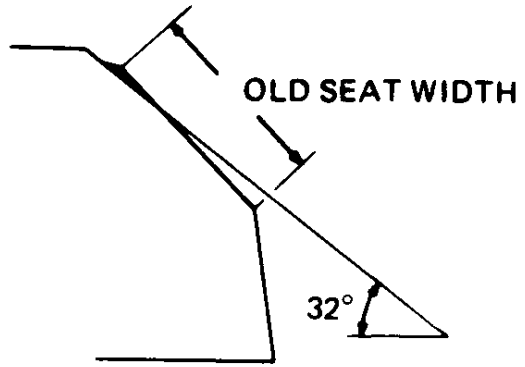
NOTE:

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

4. Clean the cylinder head thoroughly to remove any metal particles.







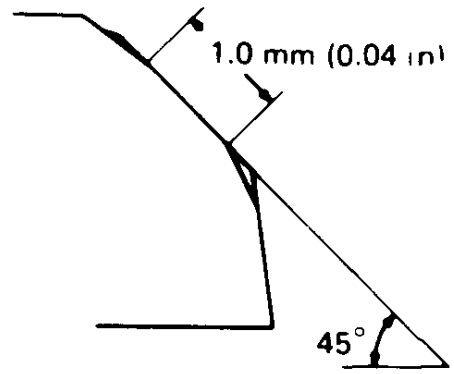
VALVE SEAT INSPECTION/REFACING

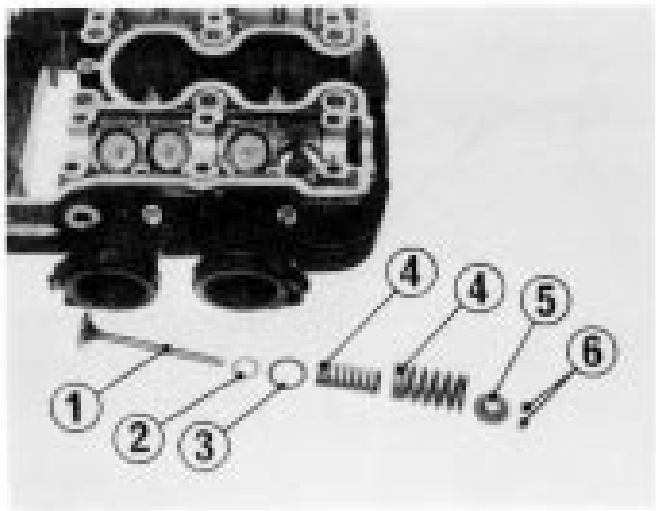
1. Clean all intake and exhaust valves thoroughly to remove carbon deposits.
2. Apply a light coating of valve lapping compound to each valve face. Lap each valve and seat using a rubber hose or other hand-lapping tool.
3. Remove the valve and inspect the face.

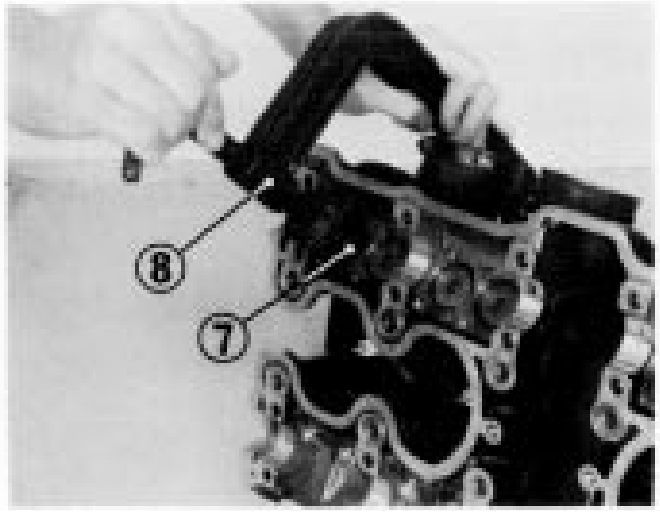
NOTE:

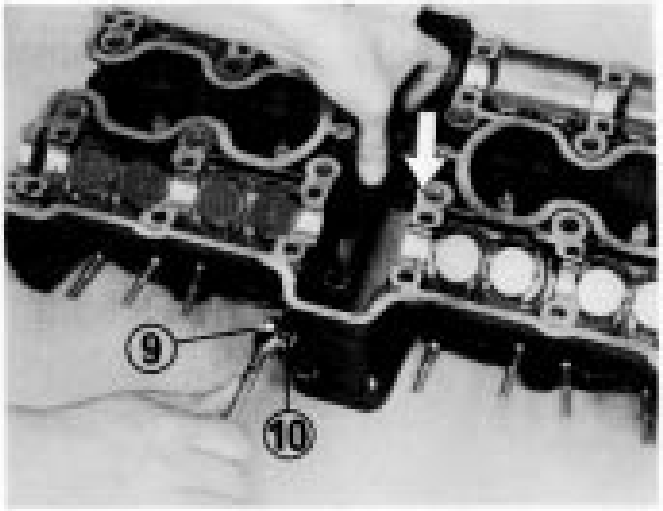
* **The valves cannot be ground. If the valve face is rough, worn unevenly, or contacts the seat improperly, the valve must be replaced.**

4. Inspect the valve seat.
   STANDARD: 0.85–1.10 mm (0.0335–0.045 in)
   SERVICE LIMIT: 1.5 mm (0.059 in)
5. If the seat is too wide, too narrow, or has low spots, the seat must be ground.
6. After cutting the seat, apply lapping compound to valve face, and lap the valve using light pressure.
7. After lapping, wash any residual compound off the cylinder head and valve.









(1) Valve (2) Inner spring seat (3) Outer spring seat (4) Tightly wound coils (5) Retainer (6) Valve cotters.

(7) Valve lifter bore protector
(8) Spring compressor

(9) Lock bolt
(10) Lock nut

CYLINDER HEAD ASSEMBLY

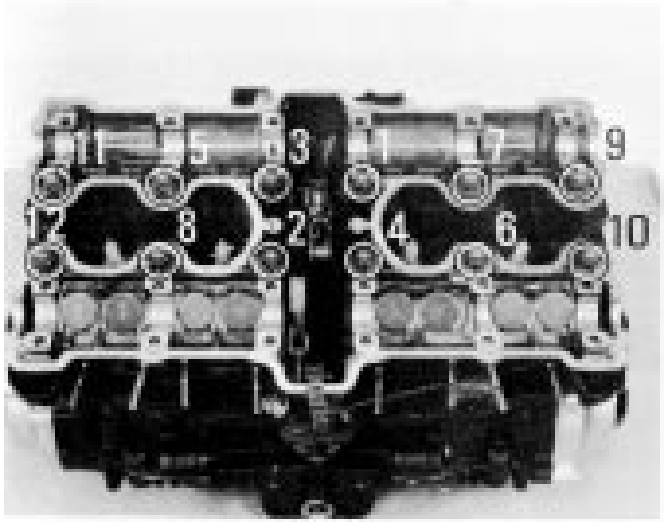
NOTE

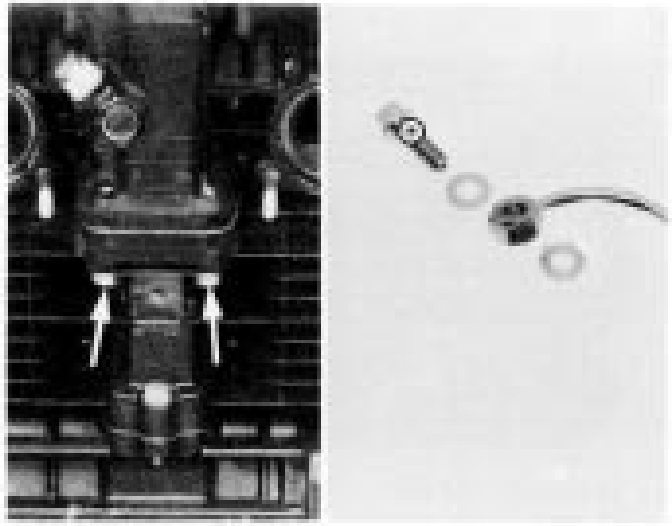
* **Install new valve stem seals when reassembling.**
* **Install the valve springs with the tightly wound coils facing the cylinder head.**

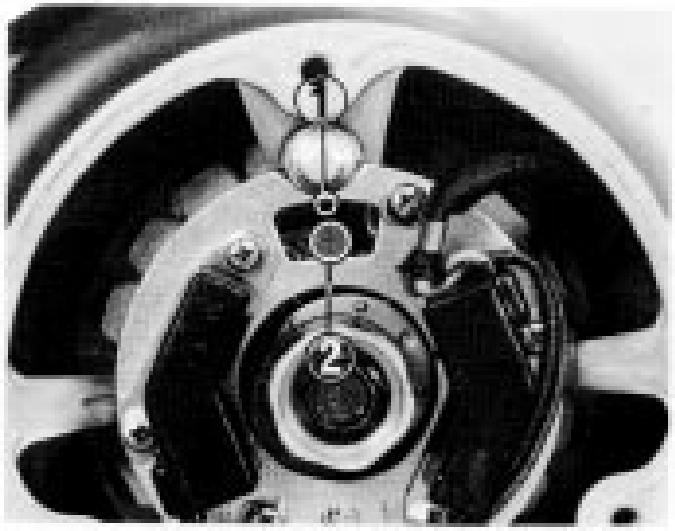
1. Lubricate each valve stem with oil and insert the valve into the valve guide.
2. Install the valve springs, retainers and valve cotters.
3. Tap the valve stems gently with a soft .hammer to firmly seat the cotters.
4. Install the front cam chain tensioner. Push the tensioner and tighten the lock bolt and lock nut.
5. Install the valve lifters and adjustment shims.

NOTE:

* **Make sure that the valve lifters and shims are in their original position.**







CYLINDER HEAD INSTALLATION

1. Clean the cylinder head gasket surface of any gasket material. Install the dowl pins, a new gasket and cam chain guide.

NOTE:

* **When install the gasket with the wide ring edge facing up.**

2. Install the two cam chain tensioner lock nuts.
3. Loosen the adjusting lock nuts, pull up the tensioner all the way up, and tighten the lock nuts.
4. Install the cylinder head and tighten the cylinder head nuts in the sequence shown in 2-3 steps.
   TORQUE: 38 N·m (3.8 kg-m)

NOTE:

* **Apply engine oil to threads and underside of nuts.**

5. Tighten the two bolts at the cam chain housing.
6. Install the oil line.

NOTE:

* **Install the oil bolt having a larger hole at the top.**

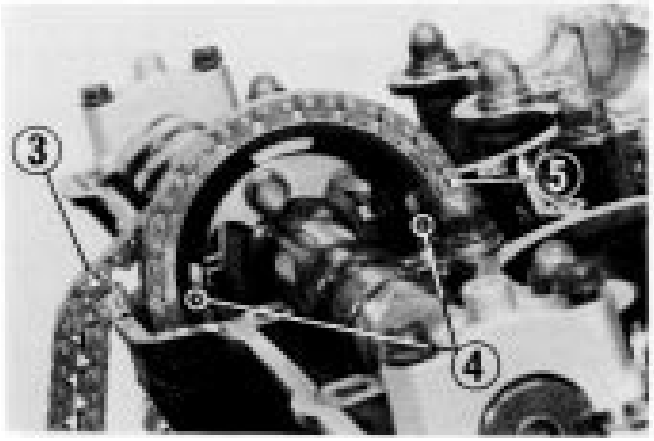
(1) Index mark
(2) "1.4T" mark

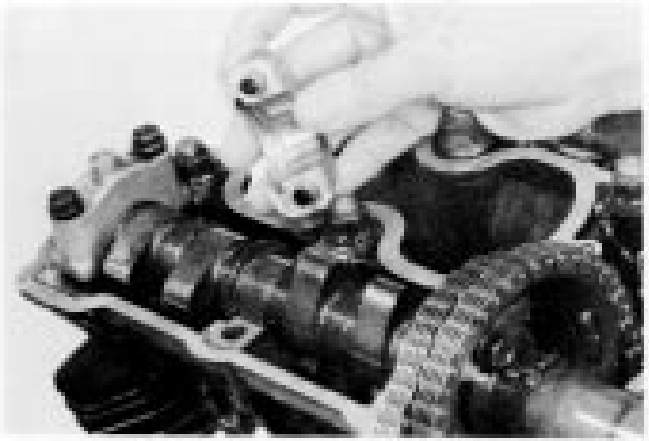
CAMSHAFT INSTALLATION

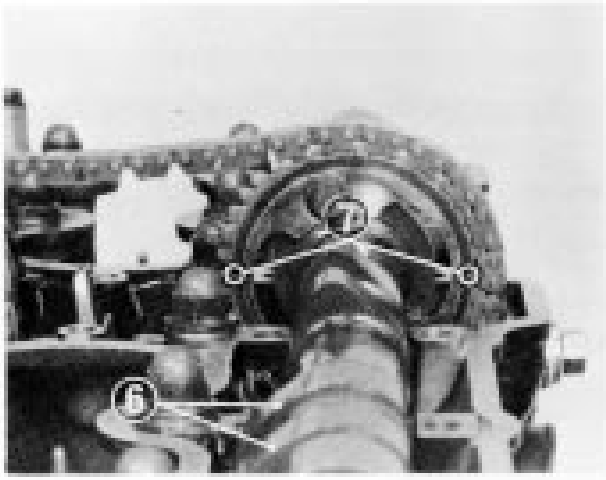
NOTE:

* **Lubricate the camshaft bearings with molybdenum disulfide grease.**

1. Turn the crankshaft counterclockwise until the "1.4T" mark is aligned with the index mark.







(3) Intake cam chain (4) Punch mark (5) Exhaust cam chain

2. Place the intake cam chain over the sprocket, making sure that the punch marks on the sprocket are aligned with the cylinder head mating surface. Position the No. 1 or No. 4 cam lobe toward the spark plug. Install the exhaust camshaft.
3. Place the exhaust cam chain over the exhaust cam sprocket. Loosely install the camshaft holders A and E.

NOTE:

* **Install the holders with the arrow marking facing the front.**

4. Apply sealing agent to one of the camshaft sprocket bolts and loosely install the bolt.
5. Loosely install the camshaft holder D and tachometer drive gear/camshaft holder, aligning the camshaft flange with the groove of the holder D.
6. Turn the crankshaft 360° and install another cam sprocket bolt.

NOTE:

Apply locking agent to the bolt threads and underside of the bolt.

7. Tighten the bolt to the specified torque.
8. Turn the crankshaft further 360° and tighten the bolt previously installed.

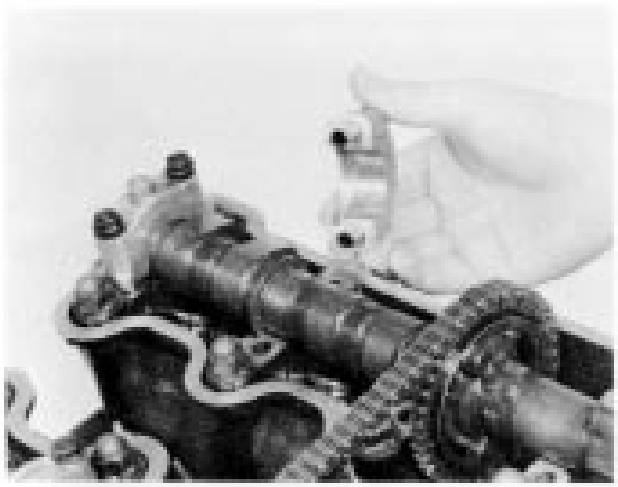
TORQUE: 18–20 N·m (1.8–2.0 kg-m)

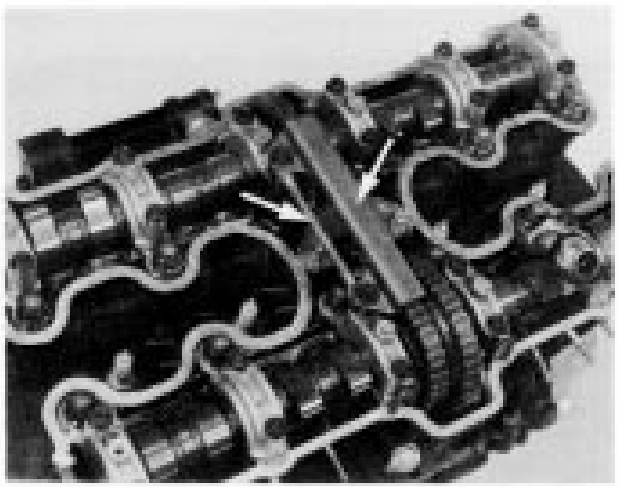
9. Install the remaining camshaft holders and tighten the holder bolts in a criss-cross pattern.

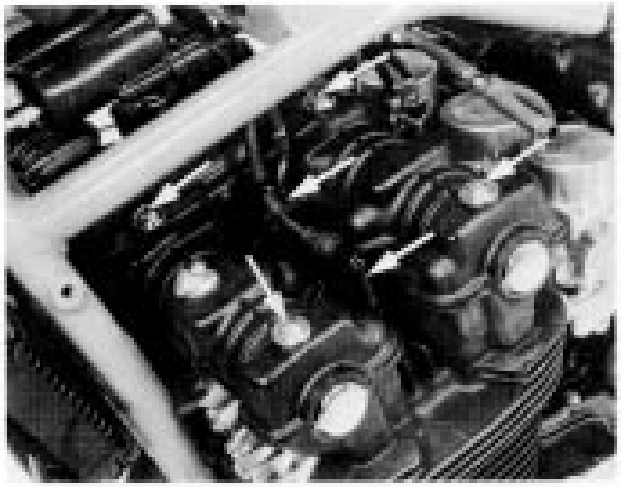
TORQUE: 12–16 N·m (1.2–1.6 kg-m)

(6) No. 1 cam lobes (7) Punch marks

10. Check that the "1.4T" mark is aligned with the index mark and the No. 1 cylinder cam lobes face the spark plugs. Also make sure that the punch marks on the exhaust are aligned with the cylinder head mating surface.
11. Align the punch marks on the intake cam sprocket with the cylinder head mating surface , then place the intake cam chain over the sprocket.
12. Install the intake camshaft with the No.1 cylinder cam lobes facing the spark plugs.
13. Loosely install the cam sprocket bolts.







NOTE:

* **The camshafts can be assembled as a unit when the cam sprockets are not removed.**

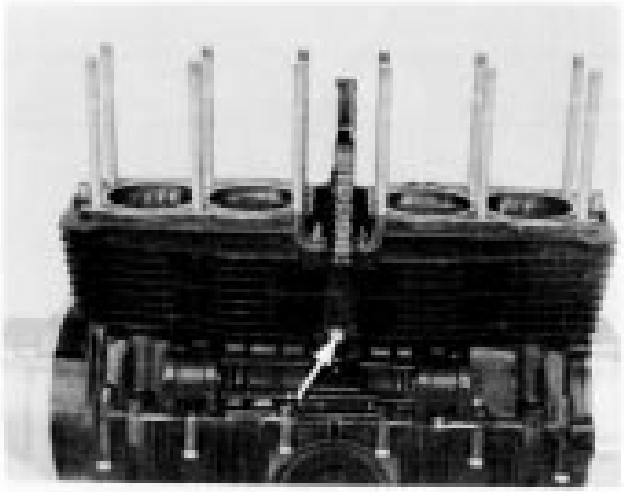
14. Install the camshaft holders F and L, Do not tighten at this time.
15. Loosely install the holders G and K with the flange of the camshaft aligned with the groove of the holder K. Install and tighten the camshaft sprocket bolts. Following the same procedures described for exhaust camshaft installation.
16. Tighten the camshaft holders in a crisscross pattern in 2-3 steps.
17. Check the location of the cam sprocket and crankshaft.
18. Install the rear cam chain guide plate and oil pool cap.
19. Install the oil pipe and cam chain guide with the B, C, H and J holder bolts. Tighten the bolts in a criss-cross pattern in 2-3 steps.
20. Adjust valve clearance.
21. Pour clean engine oil into the cylinder head until the cam lobes are submerged in the oil.
22. Check the cylinder head cover gasket for deterioration or damage. Apply sealing agent to the gasket surfaces.

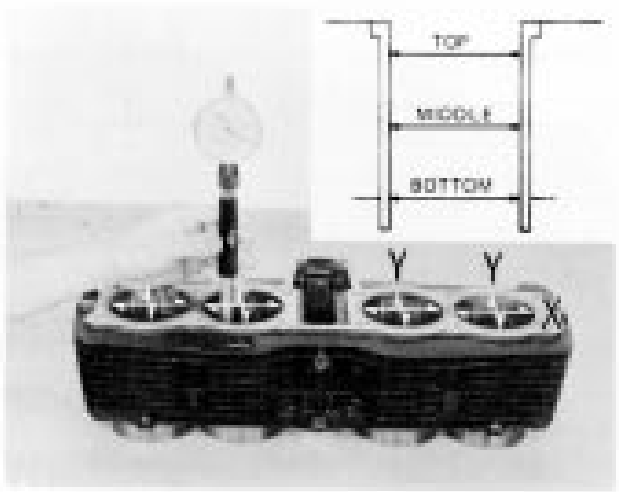
NOTE:

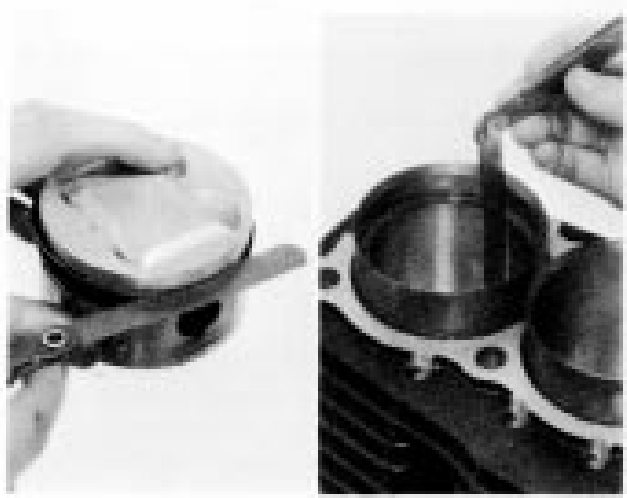
* **Clean the gasket before applying sealing agent.**

23. Install the pulser generator cover.
24. Adjust cam chain tensioner.
25. Install the cylinder head cover.
26. Install the spark plug caps.

7. CYLINDER/PISTON







CYLINDER REMOVAL

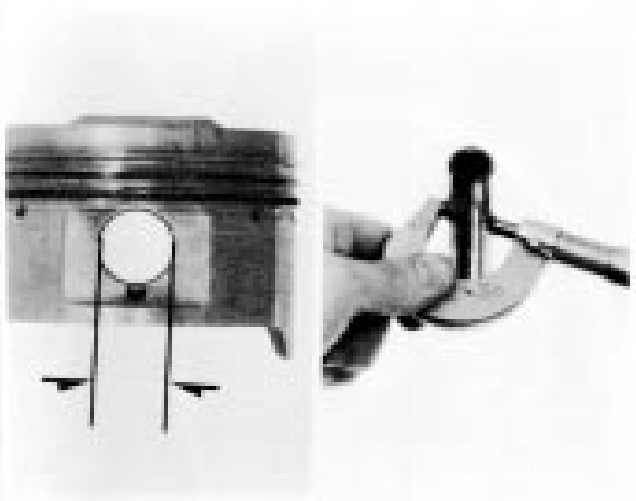
1. Remove the cylinder head.
2. Remove the cylinder bolt.
3. Remove the cylinder.
4. Remove the cam chain tensioner from the cylinder.
5. Remove the cylinder gasket and dowel pins.
6. Remove the piston pin clips, piston pins and pistons.

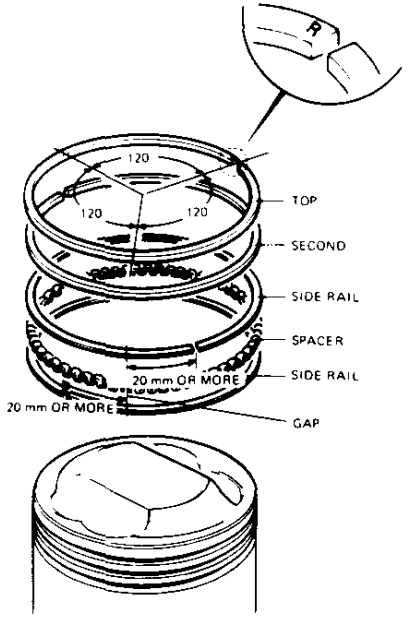
NOTE:

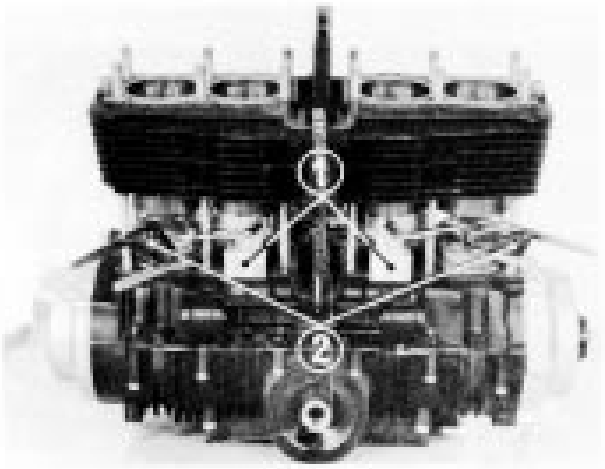
* **Do not allow clips to fall into the crankcase.**
* **Mark the pistons to indicate the cylinder position.**

INSPECTION:

1. **Cylinder**
   Inspect the cylidner bore for wear or damage. Measure the cylinder I. D. at three levels in two directions crosswise of each other.
   SERVICE LIMIT: 70.10 mm (2.759 in)
   Inspect the top of the cylinder for warpage.
   SERVICE LIMIT: 0.10 mm (0.0039 in)
2. **Cam chain tensioner**
   Inspect the slipper of the cam chain tensioner for damage or excessive wear. Inspect the tension spring for weakness.
3. **Piston/piston ring inspection**
   Inspect the piston ring-to-groove clearance with a feeler gauge.
   SERVICE LIMITS:
   Top/2nd: 0.09 mm (0.0035 in)
   For race:
   Top/2nd: 0.07 mm (0.0027 in)
4. **Piston ring end gap**
   Insert each piston ring into the cylinder and inspect the end gap.
   SERVICE LIMITS:
   Top/2nd: 0.5 mm (0.0196 in)
   Oil (side rail): 1.1 mm (0.043 in)
   For race:
   Top/2nd: 0.45 mm (0.0018 in)
   Oil (side rail): 1.0 mm (0.039 in)







5. Piston O. D.

Measure the piston O. D. at the skirt.

NOTE:

* **Measurements should be taken 10 mm (0.4 in) from the bottom.**

SERVICE LIMIT:69.90mm (2.7519 in)
For race: 69.94 mm (2.7535 in)

6. Piston pin O. D. and piston pin bore

Measure the piston pin O. D.
SERVICE LIMIT:16.98mm(0.6685 in)
Measure the piston pin hole I. D.
SERVICE LIMIT: 17.03 mm (0.6704 in)
For race: 17.015 mm (0.6698 in)
Determine the piston-to-piston pin clearance.
SERVICE LIMIT: 0.04 mm (0.0015 in)
For race: 0.03 mm (0.0012 in)

ASSEMBLY

1. Install the piston rings. The rings should rotate freely.

NOTE:

* **All rings should be installed with the markings facing up.**
* **Clean the ring grooves thoroughly before installing the piston rings.**
* **Space the piston ring end gaps 120 degrees apart.**
* **Do not align the gaps in the oil rings.**

2. Apply molybdenum disulfide grease to the connecting rod small ends. Install the piston and connecting rod assemblies with the "IN" marks on the pistons facing the rear.

(1) Piston base
(2) Piston ring compressor

NOTE:

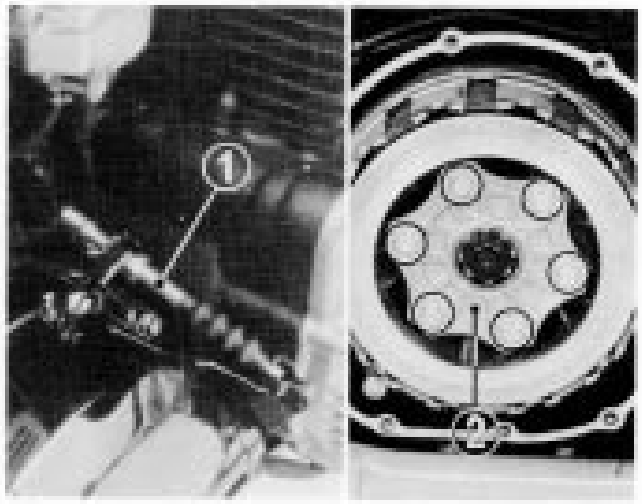
* **Install the pistons in their original locations.**
* **Do not allow the piston pin clips to fall into the crankcase.**
* **Replace the piston pin clips with new ones whenever disassembled.**

3. Install the cam chain tensioner in the cylinder. Install the dowel pins and new gasket on the upper crankcase.

NOTE:

* **Before using the special tools, position the No.2 and No.3 pistons at T. D. C. (Top Dead Center).**

8. CLUTCH



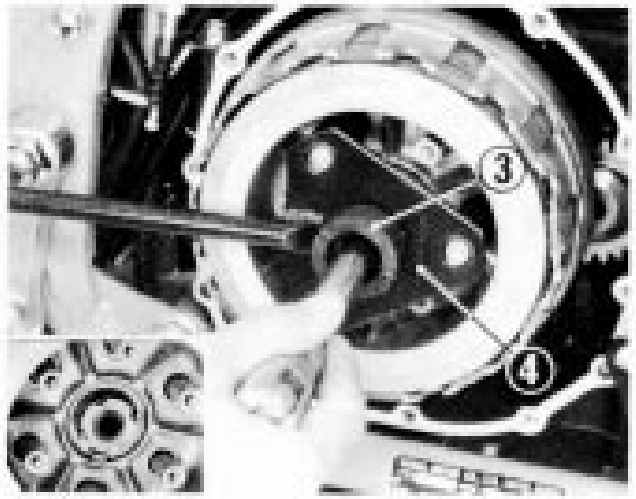
(1) Clutch cable (2) Lifter plate

* **Avoid damaging the pistons and piston rings when installing the cylinder.**

DISASSEMBLY

This section covers removal and installation of the clutch. This operation can be accomplished with the engine mounted in the frame.

1. Drain oil from the engine.
2. Disconnect the clutch cable from the clutch arm.
3. Remove the clutch cover.

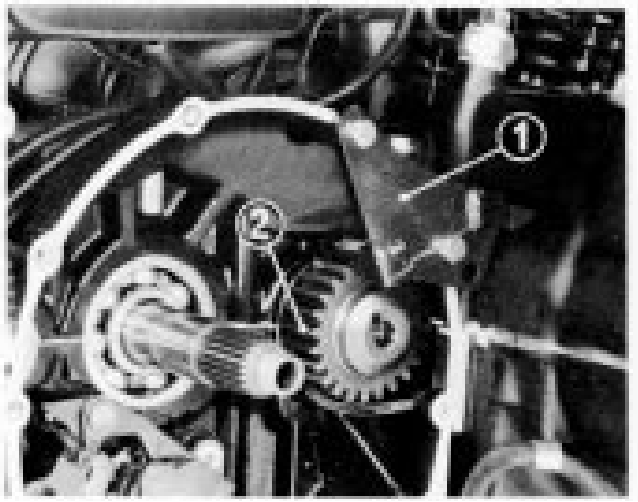


(3) Lock nut wrench
(4) Lock nut holder

NOTE:
Hold the mainshaft when servicing the clutch as follows:

On-frame service: Shift transmission into gear and apply rear brake.
Off-frame service: Use the Universal Holder.

5. Remove the 6 bolts and remove the clutch lifter plate, lifter guide and release bearing.
6. Straighten the tab of the lock washer

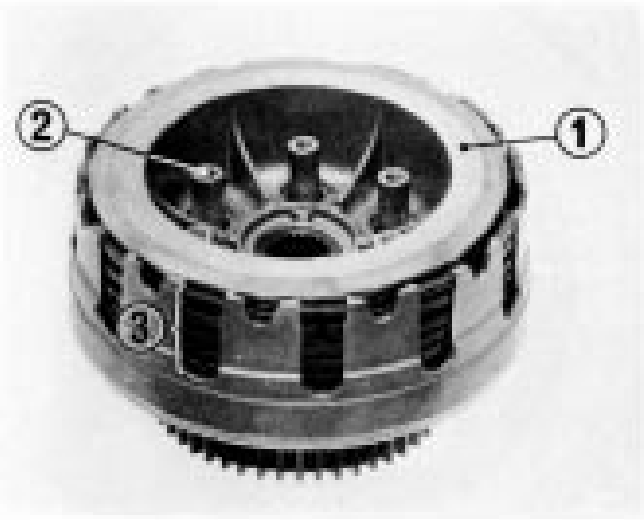


(1) Primary drive gear holder
(2) Primary drive gear

and loosen the lock nut with the special tool "Lock Nut Wrench". The clutch can now be removed as a unit.

PRIMARY DRIVE GEAR REMOVAL

1. Hold the primary gear with the special tool "Primary Gear Holder".
2. Remove the lock bolt using a 10 mm "Socket Bit".



(1) Clutch center (2) Pressure plate
(3) Plates A and B, and discs A and B

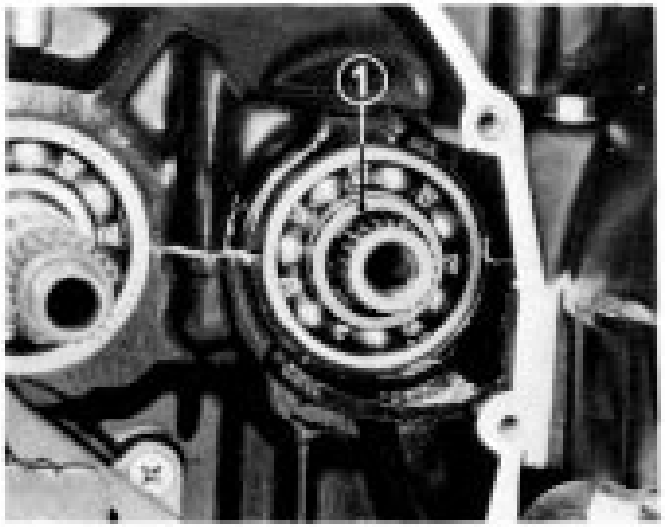
INSPECTION:

1. Replace the clutch discs if they show signs of scoring or discoloration.
2. Check the clutch plate for warpage on a surface plate.

NOTE:

* **Distorted or damaged plate can cause clutch slippage.**

3. Measure the clutch spring free length. Replace if necessary.

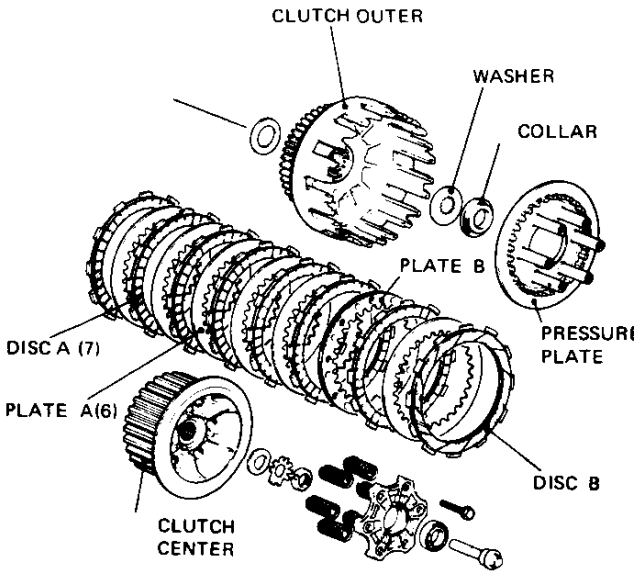


(1) Collar

ASSEMBLY

1. Install the collar and primary drive gear.
2. Tighten the primary drive gear with the special tools "Primary Drive Gear Holder" and "Socket Bit".

