HONDA

VF1000R

OWNER'S MAINTENANCE MANUAL

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 possibility 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.*

This manual should be considered a permanent part of the motorcycle and should remain with the motorcycle when resold.

TO THE NEW OWNER

By selecting a Honda VF1000R as your new motorcycle, you have placed yourself in a distinguished family of motorcycle owners and riders.

The VF1000R is designed and built by Honda engineers who spent as much time riding as at the drawing board, and it offers outstanding features.

The VF1000R 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 VF-1000R.

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.	IT:	Italy
G:	Germany	SP:	Spain
ED:	Europe		
SW:	Switzerland		
H:	Netherlands		

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MOTORCYCLE SAFETY

SAFE RIDING RULES

WARNING

Motorcycle riding requires special efforts on your part to ensure your safety. Know these requirements before you ride.

1. Always make a pre-ride inspection (page 24) before you ride the motorcycle.
   You may prevent an accident or equipment damage.
2. Many accidents involve inexperienced riders. Most states require a special motorcycle riding test or license. Make sure you are qualified before you ride. NEVER lend your motorcycle to an inexperienced rider.
3. Many automobile/motorcycle accidents happen because the automobile driver does not "see" the motorcyclist. Make yourself conspicuous to help avoid the accident that wasn't your fault:
   - Wear bright or reflective clothing.
   - Don't ride in another motorist's "blind spot."
4. Obey all federal, state, and local laws and regulations.
   - Excessive speed is a factor in many accidents. Obey the speed limits, and NEVER travel faster than conditions warrant.
   - Signal before you make a turn or lane change. Your size and maneuverability can surprise other motorists.
5. Don't let other motorists surprise you. Use extra caution at intersections, parking lot entrances and exits, and driveways.
6. Keep both hands on the handlebars and both feet on the footpegs while riding. A passenger should hold on to the motorcycle or the operator with both hands and keep both feet on the passenger footpegs.

PROTECTIVE APPAREL

1. Most motorcycle accident fatalities are due to head injuries: ALWAYS wear a helmet. You should also wear a face shield or goggles as well as boots, gloves, and protective clothing. A passenger needs the same protection.
2. The exhaust system becomes very hot during operation, and it remains hot after operation. Never touch any part of the hot exhaust system. Wear clothing that fully covers your legs.
3. Do not wear loose clothing which could catch on the control levers, footpegs, drive chain or wheels.

MODIFICATIONS

WARNING

Modification of the motorcycle, or removal of original equipment, may render the vehicle unsafe or illegal. Obey all federal, state and local equipment regulations.

WARNING

To prevent an accident, use extreme care when adding and riding with accessories and luggage. Addition of accessories and luggage can reduce a motorcycle's stability, performance and safe operating speed. Never ride an accessory-equipped motorcycle at speeds above 130 km/h (80 mph). And remember that this 130 km/h (80 mph) limit may be reduced by installation of non-Honda accessories, improper loading, worn tires and overall motorcycle condition, poor road or weather conditions, etc. These general guidelines may help you decide whether or how to equip your motorcycle, and how to load it safely.

Loading

The combined weight of the rider, passenger, luggage and additional accessories must not exceed, vehicle capacity load 170 kg (375 lbs) <G type: 180 kg (397 lbs)>. Luggage weight along should not exceed 14 kg (30 lbs).

1. Keep luggage and accessory weight low and close to the center of the motorcycle. Load weight equally on both sides to minimize imbalance. As weight is located farther from the motorcycle's center of gravity, handling is proportionally affected.
2. Adjust tire pressure (TIRES, page 6), front fork air pressure and rear shock-absorber air pressure (SUSPENSION, page 20) to suit load weight and riding conditions.
3. Luggage racks are for light weight-items. Do not carry more than 9 kg (20 lbs) of luggage on a rack behind the seat. Bulky items too far behind the rider may cause wind turbulence that impairs handling.
4. All luggage and accessories must be secure for stable handling. Recheck luggage security and accessory mounts frequently.
5. Do not attach large, heavy items to the handlebars, front forks, or fender. Unstable handling or slow steering response may result.
6. Honda fairing is designed for VF1000R only. Do not install them on any other motorcycle.
7. Do not store articles between fairing and motorcycle. They may interfere with steering causing loss of control.

Accessories

Genuine Honda accessories have been specifically designed for and tested on this motorcycle. Because the factory cannot test all other accessories, you are personally responsible for proper selection, installation, and use of non-Honda accessories. Always follow the guidelines under Loading and these:

1. Carefully inspect the accessory to make sure it does not obscure any lights, reduce ground clearance and banking angle, or limit suspension travel, steering travel or control operation.
2. Large fork-mounted fairings or windshields, or poorly designed or improperly mounted fairings can produce aerodynamic forces that cause unstable handling. Do not install fairings that decrease cooling air flow to the engine.
3. Accessories which alter your riding position by moving hands or feet away from controls may increase reaction time in an emergency.
4. Do not add electrical equipment that will exceed the motorcycle's electrical system capacity. A blown fuse could cause a dangerous loss of lights or engine power at night or in traffic.
5. This motorcycle was not designed to pull a sidecar or trailer. Handling may be seriously impaired if so equipped.
6. Any modification of the cooling system may cause overheating and serious engine damage. Do not modify the radiator shrouds or install accessories which block or deflect air away from the radiator.

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 self-sealing ability if they are punctured, and leakage is often very slow. Inspect very closely for punctures, especially if the tire is not fully inflated.*

CAUTION:
The VF1000R is equipped with tires which are guaranteed up to 250 km/h (155 mph). Always use genuine tires or their equivalent when replacement.

		Front	Rear
Tire size		120/80V16–V250	140/80V17–V250 *140/80VR17–V250
Cold tire pressure	Driver only	250 kPa (2.5 kg/cm², 36 psi)	290 kPa (2.9 kg/cm², 42 psi)
	Driver and one passenger	250 kPa (2.5 kg/cm², 36 psi)	290 kPa (2.9 kg/cm², 42 psi)
Tire brand TUBELESS ONLY BRIDGESTON DUNLOP		G511 K500	G520 or *R104 K500 or *K400

*: Radial ply tire (Except SW type)

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.

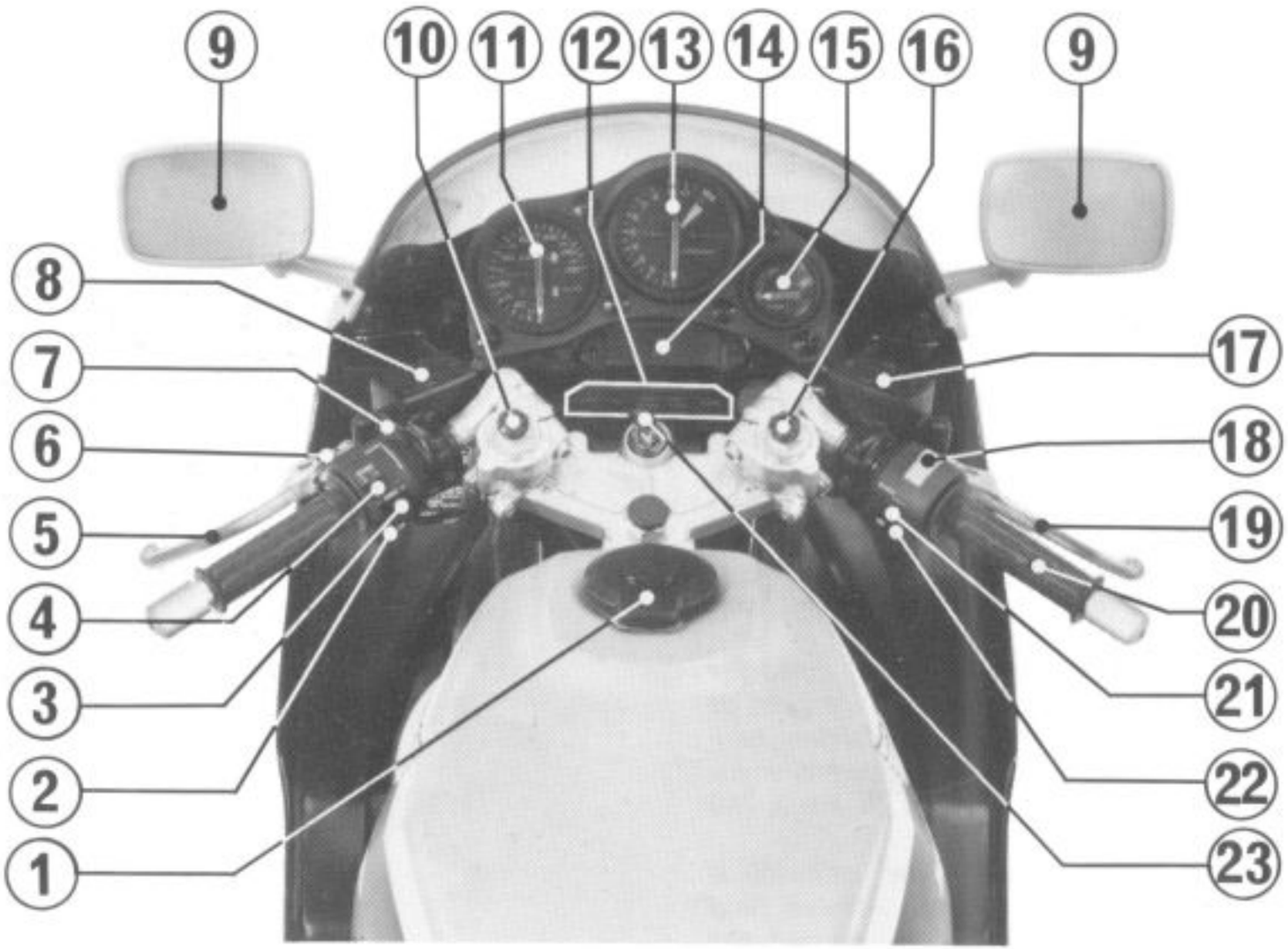
WARNING

* *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 80 km/h (50 mph) 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 120 km/h (80 mph).*
* *Replace the tire if the sidewall is punctured or damaged. Sidewall flexing may cause repair failure and tire deflation.*