   TORQUE: 80–100 N·m (8.0–10.0 kg-m)

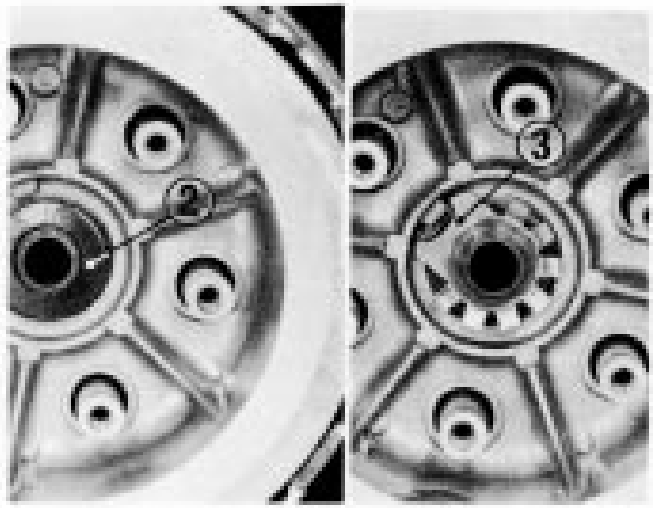


3. Install the thrust washer and clutch outer. Install the following parts in the clutch outer in this written order:

- Washer and collar
- Pressure plate
- Clutch discs A (6) and plates A (5) alternately
- Plate B (spring plate)
- Disc A and plate A
- Disc B
- Clutch center

NOTE:

* **Before assembling, apply a thin coat of clean engine oil to the clutch discs and plates, assembling them alternately.**

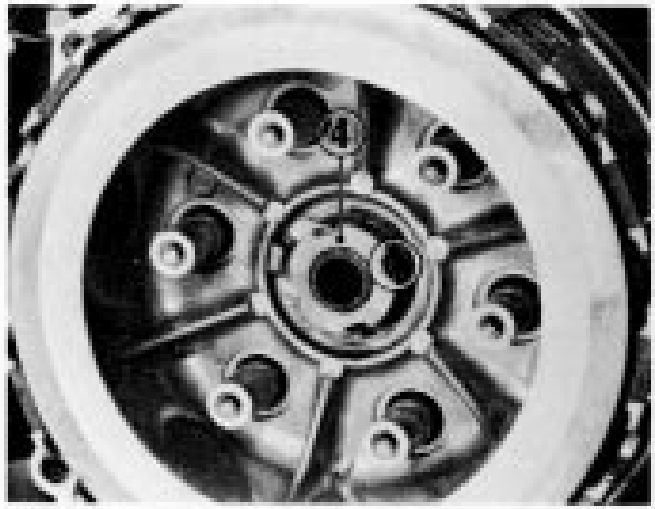


(2) Washer (3) Lock washer

4. Install the washer.

NOTE:

* **Install the washer with the marking "OUTSIDE" facing outside.**



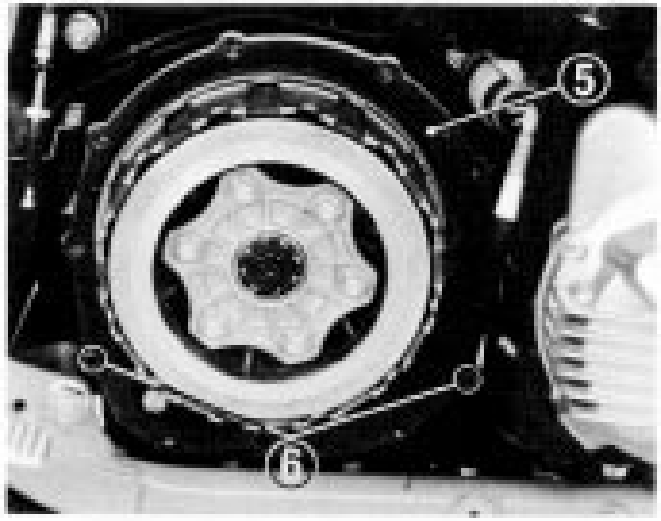
(4) Lock nut

5. Install the lock washer as shown and torque the lock nut.

TORQUE: 45–55 N·m(4.5–5.5 kg-m

Bend the tab of the lock washer up into the groove of the lock nut.

9. GEARSHIFT LINKAGE



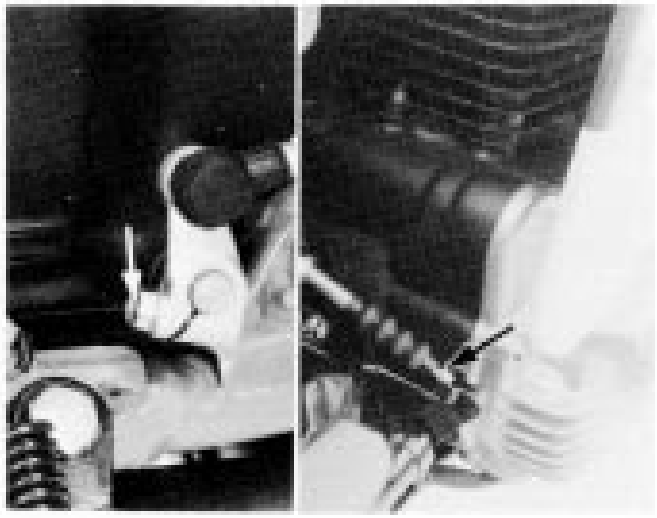
(5) Gasket (6) Dowel pins

6. Install the clutch springs, lifter plate, lifter guide and release bearing. Install the bolts and tighten.

NOTE:

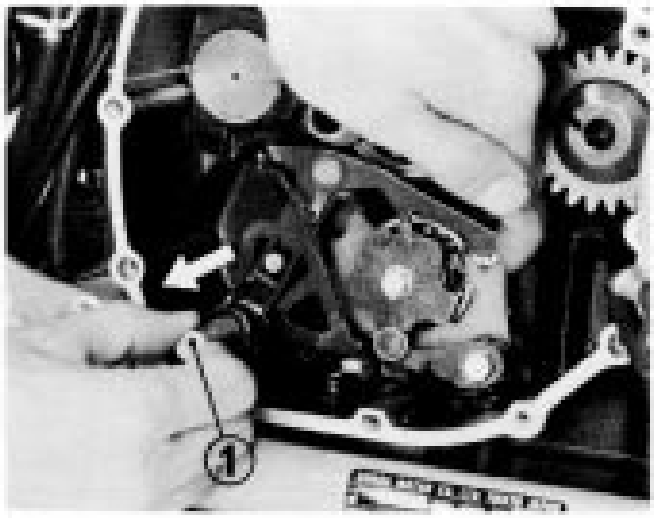
* **Tighten the bolts in a crisscross pattern in 2-3 steps.**
* **Make sure that the clutch lifter guide oil hole is not blocked.**

7. Install the dowel pins, gasket and clutch cover.
8. Adjust the clutch lever free play (Page 33).



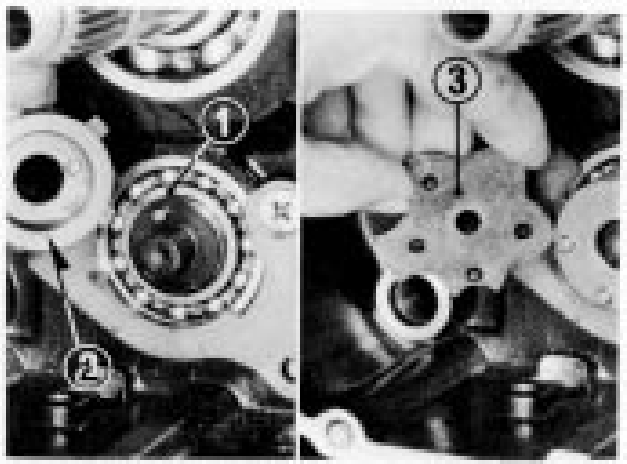
DISASSEMBLY

1. Drain oil from the engine.
2. Remove the gearshift pedal.
3. Disconnect the clutch cable from the clutch arm.
4. Remove the clutch cover and clutch.



(1) Gearshift spindle assembly

5. Withdraw the gearshift spindle.
6. Remove the drum stopper arm and spring.
7. Remove the cam plate, stopper pin and roller stopper plate.



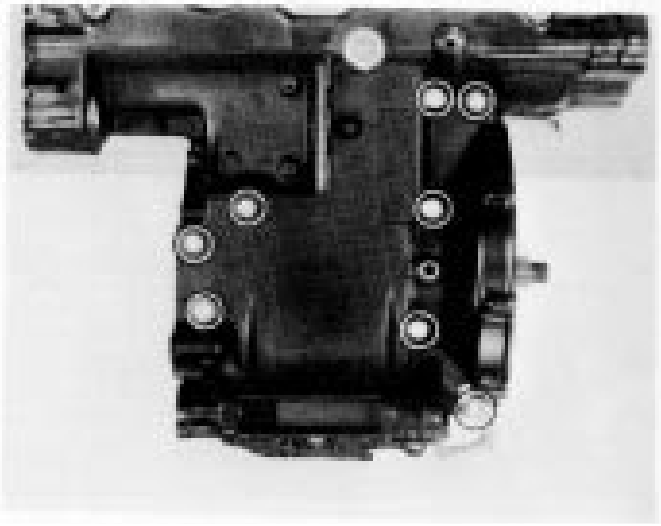
(1) Collar (2) Drum center plate
(3) Cam plate

ASSEMBLY

1. Install the collar on the drum.
2. Install the drum center plate on the drum with the hole in the plate aligned with the pin on the drum.
3. Install the cam plate with the holes in the plate aligned with the pins on the center plate. Install the bolt and tighten.
4. Install the return spring and drum stopper arm and secure with the bolt.
5. Install the gearshift spindle and return spring. Check the linkage for smooth operation by rotating the gearshift spindle.

10. CRANKCASE

Item to be serviced	Items to be removed
Crankshaft and connecting rod	Cylinder head, cylinder, piston, primary shaft, AC generator, oil pump, clutch cover.
Primary shaft	Oil pump, clutch cover L crankcase cover, AC generator rotor
Transmission	Clutch, gearshift linkage, oil pump, L crankcase cover, AC generator rotor

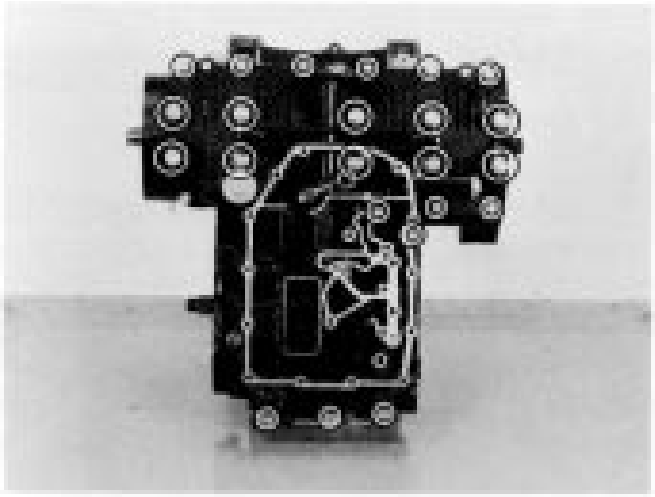


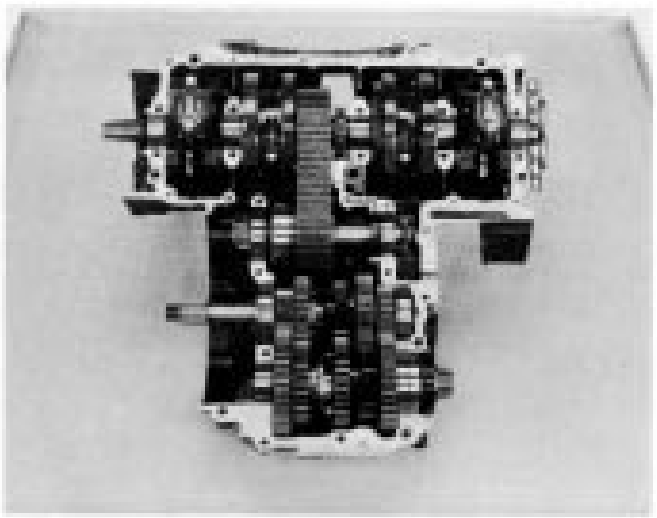
NOTE:

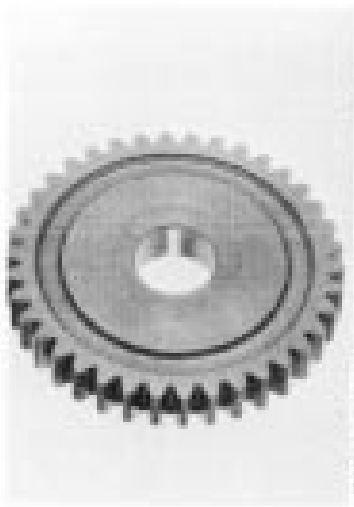
* **To repair the crankshaft, connecting rod, primary shaft and transmission, it is necessary to separate the crankcase halves.**
* **Remove the above parts before disassembling the crankcase.**
* The crankshaft can be removed with the spark advancer. Do not try to disassemble further.
* **The starter clutch is adhered and press fitted to the crankshaft. Do not try to remove it from the crankshaft.**

CRANKCASE SEPARATION

1. Remove the parts necessary to separate the crankcase halves.
2. Remove the 8 upper crankcase bolts.







3. Turn the engine upside down and remove the lower crankcase bolts. Separate the upper and lower crankcases.

NOTE:

* **Remove the bolts in two or more steps and in a crisscross pattern to prevent warpage.**

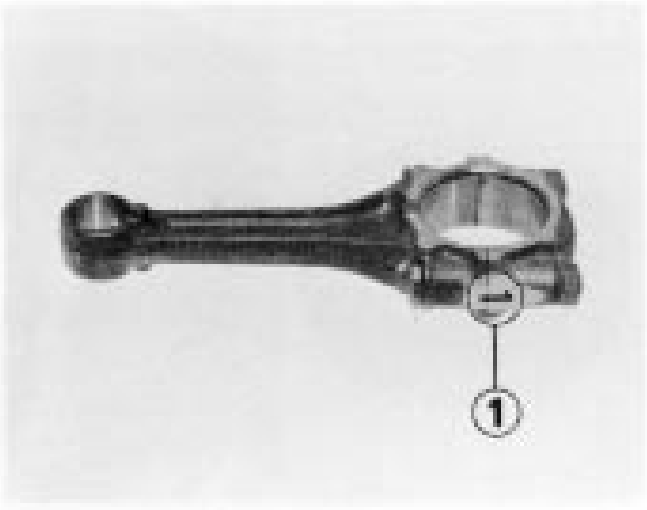
4. Remove the mainshaft and countershaft.
5. Remove the bearing stopper; remove the shift fork shaft, shift forks and shift drum.
6. Remove the primary shaft from the primary chain by pulling the shaft up.
7. Remove the crankshaft from the upper crankcase.

INSPECTION:

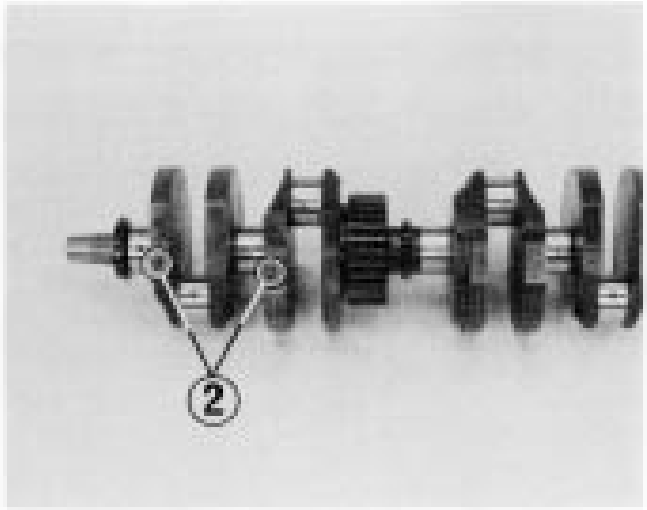
Perform the following inspections and replace any damaged parts:

- Check each gear for damage or other defects.
- Check the shift drum for damage on the end and guide grooves.
- Check for shift fork for damage or other abnormalities.
- Check the primary shaft for damage or wear.
- Remove the oil pipe and tensioner fluid valve and clean in solvent.
- Check the oil pipe for clogging.
- Check the cam and primary chains for wear or damage.
- Check each bearing insert for damage, separation or other defects.
- Measure the connecting rod and main bearing oil clearances with a Plastigauge.

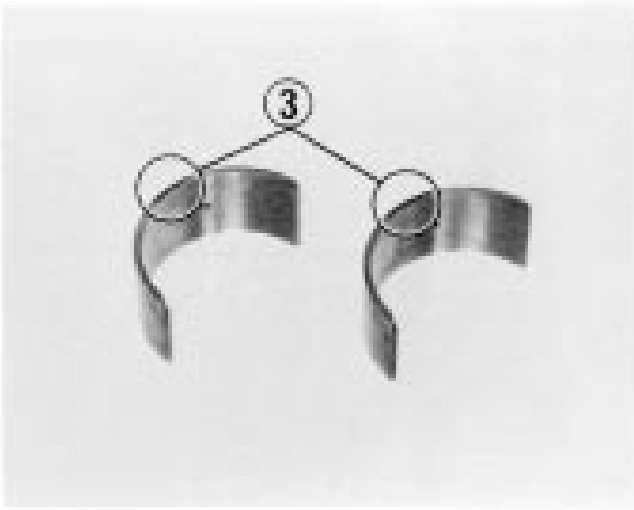
SERVICE LIMITS:
Connecting rod: 0.065 mm (0.0025 in)
Main bearing: 0.07 mm (0.0027 in)
FOR RACE:
0.35–0.45 mm (0.0013–0.0017 in)



(1) I. D. code



(2) O. D. code



(3) Color code

BEARING SELECTION

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

Connecting rod bearing

1. Determine and record the corresponding rod I. D. code number.
2. Determine and record the corresponding crankpin O. D. code number (or measure the crankpin O. D.).

NOTE:

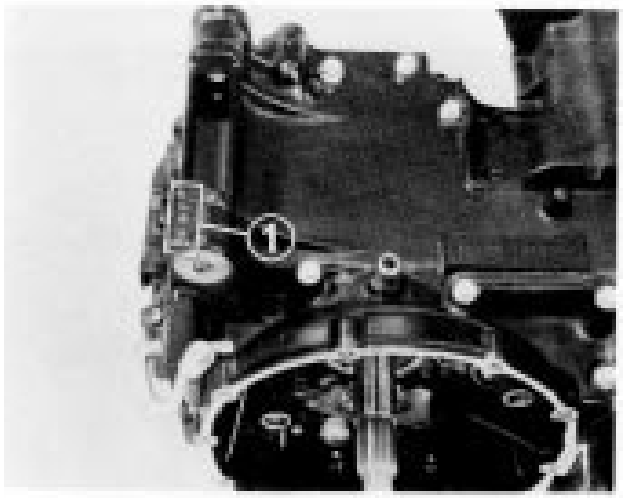
* **The crankpin O. D. is identified by code "1", "2" or "3" stamped on the crank weight.**

BEARING INSERT THICKNESS:

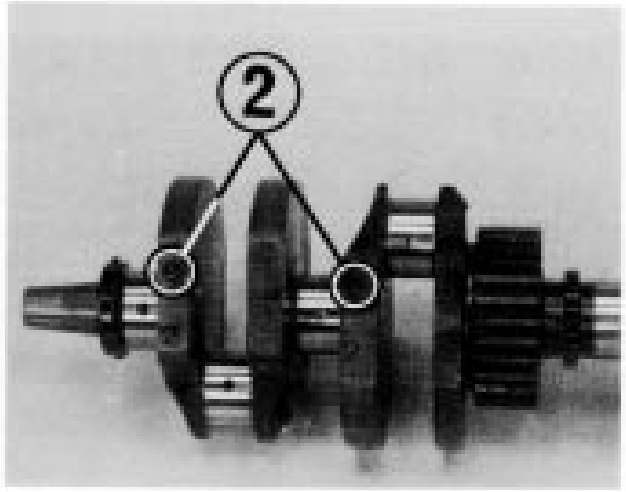
A (Blue)	:	1.502–1.506 mm (0.0591–0.0593 in)
B (Black)	:	1.498–1.502 mm (0.0590–0.0591 in)
C (Brown)	:	1.494–1.498 mm (0.0588–0.0590 in)
D (Green)	:	1.490–1.494 mm (0.0587–0.0588 in)
E (Yellow)	:	1.486–1.490 mm (0.0585–0.0587 in)

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

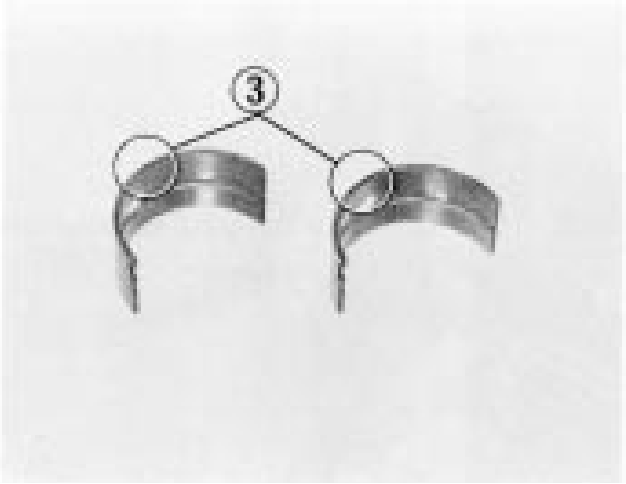
			CRANKPIN O.D. CODE NO.		
			1	2	3
			35.992–36.000 mm	35.984–35.992 mm	35.975–35.984 mm
CONNECTING ROD I.D. CODE NO.	1	39.000–39.008 mm	E (Yellow)	D (Green)	C (Brown)
	2	39.008–39.016 mm	D (Green)	C (Brown)	B (Black)
	3	39.016–39.024 mm	C (Brown)	B (Black)	A (Blue)



(1) I. D. code



(2) O. D. code



(3) Color codes

Main bearing

1. Determine and record the crankcase I. D. alphabetic codes.

NOTE:

* **The three alphabetic codes "A", "B" and "C" on the end of the upper crankcase indicate the code numbers for the main journal I. D.**

2. Determine and record the corresponding main journal O. D. codes (or measure the main journal O. D.).

NOTE:

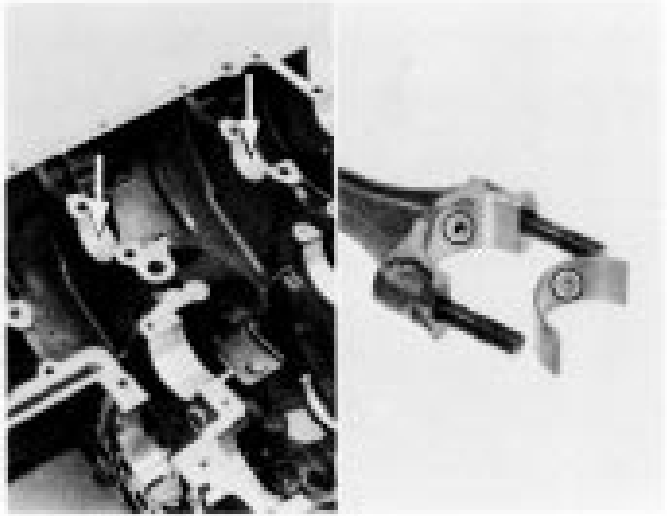
* **Letter A, B or C on each crank weight is the code for the adjacent main journal O.D.**

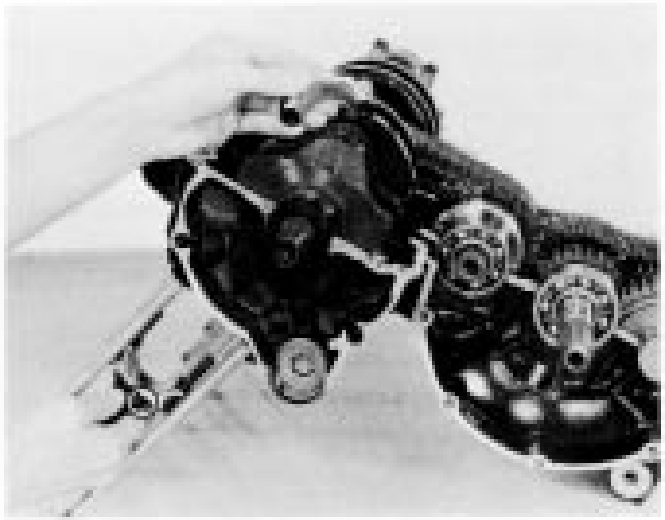
MAIN BEARING INSERT THICKNESS:

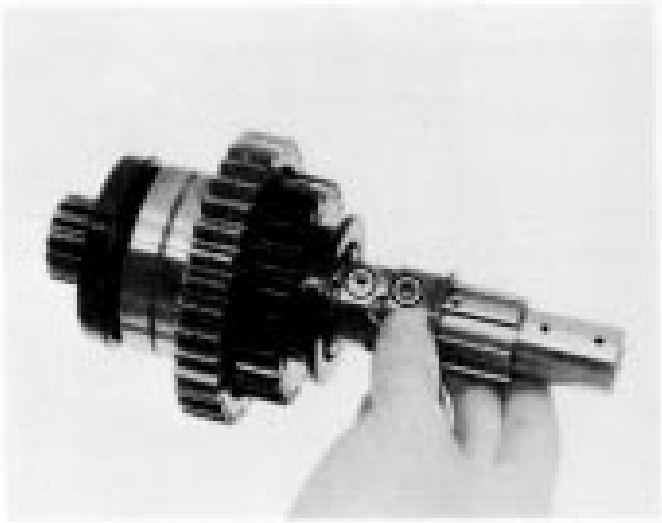
A (Black)	1.498–1.502 mm (0.0590–0.0591 in)
B (Brown)	1.494–1.498 mm (0.0588–0.0590 in)
C (Green)	1.490–1.494 mm (0.0587–0.0588 in)
D (Yellow)	1.486–1.490 mm (0.0585–0.0587 in)
E (Blue)	1.502–1.506 mm (0.0591–0.0593 in)

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

			MAIN JOURNAL O.D. CODE NO.		
			A	B	C
			35.992–36.000 mm	35.984–35.992 mm	35.975–35.984 mm
CASE I.D. CODE NO.	A	39.000–39.008 mm	D (Yellow)	C (Green)	B (Brown)
	B	39.008–39.016 mm	C (Green)	B (Brown)	A (Black)
	C	39.016–39.024 mm	B (Brown)	A (Black)	E (Blue)







ASSEMBLY

1. Install the main bearings into the upper and lower crankcases. Apply molybdenum disulfide grease to the bearings. Install the crankshaft with the cam chain and primary chain.
2. Align the hole in the bearing insert with the hole in the connecting rod. Install the connecting rod and cap bearing inserts. Apply molybdenum disulfide grease to the connecting rod bearings.
3. Install the connecting rods and bearing caps.

NOTE:

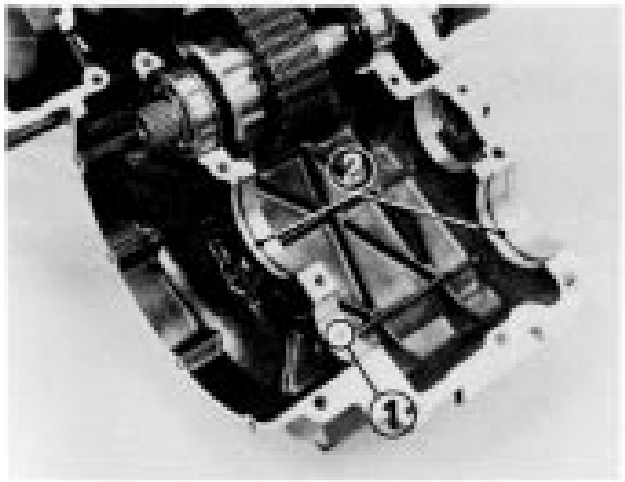
* **Be sure the connecting rods are installed in their correct position and the oil holes point to the rear.**
* **Cross reference the rod and cap I. D. codes to insure original assembly.**

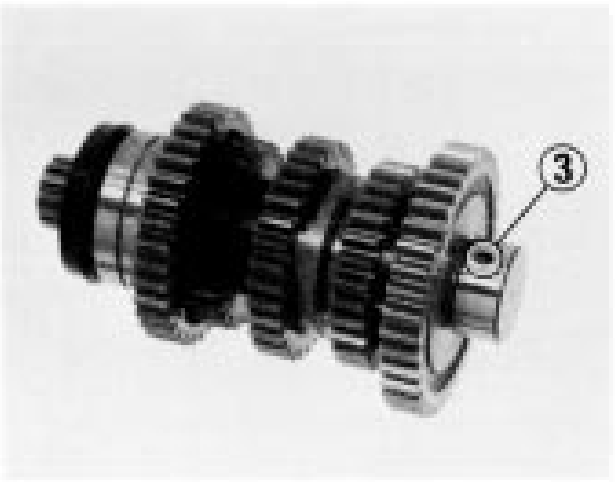
4. Torque the connecting rod bearing cap nuts.
   TORQUE: 32 N·m (3.2 kg-m)

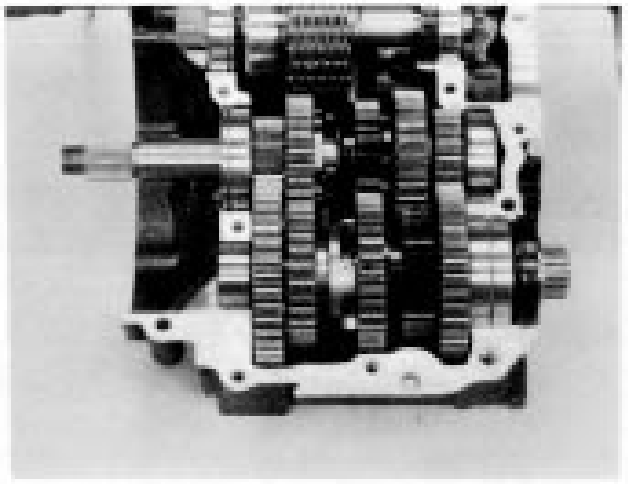
NOTE:

* **Tighten the rod bearing cap nuts in two or more steps.**
* **After tightening the nuts, check that the rod moves freely without binding.**

5. Install the primary shaft.
6. Align the holes in the M4 and M5 bushings with the holes in the mainshaft. Align the hole in the C5 gear with the hole in the countershaft.







(1) Dowel pin (2) Set rings

7. Install the dowel pin and set rings. Align the hole in the C3 gear bushing with the hole in the countershaft, and oil holes in the C4 and C5 gears with the oil holes in the countershaft.
8. Apply molybdenum disulfide grease to the fork grooves of the shifter gears (M3, C4, C5).

(3) Hole

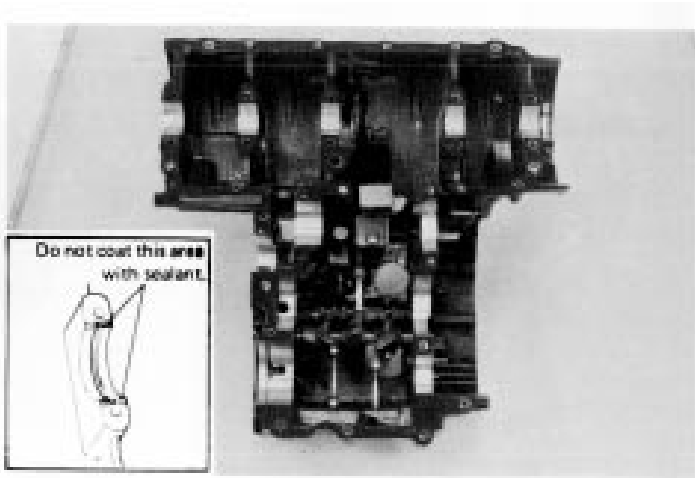
8. Align the hole in the countershaft bearing with the dowel pin. Install the assembly in the upper crankcase.

NOTE:

* **Install the countershaft oil seal carefully so that the oil seal lip is seated completely on the bearing before assembling the lower crankcase.**

9. Install the gearshift drum, shift forks and shift fork shaft.
10. Install the gearshift linkage and shift the gears into 1st.
11. Engage the C4 gear with the C1 gear with the gear dogs of the other gears out of engagement.

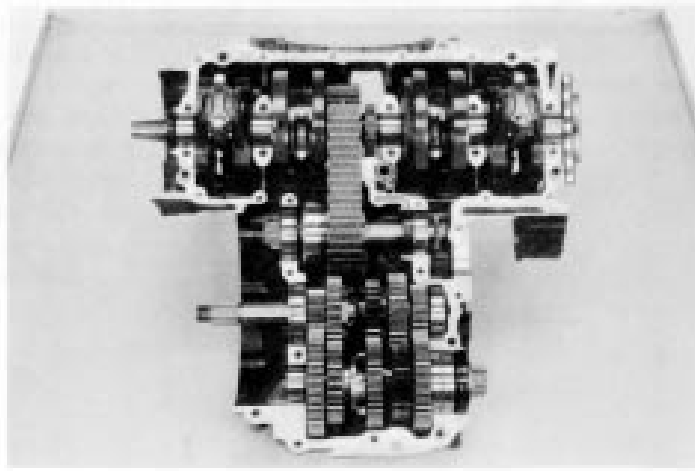
12. Remove any gasket material from the crankcase mating surfaces. Apply liquid sealant to the mating surfaces.



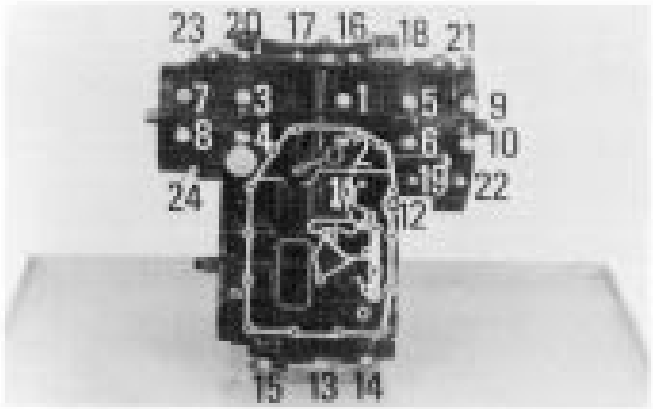
NOTE:

* **Do not apply sealant to the portion near the main bearings.**
* **Make sure that the oil orifices are open and not clogged.**

13. Apply liquid sealant only where shown.



11. CARBURETOR



14. Assemble the upper and lower crankcases aligning the shift fork ends with the shift fork grooves in the gears.
15. Tighten the lower crankcase bolts in the sequence shown:
    6 mm bolt: 10–14 N·m (1.0–1.4 kg-m)
    8 mm bolt: 21–25 N·m (2.1–2.5 kg-m)
    10 mm bolt: 45–50 N·m (4.5–5.0 kg-m)

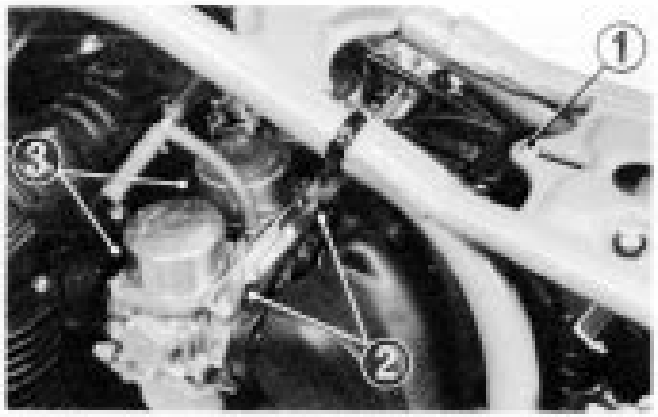
NOTE:

* **The 10 crankshaft bolts should be tightened with plain washers under the heads of the bolts. Apply molybdenum disulfide grease to the underside of the bolts and bolt threads.**

16. Torque the upper crankcase bolts.

NOTE:

* **Apply molybdenum disulfide grease to the threads of the oil gallery cap when it is removed.**



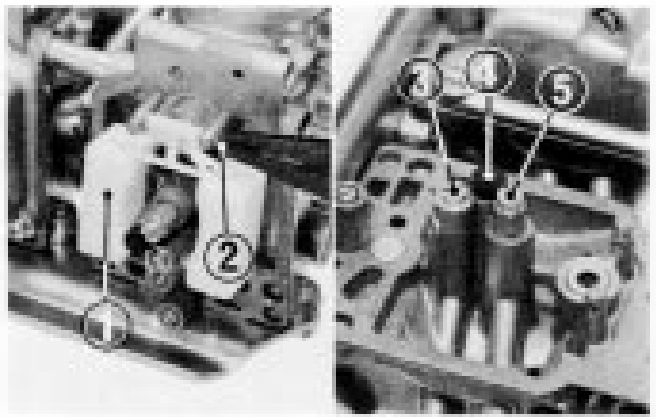
(1) Air cleaner mounting bolt (2) Connecting bands (3) Insulator bands

CAUTION:

* ***Use caution when working with gasoline.***
* ***When disassembling the fuel system parts, note the locations of the O-rings. Replace them with new ones on reassembly.***
* ***The float bowls have drain plugs that can be loosened to drain residual gasoline. Before disassembling, drain gasoline from the float bowls.***

CARBURETOR REMOVAL

1. Turn the fuel valve OFF and disconnect the fuel tube from the carburetors.
2. Remove the seat, fuel tank and front fairing.