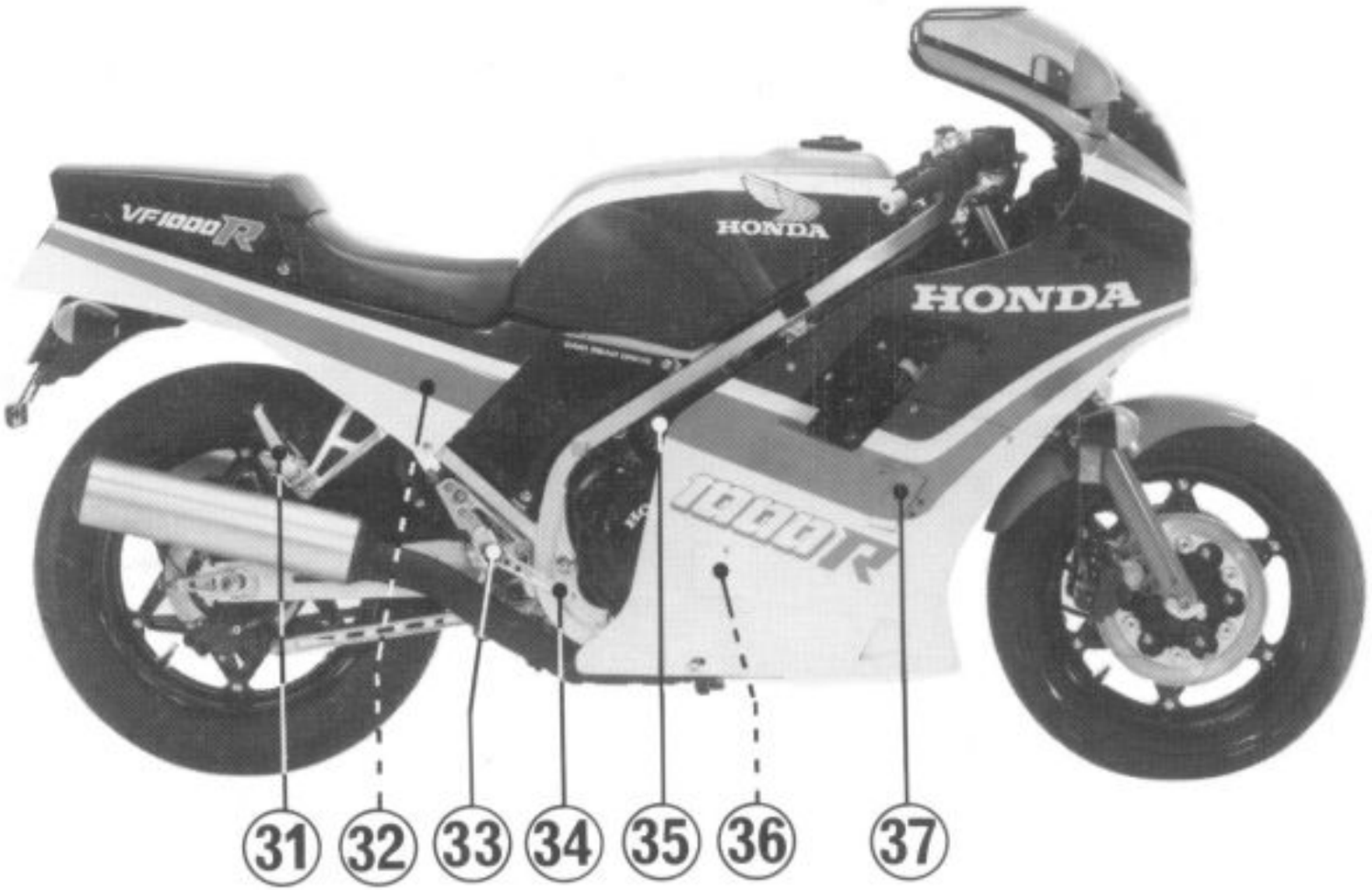
CAUTION:
Do not try to remove tubeless tires without special tools and rim protectors. You may damage the rim sealing surface or disfigure the rim.

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) Clutch fluid reservoir
(9) Rear view mirrors
(10) Valve cap
(11) Speedometer
(12) Warning and indicator lights
(13) Tachometer
(14) Fuse box
(15) Coolant temperature gauge
(16) Rebound damping adjuster
(17) Front brake fluid reservoir
(18) Engine stop switch
(19) Front brake lever
(20) Throttle grip
(21) Headlight switch
(22) Starter button
(23) Ignition switch



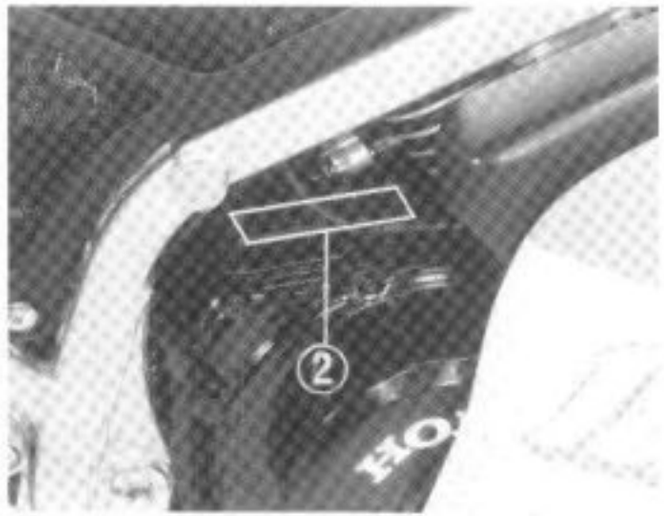
(24) Anti-dive damper adjuster (25) Air intake lid (26) Fuel valve
(27) Side stand (28) Gear change pedal (29) Footpeg (30) Passenger footpeg



(31) Passenger footpeg (32) Rear brake fluid reservoir (33) Footpeg
(34) Rear brake pedal (35) Tool compartment (36) Engine oil filler cap
(37) Air intake lid

SERIAL NUMBERS

(1) Frame number



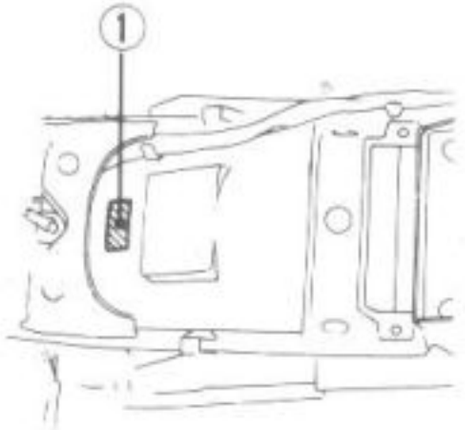
(2) Engine number

The frame and engine serial numbers are required when registering your motorcycle. They may also be required by your dealer when ordering replacement parts. Record the numbers here for your reference.
The frame number is stamped on the right side of the steering head.
The engine number is stamped on top of the crankcase.

FRAME NO. SC16-2100795

ENGINE NO. SC16E-2104014

COLOR LABEL



(1) Color label

The color label is attached to the rear fender below the seat. It helps to order replacement parts. Record the model and color here for your reference.

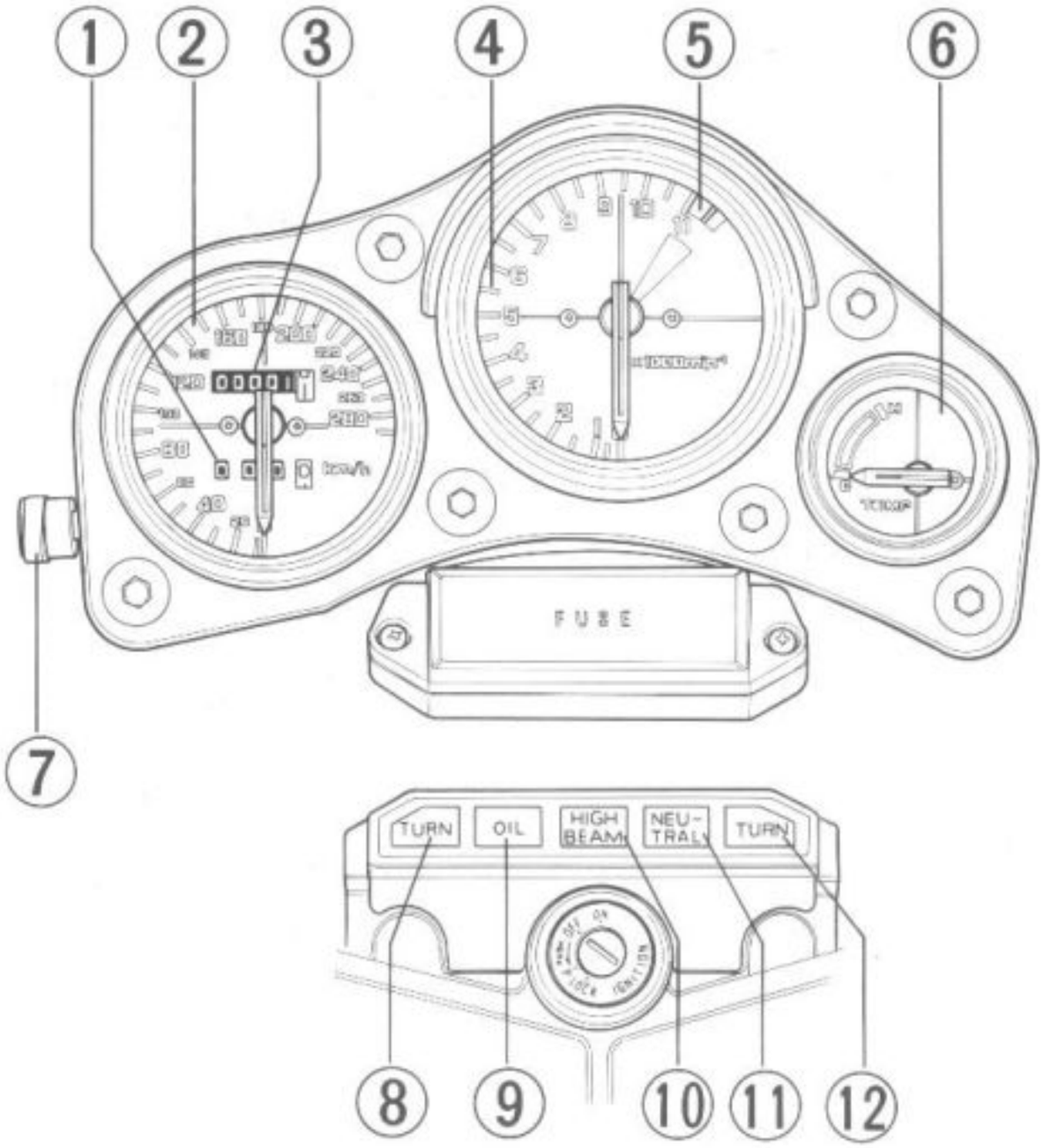
MODEL VF1000 RF

COLOR ~~PB12 7CU~~ PB-127CU
PB-127A

Instruments and Indicators

The indicators and warning lights are grouped between the instruments. Their functions are described in the tables on the following pages.

(1) Tripmeter
(2) Speedometer
(3) Odometer
(4) Tachometer
(5) Tachometer red zone
(6) Coolant temperature gauge
(7) Tripmeter reset knob
(8) Left turn signal indicator
(9) Oil pressure warning light
(10) High beam indicator
(11) Neutral indicator
(12) Right turn signal indicator

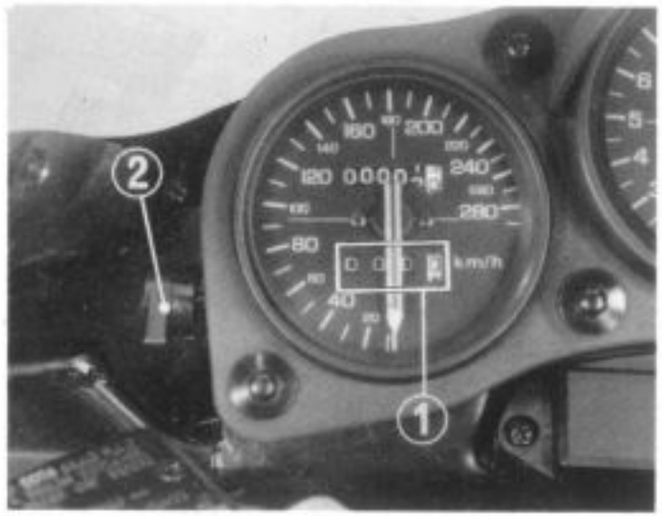


Ref. No.	Description	Function
1	Tripmeter	Shows mileage per trip.
2	Speedometer	Shows riding speed.
3	Odometer	Shows accumulated mileage.
4	Tachometer	Shows engine rpm.
5	Tachometer red zone	Avoid operating the engine in the red zone. NEVER operate beyond the red zone. *CAUTION:* ***Exceeding recommended maximum engine rpm may cause serious engine damage.***
6	Coolant temperature gauge	Shows coolant temperature (see page 14).
7	Tripmeter reset knob	Resets tripmeter to zero (0).
8	Left turn signal indicator (amber)	Flashes when the left turn signal operates.
9	Oil pressure warning light (red)	Lights when engine oil pressure is below normal operating range. Should light when ignition switch is ON and engine is not running. Should go out when engine starts, except for occasional flickering at or near idling speed when engine is warm. *CAUTION:* ***Running the engine with insufficient oil pressure will cause serious engine damage.***
10	High beam indicator (blue)	Lights when the headlight is on high beam.
11	Neutral indicator (green)	Lights when the transmission is in neutral.
12	Right turn signal indicator (amber)	Flashes when the right turn signal operates.

(1) Coolant temperature gauge

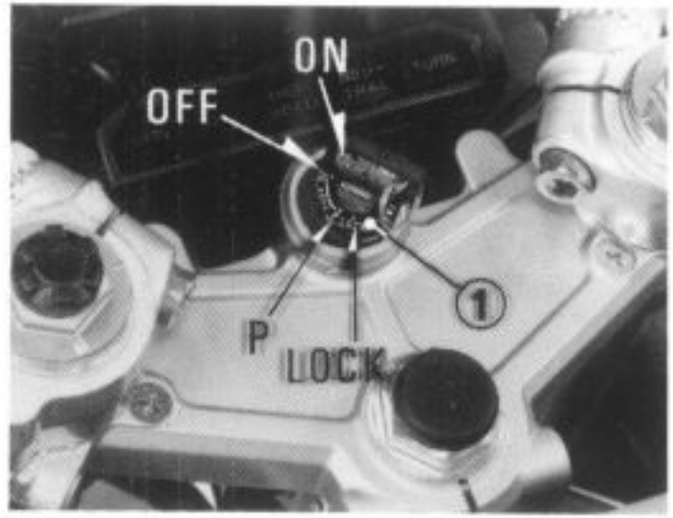
Coolant Temperature Gauge
When the needle begins to move above the C (Cold) mark, the engine is warm enough to operate. The normal operating temperature range is within the wider section of the outlined band. If the needle reaches the H (Hot) mark, stop the engine and check the reserve tank coolant level. Read page 38 and do not ride the motorcycle until the problem has been corrected.

CAUTION:
Exceeding maximum running temperature may cause serious engine damage.



(1) Tripmeter
(2) Tripmeter reset knob

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

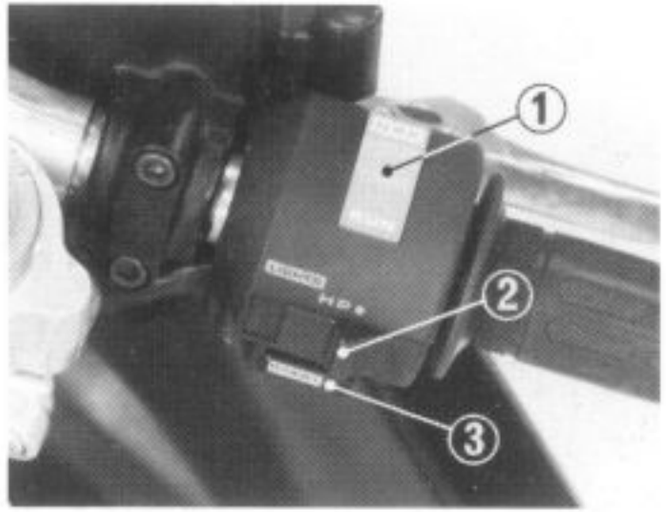


(1) Ignition switch

Ignition Switch
The ignition switch is below the indicator panel.

Ignition Switch Positions and Functions

Key position	Function	Key removal
LOCK (Steering lock)	Steering is locked. Engine and lights cannot be operated.	Remove the key.
P (Parking)	For parking the motorcycle near traffic. The tail-light is on, but all other lights cannot be operated.	Remove the key.
OFF	Engine and lights cannot be operated.	Remove the key.
ON	Headlight, taillight and instrument lights and other lights can be operated. Engine can be started.	Key cannot be removed.



(1) Engine stop switch
(2) Headlight switch
(3) Starter button

Engine Stop Switch
The engine stop switch is next to the throttle grip. In RUN, the engine will operate. In 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.