(1) Float (2) Float pin (3) Primary main jet (4) Slow jet plug (5) Secondary main jet

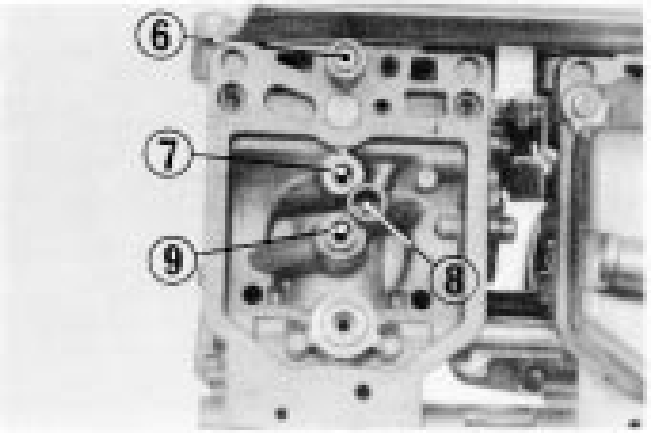
3. Move the air cleaner toward the rear by loosening the mounting bolts.
4. Loosen the carburetor insulator and connecting bands.
5. Remove the carburetor assembly.
6. Disconnect the throttle cables and choke cable.

FLOAT CHAMBER DISASSEMBLY

1. Remove the float arm pin.
2. Remove the float and float valve.
3. Remove the secondary main jet.
4. Remove the primary main jet.
5. Remove the slow jet plug.

NOTE:

* **The slow jet cannot be removed, it is a press fit.**



(6) Pilot screw (7) Primary nozzle
(8) Slow jet (9) Needle jet holder

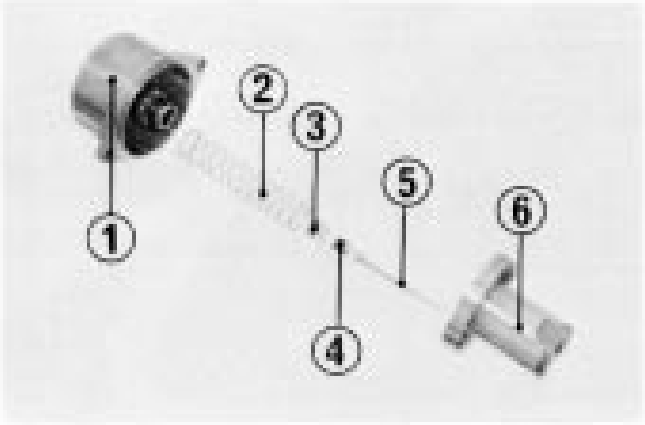
6. Remove the primary nozzle.
7. Remove the jet needle holder and needle jet by tilting the carburetor.

NOTE:

* **If the needle jet is difficult to remove, carefully press the needle jet from the cylinder side with a soft material stick.**
* **Before removing the pilot screw, record the number of turns until it seats. Do not damage the pilot screw threads when removing the plain washer and O-ring.**

INSPECTION:

- Check the float valve and valve seat for damage or clogging.
- Check each jet and body passage for clogging with compressed air.



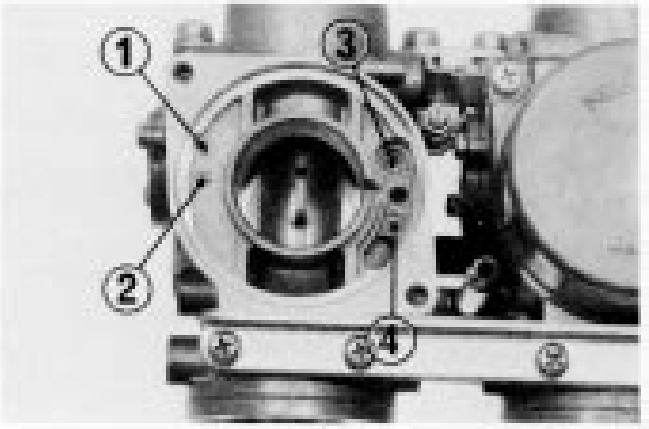
(1) Vacuum cylinder (2) Compression spring (3) Full open stopper (4) Needle jet screw (5) Jet needle (6) Vacuum piston

ASSEMBLY

The float chamber and vacuum cylinder can be reassembled in the reverse order of removal.

VACUUM CYLINDER DISASSEMBLY

1. Remove the vacuum cylinders from the carburetor bodys. Carefully lift the vacuum piston out with the needle and compression spring.
2. Remove the full open stopper.
3. Remove the needle set screw.
4. Remove the jet needle from the piston.



(1) Primary slow air jet (2) Second slow air jet (3) Primary main air jet (4) Second main air jet

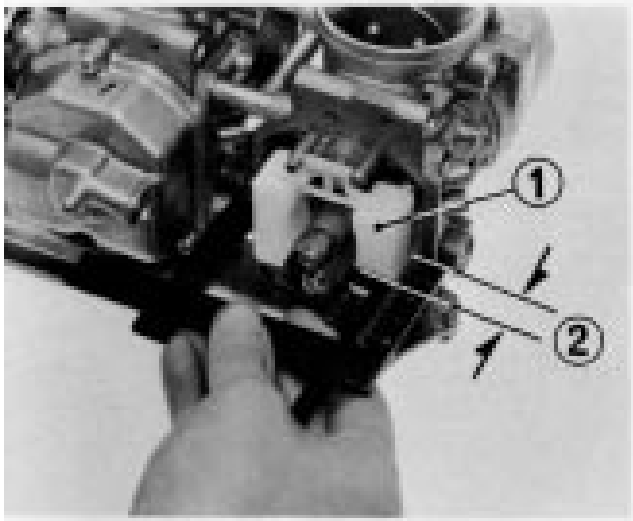
5. Carefully lift the seal ring off the carburetor body.
6. Remove the air jet cover.
7. Blow open the primary main air jet, secondary main air jet and slow air jet with compressed air.

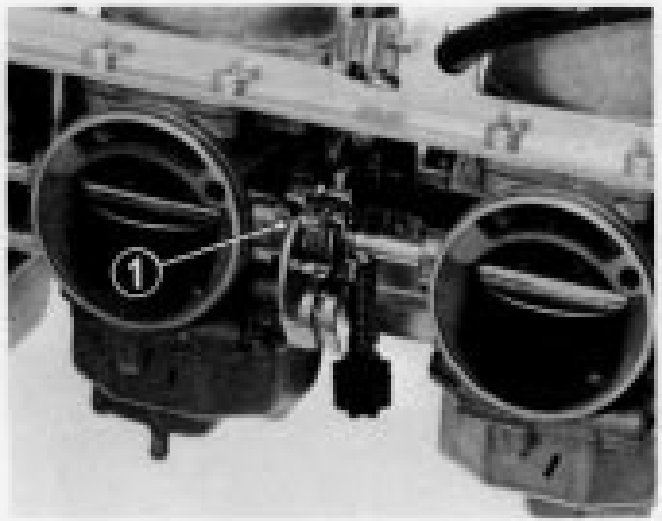
NOTE:

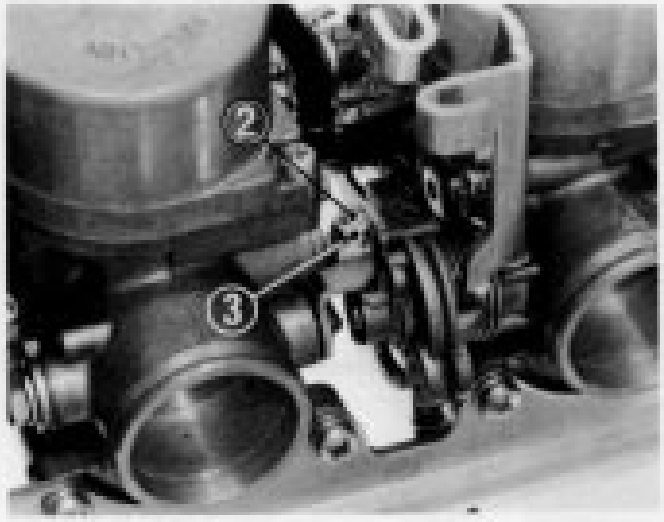
* **Never clean carburetor jets with wire or drills. This will enlarge the openings and result in excessive fuel consumption.**

INSPECTION

1. Check the vacuum piston for damage wear or other defects.
2. Check the needle and seat for fouling damage or wear.







(1) Float (2) Float level

FLOAT LEVEL

1. Remove the float chamber.
2. Measure the float level with the float tip just contacting the float valve and the carburetor inclined 15°-45° from vertical.

   FLOAT LEVEL:
   15.5 ± 1 mm (0.61 ± 0.04 in)

3. Replace the float, if the float level is not within the specification.

(1) Relief spring

CARBURETOR SEPARATION

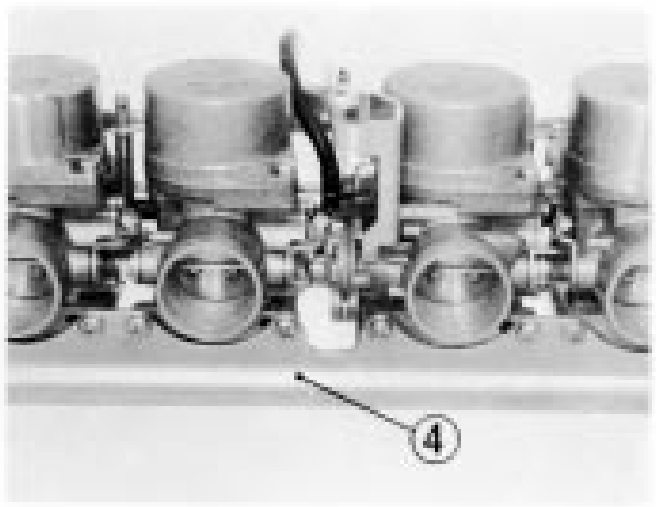
1. Remove the choke relief spring from the arm shaft.

(2) Synchronization adjusting screw
(3) Lock nut

2. Loosen the lock nut and synchronization adjusting screw.

NOTE:

* **Record the number of turns until the screw seats.**

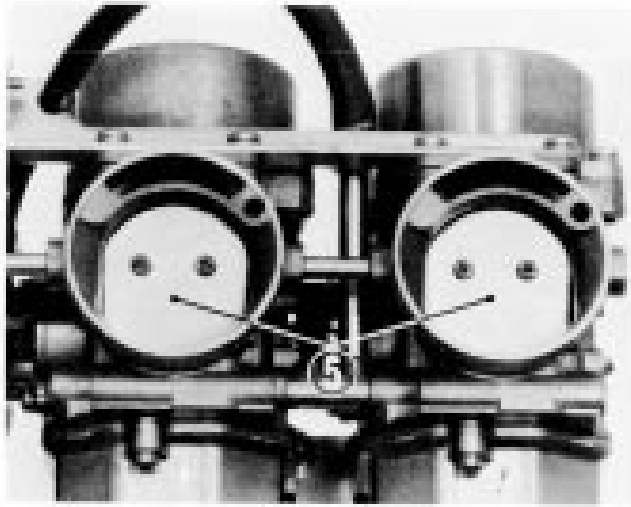


(4) Front bracket

3. Remove the rear and front brackets.
4. Separate the No. 1 and No.2 carburetors from the No. 3 and N0. 4 carburetors.

NOTE:

* **Separate the carburetors horizontally to prevent damage to the fuel and air joint pipes and choke link.**

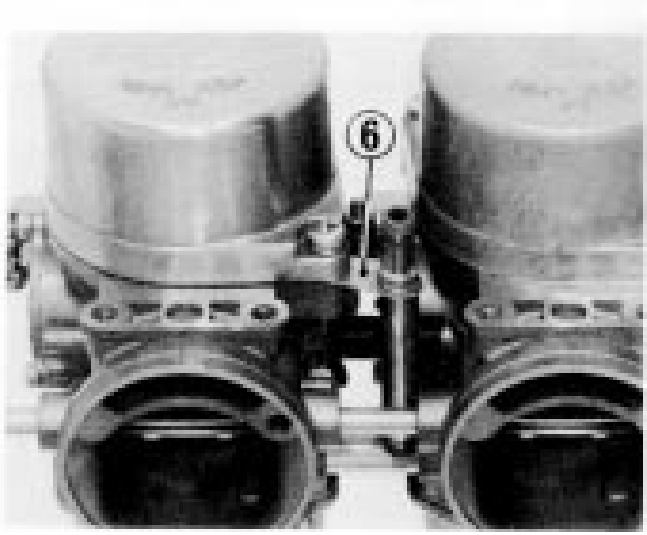


(5) Choke valve

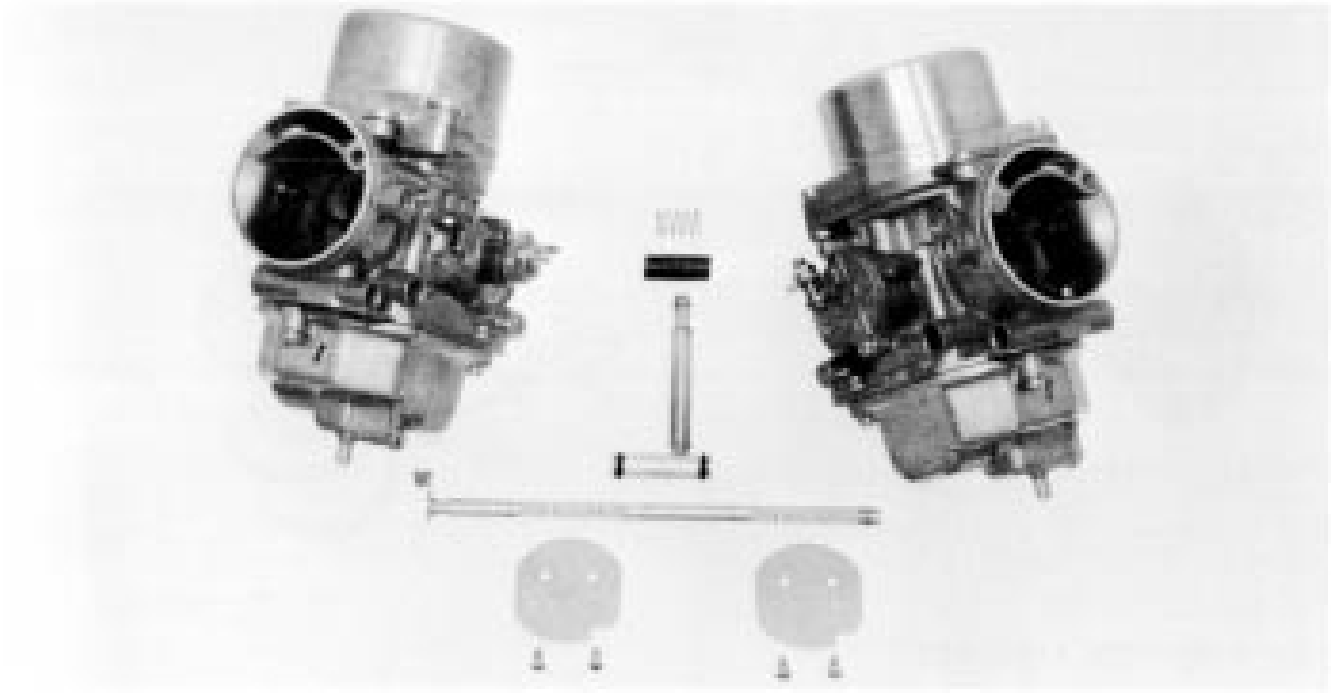
5. Remove the fuel inlet tube holder from the No.1 carburetor.
6. Cut off the staked ends of the choke valve screws with a file, and remove the choke valves. Discard the screws.

NOTE:

* **Do not allow filing to enter the carburetors.**



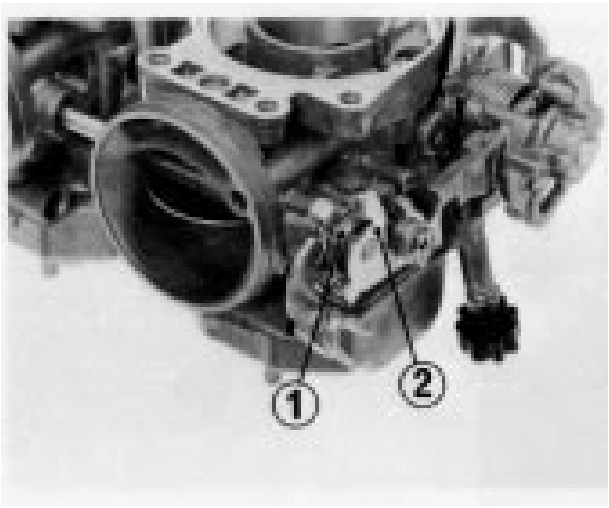
(6) Inlet tube holder



7. Separate the carburetors.

NOTE:

Carefully separate the carburetor to prevent damage to the air joint pipe and choke link.



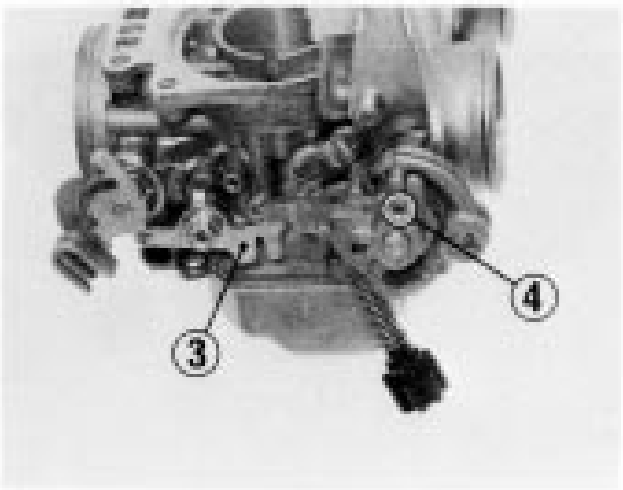
(1) Choke relief spring
(2) Choke shaft

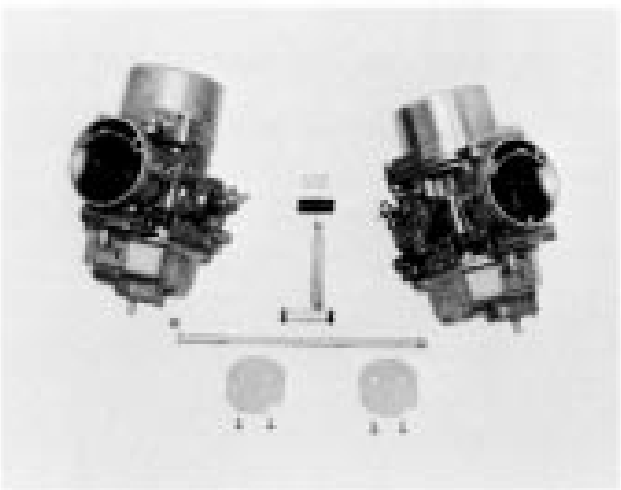
LINKAGE DISASSEMBLY

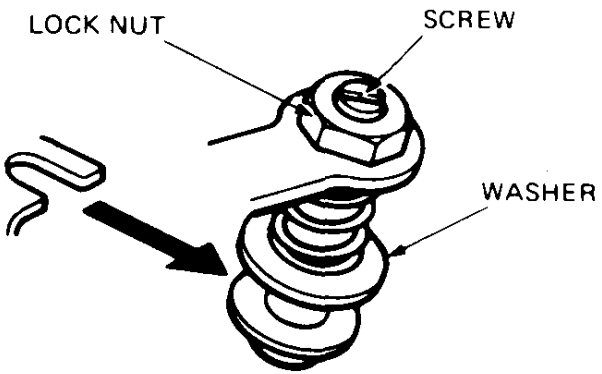
1. Remove the choke relief spring from the choke link, then remove the choke shaft.

NOTE:

* **Do not reuse the choke shaft, choke valve and screws whenever disassembled.**







(3) Fast idle adjust arm
(4) Pin

2. Remove the fast idle adjust arm bolt.
3. Remove the fast idle adjust arm and spring.
4. Remove the throttle link pin and throttle link.

ASSEMBLY

Assembly sequence is essentially the reverse order of disassembly.

CARBURETOR ASSEMBLY

NOTE:

* **Assemble one set of two carburetors at a time.**
* **Assemble the carburetors without installing the vacuum cylinder, piston and seal ring, before installing the front and rear brackets.**

1. Install new O-rings on the fuel joint pipes separately.

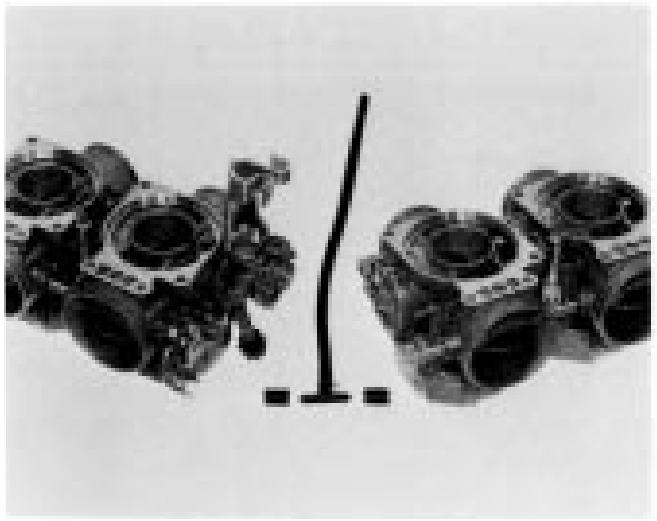
NOTE:

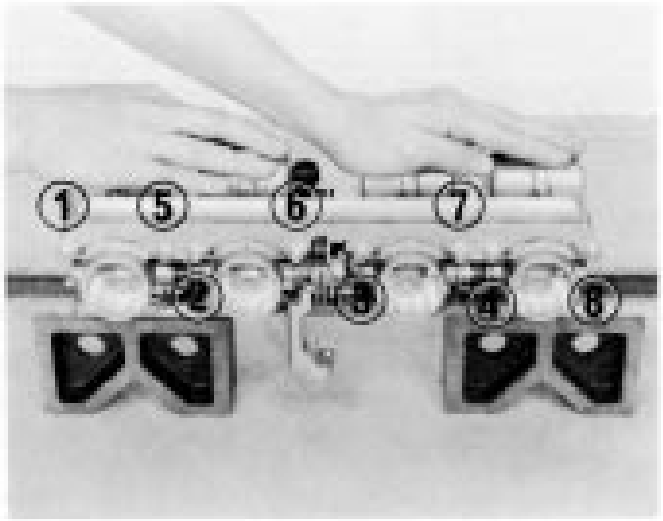
* **Apply a thin coating of oil to the O-rings.**

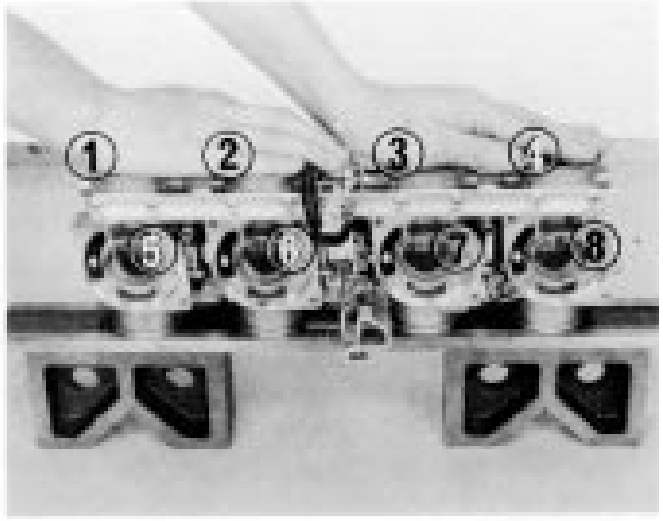
2. Install the fuel joint and air vent pipes on the No.3 carburetor. Install the choke dust tube.
3. Loosen the synchronization adjusting screw until there is no tension when assembling new carburetors.
4. Insert the No.3 throttle link between the plain washers slightly.

NOTE:

* **The large washer should be positioned on the spring side.**







5. Assemble the No.2 and No. 3 carburetors, pressing them together tightly.
6. Assemble the No.1 and No. 2 carburetors.
7. Install new choke shaft and carburetor linkage.
8. Attach the No. 1 and No. 2 carburetors to the No. 3 and No. 4 carburetors using the same procedure as for the No. 3 and No. 4 carburetors.
9. Loosely install the front bracket.
10. Place the carburetors on a flat surface with the float chambers up. Press the carburetors together equally and tighten the screws in the sequence shown in two or more steps to prevent carburetor misalignment.

    TORQUE: 4–6 N·m (0.4–0.6 kg-m)

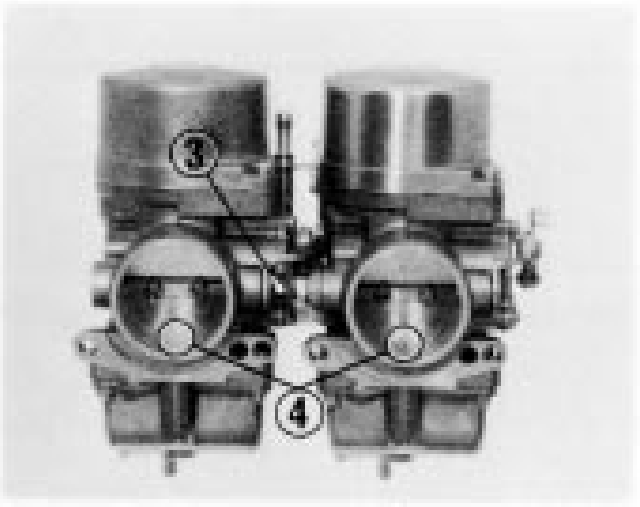
NOTE:

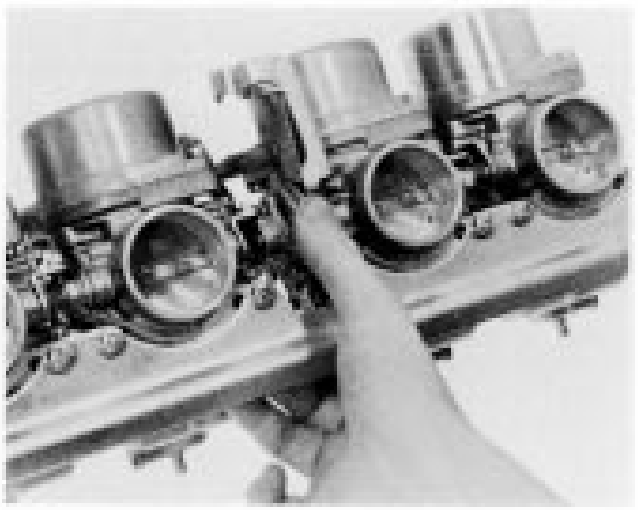
* **Check that the choke shaft operation is smooth. If it is not, recheck the carburetor alignment.**

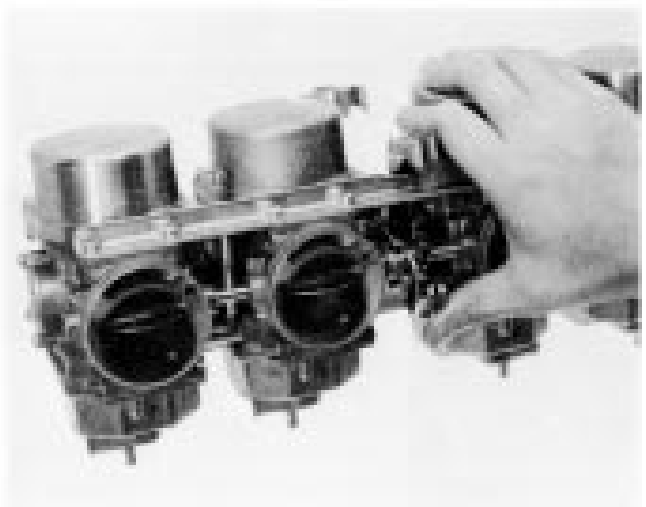
11. Install the rear bracket with the choke side facing up using the same procedure as for the front bracket.

    TORQUE: 2.8–4.2 N·m (0.28–0.42 kg-m)

12. Install the vacuum cylinder, piston and seal ring.

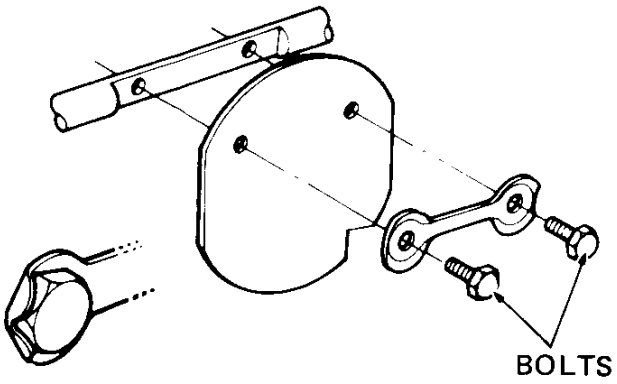


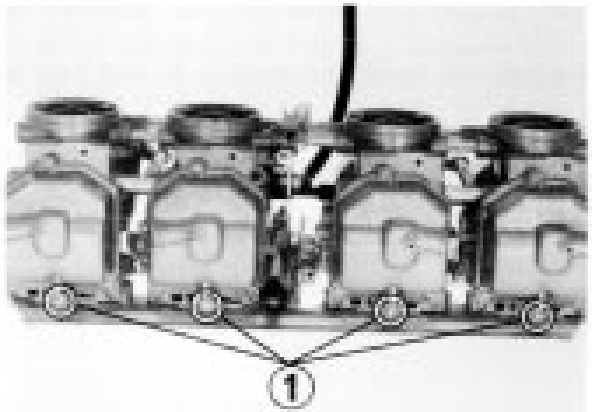


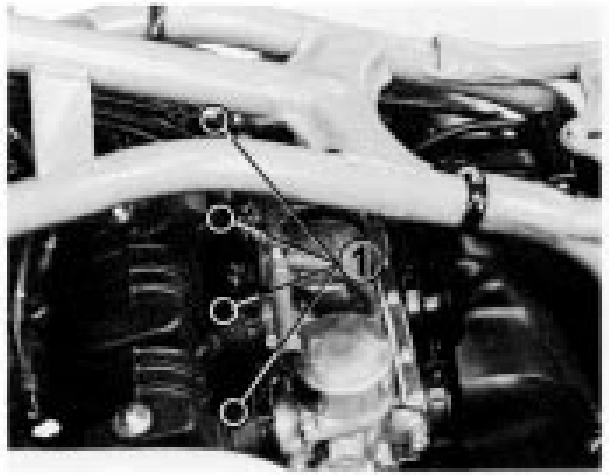


(3) Thrust spring (4) By-pass hole

13. Install the thrust springs between the No.1 and No.2 carburetors, and No. 3 and No. 4 carburetors.
14. Turn each synchronization adjusting screw to its original position as noted during disassembly.
15. Make each distance between the by-pass hole in the carburetor body and throttle valve equal.
16. 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 there is no drag when opening and closing the throttle.
17. Slide the choke relief spring over the No. 3 and No.4 carburetor choke shaft arm.
18. Install the choke valve, but do not tighten the bolts.
19. Make sure that choke valve operation is smooth by moving the choke link
20. Close the choke valve by turning the choke link. Release the choke link then make sure that it returns smooth ly.







21. Tighten the choke valve bolts.

TORQUE: 0.6–1.2 N·m (0.06–0.12 kg-m)

22. Fold the tabs of the lock washer up.
23. Recheck the throttle and choke operation.

PILOT SCREW ADJUSTMENT

1. Turn the pilot screw clockwise until it lightly seats and back it out to the original location noted during disassembly. Turn the pilot screw to the specification when the carburetor is replaced with a new one.

(1) Pilot screws

PILOT SCREW OPENING: 1-3/4

NOTE:

* **Damage to the pilot screw seat will occur if the pilot screw is tightened against the seat.**
* **Use the special tool "Pilot Screw Wrench" when servicing the carburetors on the frame (No. 07908–4220201).**

(1) Cylinder number

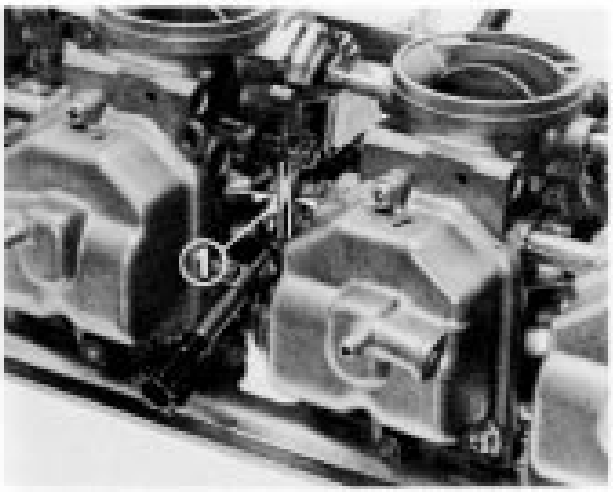
CARBURETOR INSTALLATION

Installation sequence is the reverse order of removal.

NOTE:

* **Connect the carburetors to the cylinder head to prevent leak past the joints.**
* **Install the insulator with the cylinder number on the insulator facing up.**

1. Adjust the choke cable (Page 27).
2. Adjust the throttle cable (Page 26).
3. Perform carburetor synchronization (Page 27).
4. Adjust idle speed (page 28).



(1) Adjusting arm

FAST IDLE ADJUSTMENT

FAST IDLE: 1,000–2,700 min^{-1} (rpm)

1. Close the throttle valve and open the choke valve.
2. Measure the clearance between the throttle link and fast idle adjusting arm pin.

   CLEARANCE: 0.7–1.0 mm
3. Adjustment can be made by opening or closing the fork end of the fast idle adjusting arm.

The carburetors used on the machine will seldom experience troubles with the standard setting under average load, climatic and barometric conditions. However, in order to tune the engine to the best advantage as regards the power output, it is essential that the carburetors be adjusted according to the specific riding and racing conditions.The instructions concern the Carburetor Setting Parts (Optional) for the machine and will prove of much help in diagnosing troubles resulting from improper carburetor settings.

STANDARD CARBURETOR SETTING

ITEM \ AREA		E,F,G,U, SA,D	H
Carburetor type		VB, 33 mm venturi	
Identification No.		VB53C	VB53D
Main jet	Primary	#68	
	2nd	#115	
Main air jet	Primary	#110	#105
	2nd	#90	
Slow jet		#42	
Idle speed		1,000 min^{-1} (rpm)	
Fast idle		1,000–2,700 min^{-1} (rpm)	
Pilot screw opening		1-3/4	

CARBURETOR SETTING PARTS

Primary main jets:

#60, #65, #70, #72

Secondary main jets:

#105, #110, #120, #125

Primary main air jets:

#100, #105, #115, #120

Secondary main air jets:

#80, #85, #95, #100

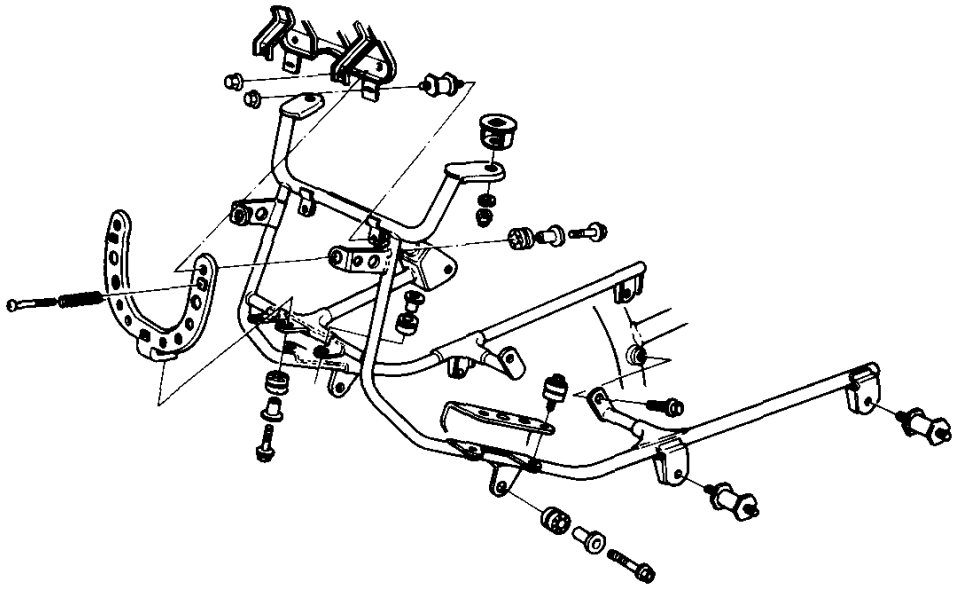
SYMPTOM	REMEDY	REMARKS
Poor acceleration at full throttle	Raise MJ number: #115 → #120 (To enrich mixture)	Mixture is leaned when air cleaner is removed.
Unstable performance at high speed with excessive black smoke	Lower MJ number: #115 → #110 (To lean mixture)	Mixture is enriched when air cleaner is clogged or at high altitude (over 1,500 m).
Poor performance at low speed (engine fails to pick up speed)	Raise PJ number: All cylinders: #68 → #72	Change of primary jet will affect PS (Pilot Screw) opening. Reset FAST IDLE after changing primary jet.
Excessive throttle response at low speed	Lower PJ number: All cylinders: #68 → #65	Same as above
Poor throttle response at low speed	Raise MJ number: #115 → #120 Raise AJ number: All cylinders: #68 → #72 Raise Main Air Jet number: All cylinders: #90 → #110	Flow of mixture increases as MJ and PJ numbers are raised. Raise AJ number to lean mixture at high speed.

1. FAIRING/HEADLIGHT/ INSTRUMENTS

FAIRING

Disassembly

1. Loosen the six lower fairing clips and remove the two screws.
2. Remove the lower fairing.
3. Remove the six fairing attaching nuts.
4. Remove the two fairing attaching bolts and remove the fairing from the bracket.



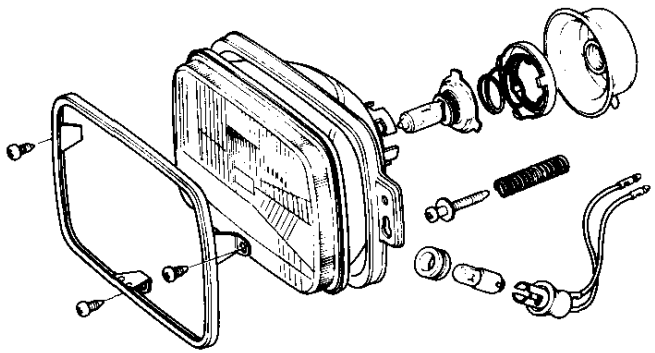
5. Remove the connector cover and disconnect the headlight, front turn signal and horn wire connectors from the main wire harness.
6. Remove the headlight and instruments.
7. Remove the three fairing bracket attaching bolts and bracket together with the turn signals.

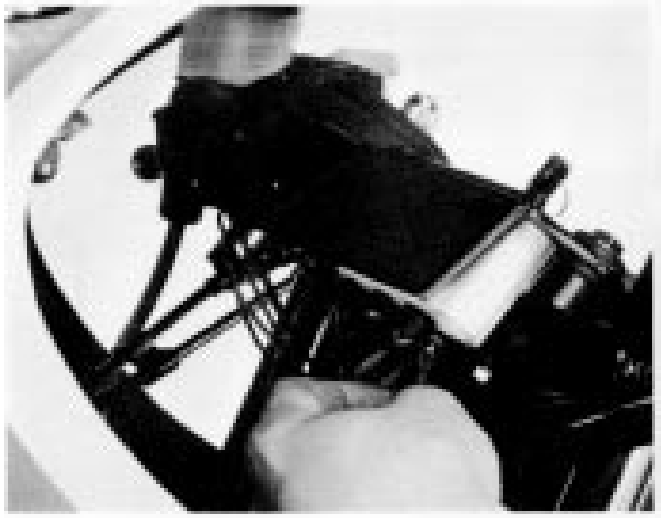
Assembly

Installation sequence is essentially the reverse order of removal.

TORQUE:

8 mm bolt and nut:
20–30 N·m (2.0–3.0 kg-m)
6 mm bolt and nut:
10–14 N·m (1.0–1.4 kg-m)





HEADLIGHT

1. Remove the fairing (Page 82).
2. Remove the connector cover and disconnect the headlight coupler and position light connectors.
3. Remove the three headlight retaining screws, retainer and headlight.
4. Remove the position light from the headlight.
5. Remove the rubber seal, turn the bulb retainer counterclockwise and remove the headlight bulb.
6. Assembly is essentially the reverse of disassembly.

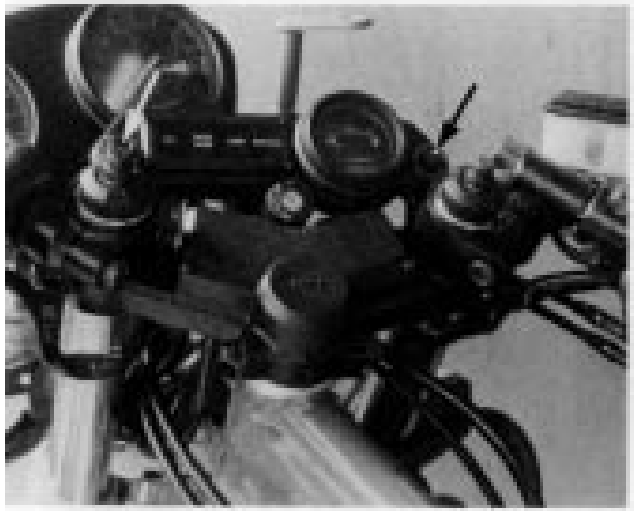
NOTE:

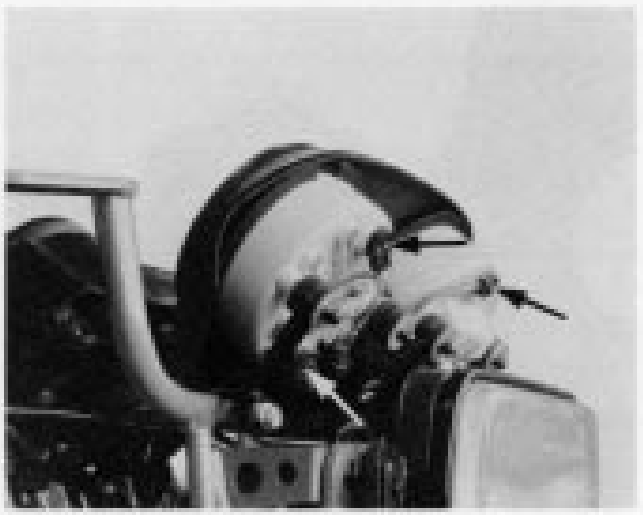
* **Check each component for operation after assembling.**

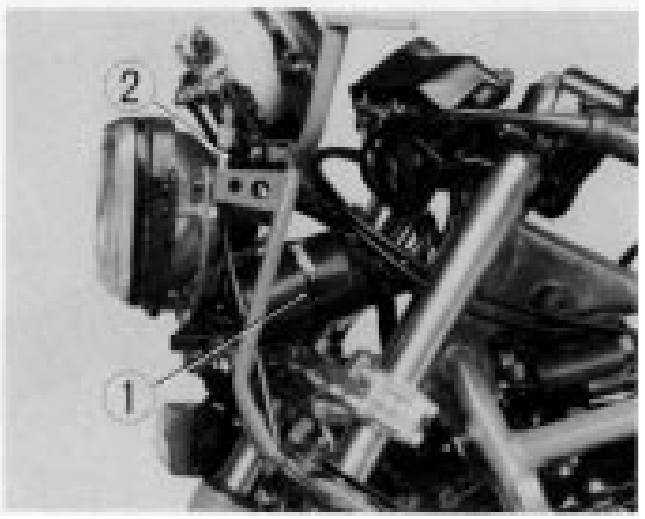
INDICATOR/OIL TEMPERATURE GAUGE

Bulb replacement

1. Pull the bulb socket and replace the bulb.
2. After installing a new bulb, check for continuity. If the bulb does not light, inspect the wiring for open or short circuits.







(1) Connector cover

Removal/installation

1. Remove the fairing (Page 82).
2. Remove the connector cover and disconnect the indicator and temperature gauge connectors.
3. Remove the two mounting bolts and indicator/oil temperature gauge.
4. Install in the reverse order of removal.

INSTRUMENTS

Bulb replacement

1. Remove the fairing (Page 82).
2. Remove the bulb socket from the instruments and replace the bulb.
3. After installing a new bulb, check for continuity. If the bulb does not light, inspect the wiring for open or short circuits.

Disassembly

1. Remove the fairing (Page 82).
2. Disconnect the speedometer cable by loosening the cable nut.
3. Remove the connector cover and disconnect the instrument connectors.

(1) Connector cover (2) Speedometer cable

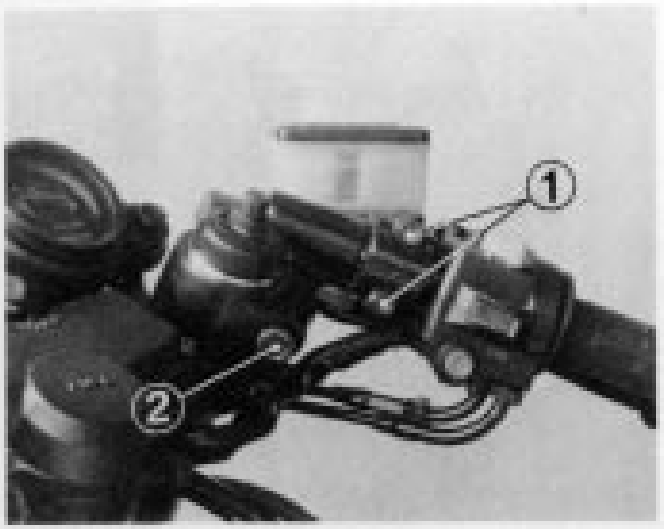
4. Remove the four instrument mounting nuts and instruments.
5. Remove the trip meter reset knob by removing the screw.
6. Separate the instrument by removing the four retaining plate nuts.

Assembly

Assembly is essentially the reverse of disassembly.

Pour a small amount of oil into the speedometer cable joint before installing.

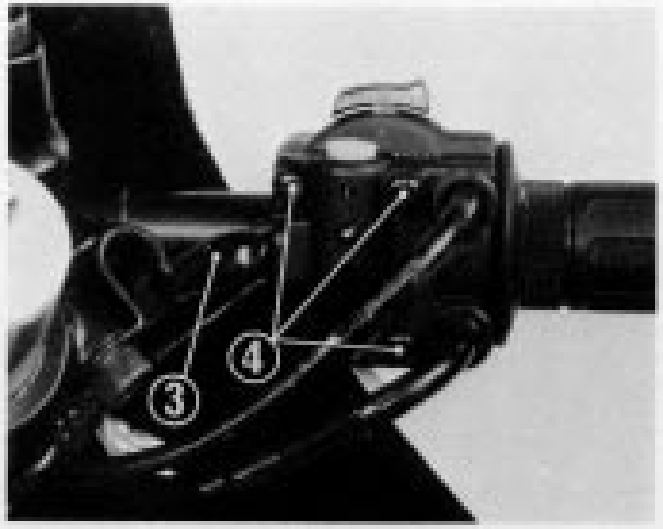
2. STEERING/FRONT WHEEL/FRONT FORK



(1) Master cylinder bolts
(2) Socket bolt

Right handlebar removal

1. Remove the brake master cylinder.
2. Remove the handlebar holding bolt and remove the handlebar.
3. Loosen the three screws attaching the throttle grip/switch housing.
4. Remove the right handlebar switch wires from the handlebar.

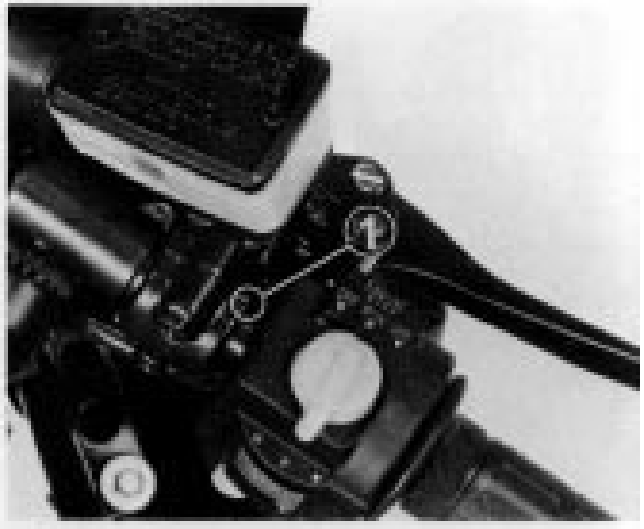


(3) Switch cords (4) Screws

CAUTION:

* ***Secure the brake cylinder in an upright position to prevent the brake fluid from leaking and damaging the paint and to prevent air from entering the brake system.***
* ***Do not loosen the brake hose unless necessary.***

5. Remove the throttle grip/switch housing.



(1) Punch mark

Right handlebar installation

1. Install the handlebar on the right fork pipe.

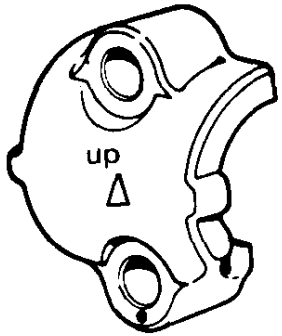
NOTE:

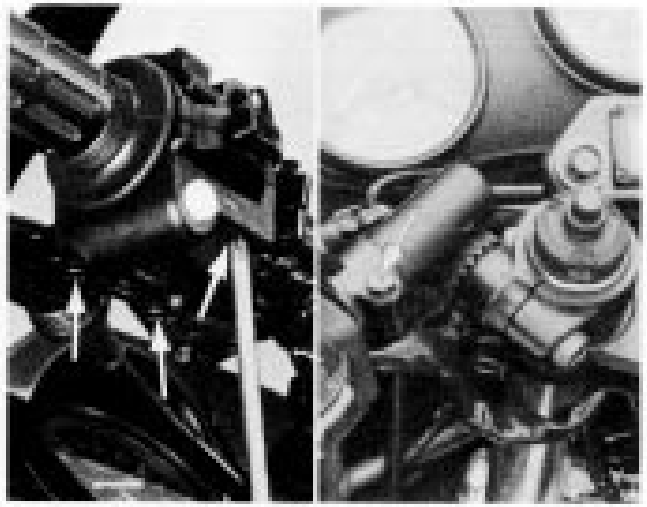
* **Location of the handlebar can be adjusted. See page 34 for adjusting procedure.**

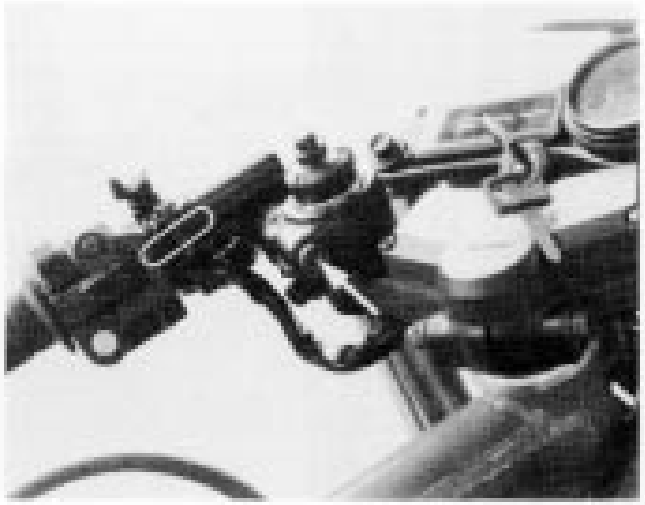
2. Coat the throttle grip area of handlebar with grease.
3. Install the throttle grip/switch housing and throttle cables.

NOTE:

* **Make sure that the throttle cable is not kinked or bound when the handlebars are turned full right and left, and then tighten the socket bolt.**







4. Install the master cylinder holder on the handlebar with the "UP" mark up and the split in the holder aligned with the punch mark on the handlebar.
5. Tighten the upper screw to the specified torque first, then tighten the lower screw to the same torque.

TORQUE: 6–8 N·m (0.6–0.8 kg-m)

Left handlebar removal

1. Remove the left handlebar switch assembly. Loosen the clutch lever bracket bolt.
2. Remove the grip rubber.
3. Remove the handlebar holding bolt and handlebar and remove the clutch lever assembly.

Left handlebar installation

1. Install the left handlebar on the fork pipe.

NOTE

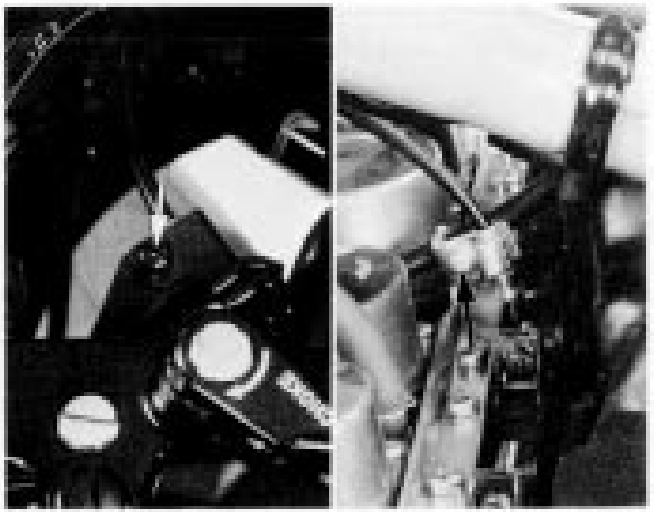
* **Position of the handlebar on the fork pipe can be adjusted. Refer to page 34 for adjusting procedure.**

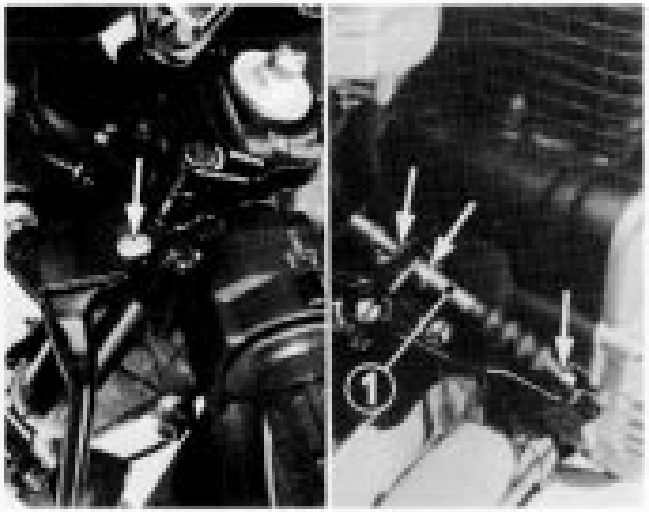
2. Loosely install the clutch lever bracket.
3. Install the left handlebar switch assembly.
4. Tighten the forward screws first, then tighten the rear screw.

NOTE:

* **Before tightening, align the split in the bracket with the split in the switch housing.**

5. Install the handlebar grip.





Choke cable replacement

1. Remove the fuel tank.
2. Remove the choke cable from the lower choke cable bracket.
3. Remove the cable end from the choke lever at the carburetor.
4. Remove the choke cable from the bracket on the handlebar.

NOTE

* **Before removing the cable, tie a string to the cable end. This string can be used as a draw cord when installing a new choke cable.**

5. Apply a small aount of oil to the choke cable.

(1) Clutch cable

Clutch cable replacement

1. Remove the fuel tank.
2. Remove the clutch cable from the lever.
3. Loosen the lock nut at the engine and remove the clutch cable from the clutch cable bracket.

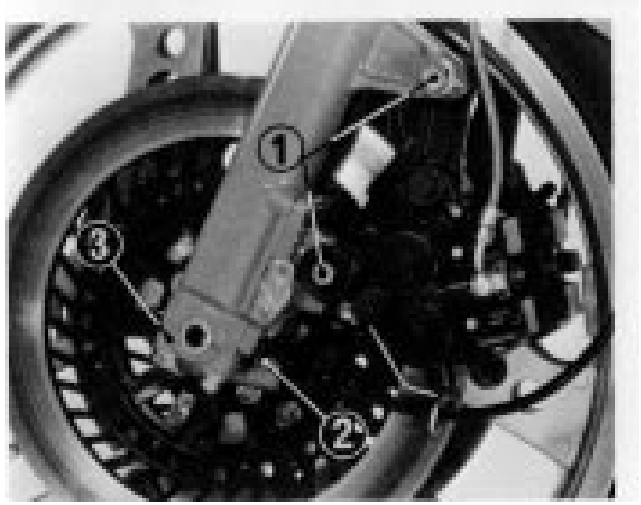
NOTE

* **Before removing the clutch cable, connect a string to the end of the cable so that a new cable can be installed easily by using this string as a draw cord.**

4. Pour a small amount of oil into the clutch cable.
5. Adjust the clutch cable.

Throttle cable replacement

1. Remove the fuel tank.
2. Remove the right handlebar switch/ throttle housing.
3. Remove the throttle cables from the throttle housing.
4. Remove the throttle cables from the carburetors.
5. Pour a small amount of oil into a new cable and install.
6. Adjust the throttle grip free play.



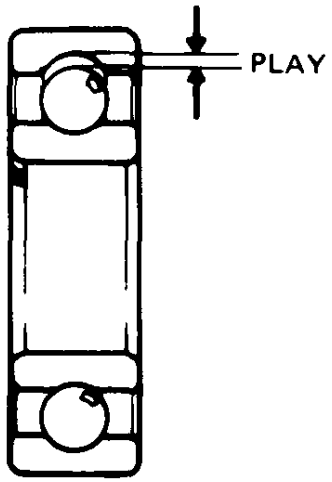
(1) Caliper mounting bolts
(2) Speedometer cable set screw
(3) Axle holder

Front wheel removal

1. Place the motorcycle on the center stand. (No. 07965–MA30001)
2. Remove the speedometer cable set screw and the speedometer cable.
3. Remove the right or left side caliper assemblies by loosening the caliper mounting bolts.

NOTE:

* **Do not operate the front brake lever after removing the front wheel. To do so will cause difficulty in fitting the brake disc between the brake pads.**



(1) Play

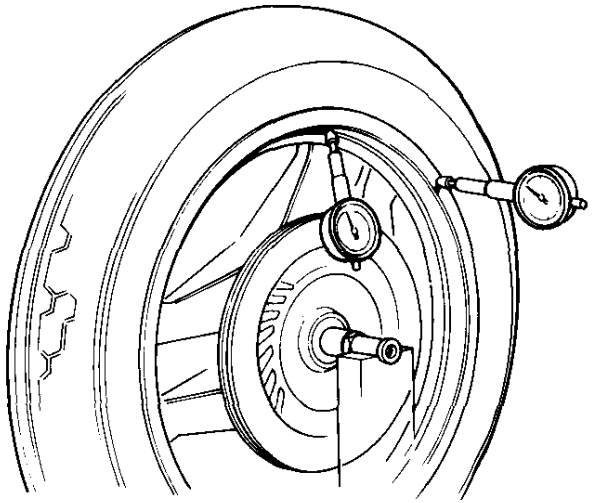
4. Remove the right and left axle holders.
5. Jack up the engine until the forks clear the front axle and remove the front wheel.

Disassembly

1. Remove the axle nut, speedometer gearbox, axle and collar.
2. Remove the oil seals.
3. Remove the bearings and distance collar from the hub.

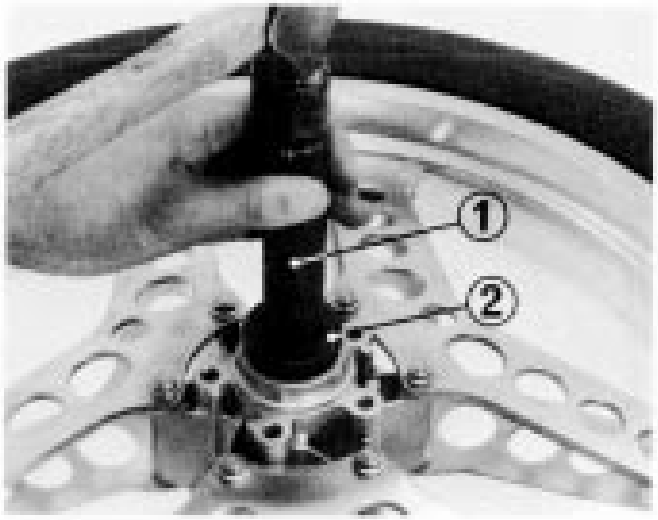
NOTE:

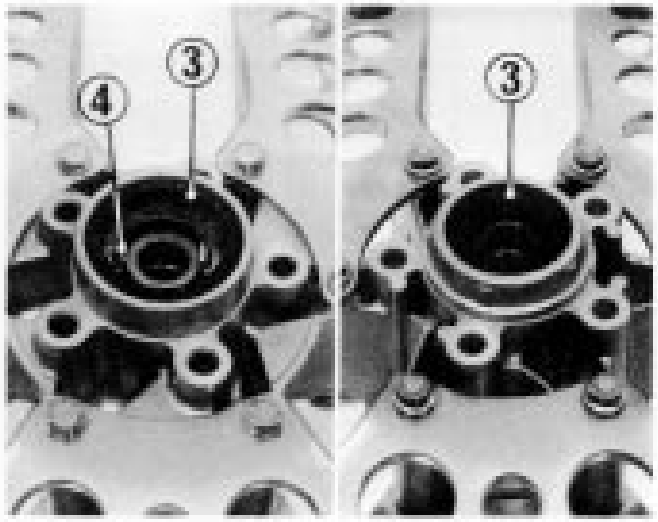
* **If the bearings are removed, they should be replaced with new ones.**

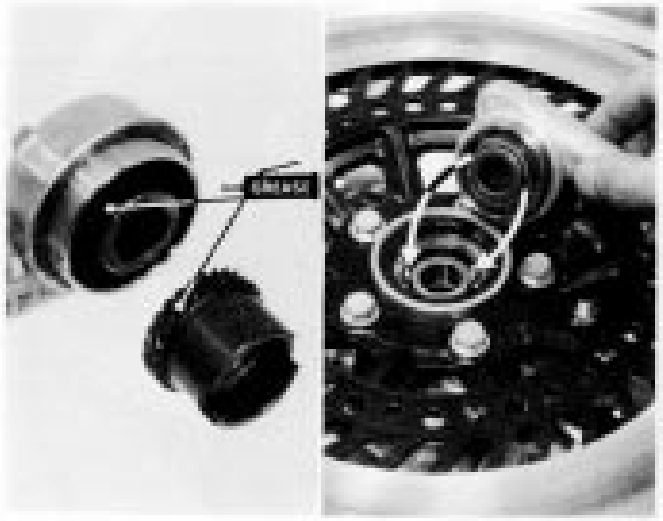


Inspection

1. Check wheel bearing play by placing the wheel in a truing stand and spinning the wheel by hand. Replace the bearing with new ones if they are noisy or have excessive play.
2. Check the rim runout by placing the wheel in a truing stand. Spin the wheel slowly and read the runout using a dial indicator gauge.
3. Set the axle in V blocks and measure the runout. The actual runout is 1/2 of TIR (Total Indicator Reading).







(1) Bearing driver handle (A)
(2) Bearing driver outer and pilot

Assembly

1. Pack all bearing cavities with grease. Drive in the right bearing first.
2. Press the distance collar into place and drive in the left bearing.

NOTE:

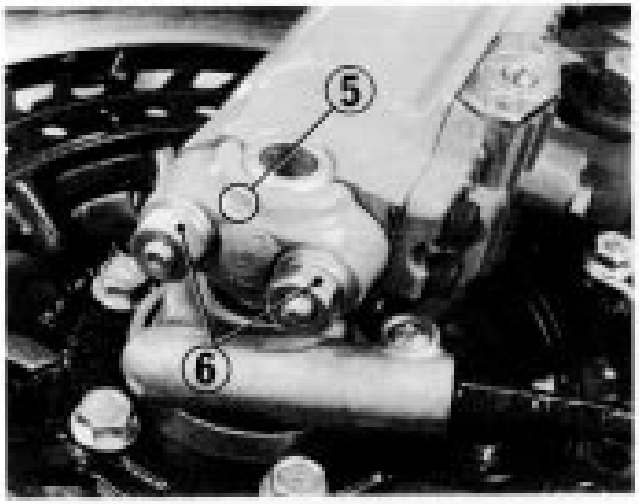
* **Drive the bearing squarely.**
* **Drive the bearing into position, making sure that it is fully seated and that the sealed end is facing out.**

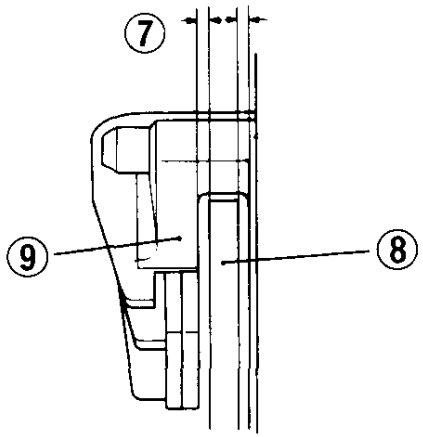
(3) Oil seals
(4) Speedometer gear retainer

3. Install the speedometer gear retainer.
4. Lubricate the inside of the oil seals and install them.
5. Install the brake disc.

   TORQUE: 27–33 N·m (2.7–3.3 kg-m)

6. Remove the drive gear from the gearbox and wipe with a clean cloth. Check for wear or damage. Pack the gearbox with grease and install the drive gear.
7. Install the speedometer gear in the wheel hub, aligning the tangs with the slots.



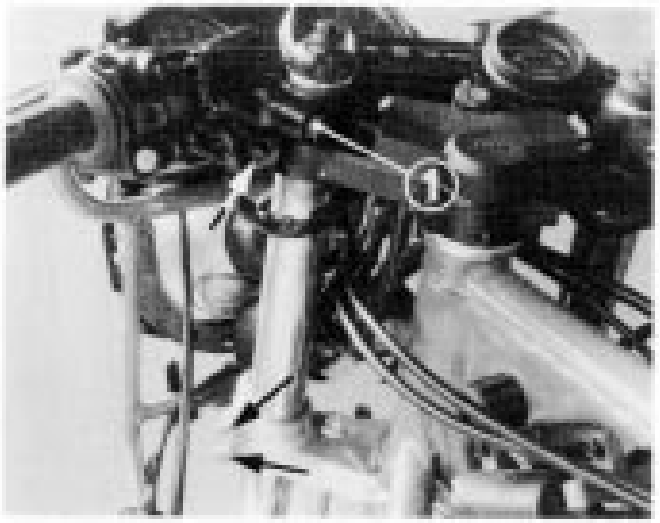


(5) "F" mark (6) Axle holder nuts

8. Install the side collar and axle nut.
   TORQUE: 55–65 N·m (5.5–6.5 kg-m)
9. Clean the brake disc using a high quality degreasing agent.
10. Fit the calipers over the disc, taking care not to damage the brake pads. Install the caliper mounting bolts.
    TORQUE: 35–45 N·m (3.5–4.5 kg-m)
11. Install the axle holders with the "F" mark forward. Tighten the the forward nuts first, then tighten the rear nuts.
12. Measure the clearance between the outside surface of the left brake disc and the left caliper holder with a 0.7 mm. (0.028 in) feeler gauge. If the gauge inserts easily, tighten the nuts on the left axle holder to 30–40 N·m (3–4 kg-m) starting with the forward nut.

(7) Clearance (9) Caliper holder
(8) Disc

13. If the feeler gauge cannot be inserted easily, move the fork leg outward until the gauge can be inserted and tighten the holder nuts with the gauge inserted. After tightening, remove the gauge.
14. Check that the other three corners of the caliper holder have a clearance of at least 0.7 mm (0.028 in) between caliper holder and disc.
15. After installing the wheel, apply the brakes several times and check for free wheel rotation when released.



(1) Handlebar socket bolt

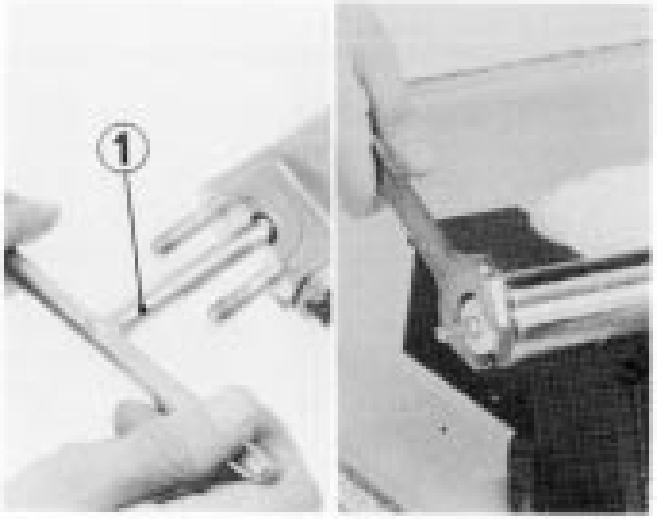
FRONT FORK

Removal

NOTE:

* **The front fork can be serviced without removing the fairing.**

1. Remove the right and left handlebars.
2. Remove the front wheel (Page 89). Remove the brake calipers and front fender.
3. Loosen the fork pinch bolts and remove the fork assembly.
4. Remove the oil drain plugs and drain the fork legs.



(1) Hollow set wrench (6 mm)

Disassembly

1. Depress the air valve and release front fork air pressure.

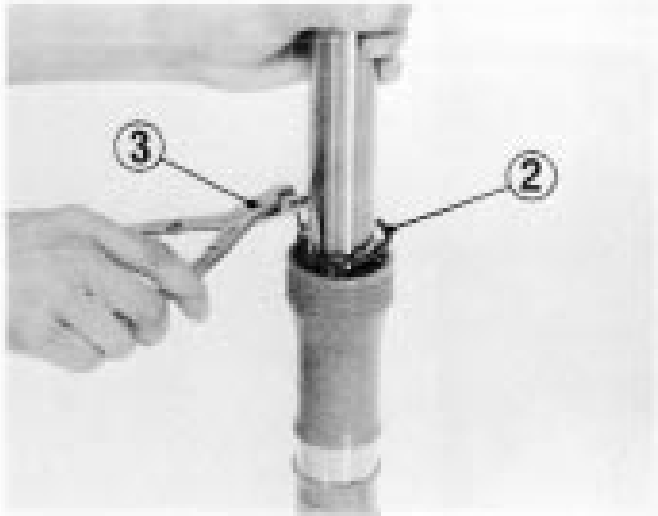
CAUTION:

* ***If air pressure is not released before disassembling, the fork tube cap may become a projectile.***
* ***The cap is also under spring pressure. Use care when removing and wear eye and face protection.***

2. Hold the fork tube in a vise, with soft jaws or a shop towel and remove the fork tube cap.

CAUTION:

* ***Be careful not to damage the sliding surface.***



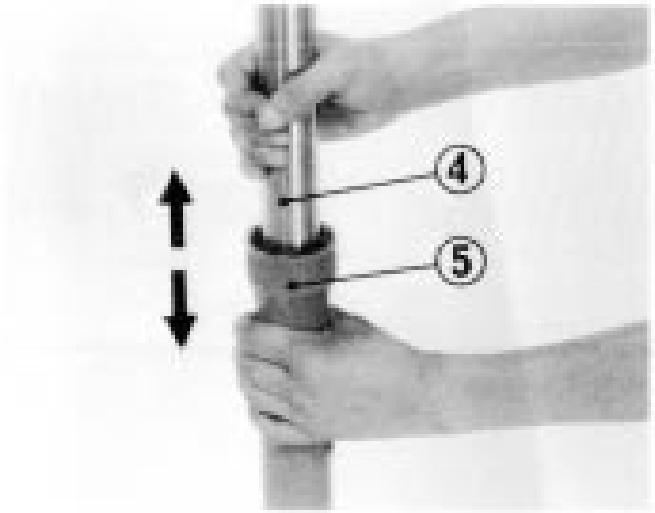
(2) Circlip (3) Snap ring pliers

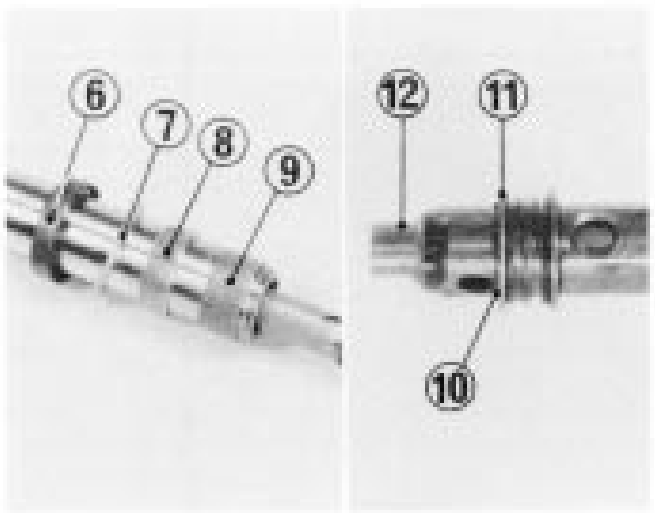
3. Remove the fork spring.
   Pour out fork fluid by pumping the fork up and down several times.
4. Hold the fork slider in a vise with soft jaws or a shop towel.
   Remove the socket bolt with a hex wrench.

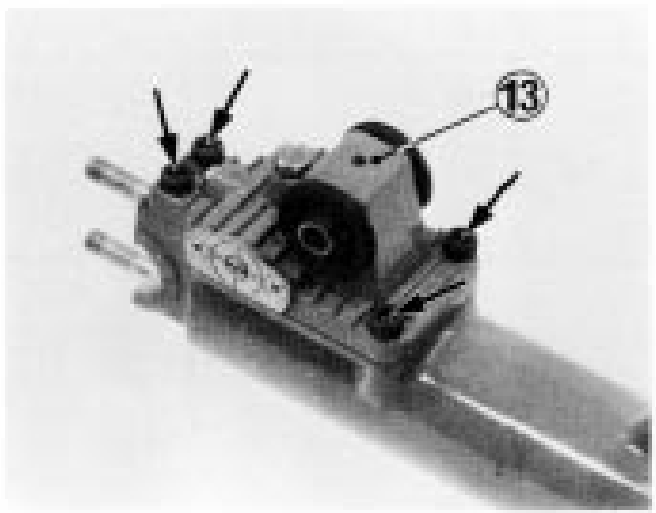
NOTE:

* **Temporaily install the spring and fork bolt if difficulty is encountered in removing the socket bolt.**

5. The piston and rebound spring can now be removed from the fork.
6. Remove the dust seal, sponge seal and plastic washer.
   Remove the snap ring.