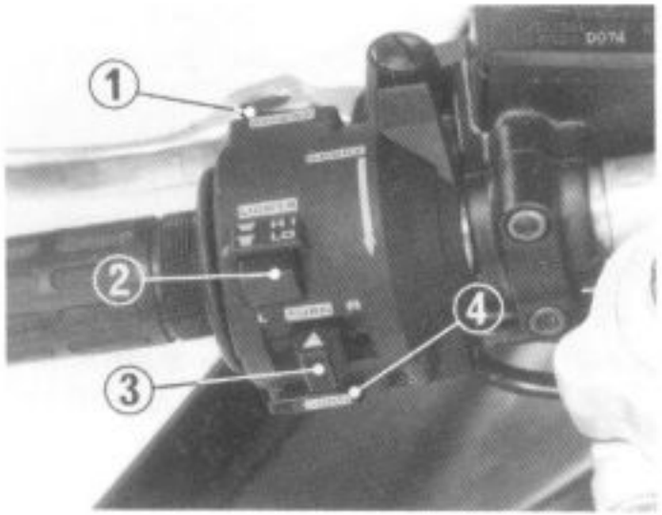
Headlight Switch
Operate the headlight switch with the ignition switch on.

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.

Starter Button
The starter button is below the headlight 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.



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

Headlight Dimmer Switch
Push the dimmer switch to "HI" to select high beam or to "LO" to select low beam.

Passing Light Switch
When this switch is pressed, the headlight flashes on to signal approaching cars or when passing.

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
When this button is pressed the horn sounds.

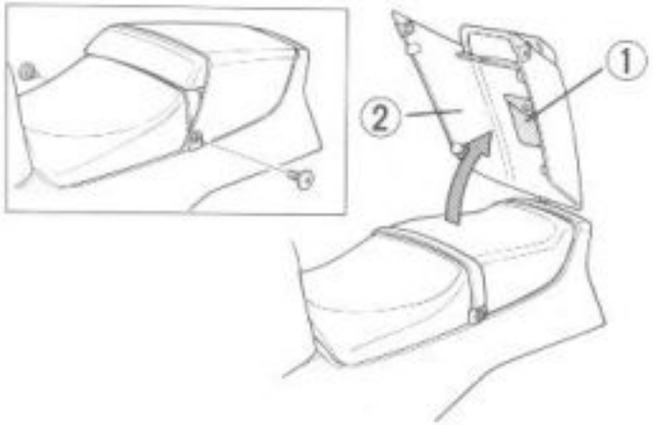
(1) Ignition switch
(2) Ignition key

Steering Lock
To lock the steering, turn the handlebars all the way to the left or right, turn the key to LOCK while pushing in. Remove the key.

WARNING
Do not turn the key to LOCK while riding the motorcycle.

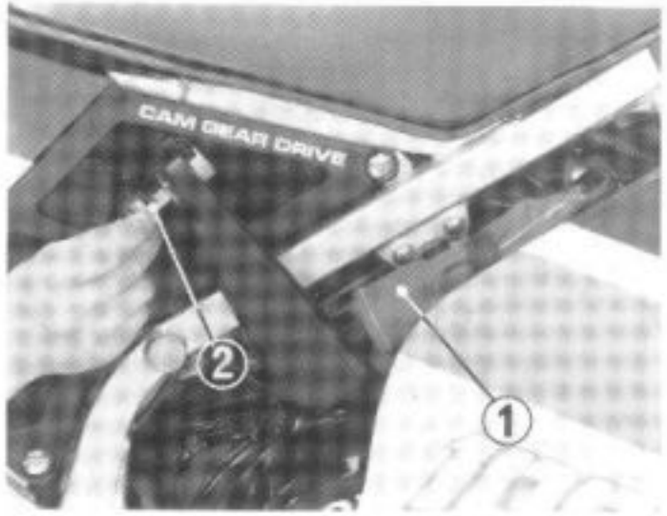
(1) Rear seat cover
(2) Screw

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



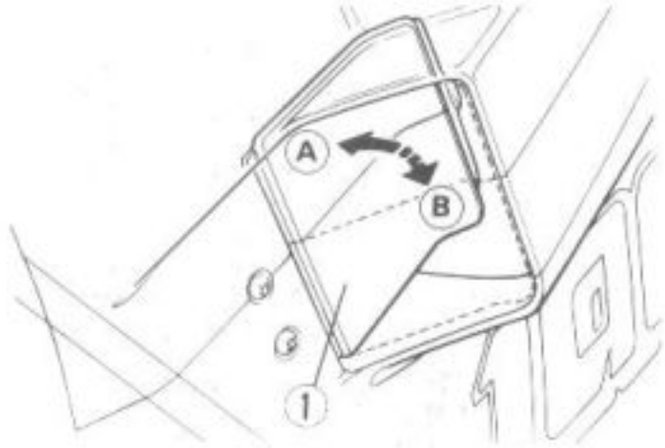
(1) Document bag
(2) Rear seat cover

Document Bag
The document bag is attached to the rear seat cover. This owner's manual and other documents should be stored in the plastic bag. When washing your motorcycle, be careful not to flood this area with water.



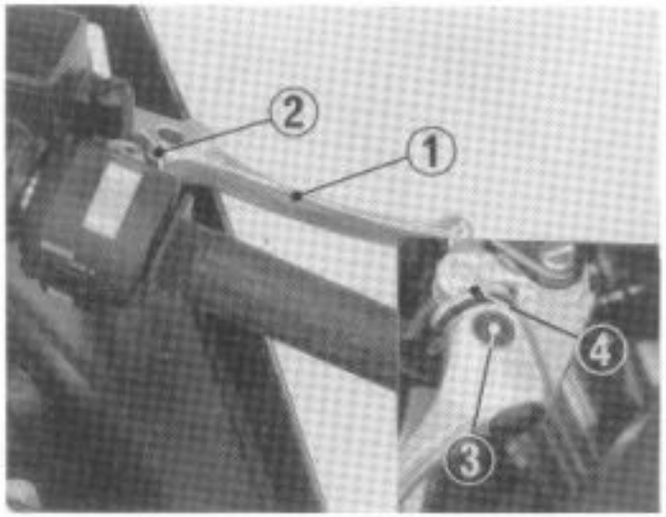
(1) Document and tool compartment
(2) Ignition key

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



(1) Air intake lid
(A) Open
(B) Closed

Air Intake Lids
This motorcycle has retractable air intake lids (1). Pull out and open the lids to direct air flow through the fairing for warm weather riding.



(1) Front brake lever
(2) Adjuster
(3) Arrow
(4) Index mark

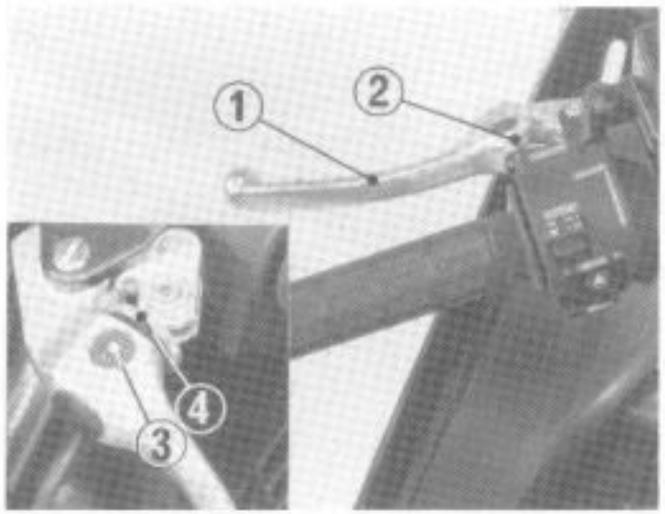
Front Brake Lever

The distance between the tip of the brake lever (1) and the grip can be adjusted by turning the adjuster (2).

CAUTION:

Align the arrow (3) on the brake lever with index mark (4) on the adjuster.

Apply the brake lever several times and check for free wheel rotation.



(1) Clutch lever
(2) Adjuster
(3) Arrow
(4) Index mark

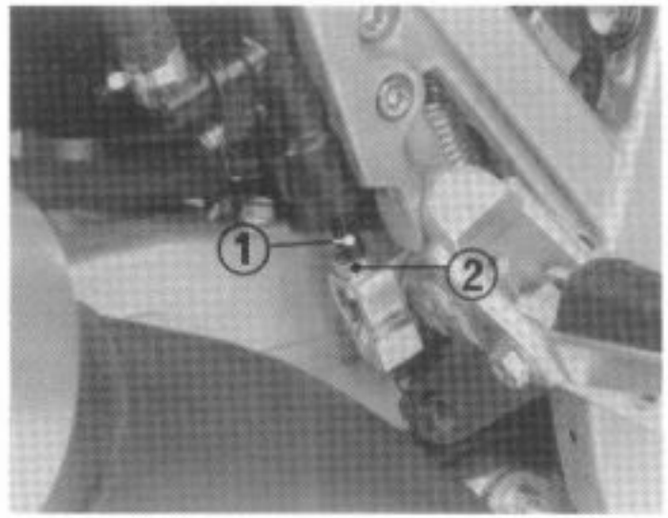
Clutch Lever

The distance between the tip of the clutch lever (1) and the grip can be adjusted by turning the adjuster (2).

CAUTION:

Align the arrow (3) on the clutch lever with the index mark (4) on the adjuster.

Start the engine, pull in the clutch lever and shift the transmission into first gear. Check that the engine does not stall and that the motorcycle does not creep. Gradually release the clutch lever and open the throttle. The motorcycle should start smoothly and accelerate gradually.