(4) Fork slider (5) Fork tube

7. 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.
8. Remove the oil lock piece from inside the slider.
   Remove the oil seal, back-up ring and slider bushing from the fork tube.

NOTE:

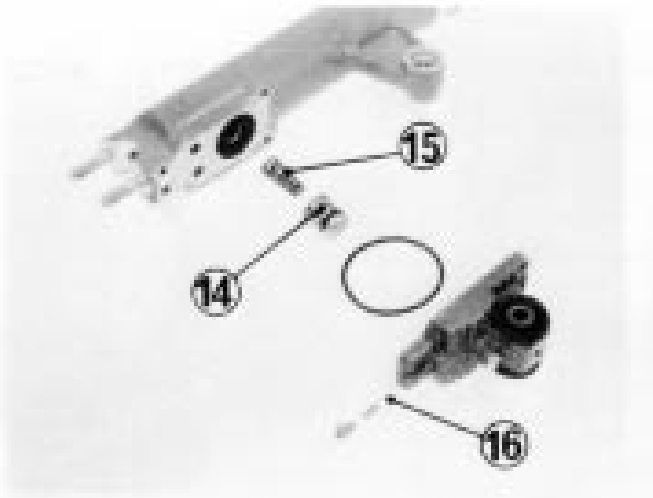
* **Do not remove the fork tube bushing unless it is necessary to replace it with a new one.**

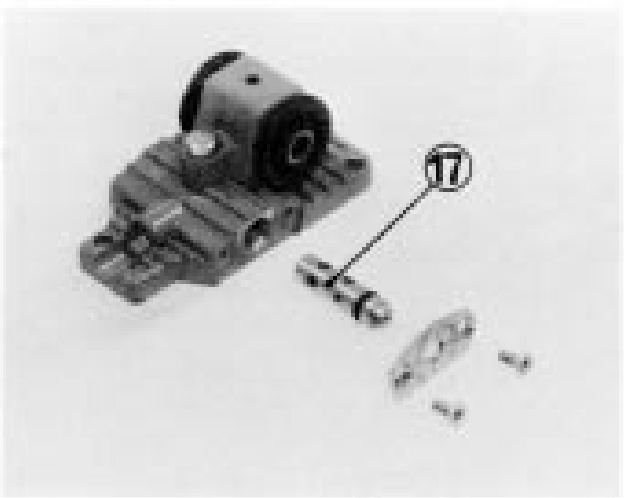
(6) Oil seal (7) Buck-up ring
(8) Gide bushing (9) Slide bushing
(10) Snap ring (11) Oil lock valve
(12) Fork piston

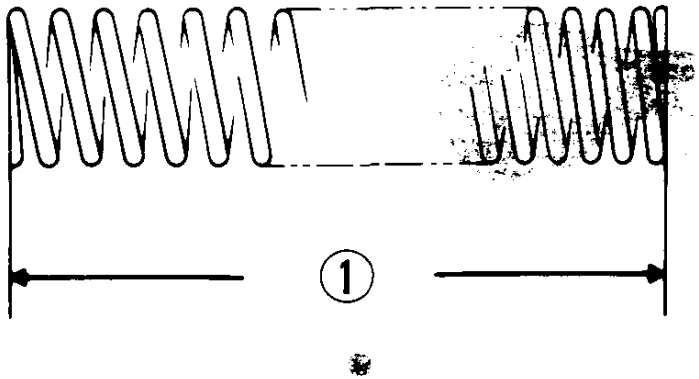
9. Remove the circlip, oil lock valve, spring and spring seat from the piston.
10. Remove the piston and rebound spring from the fork tube.

(15) Anti-dive case

11. Remove the four socket bolts and remove the anti-dive case.







(14) Piston (15) Spring (16) Steel ball

12. Remove the piston spring and piston from the anti-dive case.
13. Remove the screw, spring and steel ball.
14. Remove the screws attaching the anti-dive adjusting plate and plate.

(17) Adjusting orifice

15. Remove the adjusting orifice from the case.

Inspection

1. Measure the anti-dive piston spring free length.

SERVICE LIMIT: 28.2 mm (1.11 in)

2. Check the anti-dive piston O.D. for wear or damage.

SERVICE LIMIT: 17.93 mm (0.716 in)

3. Check the adjusting orifice for clogging, wear or damage. Clean it by applying compressed air.

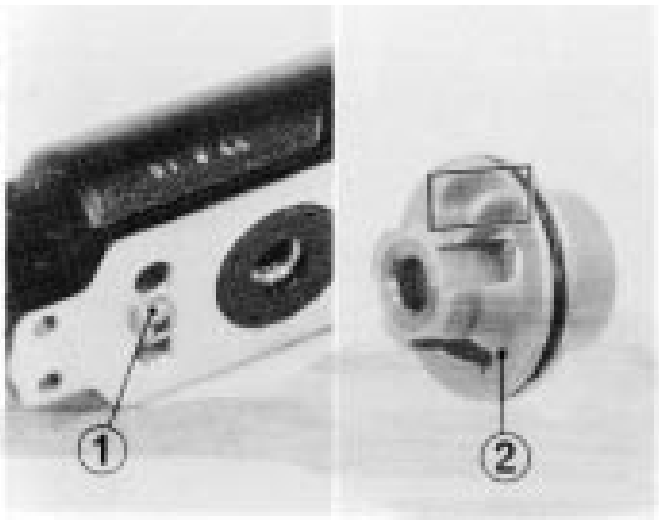
(1) Fork spring free length

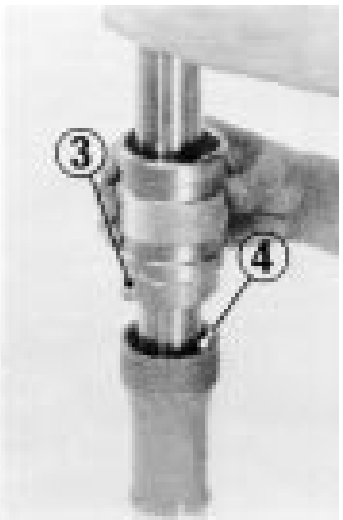
4. Check the free length of fork springs.

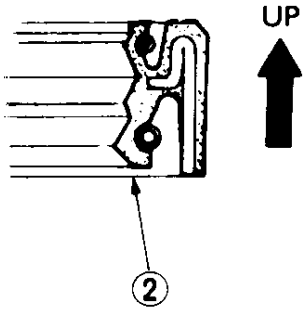
SERVICE LIMIT: 444 mm (17.5 in)

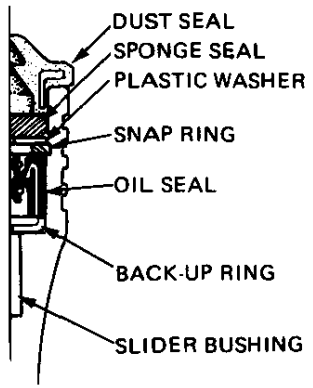
5. Check the fork tubes, fork sliders and pistons for score marks, scratches or excessive or abnormal wear, replacing those which cannot be reused.
6. Set the fork tube in V blocks and read the runout. Take 1/2 Total Indicator Reading to determine the actual runout.

SERVICE LIMIT: 0.2 mm (0.0078 in)









(1) Locating screw (2) Oil lock piece

Assembly

1. Insert the rebound spring and piston into the fork tube.
2. On the left fork, install the spring seat, valve spring, oil lock valve and circlip on the piston.
3. Remove the locating screw from the fork slider.
4. Install the oil lock piece and piston into the fork tube and insert the tube into the slider.
5. Align the slot in the oil lock piece with the screw hole and install the locating screw.
6. Assemble the anti-dive case and install with the socket bolt.
7. Place the fork slider in a vise with soft jaws or a shop towel.

(3) Fork seal driver
(4) Oil seal

8. Apply a locking agent to the socket bolt and thread it into the piston. Tighten with a 6 mm hex wrench.

NOTE:

* **Temporaily install the fork spring and fork cap bolt to tighten the socket bolt.**

TORQUE: 15–25 N·m (1.5–2.5 kg-m)

9. 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.
10. Drive the bushing into place with the seal driver and remove the old bushing or equivalent tool.
11. Coat a new oil seal with ATF and install it with the seal markings facing up. Drive the seal in with the seal driver.
12. Install the snap ring with its radiused edge facing down.
13. Install the plastic washer, sponge seal and dust seal.
14. Pour the specified amount of ATF into the fork tube.

CAPACITY: 380 cc (13.4 oz)

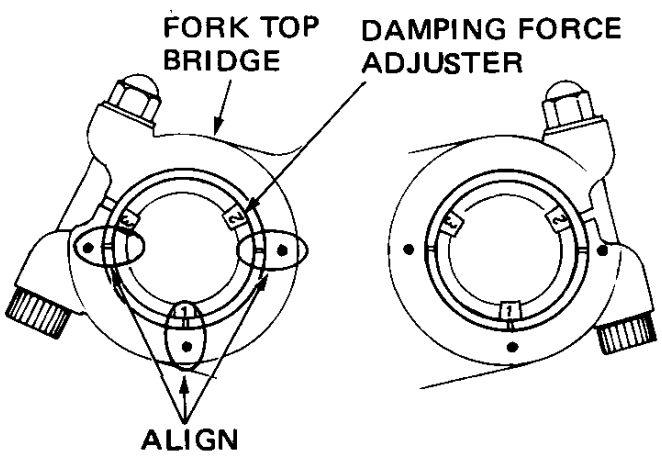
15. Install the fork spring, spring seat and spacer in the fork tube.

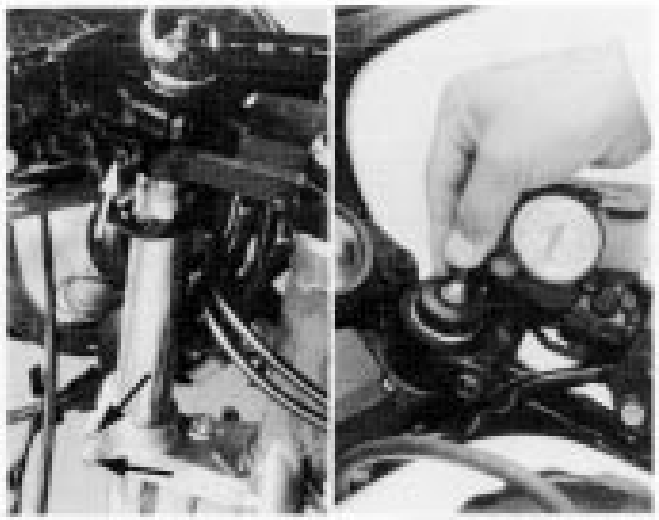
NOTE:

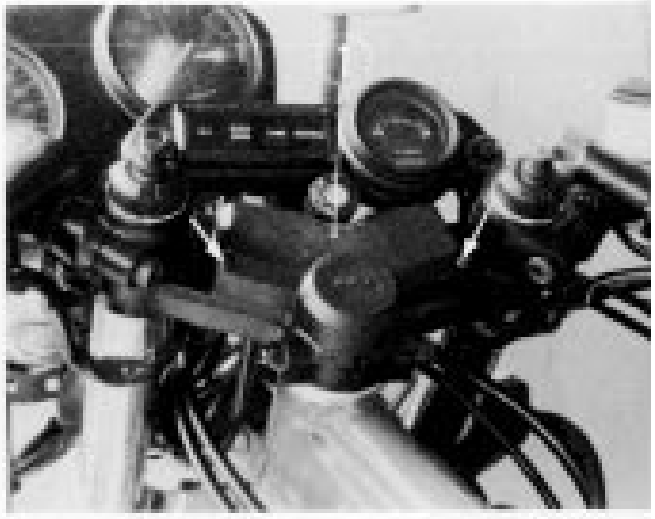
* **Note the spring direction, the narrow pitches should face toward the top.**

16. Install and torque the fork tube cap.

TORQUE: 15–30 N·m (1.5–3.0 kg-m)







Fork installation

1. Install the fork tube in the fork bridges while rotating it by hand.
2. Temporarily install the handlebar and align the fork tube top surface with the handlebar upper surface.
3. Align the three alignment marks on the fork cap bolt with the index marks on the fork top bridge.
4. Tighten the upper and lower fork pinch bolts.
   TORQUE:
   Upper: 9–13 N·m (0.9–1.3 kg-m)
   Lower: 20–24 N·m (2.0–2.4 kg-m)
5. Install the damping force adjuster over the fork cap bolt so that its adjustment mark 1, 2 or 3 aligns with the adjustment index mark on the fork top bridge.
6. Install the removed parts in the reverse order of removal.
7. Fill the fork tubes with air.
   AIR PRESSURE:
   0–60 kPa (0–0.6 kg/cm^2, 0–8 psi)

CAUTION:

- ***Use only a hand operated air pump to fill the fork tubes.***
- ***Do not use compressed air.***
- ***Maximum pressure is 3 kg/cm^2 (43 psi.). Do not exceed this or fork tube component damage may occur.***

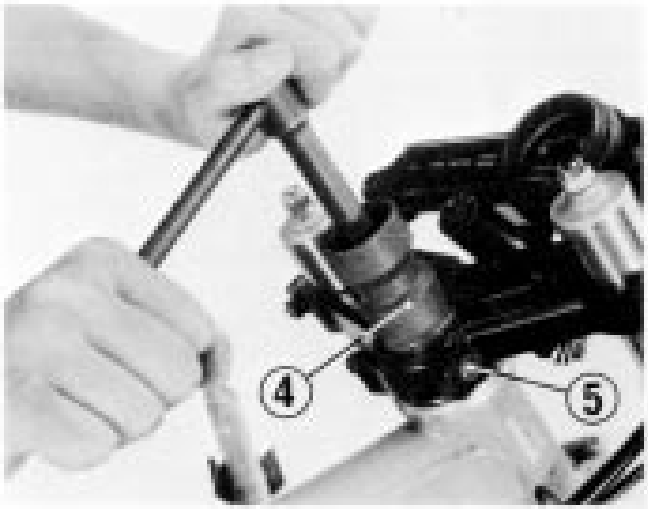
(1) Fuse box cover

8. With the front brake applied, pump the front forks up and down several times. Check the air pressure, adjust if necessary.

STEERING STEM

Removal

1. Remove the fairing and bracket (Page 82).
2. Remove the right and left handlebars (Page 86–87).
3. Remove the front wheel (Page 89).
4. Remove the fuse box cover.



(2) Fuse box

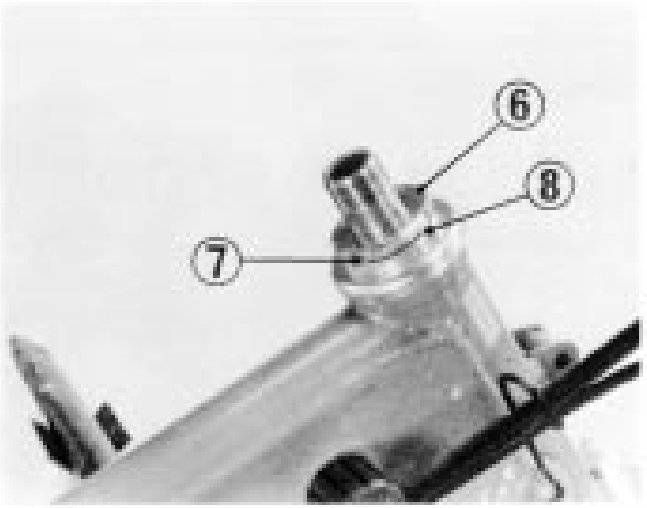
5. Remove the fuse box attaching screws and fuse box.

(3) Brake hose 3-way joint

6. Remove the brake hose 3-way joint from the steering stem.

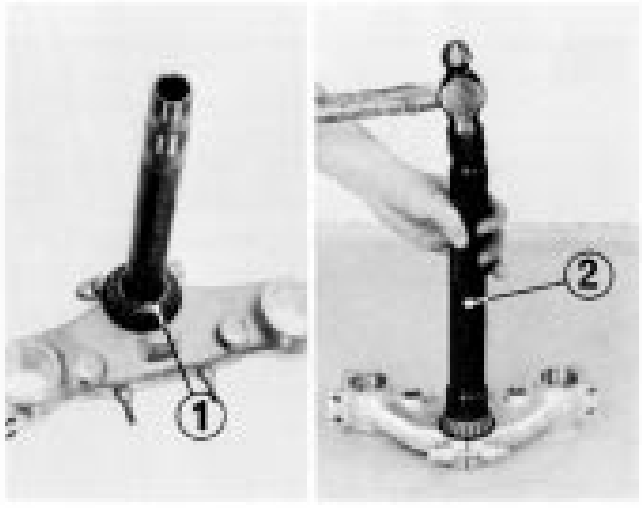
(4) Lock nut wrench
(5) Top bridge pinch bolt

7. Remove the steering stem nut with a lock nut wrench.
8. Remove the front forks (Page 92).
9. Loosen the top bridge pinch bolt and remove the top bridge.



(6) Top thread "B" nut
(7) Lock washer
(8) Bearing adjustment nut

10. Remove the top thread B nut, lock washer and bearing adjustment nut.
11. Remove the sterring stem. Inspect the bearing for wear or damage.



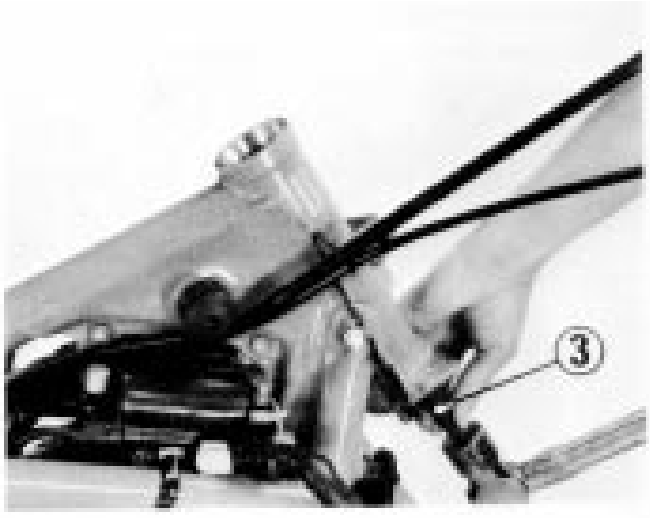
(1) Bearing
(2) Steering stem driver

Bearing replacement

NOTE:

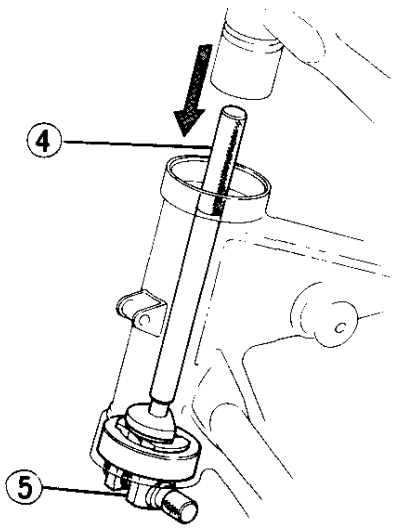
* **Replace the bearing inner and outer races as a set.**

1. Remove the lower steering stem inner race.
2. Install a dust seal onto the steering stem and drive the lower bearing inner race over the stem with the special tool.



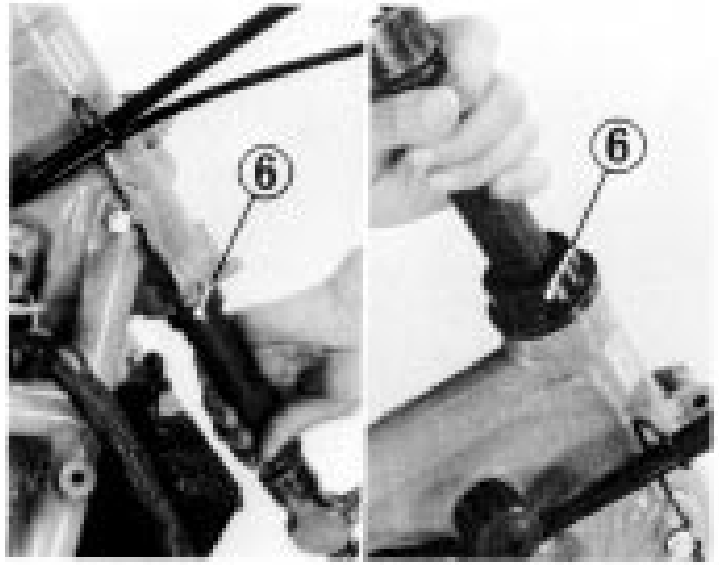
(3) Bearing race remover

3. Remove the upper bearing outer race.



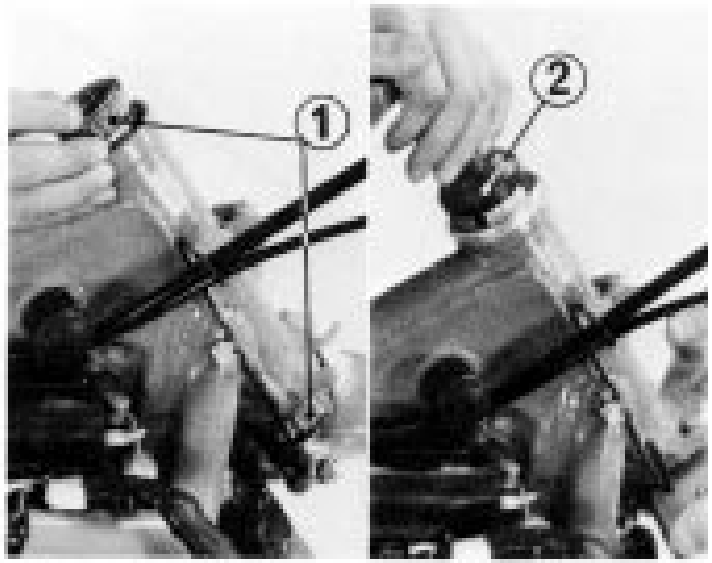
(4) Bearing race remover
(5) Bearing race remover

4. Remove the lower bearing outer race.



(6) Bearing driver attachment

5. Drive the upper bearing race into the head pipe with the special tools "Driver Handle (A)" and "Driver Attachment".
6. Drive the lower bearing outer race into place with the special tools "Driver Handle (A)" and "Driver Attachment".

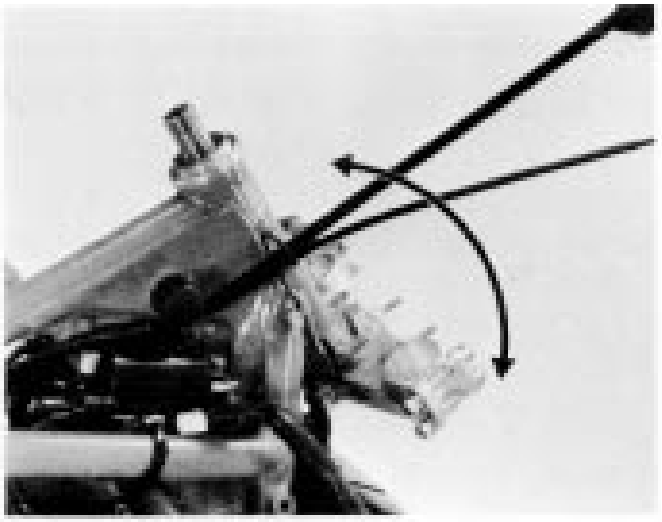


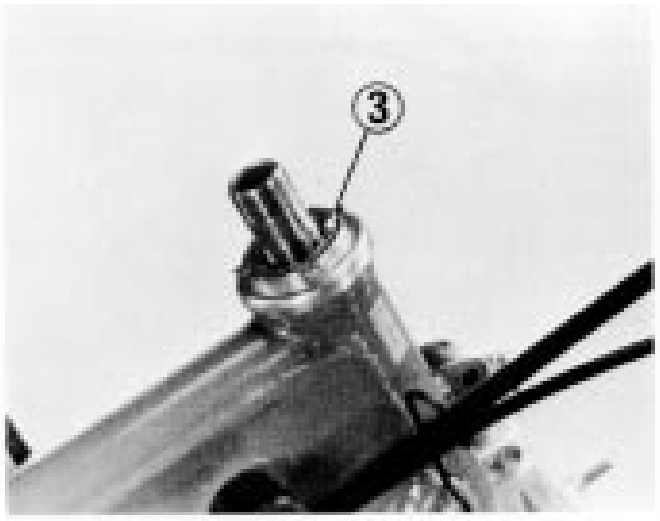
(1) Bearings
(2) Steering stem socket

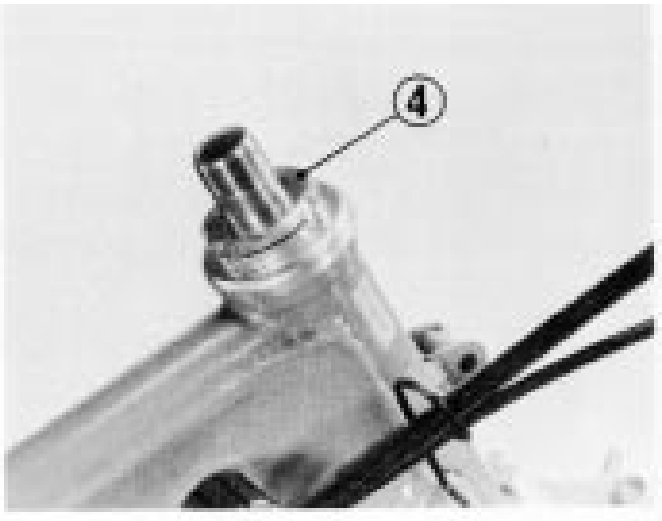
Steering stem installation

1. Pack the bearing cavities with bearing grease.
2. Insert the steering stem into the steering head pipe and install the upper bearing inner race.
3. Install the bearing adjustment nut and tighten to the specified torque.

TORQUE: 18–20 N·m (1.8–2.0 kg-m)







5. Rotate the handlears full left and right several times to seat the bearings. Recheck the adjustment nut torque each time and tighten the nut three times.

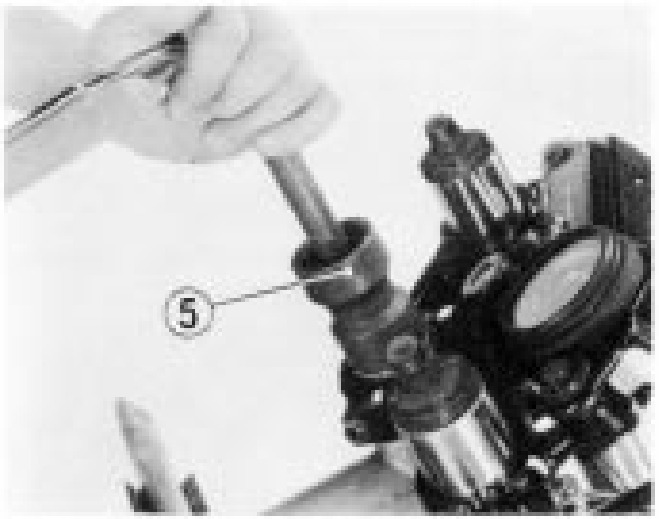
(3) Lock washer

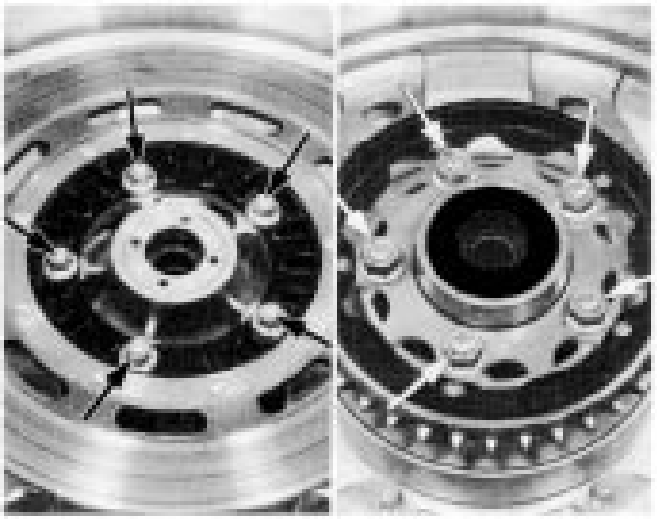
6. Install a new lock washer aligning the tabs with the grooves in the nut.

NOTE:
Do not reuse the lock nut washer.

(4) Top thread nut "B"

7. Hand tighten the top thread "B" nut until it contacts the lock washer. Hold the adjustment nut and further tighten the "B" nut to align its grooves with the lock washer tabs within 90 degrees.
8. Bend the other two lock washer tabs up into the top thread "B" nut grooves.



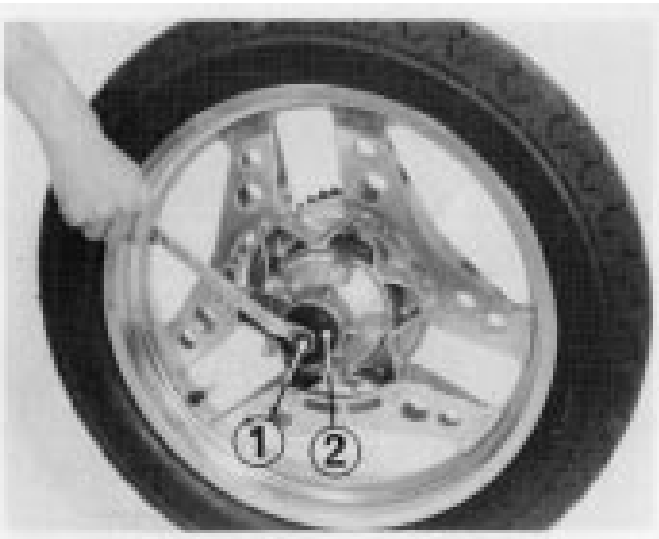


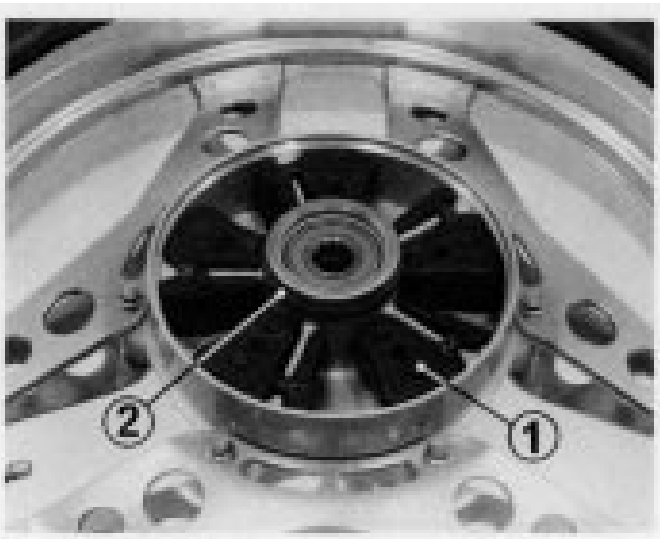
(5) Lock nut wrench

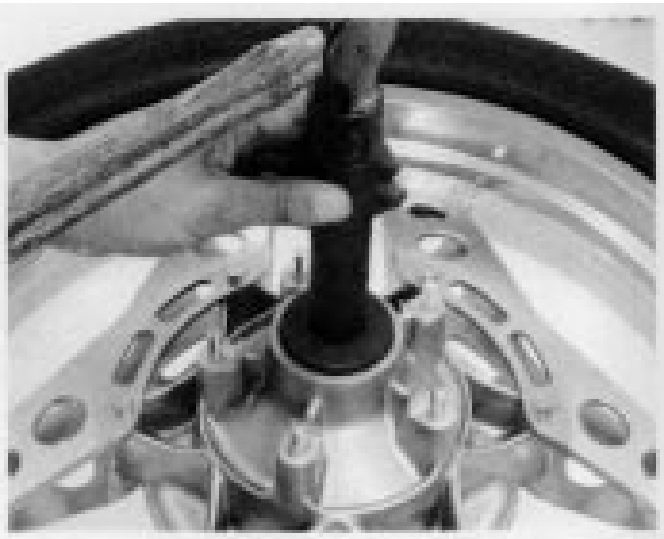
9. Install the front fork legs and fork top bridge.
10. Tighten the steering stem nut to the specified torque.
    TORQUE: 80–120 N·m (8.0–12.0 kg-m)
11. Install the front forks.
12. Install the following parts:
    - **Handlebars**
    - **Front fender**
    - **Instruments**
    - **Front wheel**
    - **Fairing**

Rear wheel disassembly

1. Place the motorcycle on its center stand (No. 07965–MA30000) to raise the rear wheel off the ground.
2. Loosen the drive chain adjuster lock nuts and adjusting nuts.
3. Remove the axle nut and pull out the axle.
4. Push the wheel forward and remove the drive chain from the rear sprocket.
5. Pull out the wheel from the swingarm.
6. Remove the rear disc and loosen the driven sprocket nuts.
7. Remove the driven flange from the wheel hub.
8. Remove the driven sprocket.







(1) Retainer wrench body
(2) Retainer wrench (A)

9. Remove the bearing retainer with special tool. Remove the bearing and distance collars from the wheel hub. Remove the bearing from the final driven flange.

(1) Damper rubber
(2) O-ring

Inspection:

Check the following items:
- Axle shaft bend
- Wheel bearing play or rattle
- Wheel rim runout
- Final driven sprocket wear or damage
- Weak or damaged damper rubbers

Assembly:

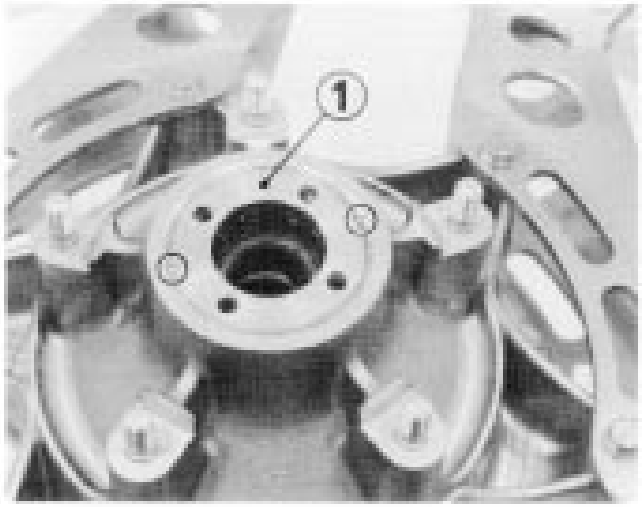
1. Pack all bearing cavities with grease.
2. Press the distance collar into position.
3. Drive the right bearing first, then the left bearing.

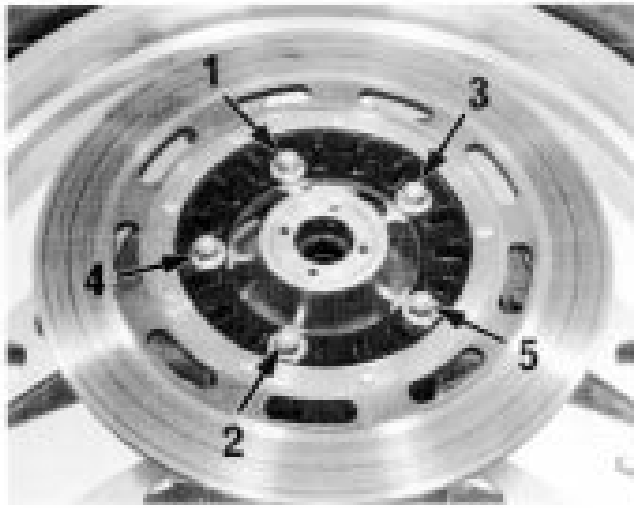
NOTE:

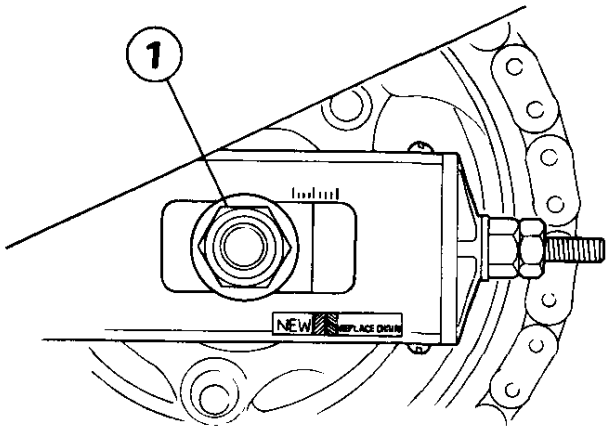
* **Drive the bearing squarely.**
* **Install the bearing with the sealed end facing out.**

DRIVEN FLANGE SIDE:
Bearing Driver Handle (A)
Bearing Driver Outer (62 x 68 mm)
Bearing Driver Pilot (25 mm)

WHEEL HUB SIDE:
Bearing Driver Handle (A)
Bearing Driver Outer (52 x 55 mm)
Bearing Driver Pilot (20 mm)







(1) Bearing retainer

4. Install the bearing retainer with the same tool that was used to remove it.
5. Peen the retainer to the hub at two locations.