(1) Push rod
(2) Lock nut

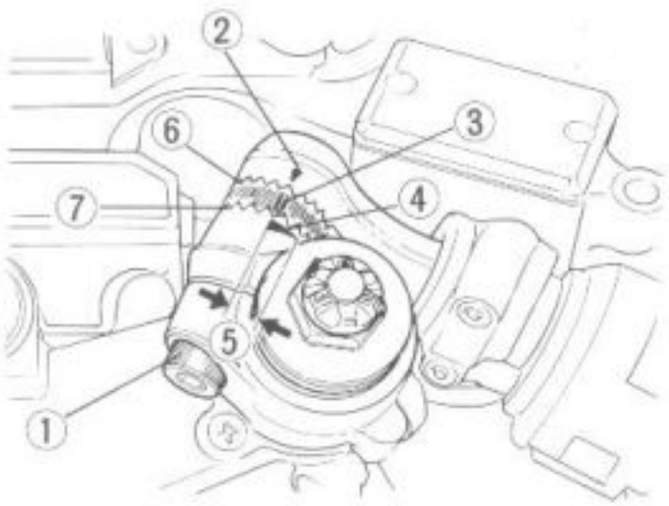
Rear Brake Pedal

Loosen the lock nut and turn the push rod until the correct pedal height is obtained.

Retighten the lock nut.

NOTE:

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



(1) Handlebar attaching bolt
(2) Index mark A
(3) Index mark B
(4) Index mark C
(5) Adjustment range
(6) 18° serration (7) 20° serration

Handlebar

Tilt adjustment:

NOTE:
The standard tilt adjustment is the position that index marks A and B are aligned with the wider end of index mark C as shown.

CAUTION:
Adjustment must be made within the range (4°) that index mark B is aligned within index mark C.

The handlebar has serrations of 18° per pitch and the holder has serrations of 20° per pitch.
Relative movement between the 18° and 20° serrations by one pitch causes the handlebar to be lowered by 2°.

Example:

- To lower the handlebar 2°, loosen the handlebar attaching bolt, rotate the 20° serration one pitch to the outside and 18° serration one pitch to the opposite direction.
  $(20^\circ \times 1) - (18^\circ \times 1) = 2^\circ$
- To lower the handlebar 4°, loosen the handlebar attaching bolt, rotate the 20° serration two pitch to the outside and the 18° serration to the opposite side two pitch.
  $(20^\circ \times 2) - (18^\circ \times 2) = 4^\circ$

After adjustment, tighten the handlebar attaching bolts.

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

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 taut in all steering positions.***

The front and rear suspension of this motorcycle can provide the desired ride under various rider/cargo weights and riding conditions through adjustment of the air pressure.
The recommended pressures under normal conditions are:

Front: 0–40 kPa (0–0.4 kg/cm², 0–6 psi)
Rear: 0–300 kPa (0–3.0 kg/cm², 0–43 psi)

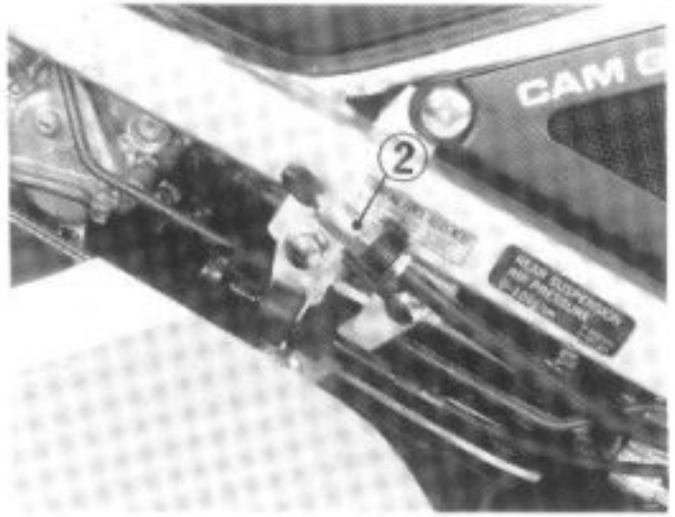
Low air pressure settings provide a softer ride and are for light loads and smooth road conditions. High air pressure settings provide a firmer ride and are for heavy loads and rough road conditions.

Front air pressure	Rear air pressure	Conditions	
		Rider/ load	Riding conditions
0 kPa (0 kg/cm², 0 psi) ↕ 40 kPa (0.4 kg/cm², 6 psi)	0 kPa (0 kg/cm², 0 psi) ↕ 300 kPa (3.0 kg/cm², 43 psi)	One ↕ Up to *170 kg (375 lbs) <*180kg (397 lbs)>	Ordinary or city road riding ↕ Rough road riding

* The combined weight of the rider, passenger, luggage and all accessories.

< >: G type

(1) Front fork air valve



(2) Rear shock absorber air valve

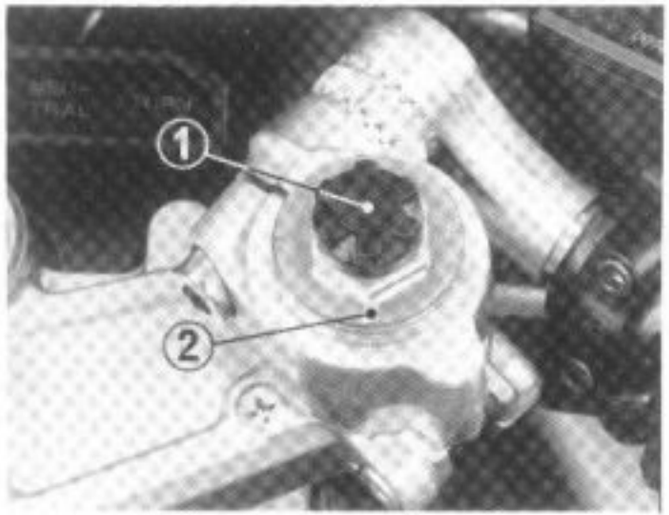
Air Pressure
Check and adjust air pressure when the front fork tubes and rear shock absorbers are cold before riding.

1. Place the motorcycle on center stand (special tool). Jack up the engine and raise the front wheel off the ground.
2. Remove the front fork air valve cap and rear shock absorber air valve cap.
3. Check the air pressure.

NOTE:
Some pressure will be lost when removing the gauge from the valve. Determine the amount of loss and compensate accordingly.

4. Add air to the recommended pressure.

NOTE:
Excessive pressure cause the suspension to become too firm and performance to decline.

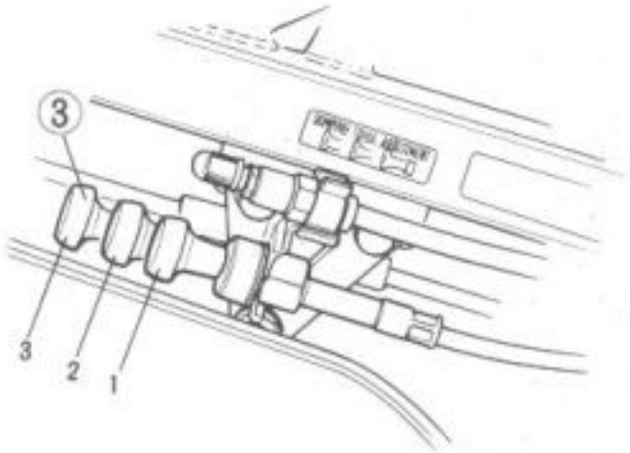


(1) Front fork damping adjuster
(2) Aligning mark

Rebound Damping Adjuster
After adjusting preload air pressure, set the front and rear rebound damping adjusters.
Adjust damping to provide the desired ride according to the chart.

Front:

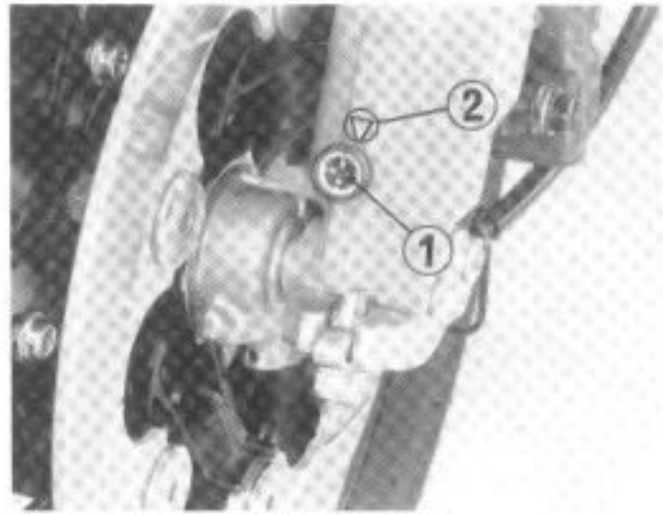
Adjuster position	Riding conditions
1	Around town
2	Highways or winding roads
3	Rough or uneven



(3) Shock absorber damping adjuster

Rear:

Adjuster position	Riding conditions
1	Rider only on general public road
2	• Rider and passenger on general public road • Rider only on highway or winding road
3	Rider and passenger on rough road or highway



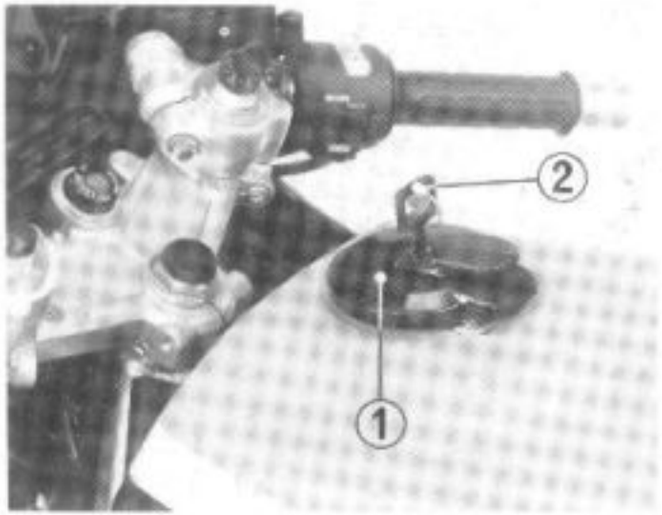
(1) Anti-dive damper adjuster
(2) Aligning mark

Anti-dive Damper Adjuster
This adjuster reduces nose-dive during braking and may be adjusted to the rider's choice independent of load or the rider's weight.
Located on the left side of the front fork, this adjuster can be set to any one of four positions.