NOTE:

* **Check the condition of the bearing retainer. If the threads are damaged, the retainer should be replaced.**

6. Install the rear brake disc and nuts. Tighten the nuts in the sequence shown.

   TORQUE: 27–33 N·m (2.7–3.3 kg-m)

7. Clean the brake disc with a high quality degreasing agent.
8. Install the final driven sprocket and tighten the nuts in a crisscross pattern.

   TORQUE: 80–100 N·m (8.0–10.0 kg-m)

9. Install the rear wheel in the reverse order of removal.

(1) Axle nut

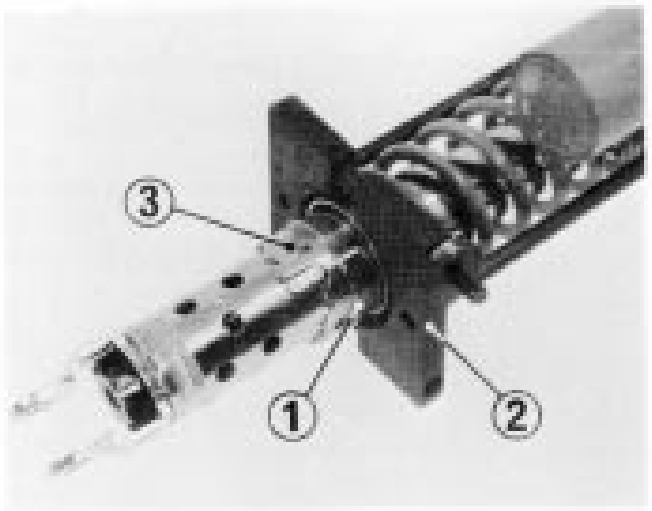
NOTE:

* **When installing the wheel, fit the brake disc between the brake pads carefully.**
* **After installing the wheel, apply the brakes several times and then check if the wheel rotates freely. Recheck the wheel if the brake drags or if the wheel does not rotates freely.**

10. Install the axle nut and secure with a lock pin.

    TORQUE: 80–100 N·m (8.0–10.0 kg-m)

11. Adjust the drive chain slack.

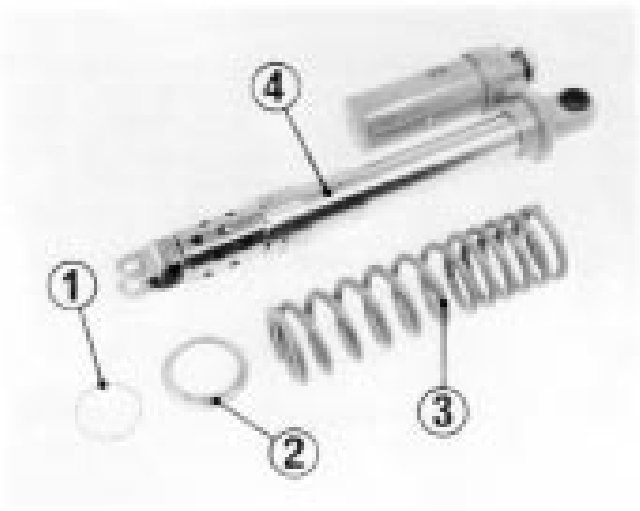


(1) Snap ring (2) Rear shock absorber compressor (3) Adjuster

REAR SHOCK ABSORBER

Rear shock absorber disassembly

1. Remove the upper and lower shock absorber mounting bolts and nuts and remove the shock absorbers.
2. Compress the spring just enough to remove the snap ring and remove the parts.



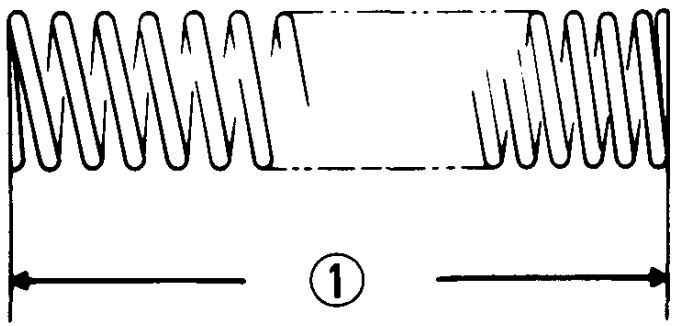
(1) Snap ring (2) Seat
(3) Spring (4) Rear damper

NOTE

* **Wrap a tape around the cover to prevent it from being damaged during disassembly.**

NOTE

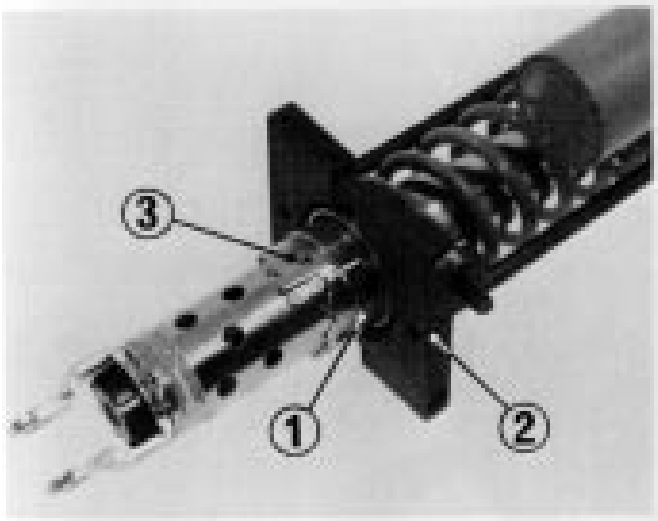
* **An exploded view of the rear shock absorber is shown. Do not attempt to disassemble the shock absorber further.**



(1) Free length

Inspection:

1. Measure the free lenght of the spring.
   FREE LENGTH: 200.9 mm (7.91 in)
2. Check each part for signs of damage, wear or other defects.



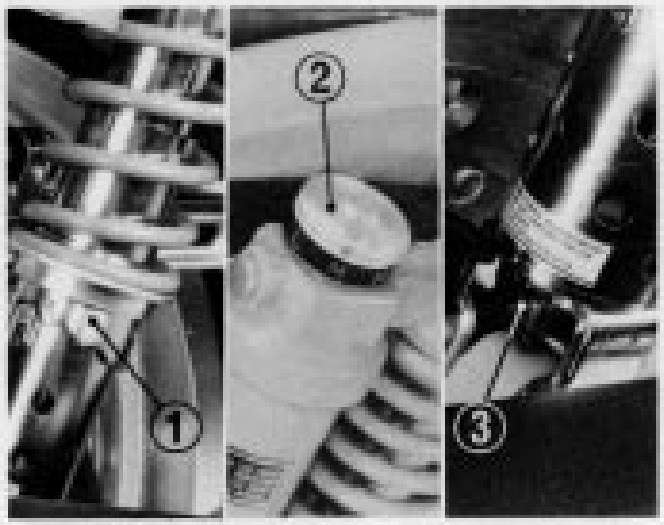
(1) Snap ring
(2) Shock absorber compressor
(3) Adjuster

Assembly

NOTE:

* **Install the spring with the tightly wound coils at the top.**

1. To install the snap ring, use the tool "Rear Spring Compressor" as in disassembly.



(1) Adjuster (Spring)
(2) Adjuster (Compression)
(3) Adjuster (Extension)

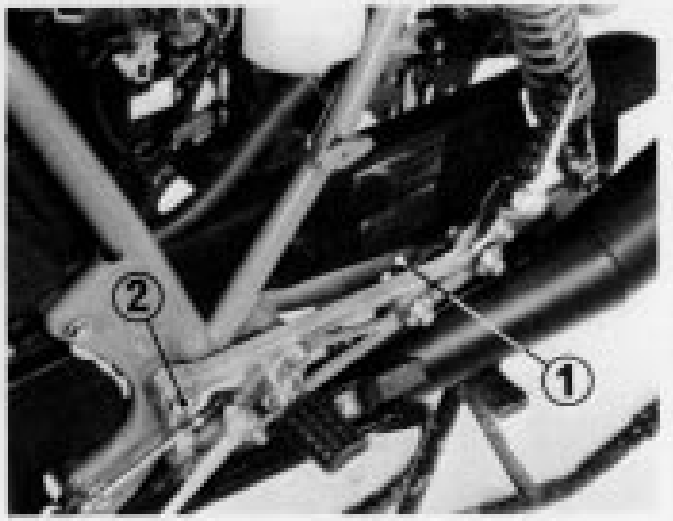
2. Torque the shock absorber bolts and nuts.

   TORQUE: 30–40 N·m (3.0–4.0 kg-m)

NOTE:

Be certain to adjust both shock absorbers to the same position.

3. Check operation of the shock absorbers.

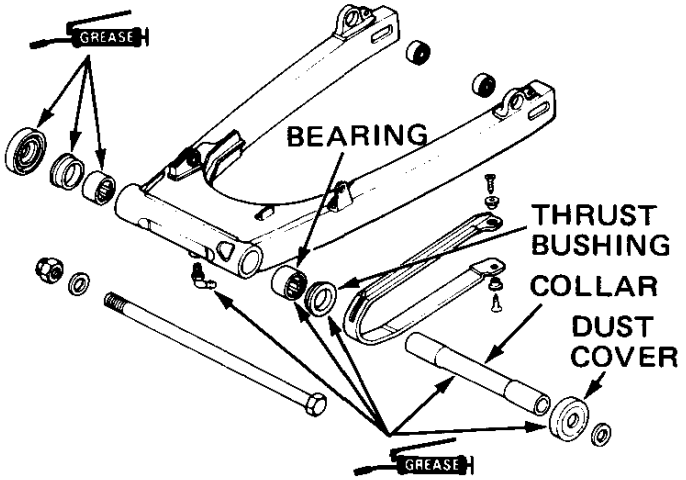


(1) Swingarm
(2) Swingarm pivot bolt

SWINGARM

Disassembly

1. Remove the left crankcase rear cover.
2. Remove the rear wheel (Page 101).
3. Remove the right and left rear shock absorbers.
4. Remove the brake torque rod from the brake caliper.
5. Remove the swingarm.

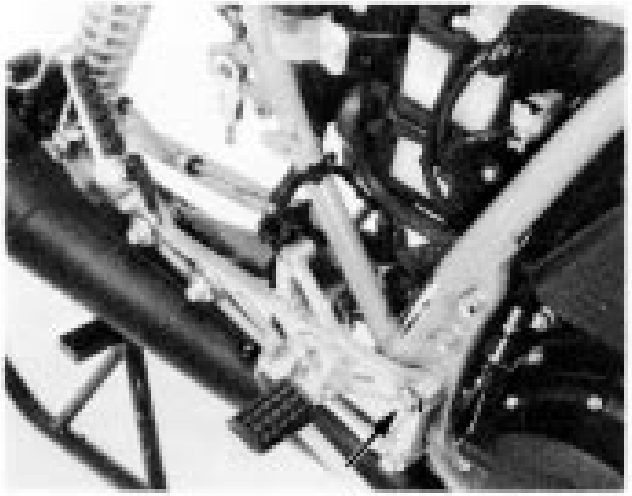


Inspection:

1. Inspect the collar and bearings.
2. Replace them if they have score marks, scratches, excessive or abnormal wear.

NOTE:

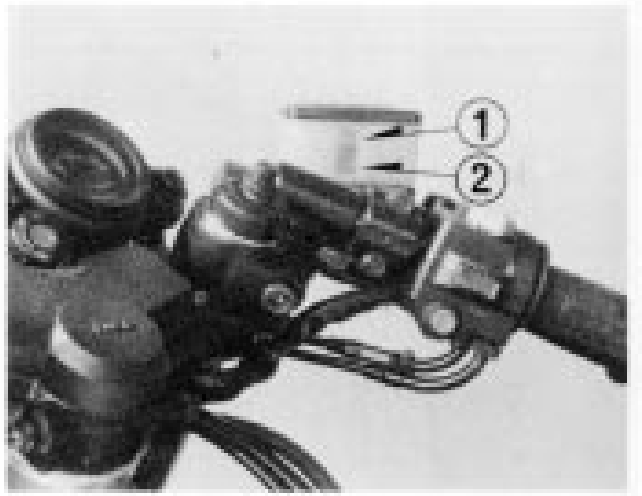
* **Drive the bushing in through a pad.**
* **Apply grease to the collars, bearings and bushings before installing them.**



Swingarm installation

1. Place the drive chain over the swingarm.
2. Install the pivot bolt and tighten the nut to the specified torque.
   TORQUE: 60–70 N·m (6.0–7.0 kg-m)
3. Install the right and left rear shock absorbers.
4. Install the rear wheel.

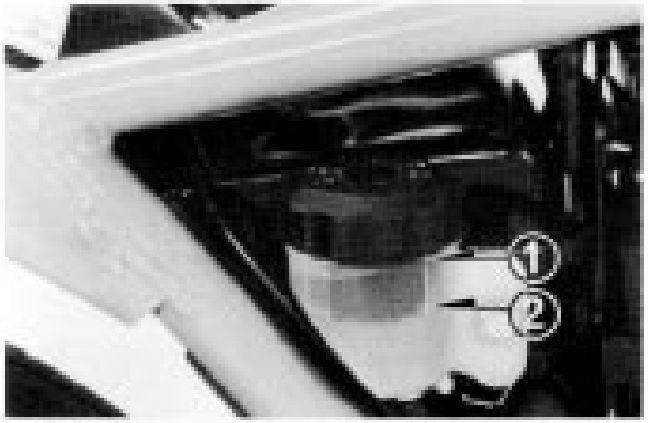
4. HYDRAULIC BRAKE

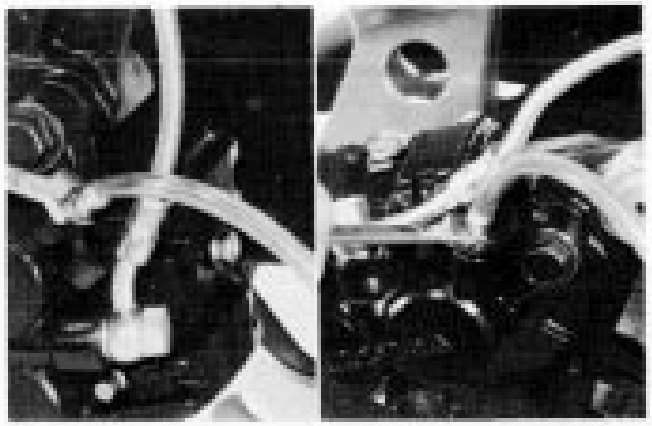


(1) Upper level
(2) Lower level

NOTE:

* **The front and rear brake pads can be removed without disconnecting the brake hoses. Once the brake hoses or brake system have been disconnected. 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 will result.**





Brake fluid replacement/air bleeding

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

CAUTION:

* ***Install the diaphragm on the reservoir when operating the brake lever/ pedal.***

2. Connect a bleeder hose to the bleeder valve. Loosen the caliper bleeder valve and pump the brake lever or pedal.
3. Stop operating the lever or pedal when no fluid flows out of the bleeder valve.
4. Close the bleeder valve, fill the reservoir, and install the diaphragm.

CAUTION:

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

5. To prevent piston overtravel and brake fluid seepage, keep a 20 mm (3/4 in) space to the handlebar grip when bleeding the front brake system. Pump up the system pressure with the lever until there are no air bubbles in the fluid flowing out of the reservoir small hole and lever or pedal resistance is felt.
6. Squeeze the brake lever (or depress the pedal), open the bleeder valve 1/2 turn then close the valve.

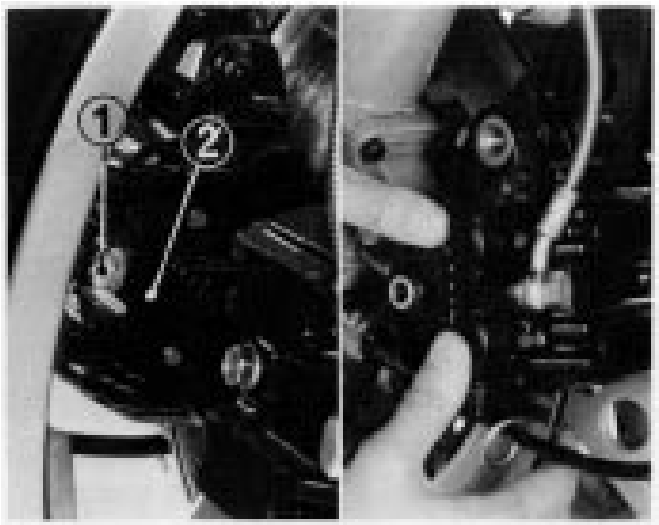
NOTE:

* **Do not release the brake lever (or pedal) until the bleeder valve has been closed again.**

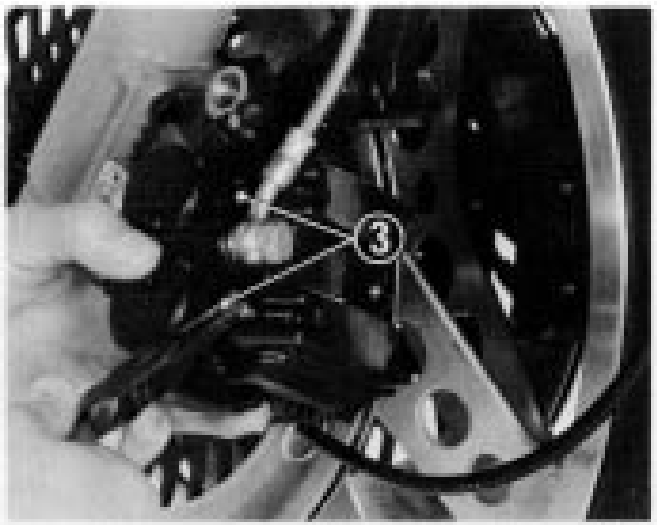
7. Release the brake lever (or pedal) slowly and wait several seconds after it reaches the end of its travel.
8. Repeat the above steps (6) and (7) until bubbles cease to appear in the fluid at the end of the hose.
9. Refill the reservoir to upper level.

WARNING

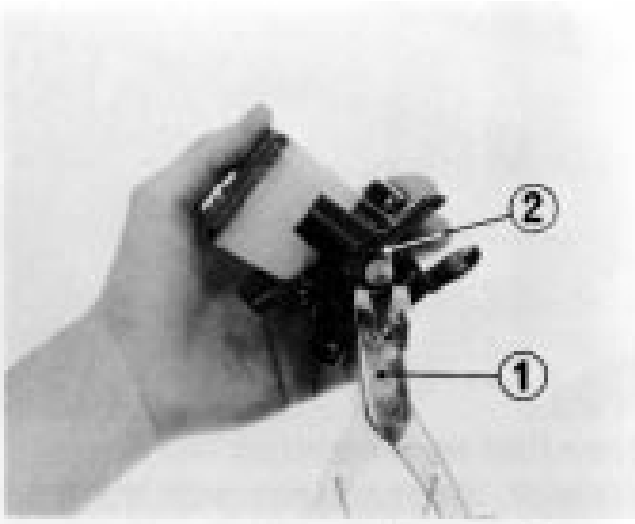
* ***A contaminated brake disc or pad reduces stopping power. Discard contaminated pads and clean a contaminated disc with a high quality brake degreasing agent.***



(1) 6 mm bolt (2) Pad pin retainer



(3) Pad pins



(1) Snap ring pliers
(2) Snap ring

Brake pad replacement

1. Unscrew the 6 mm bolt and remove the brake pad pin retainer.
2. Remove the two caliper bolts.
3. Push the piston in to facilitate installation of new pads.
4. Lift off the caliper and remove the caliper carrier toward you. Lift off the two pad pins with pliers and remove the pads.
5. Install new brake pads and brake pad pins.
6. Install brake pad pin retainer and torque the caliper mounting bolts.

TORQUE:
UPPER: 20–25 N·m (2.0–2.5 kg-m)
LOWER: 25–30 N·m (2.5–3.0 kg-m)

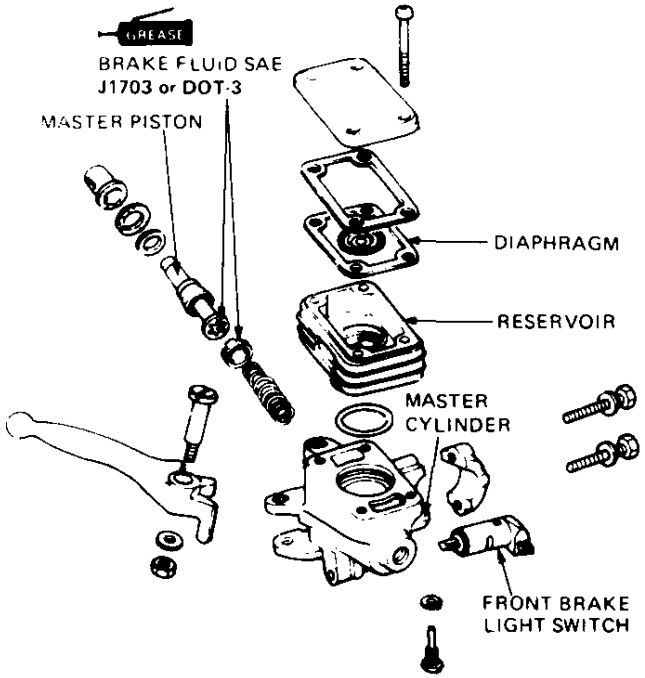
Front brake master cylidner disassembly

1. Drain brake fluid from the hydraulic system.
2. Remove the brake lever from the master cylinder.
3. Remove the brake hose.

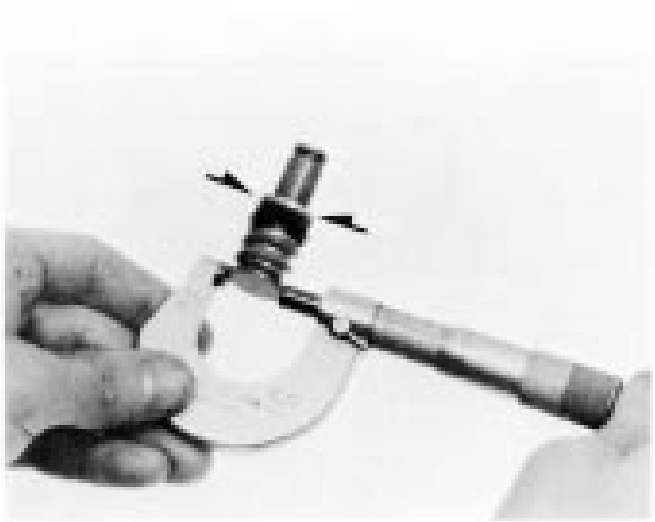
CAUTION:

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

4. Remove the master cylinder.
5. Remove the boot and circlip from the master cylinder.



6. Remove the stopper plate, secondary cup and master piston.
7. Remove the primary cup and spring.
8. Remove the brake fluid reservoir from the master cylinder body.
9. Clean the inside of the master cylinder and reservoir with brake fluid.



Inspection

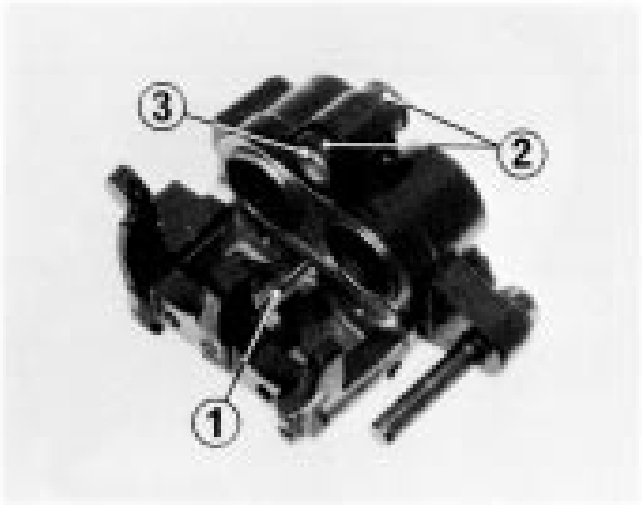
1. Measure the master cylinder I. D. Check the master cylinder for scores, scratches or nicks.
2. Measure the master piston O. D. Check the primary cup and secondary cup for damage before assembly.

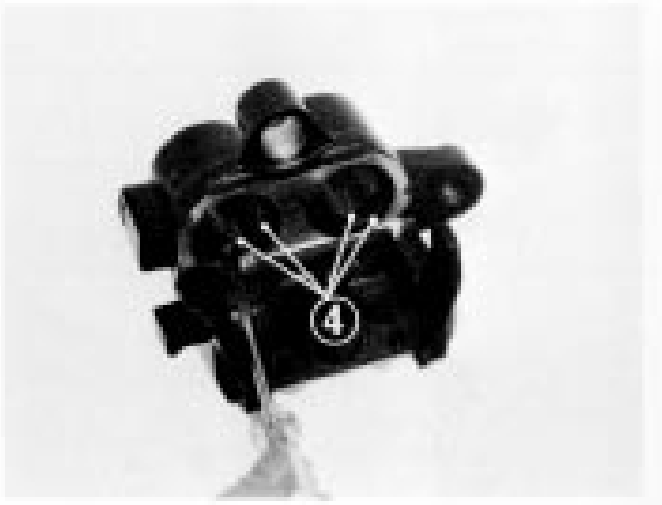
Assembly

NOTE:

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

1. Assemble the master cylinder. Coat piston cups with silicon grease or brake fluid.
2. Place the master cylinder on the handlebar.
3. Install the brake hose and brake lever.
4. Fill the reservoir to the upper level and bleed the brake system.





(1) Pad spring (2) Boots
(3) Collar

Front brake caliper disassembly

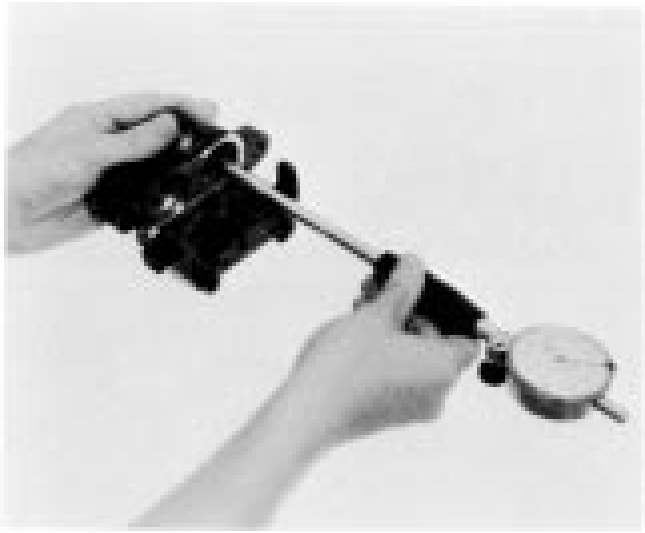
1. Place clean container under the caliper and disconnect the brake hose bolt.
2. Remove the brake hose.
3. Remove the brake caliper.
4. Remove the brake pad spring, boot and collar.
5. Remove the bleeder valve.
6. Place a shop towel over the piston to prevent the piston from coming out, and position the caliper with the piston down.
7. Apply a small amount of air pressure to the fluid inlet.

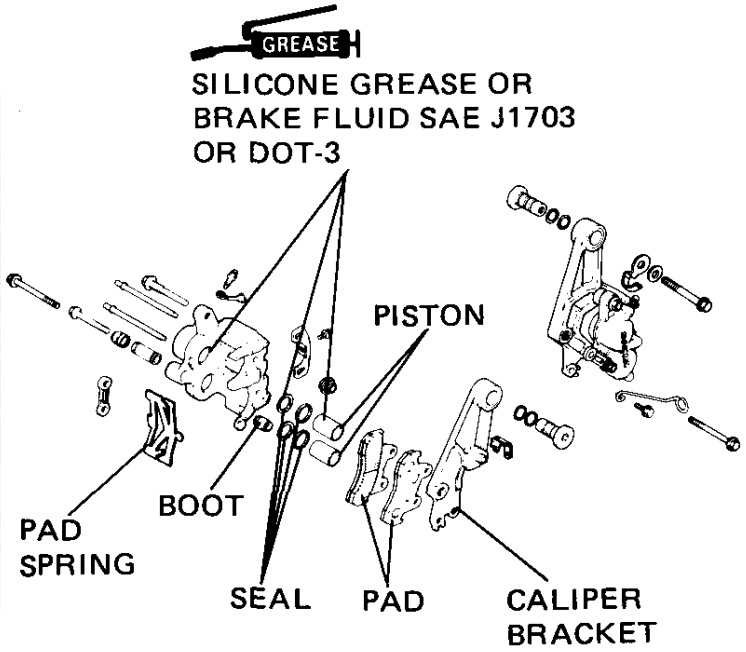
WARNING

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

(4) Oil seals

8. Remove the oil seals from the caliper and clean the pistons and caliper with brake fluid.





Inspection

1. Check the caliper and piston for scoring or scratches.
2. Measure the outside diamter of the piston and inside diameter of the caliper.

Assembly

1. Lubricate the piston and oil seal with silicon grease or brake fluid. Place the piston in the caliper with the concaved end facing the outside.
2. Assemble the caliper in the reverse order of disassembly.
3. Fill the brake fluid reservoir and bleed the front brake system.

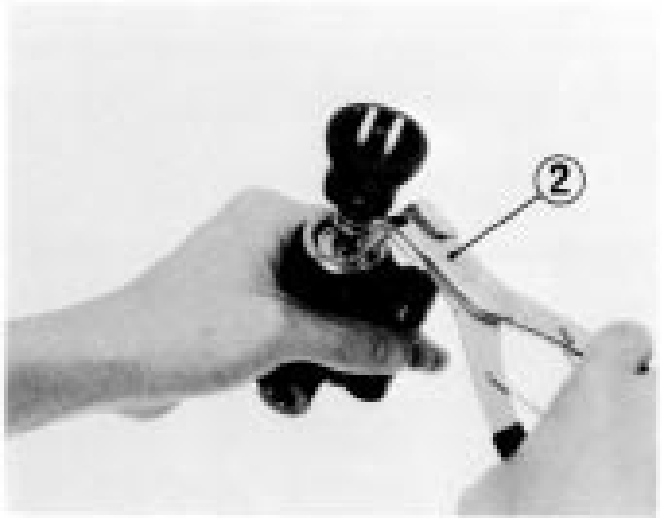
(1) Master cylinder

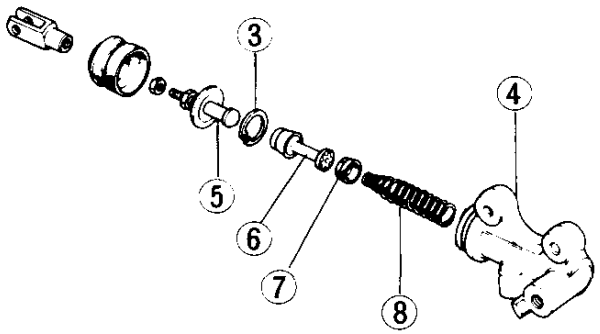
Rear brake master cylinder disassembly

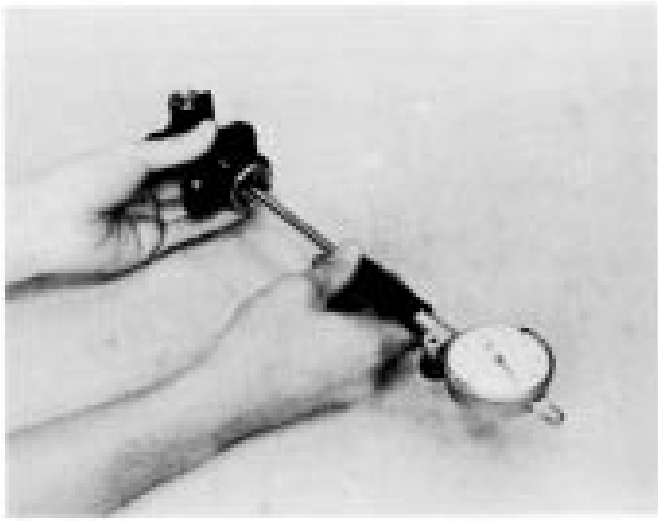
1. Remove the rear cowling. Place a clean drip pan under the brake line.
2. Remove the cotter pin and brake rod joint.

CAUTION:

* ***Avoid spilling brake fluid on painted surfaces.***







(2) Snap ring pliers

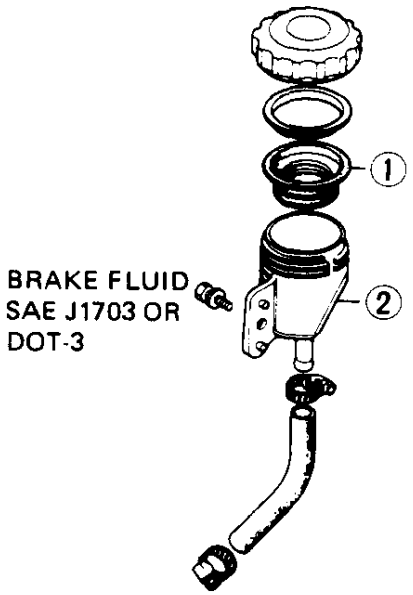
3. Remove the two bolts and master cylinder.
4. Remove the circlip and push rod from the master cylinder body.

(3) Snap ring (4) Rear master cylinder body (5) Push rod
(6) Master piston (7) Primary cup
(8) Spring

5. Remove the master piston, primary cup and spring.
6. Clean all parts with brake fluid.

Inspection

1. Measure the inside diameter of the master cylinder bore. Check for scores or scratches.
2. Measure the outside diameter of the master piston.
3. Check the primary cup and secondary cup for damage before assembly.



(1) Diaphragm (2) Reservoir

Assembly

CAUTION:

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

1. Assemble the master cylinder in the reverse order of disassembly. Lubricate the piston cups with silicon grease or brake fluid before assembly.
2. Fill the reservoir and bleed the rear brake system.

   BRAKE FLUID: SAE J1703 or DOT–3 BRAKE FLUID

1. CHARGING SYSTEM/BATTERY

SERVICE INFORMATION

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

SPECIFICATION

Battery	Capacity	Standard	12V 12AH	
		Optional	12V 14AH, 12V 9AH	
	Specific gravity		1.270–1.290/20°C	
	Charging rate		1.4 amperes maximum	
A.C. generator	Capacity		1,500 min^{-1} (rpm)	5A min
			5,000 min^{-1} (rpm)	17A min
Voltage regulator	Type		Transistorized non-adjustable	

BATTERY

Testing specific gravity

Test each cell with a hydrometer. (at 20°C)

Specific gravity:

1.270–1.290:	**Fully charged**
Below 1.260:	**Undercharged**

NOTE:

* **The battery must be charged if the specific gravity is below 1.230.**
* **The specific gravity varies with the temperatures as shown in the table on the next page.**
* **Replace the battery if sulfation is evident.**
* **The battery must be replaced if there are pastes settled on the bottom of each cell.**

WARNING

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

BATTERY CHARGING

Hook-up instructions

Connect the charger positive (+) cable to the battery positive (+) terminal.

Connect the charger negative (–) cable to the battery negative (–) terminal.

Charging current: 1.4 amperes maximum

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

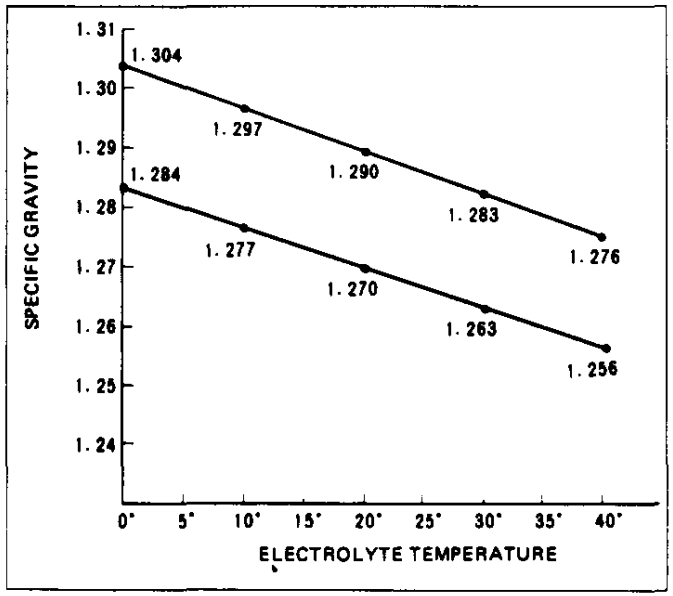
WARNING

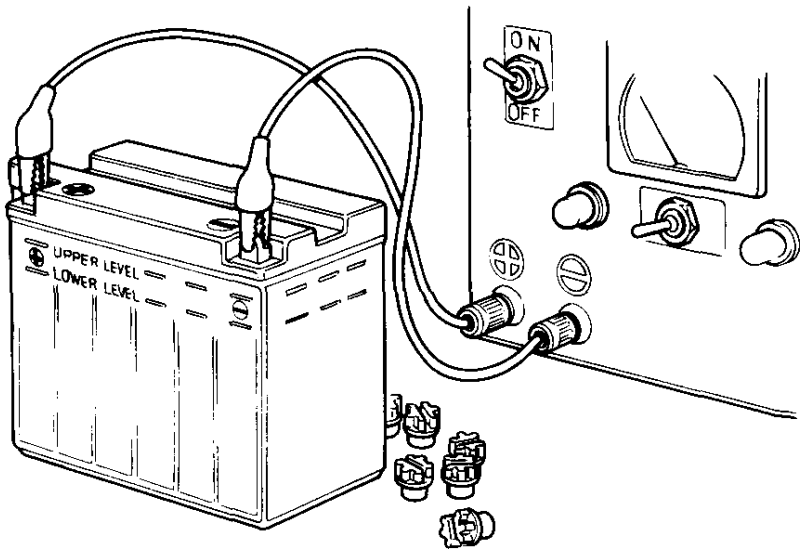
- ***Before charging the battery, remove the cap from each cell.***
- ***Keep flames and sparks away from a charging battery.***
- ***Turn power ON/OFF at the charger, not at the battery terminals.***
- ***Discontinue charging if the electrolyte temperature is 45°C (113°F).***

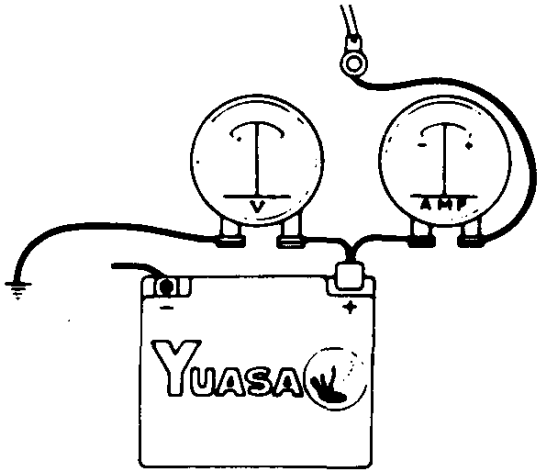
CAUTION:

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

Battery Temperture vs Specific Gravity







CHARGING SYSTEM

Charging output test

Warm up the engine before taking readings.