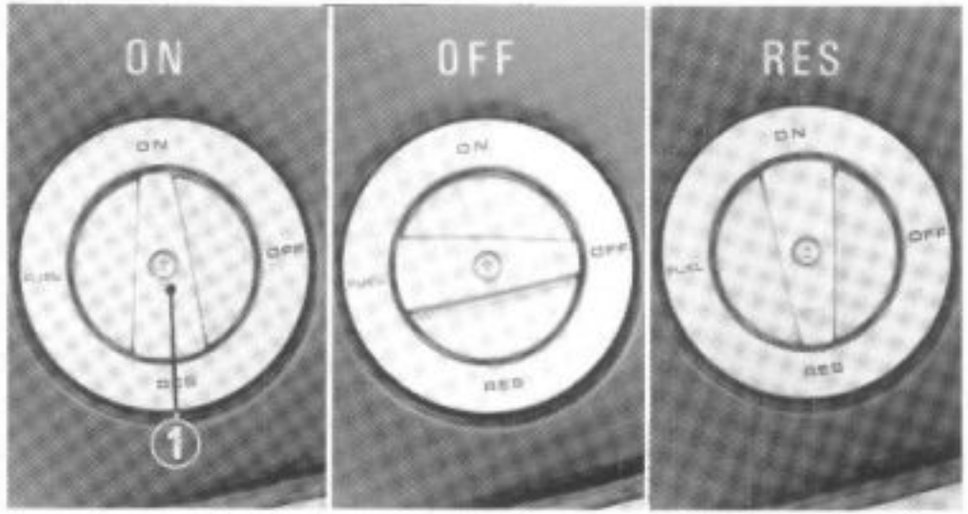
WARNING

Do not position the adjuster between the numbered detent adjustment points.

Position	Anti-dive damper force
1	LIGHT ANTI-DIVE
2	MEDIUM
3	HARD
4	MAXIMUM ANTI-DIVE



(1) Fuel tank cap (2) Ignition key



(1) Fuel valve

Fuel Tank

The fuel tank holds 25 liters (6.6 U.S. gal., 5.5 Imp. gal.) including the 4.5 liters (1.2 U.S. gal., 1.0 Imp. gal.) in the reserve supply. To open the fuel tank cap, insert the ignition key and turn it clockwise. The cap is hinged and will lift up. Use low-lead gasoline with an Octane number of 94 or higher.

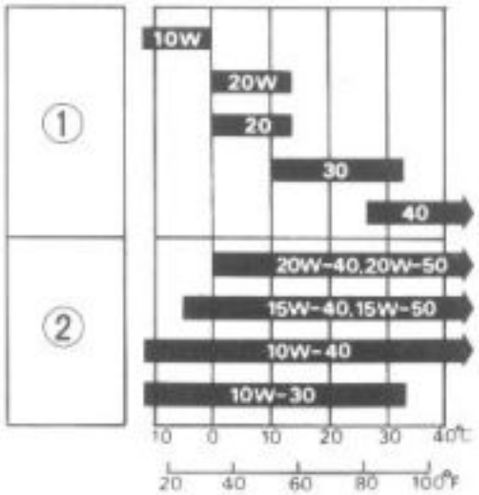
WARNING

* *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.*
* *Do not overfill the tank (there should be no fuel in the filler neck). After refueling, make sure the tank cap is closed securely.*

Fuel Valve

The fuel valve is located under the left side of the fuel tank. With the valve set in the "OFF" position, fuel supply is cut off. The valve should be set in this position when the motorcycle is not in use. Turn to the "ON" position for normal riding (gasoline will flow to the carburetors).

Turning the fuel valve to the "RES" position allows fuel to flow from the reserve supply.



(1) Single grade
(2) Multi grade

Engine Oil

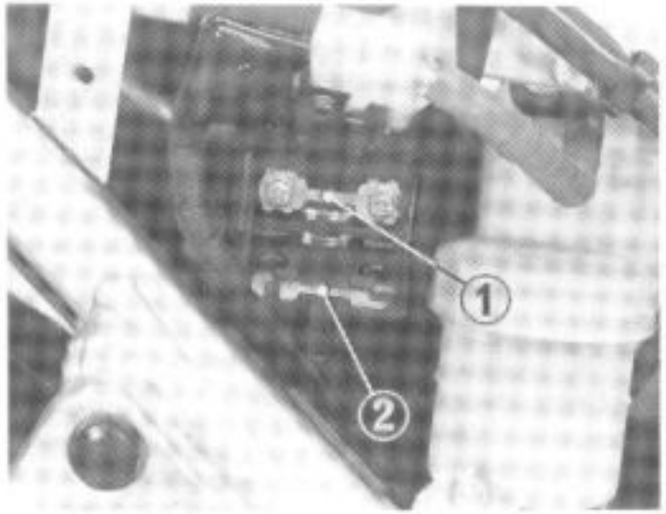
Good engine oil has many desirable qualities. Use only high detergent, quality motor oil certified on the container to meet or exceed requirements for service SE or SF. It is not necessary to use additives.

Viscosity:

Viscosity grade of engine oil should be based on average atmospheric temperature in your riding area. The following provides a guide to the selection of the proper grade or viscosity of oil to be used at various atmospheric temperatures.

See page 36 for engine oil level inspection and replacement.

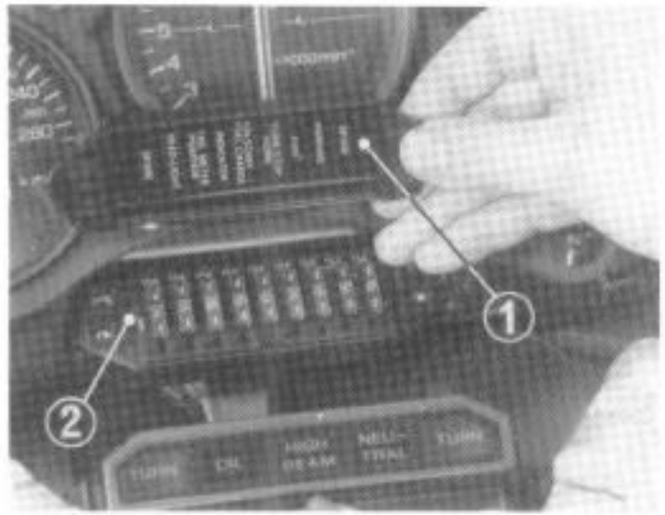
FUSE REPLACEMENT



(1) Main fuse
(2) Spare fuse

The main fuse, located near the battery on the positive lead, is 30A.
The fuse box is under the tachometer.

Remove the screws and fuse box cover. The specified fuses are 10A and 15A. When frequent fuse failure occurs, it usually indicates a short circuit or an over-load in the electrical system. See your authorized Honda dealer for repair.



(1) Fuse box cover
(2) Fuse box

CAUTION:
Turn the ignition switch OFF before checking or replacing fuses to prevent accidental short-circuiting.

To replace the main fuse, loosen the screws and remove the old fuse. Install the new fuse and tighten the screws securely.

(1) Fuse puller

To replace fuses in the fuse box, remove the fuse box cover. Pull the old fuse with the fuse puller included in the tool kit (out of the clips). Push a new fuse (into the clips) and install the fuse box cover.

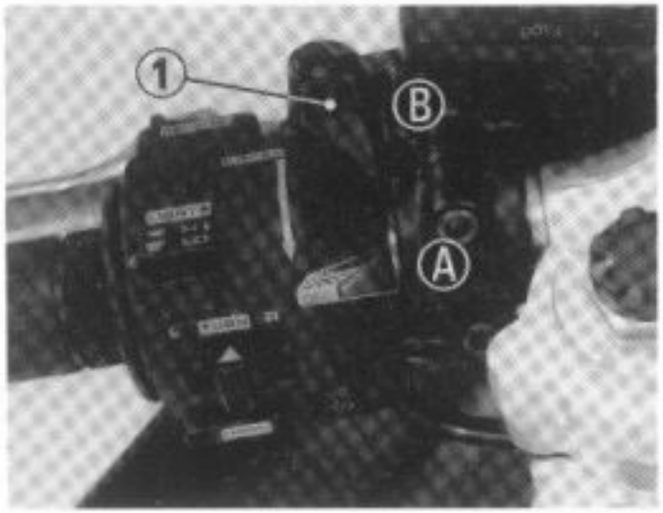
WARNING

Never use a fuse with a different rating from that specified. Serious damage to the electrical system or a fire may result, causing a dangerous loss of lights or engine power at night or in traffic.