Connect a voltmeter and an ammeter to check charging system output.

NOTE:

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

TECHNICAL DATA

Ignition switch	Lighting switch	Initial charging	5,000 min-1 (rpm)
ON	ON	1,700 min-1 (rpm)	0 A min 14V

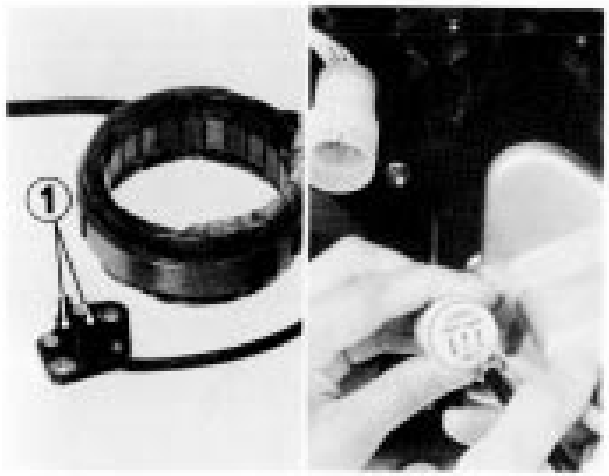
(1) Generator rotor bolt

A. C. generator removal

1. Disconnect the A.C. generator coupler.
2. Remove the A. C. generator cover.
3. Unscrews the three screws and two bolts and remove the generator stator with the brush holder.
4. Shift the transmission into gear, apply the rear brake and remove the generator rotor bolt.

(2) Rotor puller

5. With the rear brake applied, remove the generator rotor with the tool "Generator Rotor Puller",



(1) Scribed lines

Inspection

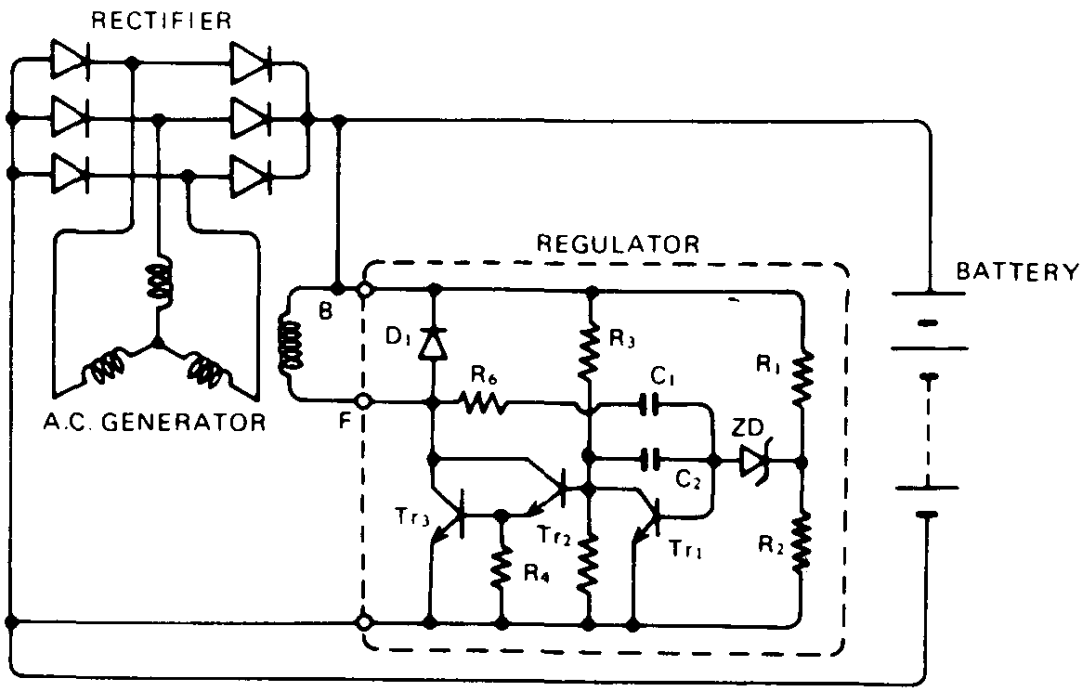
1. Replace the brush if it shows wear to the scribed line. Check the stator for continuity.

NOTE:

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

1. Check the yellow leads for continuity with each other. Replace the stator if any yellow lead is not continuous with the others or if any lead has continuity to ground.

   RESISTANCE: 0.49–0.59 Ω

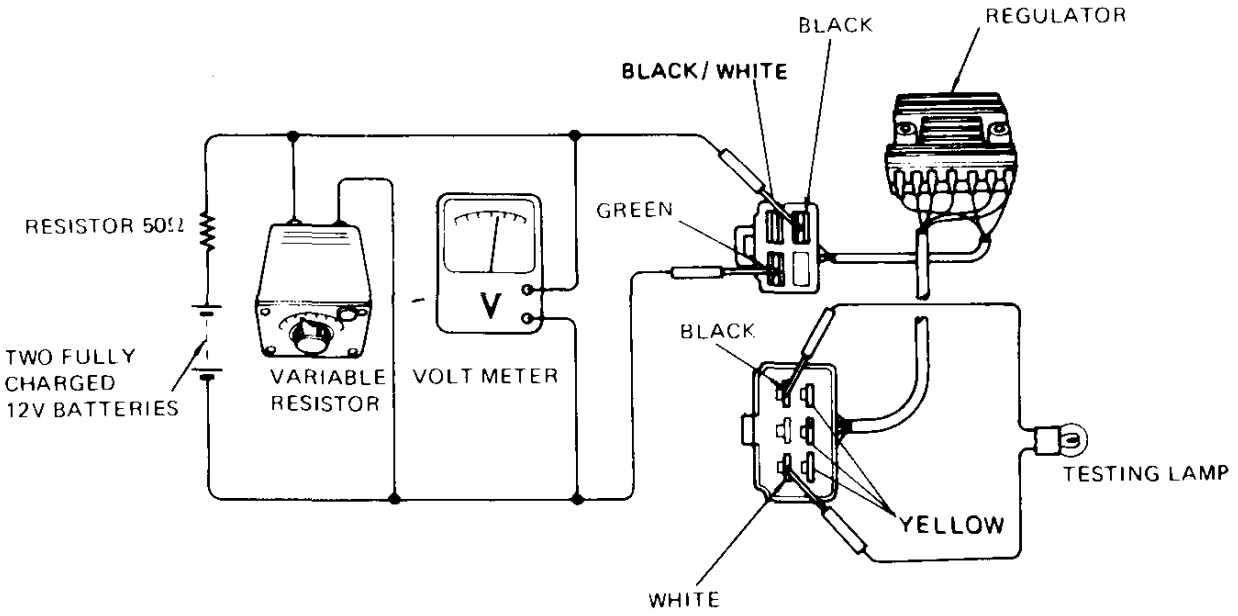


VOLTAGE REGULATOR

Performance test

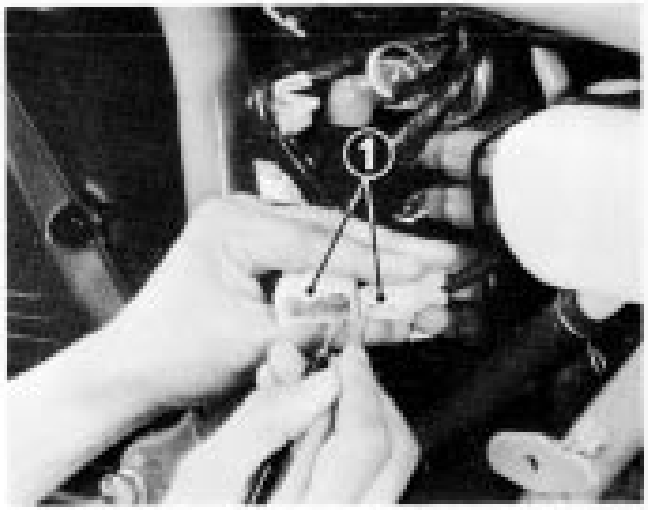
a. Testing with a voltmeter

Connect a voltmeter across the battery.
Check regulator performance with the engine running.
Regulator must cut off the field coil current when battery voltage reaches 14–15V.



b. Testing with a variable resistor

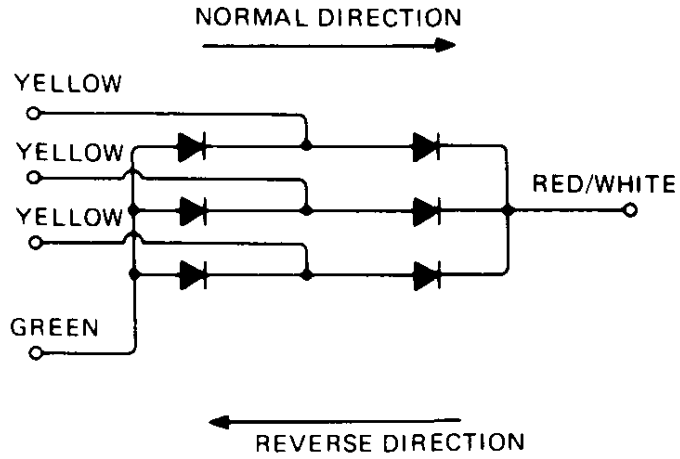
Connect two 12V batteries in series.
Connect a variable resistor (0–100 Ω) across the battery with a 50 Ω resistor in between.
The test lamp must go out when voltage reaches 14–15V on the voltmeter by adjusting the variable resistor.



(1) Regulator/Rectifier couplers

Voltage regulator/rectifier performance test

Check the resistance between the leads with an ohmmeter.



Resistance in normal direction:

Green lead and any yellow lead	0.5–50 Ω min
Red/white lead and any yellow lead	0.5–50 Ω min

Resistance in reverse direction:

Red/white lead and any yellow lead	∞
Green lead and any yellow lead	∞

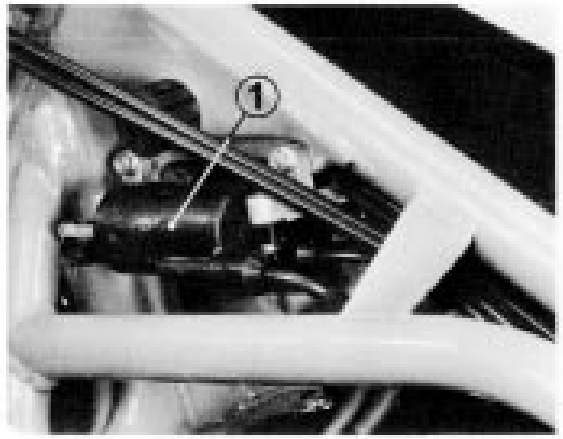
2. IGNITION SYSTEM

CAUTION

* ***A transistorized ignition system is used and no adjustments are to be made unless the pulser generator screws are loosened. If these screws are loosened, ignition timing must be adjusted. For ignition timing adjustment, see page 21.***

SPECIFICATIONS

Type		**E, F, G, NL**	**U, D**
Spark plug	**ND**	**X27ESR–U**	**X27ES–U**
	NGK	**DR8ES**	**D9EA**
	Optional	**X31ESR–U**	**– – – –**
	For races	**X31ES–U, D10EA**	
Spark plug gap		**0.6–0.7 mm (0.024–0.028 in)**	
Ignition timing	**At idle**	**10° BTDC**	
	Initial	**1,700 min⁻¹ BTDC**	
Advance	**Full**	**28°/3,600 min⁻¹ BTDC**	

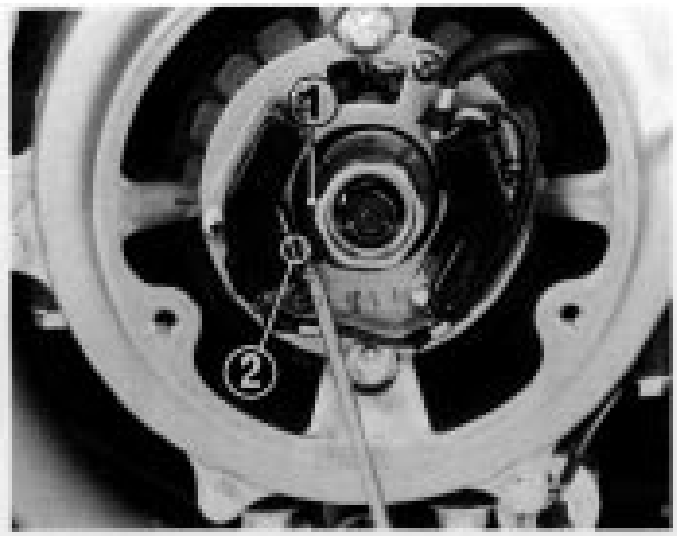


(1) Ignition coil

IGNITION COIL

Removal

1. Remove the fuel tank.
2. Disconnect the wire leads.
3. Remove the coils by removing the attaching bolts.



(1) Rotor (2) Steel core

(3) Pulser coil coupler

TRANSISTORIZED IGNITION SYSTEM

Performance check

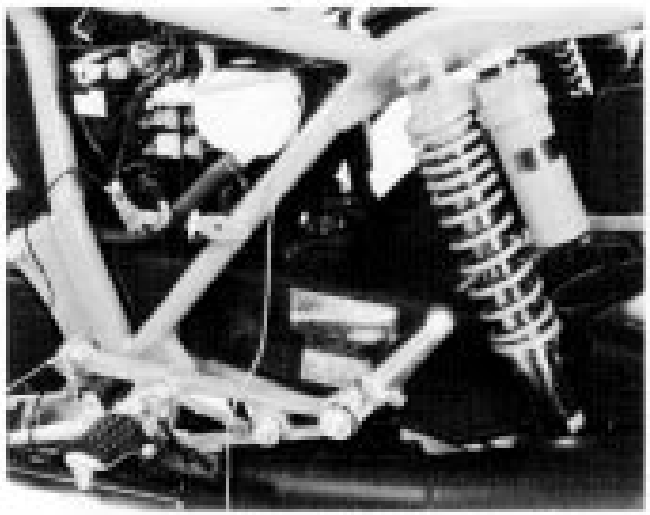
1. Disconnect the No. 1 and No.2 spark plugs.
2. Remove the pulser generator cover.
3. Hold each plug against any engine ground. Turn the ignition switch ON.
4. Touch the end of a screwdriver to the rotor and one pulser generator steel core.
5. Repeat this operation several times.
6. A good spark to the plug means that the ignition system for that cylinder is in good shape. Repeat the above for the other pulsers.

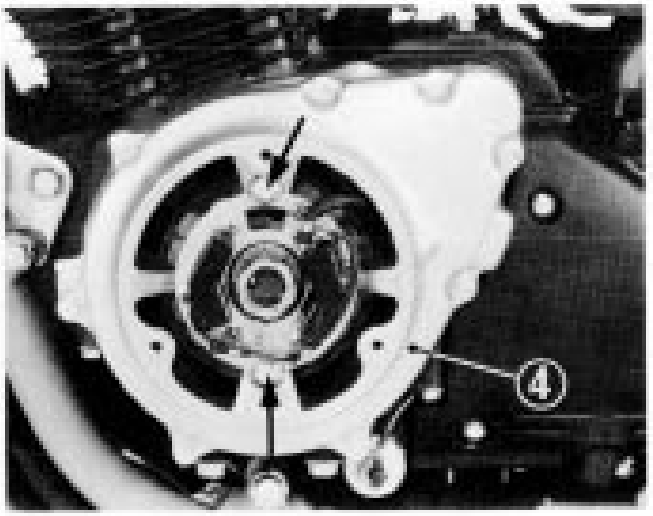
Pulser generator inspection

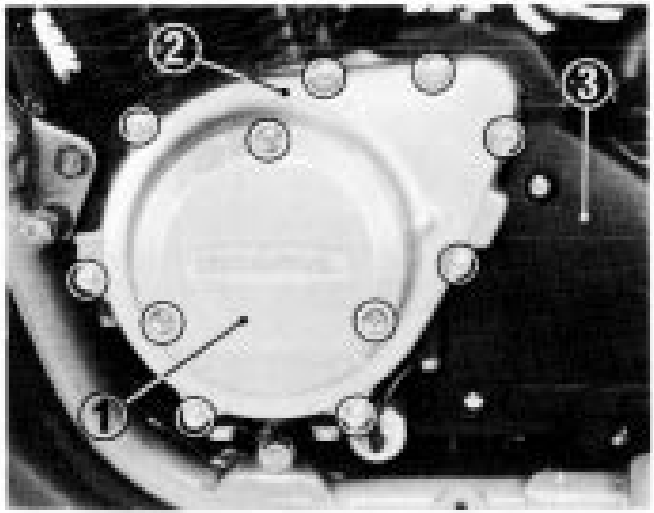
Measure the coil resistances:

Between yellow leads (2, 3 cylinders)
Between blue leads (1, 4 cylinders)

COIL RESISTANCE: 530 ± 50 Ω (20°C, 68°F).







Spark unit inspection

1. Disconnect the wirings at the 6-pole coupler (red).
2. Attach the positive lead of a voltmeter to the Blue/Yellow tube (1, 4) terminal or the yellow tube (2, 3) terminal of the 6-pole coupler (white). Attach the negative lead to any convenient ground. Turn the ignition switch on.
4. Ground each corresponding terminal of the 6-pole coupler (1, 4: Blue/white tube; 2, 3: Yellow/white tube).
5. The transistor unit is normal if the voltage indicated by the voltmeter changes from 12V to less than 3V in each test.

(4) Left crankcase cover

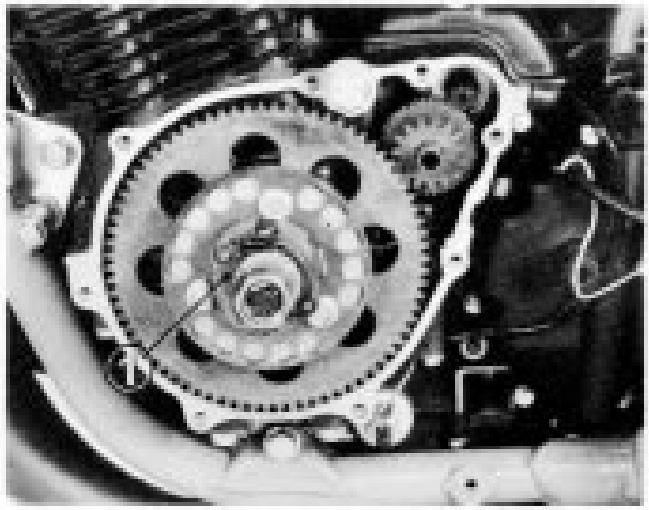
Pulser generator replacement

1. Remove the pulser base plate screws.
2. Remove the left crankcase cover.
3. Remove the pulser generator and install a new one.
4. Adjust ignition timing (Page 21).

(1) Pluser generator cover
(2) Left crankcase cover
(3) Drive sprocket cover

Spark advancer

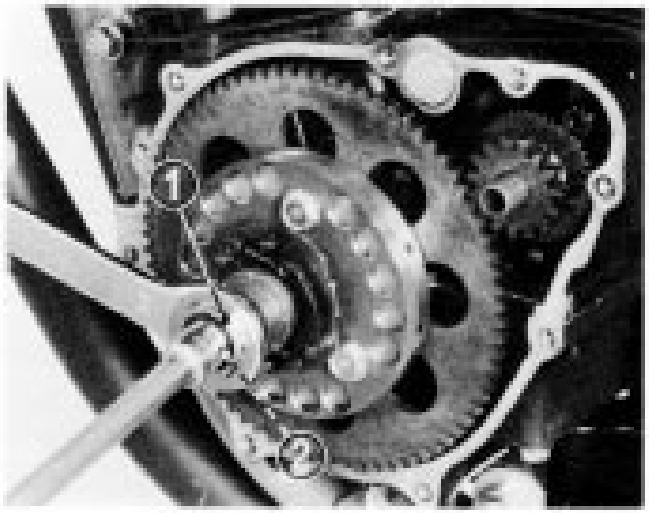
1. Remove the pulser generator cover.
2. Remove the drive sprocket cover and left crankcase cover.



(1) Spark advancer

Inspection

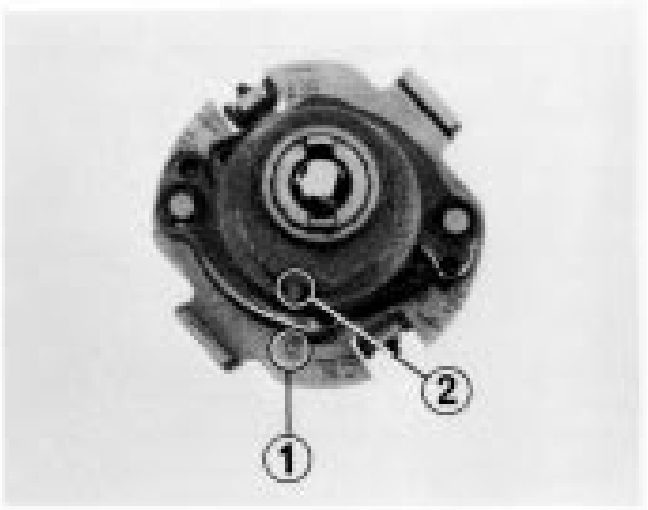
1. Check the mechanical advancer cam for sticking. Lubricate the sliding surfaces.
2. Check the spring for loss of tension and advancer pin for excessive wear if the advancer fails to return.



(1) Spacer (2) Bolt

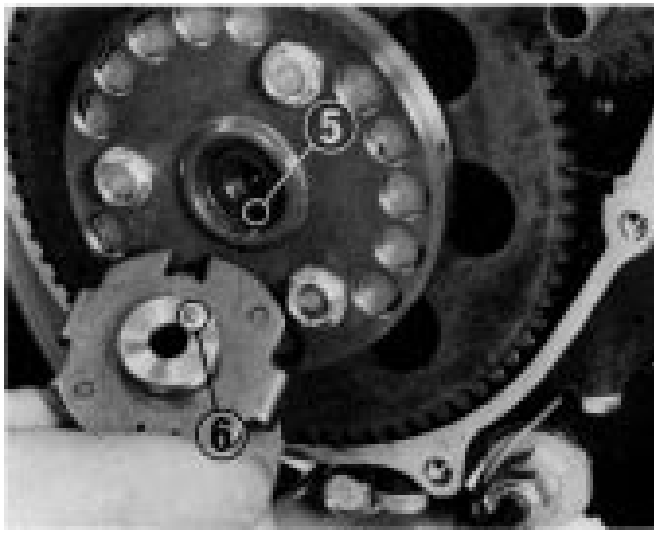
Advancer replacement

1. Remove the spark advancer by removing the bolt attaching the spacer.



(1) "O" mark
(2) Rotor tooth

2. Align the "O" mark on the advancer with the rotor tooth as shown.



(5) Groove (6) Pin

3. Align the advancer pin with the groove in the crankshaft and install.

ASSEMBLY

1. Remove all traces of locking agent from the 8mm hole on the crankshaft side.
2. Using a plastic hammer, drive the driven flange carefully until it contacts the end of the crankshaft.
3. Apply a heat resistant (about 200°C) locking agent to the threads of the advancer bolt; also apply molybdenum disulfide grease to the underside of the same bolt. Tighten the bolt to the specified torque.
   TORQUE: 38 N·m (3.8 kg-m)

1. TROUBLESHOOTING CHART

ENGINE DOES NOT START OR IS HARD TO START

		POSSIBLE CAUSE
1. Check fuel flow to carburetor	NOT REACHING CARBURETOR →	(1) Fuel tank empty (2) Clogged fuel tube or fuel filter (3) Sticking float valve (4) Clogged fuel tank cap breather hole
REACHING CARBURETOR ↓		
2. Perform spark test	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 A. C. generator (6) Broken or shorted ignition coil (7) Faulty ignition switch (8) Faulty pulser generator (9) Low battery charge
GOOD SPARK ↓		
3. Test cylinder compression	LOW COMPRESSION →	(1) Improper valve clearance (2) Valve stuck open (3) Worn cylinder and piston rings (4) Damaged cylinder head gasket (5) Seized valve (6) Improper valve timing
COMPRESSION NORMAL ↓		

4. Start by following normal procedure ENGINE DOES NOT FIRE ↓	ENGINE FIRES BUT STOPS →	(1) Improper choke operation (2) Carburetor incorrectly adjusted (3) Manifold leaking (4) Improper ignition timing (Spark unit or pulser generator) (5) Incorrect fast idle (6) Fuel contaminated
5. Remove and inspect spark plug	WET PLUG →	(1) Carburetor flooded (2) Choke closed (3) Throttle valve open (4) Air cleaner dirty

ENGINE LACKS POWER		**POSSIBLE CAUSE**
1. Raise wheels off ground and spin by hand WHEEL SPINS FREELY ↓	WHEELS DO NOT SPIN FREELY →	(1) Brake dragging (2) Worn or damaged wheel bearings (3) Wheel bearing needs lubrication
2. Check tire pressure PRESSURE NORMAL ↓	PRESSURE LOW →	(1) Punctured tire (2) Faulty tire valve
3. Accelerate rapidly from low to second ENGINE SPEED LOWERED WHEN CLUTCH IS RELEASED ↓	ENGINE SPEED NOT CHANGED WHEN CLUTCH IS RELEASED →	(1) Clutch slipping (2) Worn clutch disc/plate (3) Warped clutch disc/plate

4. Accelerate lightly

ENGINE SPEED INCREASES

↓

ENGINE SPEED NOT INCREASED →
(1) Carburetor choke closed
(2) Clogged air cleaner
(3) Restricted fuel flow
(4) Clogged fuel tank breather tube
(5) Clogged muffler

5. Check ignition timing (use timing light)

CORRECT

↓

INCORRECT →
(1) Faulty spark unit
(2) Faulty pulser generator
(3) Faulty spark advancer

6. Check valve clearance

CORRECT

↓

INCORRECT →
(1) Improper valve adjustment
(2) Worn valve seat

7. Test cylinder compression

NORMAL

↓

TOO LOW →
(1) Valve stuck open
(2) Worn cylinder and piston rings
(3) Leaking head gasket
(4) Improper valve timing

8. Check carburetor for clogging

NOT CLOGGED

↓

CLOGGED →
(1) Carburetor not serviced frequently enough

9. Remove spark plug

NOT FOULED OR DISCOLORED

↓

FOULED OR DISCOLORED →
(1) Plugs not serviced frequently enough
(2) Spark plug with incorrect heat range

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 or advancer)
ENGINE DOES NOT KNOCK		

POOR PERFORMANCE AT LOW AND IDLE SPEEDS		**POSSIBLE CAUSE**
1. Check ignition timing and valve clearance	INCORRECT →	(1) Improper valve clearance (2) Improper ignition timing (Faulty spark unit or spark advancer)
CORRECT ↓		

2. Check carburetor pilot screw adjustment — INCORRECT → See Carburetor Section

CORRECT ↓

3. Check for leaking manifold — LEAKING →
   (1) Deteriorated insulator O-ring
   (2) Loose carburetor

NO LEAK ↓

4. Perform spark test — WEAK OR INTERMITTENT SPARK →
   (1) Faulty, carbon or wet fouled spark plug
   (2) Faulty spark unit
   (3) A. C. generator faulty
   (4) Faulty ignition coil
   (5) Faulty spark advancer

GOOD SPARK

POOR PERFORMANCE AT HIGH SPEED — **POSSIBLE CAUSE**

1. Check ignition timing and valve clearance — INCORRECT →
   (1) Improper valve clearance
   (2) Faulty spark unit
   (3) Faulty pulser generator
   (4) Faulty spark advancer

CORRECT ↓

2. Disconnect fuel tube at carburetor — FUEL FLOW RESTRICTED →
   (1) Lack of fuel in tank
   (2) Clogged fuel line
   (3) Clogged fuel tank breather hole
   (4) Clogged fuel valve

FUEL FLOWS FREELY ↓

3. Remove carburetor and check for clogged jet — CLOGGED →
   (1) Clean

NO CLOG ↓

4. Check valve timing — INCORRECT → (1) Cam sprocket not installed properly

   CORRECT

   ↓

5. Check valve spring tension — WEAK → (1) Faulty spring

   NOT WEAKENED

POOR HANDLING → Check tire pressure

1. If steering is heavy →
   (1) Steering bearing adjustment nut too tight
   (2) Damaged steering head bearings

2. If either wheel is wobbling →
   (1) Excessive wheel bearing play
   (2) Distorted rim
   (3) Improperly installed wheel hub
   (4) Swingarm pivot bearing excessively worn
   (5) Distorted frame
   (6) Swingarm pivot bolt too tight

3. If the motorcycle pulles to one side →
   (1) Faulty shock absorber
   (2) Front and rear wheels not aligned
   (3) Bent front fork
   (4) Bent swingarm

2. TORQUE VALUES

ENGINE

Item	Q'ty	Thread Dia (mm)	Torque N·m (kg-m)	Remark
Cylinder head cover	8	6	8–12 (0.8–1.2)	
Camshaft holder	24	6	12–16 (1.2–1.6)	
Cylinder head	12	10	38 (3.8)	Apply engine oil to threads and underside of nuts
Cam sprocket	4	7	18–20 (1.8–2.0)	
Spark plug	4		12–19 (1.2–1.9)	
Crankcase		8	21–25 (2.1–2.5)	Apply engine oil to threads and underside of nuts
A. C. generator	1	12	80–100 (8.0–10.0)	
Primary shaft	1	12	80–100 (8.0–10.0)	
Mainshaft	1	16	38–42 (3.8–4.2)	
Drive sprocket	1	10	33–37 (3.3–3.7)	
Connecting rod nut	8		32 (3.2)	
Oil filter center bolt	1		28–32 (2.8–3.2)	
Oil pressure switch	1		15–20 (1.5–2.0)	Apply liquid sealant
Neutral switch	1		16–20 (1.6–2.0)	
Oil drain plug	1	14	35–40 (3.5–4.0)	
Oil pipe	2	10	21–15 (2.1–2.5)	
Spark advancer	1	8	38 (3.8)	UBS Apply molybdeum grease
Crankcase	3	7	15–19 (1.5–1.9)	
Clutch center	1		45–55 (4.5–5.5)	

CHASSIS

Item	Q'ty	Thread Dia (mm)	Torque N·m (kg-m)	Remarks
Steering stem nut	1	24	80–120 (8.0–12.0)	
Steering adjstment nut	1	26	18–20 (1.8–2.0)	

Item	Q'ty	Thread Dia (mm)	Torque N·m (kg-m)
Steering handlebar	2	8	20–25 (2.0–2.5)
Front fork top bridge	2	7	9–13 (0.9–1.3)
Front fork bolt	2	31	15–30 (1.5–3.0)
Front fork bottom bridge	2	8	20–24 (2.0–2.4)
Front axle holder	4	8	18–25 (1.5–2.5)
Front axle nut	1	12	55–65 (5.5–6.5)
Front/rear brake disc	5	8	27–33 (2.7–3.3)
Brake caliper carrier	2	10	35–45 (3.5–4.5)
Brake caliper pin bolt	2	8	20–25 (2.0–2.5)
Brake caliper mounting bolt	2	8	20–25 (2.0–2.5)
Rear axle	1	18	80–100 (8.0–10.0)
Final driven sprocket	4	12	80–100 (8.0–10.0)
Swingarm pivot nut	1	16	70–80 (7.0–8.0)
Rear brake stopper arm bolt	1	8	19–23 (1.9–2.3)
Rear brake torque link bolt	1	10	30–40 (3.0–4.0)
Rear shock absorber	2	10	30–40 (3.0–4.0)
Engine hanger bolt	1	12	55–65 (5.5–6.5)
	4	10	30–40 (3.0–4.0)
Gearshift pedal	1	6	8–12 (0.8–1.2)
Front fork piston socket bolt	2	8	15–25 (1.5–2.5)
Anti-dive case	8	6	6– 9 (0.6–0.9)
Front fork air valve	1	8	4– 7 (0.4–0.7)

Torqeu specifications listed above are for the most important tightening points. If a torque specification is not listed, follow the standards given below.