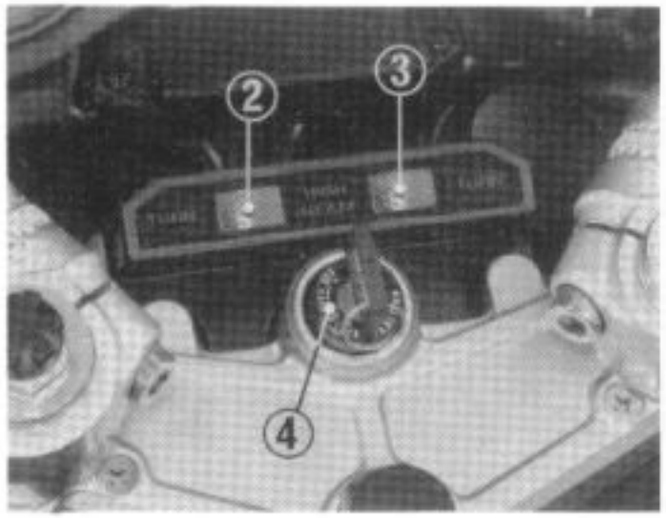
PRE-RIDING INSPECTION

Prior to starting your motorcycle, perform a general inspection as a matter of habit to make sure that the motorcycle is in good, safe riding condition.
Check the following items and if adjustment or servicing is necessary, refer to the appropriate section in the manual.

Engine oil level – Check the level and add if necessary.
Fuel level – Fill fuel tank when necessary.
Radiator reserve tank coolant level – Check the level and add if necessary.
Brakes – Check the brake lines for leaks, check brake fluid level.
Tires – Check the air pressure and the tires for wear or damage.
Battery electrolyte – Check the level and add if necessary.
Throttle operation – Check throttle operation, cable routing and free play. Correct or replace if necessary.
Lighting – See if all lights operate properly.
Drive chain – Check condition of drive chain and measure the chain tension. Adjust if the chain tension is incorrect. Lubricate if it appears dry. Replace if it is badly worn or damaged.
Others – Check for loose or missing bolts, nuts and other fasteners.



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



(2) Oil pressure warning light
(3) Neutral indicator
(4) Ignition switch

NOTE:
The electric system is designed to prevent electric starting if the transmission is in gear, unless the clutch is disengaged. However, it is recommended that the transmission be placed in neutral before attempting to start the engine.

WARNING

Exhaust gases contain poisonous carbon monoxide. Never run the engine in a closed garage or confined area.

1. Make sure the transmission is in neutral and the fuel valve is ON.
2. Insert the key in the ignition switch and turn to ON. The neutral indicator (green) and oil pressure warning light (red) should go on.
3. Make sure the engine stop switch is in RUN.
4. Pull the choke lever back all the way to the fully open position (A), if the engine is cold.
5. Press the starter button, leaving the throttle closed.
6. Warm up the engine by opening and closing the throttle until it runs smoothly, with the choke closed.

CAUTION:

* *The oil pressure warning light should go off within a few seconds after the engine is started. If the light remains on, turn off the engine immediately and check the oil level. If the level is adequate, do not operate the motorcycle until the lubrication system has been examined.*
* *The engine is a high compression, high output engine. If it is not warmed, oil or gas leak will result.*

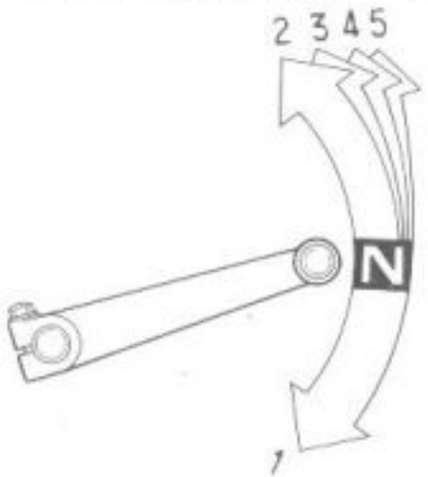
WARNING

* *Review Motorcycle Safety (pages 4–7) before you ride.*
* *Make sure the side stand is fully retracted before riding the motorcycle. If the stand is extended, it may interfere with control during a left turn.*

Break-in

During initial 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

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

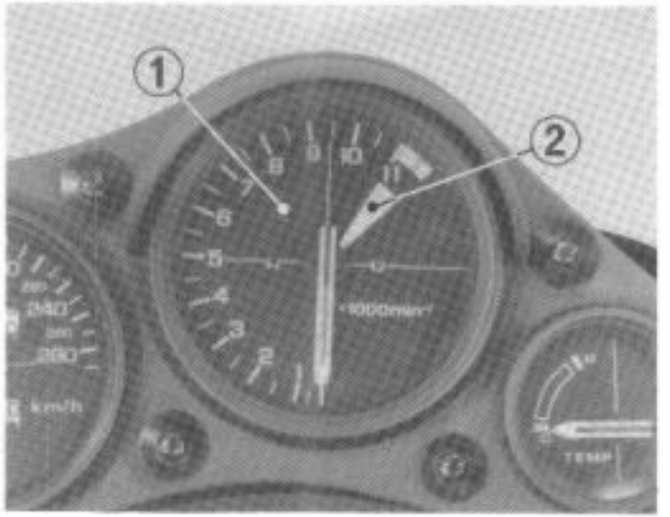
- For maximum deceleration, close the throttle and apply the front and rear brakes firmly.
- Avoid extreme braking.
- When descending a long, steep grade, use engine compression braking by downshifting, with intermittent use of both brakes.

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.

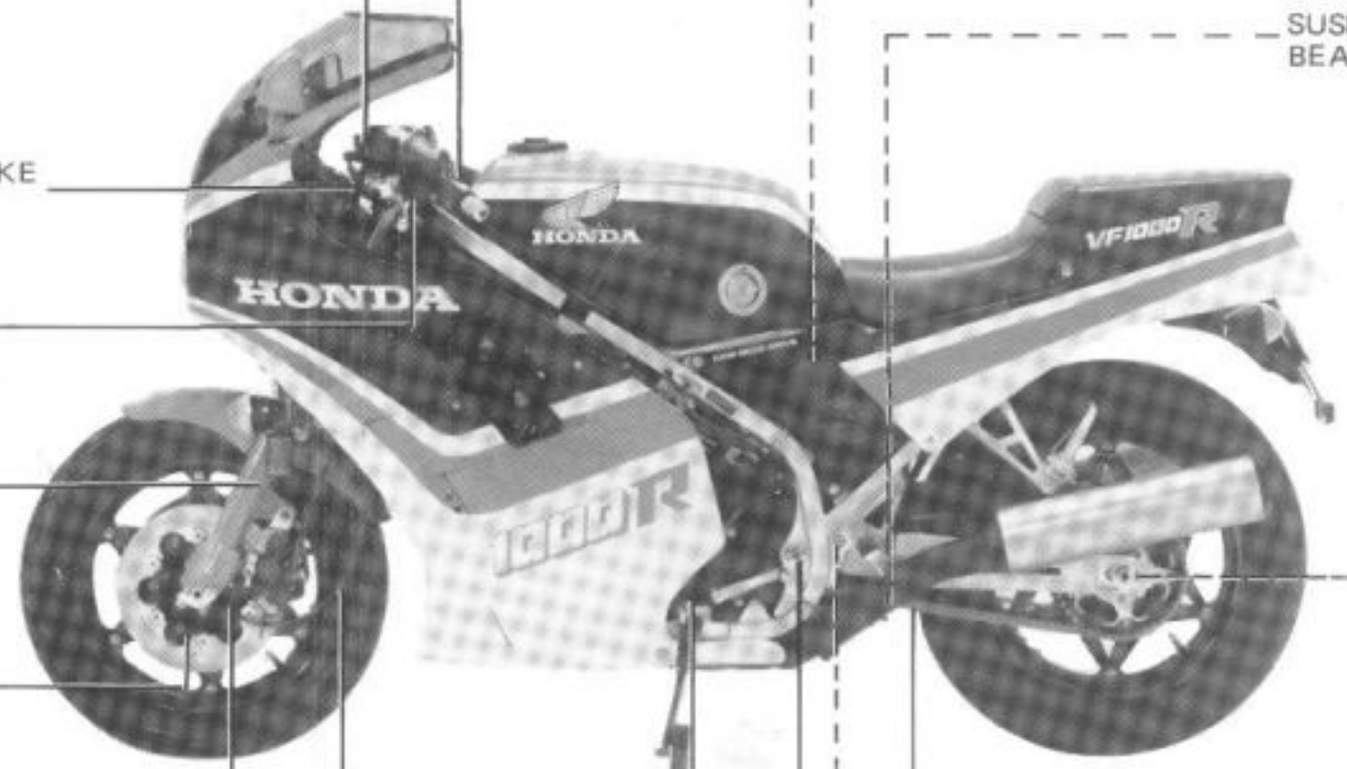


(1) Tachometer
(2) Tachometer red zone

- 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 taillight 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.