Type	Torque N·m (kg-m)	Type	Torque N·m (kg-m)
5 mm bolt, nut	4.5–6 (0.45–0.6)	5 mm screw	3.5–5.0 (0.35–0.5)
6 mm bolt, nut	8–12 (0.8–1.2)	6 mm screw	7–11 (0.7–1.1)
8 mm bolt, nut	18–25 (1.8–2.5)	6 mm flange bolt, nut	10–14 (1.0–1.4)
10 mm bolt, nut	30–40 (3.0–4.0)	8 mm flange bolt, nut	24–30 (2.4–3.0)
12 mm bolt, nut	50–60 (5.0–6.0)	10 mm flange bolt, nut	30–40 (3.0–4.0)

3. SERVICE DATA

ENGINE

ITEM			STANDARD	SERVICE LIMIT	For race
Camshaft	Cam height	IN	38.00–38.16 mm (1.496–1.50 in)	37.9 mm (1.492 in)	←
		EX	38.50–38.66 mm (1.515- 1.522 in)	38.4 mm (1.511 in)	←
	Oil clearance	Gear holder D, G, K	0.062–0.109 mm (0.002–0.004 in)	0.12 mm (0.008 in)	←
		B, H, C, J	0.085–0.139 mm (0.003–0.005 in)	0.24 mm (0.009 in)	←
		A, E, F, L	0.040–0.0082 mm (0.0015–0.0032 in)	0.18 mm (0.007 in)	←
	Runout		———	0.05 mm (0.0019 in)	←
Valve lifter	Valve lifter O. D.		27.972–27.993 mm (1.101–1.102 in)	27.96 mm (1.100 in)	←
	Valve lifter hole I. D.		28.000–28.016 mm (1.1023–1.1029 in)	28.04 mm (1.1039 in)	←
	Lifter-to-cylinder head clearance		———	0.07 mm (0.0027 in)	←
Valve spring	Free length	IN, EX outer	44.1 mm (1.736 in)	42.7 mm (1.681 in)	←
		IN, EX inner	39.4 mm (1.551 in)	38.5 mm (1.515 in)	←
	Preload/length	IN, EX outer	14.6–16.6 kg/37.5 mm	14.0 kg/37.5 mm	←
		IN, EX inner	5.9–7.3 kg/34.5 mm	5.5 kg/34.5 mm	←
Valve, valve guide	Stem O. D.	IN	5.475–5.490 mm (0.2155–0.216 in)	5.47 mm (0.2153 in)	←
		EX	5.455–5.470 mm (0.2142–0.2153 in)	5.44 mm (0.214 in)	←
	Guide I. D.	IN	5.500–5.515 mm (0.2165–0.2171 in)	5.54 mm (0.2181 in)	←
		EX	5.500–5.515 mm (0.2165–0.2171 in)	5.54 mm (0.2181 in)	←
	Stem-to-guide clearance	IN	———	0.07 mm (0.0027 in)	←
		EX	———	0.09 mm (0.0035 in)	←

ITEM			STANDARD	SERVICE LIMIT	For race
	Valve seat width		0.85–1.10 mm (0.0334–0.044 in)	1.5 mm (0.059 in)	←
Cam chain B	Length		175.70–175.92 mm (6.917–6.926 in)	177.3 mm (6.97 in)	←
Cylinder head warpage			———	0.10 mm (0.0639 in)	←
Cylinder	Bore I. D.		70.00–70.01 mm (2;7559–2;7562 in)	70.10 mm (2.759 in)	←
	Warpage		———	0.1 mm (0.0039 in)	←
Piston, piston rings, piston pin	Piston ring-to-clearance	TOP	0.025–0.055 mm (0.0009–0.0021 in)	0.09 mm (0.0035 in)	0.07 mm (00027 in)
		SECOND	0.015–0.045 mm (0.0006–0.0018 in)	0.09 mm (0.035 in)	0.07 mm (0.0027 in)
	Ring end gap	TOP	0.15–0.35 mm (0.0006–0.0137 in)	0.50 mm (0.019 in)	0.45 mm (0.0018 in)
		SECOND	0.15–0.35 mm (0.0006–0.0137 in)	0.50 mm (0.019 in)	0.45 mm (0.0018 in)
		OIL (SIDE RAIL)	0.3–0.9 mm (0.0118–0.0354 in)	1.1 mm (0.043 in)	1.0 mm (0.00393 in)
		Piston O. D.	69.96–69.98 mm (2.7543–2.7551 in)	69.90 mm (2.751 in)	69.94 mm (2.7535 in)
	Piston pin bore		17.002–17.008 mm (0.6693–0.6696 in)	17.03 mm (0.6704 in)	17.015 mm (0.6698 in)
	Connecting rod small end I. D.		17.016–17.034 mm (0.6699–0.6706 in)	17.05 mm (0.6712 in)	17.045 mm (0.6710 in)
	Piston pin O. D.		16.994–17.000 mm (0.6690–0.6692 in)	16.98 mm (0.6685 in)	←
	Piston-to-piston pin clearance		———	0.04 mm (0.00015 in)	0.03 mm (0.00118 in)
	Cylinder-to-piston clearance		———	0.10 mm (0.0039 in)	←
Clutch	Spring free length		41 mm (1.614 in)	39 mm (1.535 in)	←
	Spring preload/length		20.7–22.5 kg/27.4 mm	20.0 kg/27.4 mm	←

Clutch	Disc thickness		3.72–3.88 mm (0.1461–0.152 in)	3.4 mm (0.133 in)	←
Starter clutch	Drive gear O. D.		42.275–42.30 mm (1.6644–1.6654 in)	42.255 mm (1.6636 in)	←
Transmission	Backlash		0.023–0.117 mm (0.0009–0.0046 in)	0.13 mm (0.0051 in)	←
	Gear I. D.	M4 gear	31.025–31.05 mm (1.2215–1.2224 in)	31.07 mm (1.223 in)	←
		M5 gear	31.025–31.05 mm (1.2215–1.2224 in)	31.07 mm (1.223 in)	←
		C1 gear	25.000–25.021 mm (0.9843–0.9851 in)	25.06 mm (0.9866 in)	←
		C3 gear	31.025–31.05 mm (1.2215–1.2224 in)	31.07 mm (1.223 in)	←
	Gear bushing	M5 O. D.	30.950–30.975 mm (1.2185–1.2195 in)	30.93 (1.218 in)	←
		C1 O. D.	24.959–24.980 mm (0.9826–0.9835 in)	24.93 mm (0.981 in)	←
		C1 I. D.	22.000–22.021 mm (0.8661–0.8669 in)	22.04 mm (0.8677 in)	←
	Mainshaft O.D.	At M4	27.959–27.980 mm (1.1007–1.1015 in)	27.93 mm (1.0996 in)	←
	Gear bushing O. D.	M4, C3	30.950–30.975 mm (1.2185–1.2194 in)	30.93 mm (1.2177 in)	←
	Countershaft	At C1	21.987–22.0 mm (0.8656–0.8661 in)	21.93 mm (0.863 in)	←
	O. D.	at C3	27.959–27.980 mm (1.1007–1.1015 in)	27.93 mm (1.0996 in)	←
	Gear-to-bushing/shaft clearance	M4 to bush	0.050–0.10 mm (0.0019–0.0039 in)	0.12 mm (0.0047 in)	←
		M5 to bush	0.050–0.10 mm (0.0019–0.0039 in)	0.12 mm (0.0047 in)	←
		C1 to bush	0.020–0.062 mm (0.0007–0.0024 in)	0.08 mm (0.0031 in)	←
		C1 bush to shaft	0–0.034 mm (0–0.0013 in)	0.045 mm (0.0017 in)	←
		C3 to bush	0.050–0.10 mm (0.0019–0.0039 in)	0.12 mm (0.0047 in)	←
Shift fork	Claw thickness	6.43–6.50 mm (0.2531–0.2559 in)		6.1 mm (0.240 in)	←
	I. D.	13.000–13.018 mm (0.5118-0.5125 in)		13.04 mm (0.5133 in)	←
Shift gear-to-shift fork claw		0.1–0.24 mm (0.0039–0.0094 in)		0.5 mm (0.0196 in)	←
Fork shaft	O. D.	12.996–12.984 mm (0.5116–0.5111 in)		12.90 mm (0.5078 in)	←

ITEM		STANDARD	SERVICE LIMIT	FOR RACE
Crankshaft,	Connecting rod big end side clearance	0.05–0.20 mm (0.0019–0.0007 in)	0.3 mm (0.0118 in)	0.25 mm (0.0098 in)
	Crankshaft runout	———	0.05 mm (0.0019 in)	0.03 mm (0.00118 in)
	Crankpin oil clearance	0.025–0.055 mm (0.00098–0.00216 in)	0.065 mm (0.0025 in)	0.0035–0.0045 mm (0.0013–0.0017 in)
	Main journal oil clearance	0.03–0.06 mm (0.0011–0.0023 in)	0.070 mm (0.0027 in)	0.030–0.040 mm (0.0011–0.0015 in)

FRAME

ITEM		STANDARD	SERVICE LIMIT	FOR RACE
Front axle shaft bend		———	0.2 mm (0.0078 in)	←
Front wheel rim runout	Radial	———	2.0 mm (0.078 in)	←
	Axial	———	2.0 mm (0.078 in)	←
Front cushion spring free length		452.6 mm (17.82 in)	444 mm (17.5 in)	←
Front fork pipe bend		———	0.2 mm (0.0078 in)	←
Front fork pipe DU bush O. D.		39.92–40.04 mm (1.572–1.576 in)	39.87 mm (1.570 in)	←
Front fork pipe O. D.		38.90–38.98 mm (1.537–1.535 in)	38.85 mm (1.530 in)	←
Front fork bottom case slider DU bush I.D.		38.97–39.04 mm (1.5342–1.5370 in)	39.09 mm (1.5389 in)	←
Front fork anti-dive piston O.D.		17.947–17.980 mm (0.7066–0.7079 in)	17.93 mm (0.716 in)	←
Front fork anti-dive piston spring free length		28.80 mm (1.134 in)	28.2 mm (1.11 in)	←
Rear axle shaft bend		———	0.2 mm (0.0078 in)	←
Rear wheel rim runout	Axial	———	2.0 mm (0.078 in)	←
	Radial	———	2.0 mm (0.078 in)	←
Rear cushion spring free length		205 mm (8.07 in)	200.9 mm (7.91 in)	←

ITEM	STANDARD	SERVICE LIMIT
Swingarm collar O.D.	21.500–21.552 mm (0.8464–0.8485 in)	21.7 mm (0.8543 in)
Swing arm collar O. D.	21.427–21.460 mm (0.8435–0.8448 in)	21.4 mm (0.8425 in)
Front brake disc thickness	10.0 mm (0.39 in)	9.0 mm (0.35 in)
Front brake disc runout	———	0.3 mm (0.0118 in)
Front master cylinder I. D.	15.870–15.913 mm(0.6248–0.6265 in)	15.925 mm (0.6269 in)
Front caliper piston O. D. (U Type) (except U Type)	30.195–30.198 mm (1.1888–1.1889 in) 31.948–31.998 mm (1.2578–1.2598 in)	30.14 mm (1.1866 in) 31.940 mm (1.2575 in)
Front caliper bore I. D. (U Type) (except U Type)	30.23–30.28 mm (1.1901–1.1921 in) 32.03–32.08 mm (1.2610–1.2630 in)	30.290 mm (1.1925 in) 32.090 mm (1.2634 in)
Rear master cylinder I. D.	15.870–15.913 mm (0.6248–0.6265 in)	15.925 mm (0.6270 in)
Rear master piston O. D.	15.827–15.854 mm (0.6231–0.6242 in)	15.810 mm (0.6224 in)
Rear caliper cylinder I. D.	27.000–27.05 mm (1.0629–1.0649 in)	27.06 mm (1.0653 in)
Rear caliper piston O. D.	26.918–26.968 mm (1.0597–1.0617 in)	26.91 mm (1.0594 in)
Rear brake disc runout	———	0.05 mm (0.0019 in)
Rear brake disc thickness	5.0 mm (0.20 in)	4.0 mm (0.1574 in)

4. SPECIAL TOOLS

Tool Name	Tool No.	Q'ty	Ref. page
Vacuum gauge set	07404–0020000	1	27–28
Oil pressure gauge	07506–3000000	1	19
Oil pressure gauge attachment	07510–4220100	1	19
Primary gear holder	07924–4250000	1	60
Rotor puller	07933–4250000	1	116
Bearing ball race remover	07953–4250001	1	98–99
Carburetor throttle wrench	07908–4220100	1	28
Carburetor pilot screw wrench	07908–4220201	1	
Snap ring pliers	07914–3230001	1	102, 108, 112
Steering stem socket	07916–3710100	1	99
6 mm hollow set wrench	07917–3230000	1	92
Bearing race remover	07946–3710500	1	98
Steering stem driver	07946–3710600	1	98
Bearing driver attachment	07946–3710700	1	99
Piston base	07958–3000000	2	59
Valve lifter holder	07964–4220300	1	24
Valve compressor	07964–422010T	1	23
Valve guide reamer (5.5 mm)	07984–2000000	1	51,52
Piston ring compressor	07954–2830000	2	59
Valve lifter bore protector	07999–4220000	1	50, 54
Socket bit (10 mm)	07917–3710000	1	60
Clutch center holder	07923–4610000	1	60
Valve seat cutter (24.5 mm)	07780–0010100	1	53
Valve seat cutter (27.5 mm)	07780–0010200	1	
Valve seat flat cutter (28 mm)	07780–0012100	1	
Valve seat flat cutter (30 mm)	07780–0012200	1	
Valve seat interior cutter (30 mm)	07780–0014000	1	
Valve seat cutter holder (5.5 mm)	07780–0010100	1	
Float valve gauge	07401–0010000	1	73

Tool Name	Tool No.	Q'ty	Ref. page
Retainer wrench (A)	07710–0010100	1	102
Retainer wrench body	07710–0010401	1	102
Lock nut wrench socket (20 x 24 mm)	07716–0020100	1	60
Lock nut wrnech socket (30 x 32 mm)	07716–0020400	1	97
Extension bar	07716–0020500	1	97
Universal holder	07725–0010101	1	60
Valve guide remover (5.5 mm)	07742–0010100	1	52
Valve guide driver (B)	07742–0020200	1	52
Bearing driver outer (42 x 47 mm)	07746–0010300	1	90
Bearing driver outer (52 x 55 mm)	07746–0010400	1	102
Bearing driver outer (62 x 68 mm)	07746–0010500	1	102
Bearing driver handle (C)	07746–0030100	1	Mainshaft
Bearing driver inner (25 mm)	07746–0030200	1	
Bearing driver pilot (15 mm)	07746–0040300	1	90
Bearing driver pilot (20 mm)	07746–0040500	1	102
Bearing driver pilot (25 mm)	07746–0040600	1	102
Bearing driver handle (B)	07746–0020100	1	Mainshaft
Front fork oil seal driver	07947–4630100	1	95
Bearing driver handle (A)	07749–0010000	1	100, 102
Valve spring compressor	07757–0010000	1	50, 54
Shock absorber compressor	07959–3290001	1	104
Bearing driver inner (20 mm)	07746–0020400	1	
Center stand	07965–MA30001	1	42

5. SPECIFICATIONS

ITEM		STANDARD	AREA (Typ.)
DIMENSIONS	Overall length	2,200 mm (86.6 in) 2,220 mm (87.4 in)	E, F, G, U, D H
	Overall width	755 mm (29.7 in)	
	Overall height	1,295 mm (51.0 in)	
	Wheel base	1,490 mm (58.6 in)	
	Seat height	795 mm (31.3 in)	
	Ground clearance	140 mm (5.5 in)	
	Dry weight	233 kg (513.7 lbs)	
FRAME	Type	Double cradle	
	Front suspension, travel	Telescopic fork 140 mm (5.5 in)	
	Rear suspension, travel	Swing arm 105 mm (4.1 in)	
	Front tire size	100/90V18	
	Rear tire size	130/80V18	
	Cold tire pressure (F)	250 kPa (2.50 kg/cm²) General riding	
	(R)	250 kPa (2.50 kg/cm²)	
	(F)	250 kPa (2.50 kg/cm²) High speed on circuits	
	(R)	290 kPa (2.90 kg/cm²)	
	Front brake	Double disc brake	
	Rear brake	Single disc brake	
	Fuel capacity	26 litrs (6.8 US gal, 5.7 Imp gal)	
	Fuel reserve capacity	4.5 litrs (1.2 US gal, 0.9 Imp gal)	
	Caster angle	62°	
	Trail	118 mm (4.6 in)	
	Front fork oil capacity	380 cm³ (13.4 ozs)	
ENGINE	Type	Air cooled 4-stroke	
	Cylinder arrangement	Vertical parallel four	
	Bore x stroke	70 x 69 mm (2.75 x 2.71 in)	
	Displacement	1,062 cm³ (64.8 cu-in)	

E: UK **F: France** **G: Germany** **D: Others**
U: Australia **H: Netherlands** **SA: South Africa**

ITEM		STANDARD	AREA (Typ.)
	Compression ratio	10:1	
	Maximum horsepower	120 PS/9,000 min^{-1} (rpm) (DIN)	D
		115 PS/9,000 min^{-1} (rpm) (DIN)	E, F, U
		100 PS/9,000 min^{-1} (rpm) (DIN)	G, H
	Maximum torque	10.0 kg-m/7,500 min^{-1} (rpm) (DIN)	E, F, U, SA, D
		8.8 kg-m/7,500 min^{-1} (rpm) (DIN)	G, H
	Oil capacity	4.5 lt (4.7 US qt)	
	Lubricating system	Forced pressure and wet sump	
	Air filtration	Paper	
	Cylinder compression	1470.9 kPa (15 kg/cm^2, 213 psi)	
	Intake valve Opens	15 °BTDC	
	Closes	35° ABDC	
	Exhaust valve Opens	40 °BBDC	
	Closes	10° ATDC	
	Valve clearance	$0.08 \begin{smallmatrix} + & 0.05 \\ - & 0.02 \end{smallmatrix}$ mm	
	Engine weight	92 kg	
	Idle speed	1,000 ± 100 min^{-1} (rpm)	
CARBURETION	Carburetor type	VB, 33 mm (1.29 in) vertical bore	
	Identification number	VB53C	E, F, G, U, SA, D
		VB53D	H
	Pilot screw opening	1-3/4	
	Float level	15.5 mm (0.61 in)	
DRIVE TRAIN	Clutch	Wet, multi-plate	
	Transmission	5-speed constant-mesh	
	Primary reduction	2.041	
	Gear ratio I	2.533	
	II	1.789	

<table>
<tr><th colspan="2">ITEM</th><th>STANDARD</th><th>AREA (Typ.)</th></tr>
<tr><td></td><td>Gear ratio III
IV
V
Final reduction

Gearshift pattern
Drive chain</td><td>1.391
1.160
1.000
2.294
2.471
Left foot operated return system
DID50ZL or RK50LO</td><td>

E, F, G, H, U, D
SA

</td></tr>
<tr><td>ELECTRICAL</td><td>Ignition
Ignition timing "F–1" mark
Full advance
Starting system
Generator

Battery capacity
Spark plug

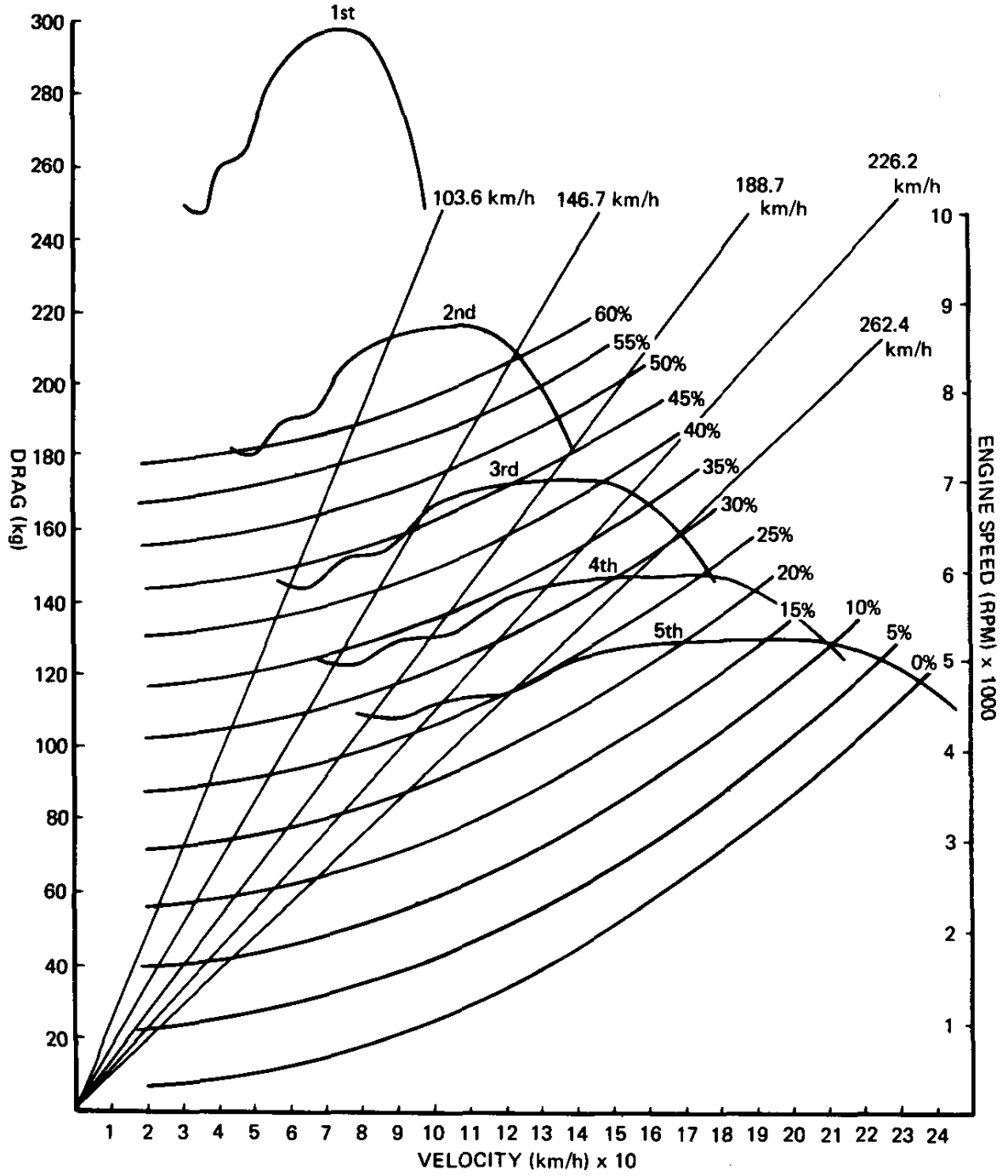
Spark plug gap
Firing order
Fuse</td><td>Transistorized
10° BTDC at idle
38° BTDC at 3,600 min^{-1} (rpm)
Starting motor only
Three-phase A. C. generator
0.24 kW/5,000 min^{-1} (rpm)
12V 12AH (Optional: 12V 14AH, 12V 9AH)

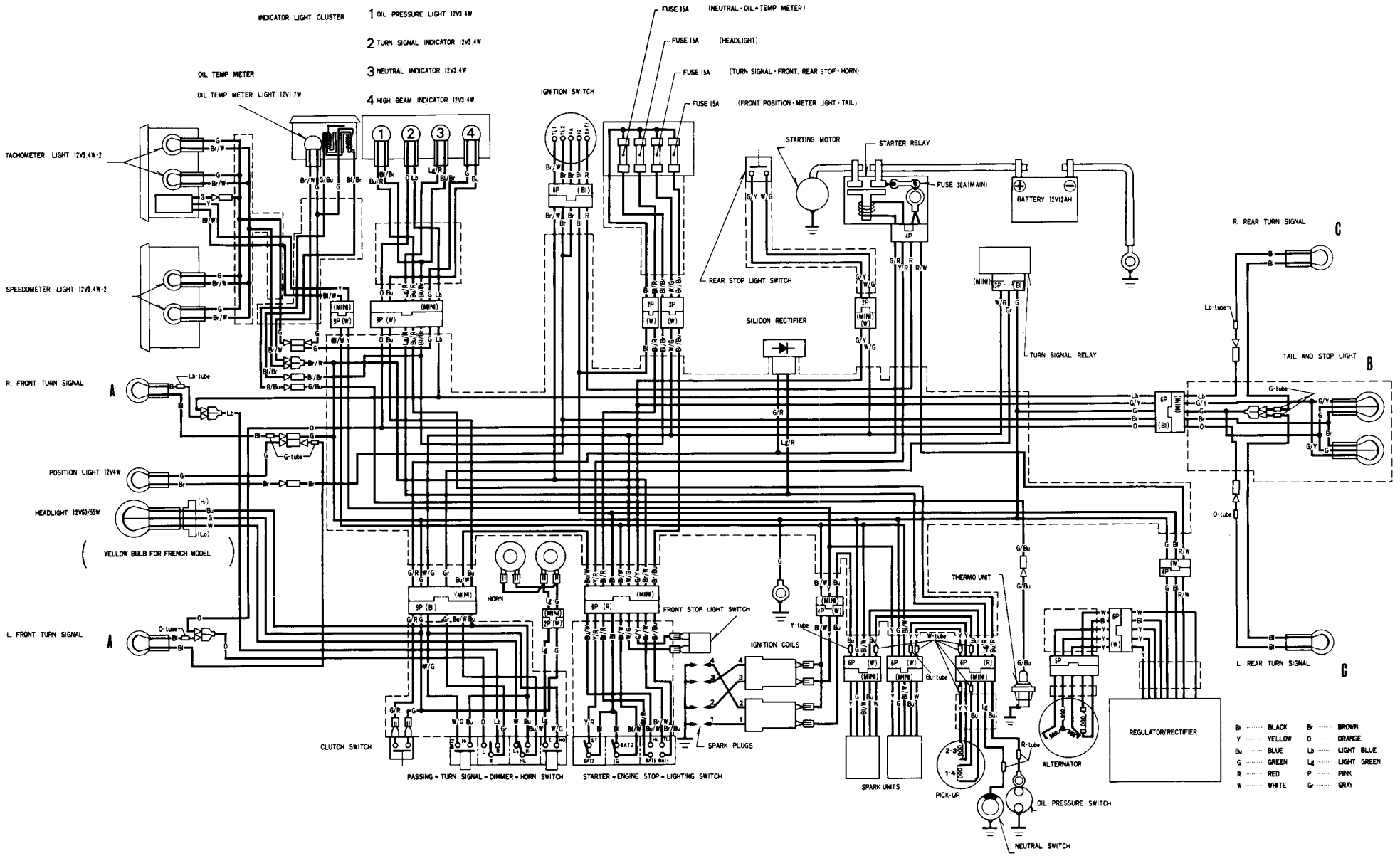
0.6–0.7 mm (0.024–0.028 in)
1–2–4–3
15A x 4, 30A (MAIN)</td><td></td></tr>
</table>

	E, F, G, H	SA, U, D
NGK	**DR–8ES**	**D9EA**
ND	**X27ESR–U**	**X27ES–U**
Optional	**X31ESR–U**	
Race only	**X31ES–U** **D10EA**	

	ITEM	STANDARD	AREA (Typ.)
LIGHTS	Headlight (High/Low beam)	60/55W	
	Tail/Stoplight	5/21W	E, F, G, H
		8/23	U, D, SA
	Turn signal light (front/ rear)	21/21W	E, F, G, H
		23/23	U, D, SA
	Speedometer light	3.4W	
	Tachometer light	3.4W	
	Neutral indicator light	3.4W	
	Turn signal light	3.4W	
	High beam indicator light	3.4W	
	Position light	4W	

PERFORMANCE CHART (E, F, U)





SWITCH CONTINUITY

IGNITION SWITCH

	BAT1	IG	TL1	TL2	P
OFF					
ON	○	○	○		
P					○

LIGHTING SWITCH

	BAT4	TL	BAT3	HL
•				
P	○			○
HL	○		○	○

ENGINE STOP SWITCH

	IG	BAT2
OFF		
RUN	○	
OFF		

STARTER SWITCH

	ST	BAT2
FREE		
PUSH	○	○

TURN SIGNAL SWITCH

	W	R	L
R	○		
N			
L		○	

DIMMER SWITCH

	HL	Lo	Hi
Lo	○	○	
(N)	○	○	
Hi		○	○

HORN SWITCH

	HO	E
FREE		
PUSH	○	○

PASSING SWITCH

	BAT3	Hi
FREE		
PUSH	○	○

	A	B	C
0030Z-MA3-8400	12V21W	12V21/5W×2	12V21W
0030Z-MA3-8600	12V23W	12V23/8W×2	12V23W

0030Z—MA3—8400
0030Z—MA3—8600

IMPORTANT SAFETY NOTICE

OPERATOR AND PASSENGER.

This motorcycle is designed to carry the operator and one passenger. Never exceed the vehicle capacity load as shown on the tire information label.

ON-ROAD USE

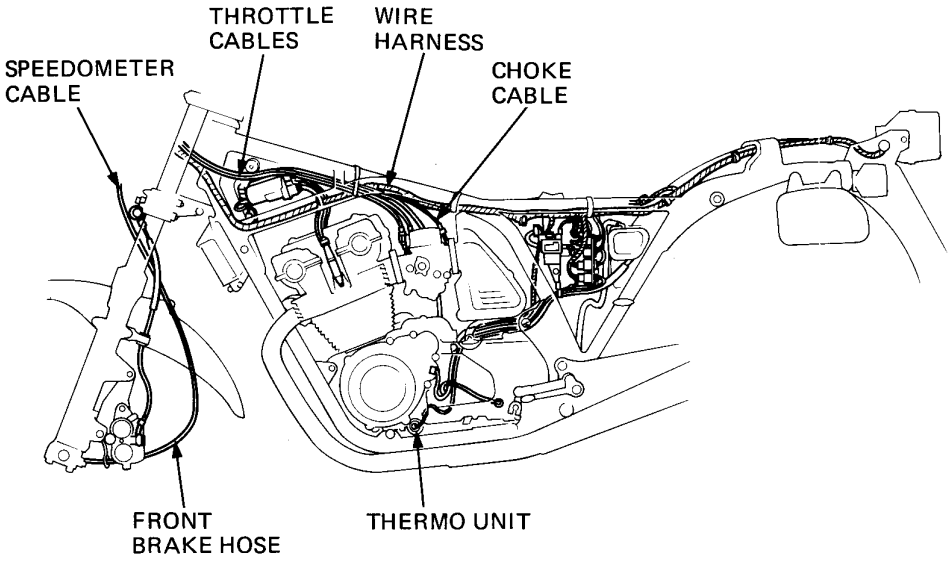
Obey local laws and regulations. Don't use the motorcycle off the road.

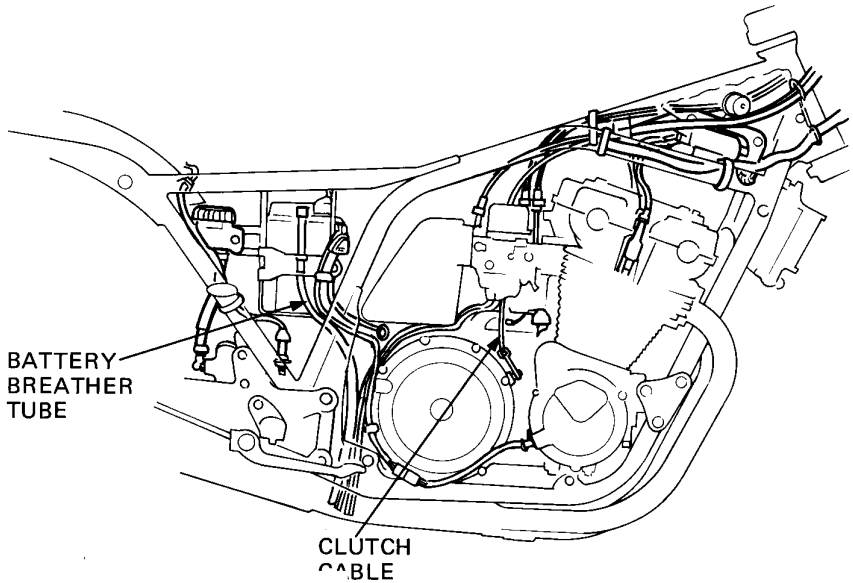
READ OWNER'S MANUAL CAREFULLY

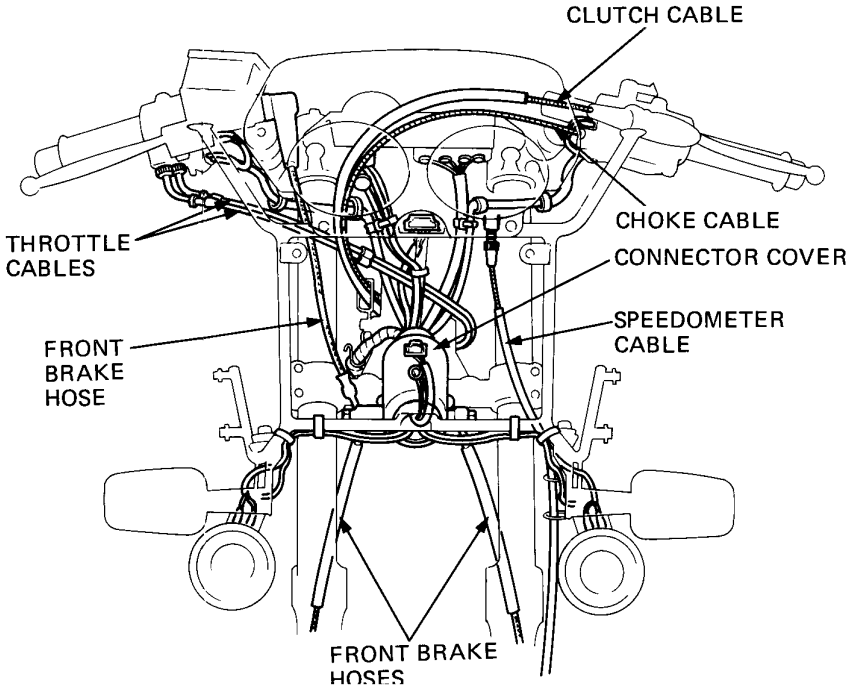
Pay special attention to statements preceeded by the following words.

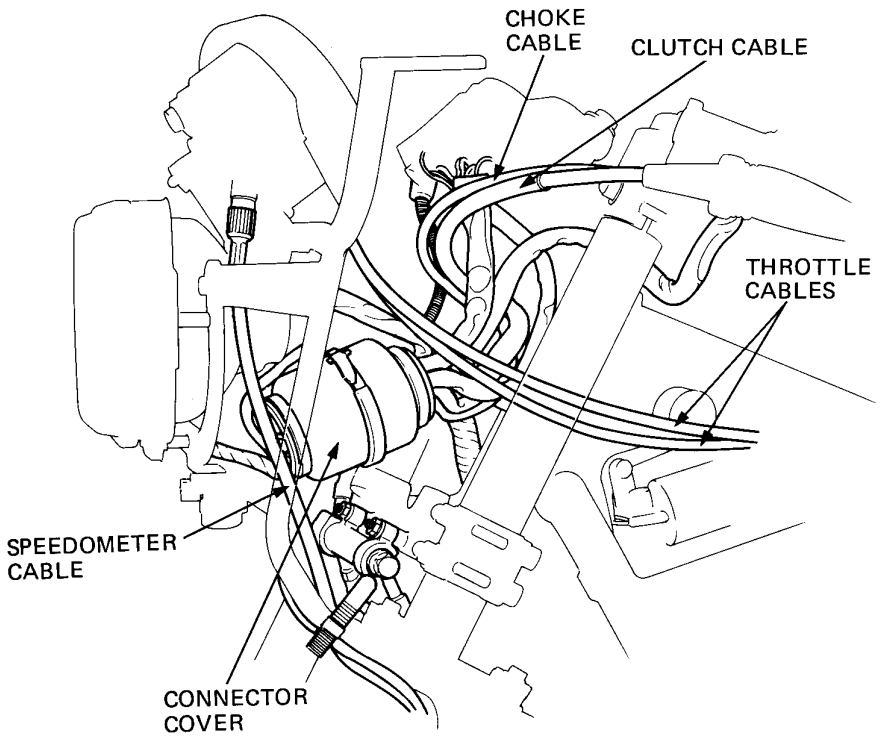
WARNING	***Indicates a possiblity of personal injury or loss of life if instructions are not followed.***
CAUTION:	***Indicates a possibility of equipment damage if instructions are not followed.***
NOTE:	**Gives helpful information.**

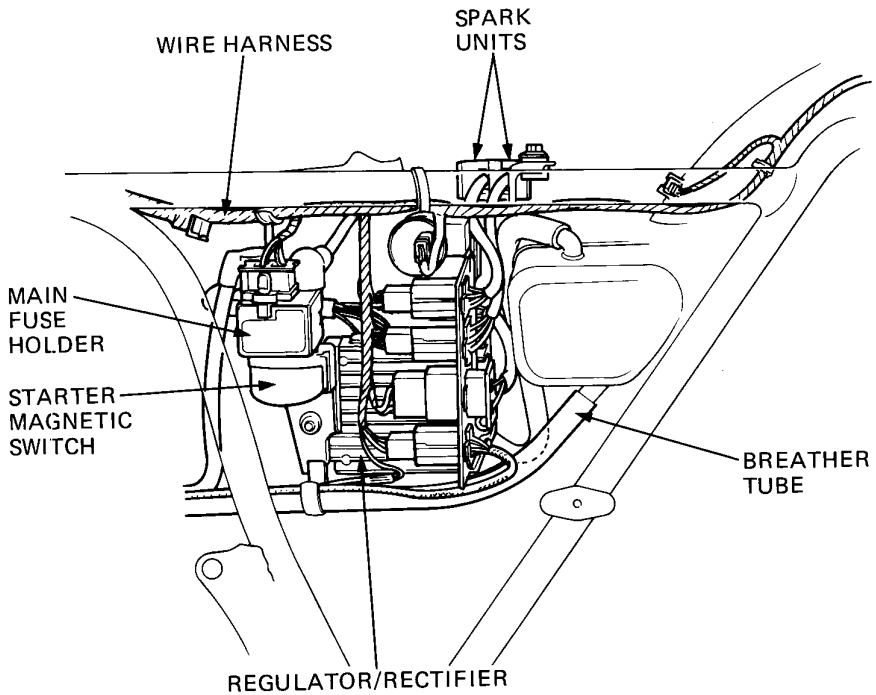
CABLE & HARNESS ROUTING

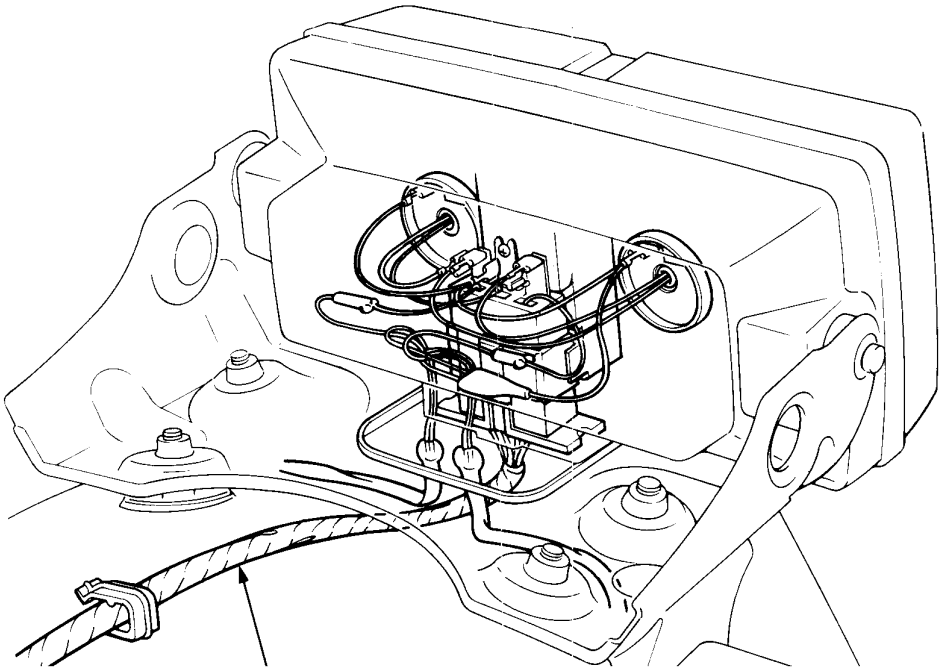







CHOKE CABLE
CLUTCH CABLE
THROTTLE CABLES
SPEEDOMETER CABLE
CONNECTOR COVER


WIRE HARNESS
SPARK UNITS
MAIN FUSE HOLDER
STARTER MAGNETIC SWITCH
BREATHER TUBE
REGULATOR/RECTIFIER



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