LUBRICATION POINTS



OIL
CONTROL CABLES

GREASE
THROTTLE GRIP

SPECIAL LUBRICANT
SHOCK ABSORBER UPPER SPHERICAL BEARING (page 169)

GREASE (MoS_2 ADDITIVE)
SUSPENSION LINKAGE BEARINGS

GREASE
CLUTCH AND BRAKE LEVER PIVOTS

GREASE
STEERING HEAD BEARINGS

ATF
FRONT FORKS (ATF)

GREASE
WHEEL BEARING AND DUST SEALS

GREASE
DUST SEALS

GREASE
SPEEDOMETER DRIVE GEAR

OIL
DRIVE CHAIN (SAE 80–90 GEAR OIL)

OIL
SPEEDOMETER CABLE

GREASE
BRAKE PEDAL PIVOT

GREASE
SIDE STAND PIVOT

GREASE
SWING ARM PIVOT BEARINGS

MAINTENANCE SCHEDULE

Perform the PRE-RIDE INSPECTION (Page 24) at each maintenance period.
I: INSPECT AND CLEAN, ADJUST, LUBRICATE, OR REPLACE IF NECESSARY
C: CLEAN R: REPLACE L: LUBRICATE

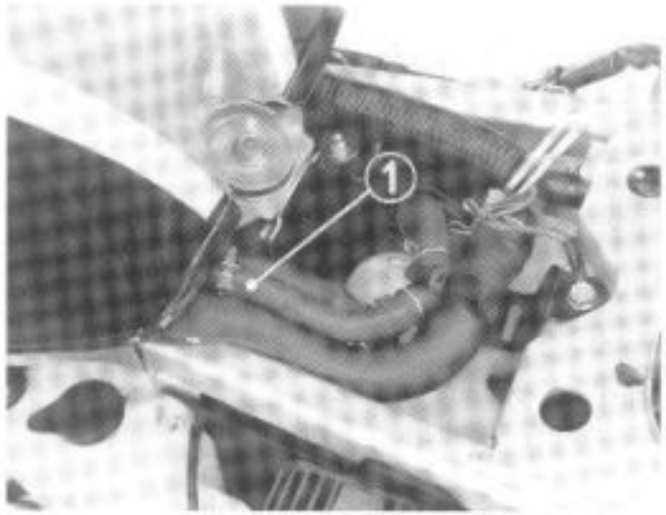
	FREQUENCY / ITEM	WHICHEVER COMES FIRST ➡ / EVERY ⬇	ODOMETER READING [NOTE (3)] 1,000 km (600 mi)	6,000 km (3,750 mi)	12,000 km (7,500 mi)	18,000 km (11,250 mi)	24,000 km (15,000 mi)	30,000 km (18,750 mi)	36,000 km (22,500 mi)	Refer to pages
*	FUEL LINES				I		I		I	30
*	FUEL FILTER								R	30
*	THROTTLE OPERATION				I		I		I	31
*	CARBURETOR-CHOKE				I		I		I	32
*	AIR CLEANER	NOTE (1)			R		R		R	32
	CRANKCASE BREATHER	NOTE (2)		C	C	C	C	C	C	33
	SPARK PLUGS			I	R	I	R	I	R	33
*	VALVE CLEARANCE		I	I	I		I		I	34
	ENGINE OIL	YEAR	R	R	R	R	R	R	R	36
	ENGINE OIL FILTER	YEAR	R		R		R		R	36
*	CARBURETOR-SYNCHRONIZATION		I		I		I		I	37
*	CARBURETOR-IDLE SPEED		I	I	I	I	I	I	I	38
	RADIATOR COOLANT				I		I		*R	38
*	RADIATOR CORE				I		I		I	38
*	COOLING SYSTEM HOSES & CONNECTIONS				I		I		I	39
	DRIVE CHAIN		I, L EVERY 1,000 km (600 mi)							40
	DRIVE SPROCKET				I		I		I	40
	DRIVEN SPROCKET				I		I		I	40

	ITEM / FREQUENCY	WHICHEVER COMES FIRST ➡ / EVERY ⬇	ODOMETER READING [NOTE (3)] 1,000 km (600 mi)	6,000 km (3,750 mi)	12,000 km (7,500 mi)	18,000 km (11,250 mi)	24,000 km (15,000 mi)	30,000 km (18,750 mi)	36,000 km (22,500 mi)	Refer to pages
	BATTERY	MONTH		I	I	I	I	I	I	41
	BRAKE FLUID	MONTH I 2 YEARS*R		I	I	*R	I	I	*R	42
	BRAKE PAD WEAR			I	I	I	I	I	I	42
	BRAKE SYSTEM		I		I		I		I	43
*	BRAKE LIGHT SWITCH				I		I		I	43
*	HEADLIGHT AIM				I		I		I	43
	CLUTCH FLUID	MONTH I 2 YEARS*R		I	I	*R	I	I	*R	44
	CLUTCH SYSTEM				I		I		I	44
	SIDE STAND				I		I		I	45
*	SUSPENSION				I		I		I	45
*	NUTS, BOLTS, FASTENERS		I		I		I		I	46
**	REAR WHEEL DAMPER				I		I		I	46
**	WHEELS				I		I		I	46
**	STEERING HEAD BEARING		I		I		I		I	46

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

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

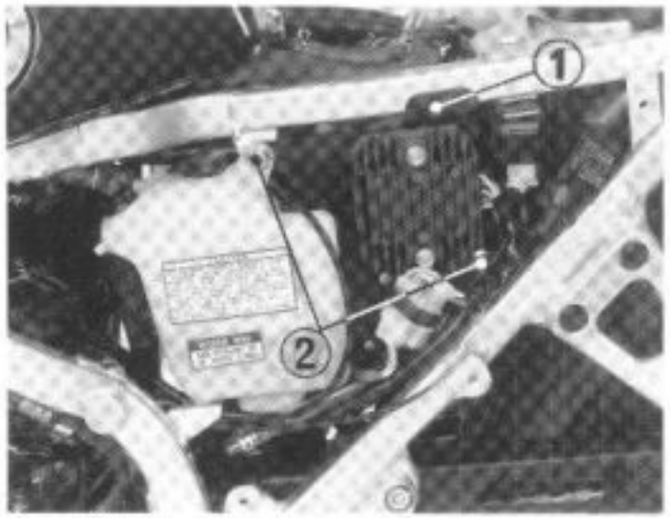
NOTES: (1) Service more frequently when riding in dusty areas.
(2) Service more frequently when riding in rain, or at full throttle.
(3) For higher odometer reading, repeat at the frequency interval established here.



(1) Fuel line

Fuel Lines

Remove the seat and left side cover.
Check the fuel lines and replace any parts which show deterioration, damage or leakage.



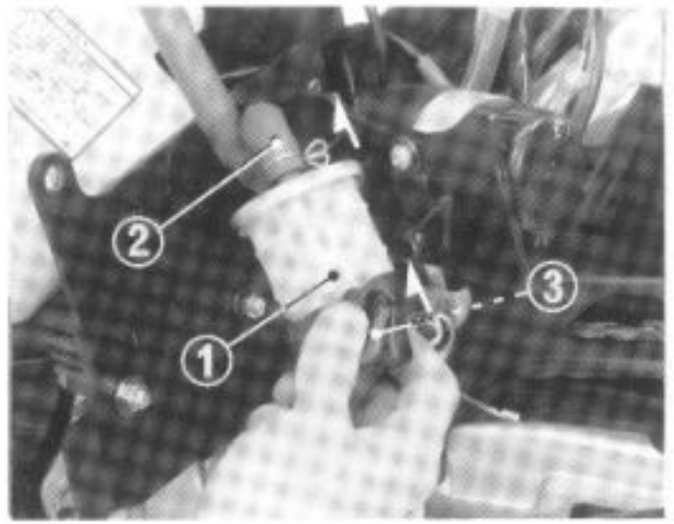
(1) Electric panel
(2) Mounting bolt

Fuel Filter

WARNING

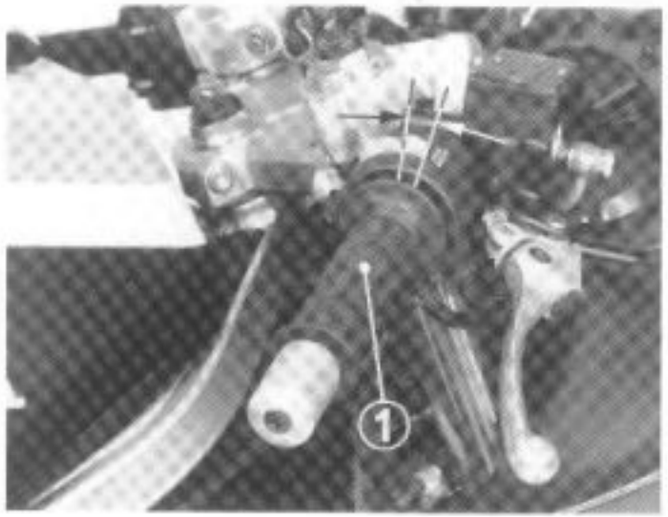
Gasoline is flammable and is explosive under certain conditions. Do not smoke or allow flames or sparks in your working area.

Replace the fuel filter with a new one when indicated by the maintenance schedule (pages 28-29).
Remove the left side cover.
Remove the electric panel mounting bolts.



(1) Fuel filter
(2) Outlet line
(3) Inlet line

Unclip the fuel filter holder from the bottom of the electric panel.
Disconnect the fuel outlet line from the fuel filter.
Pull the fuel filter out then clip the inlet line closed.
Disconnect the fuel inlet line.
Install the fuel strainer in the normal direction of fuel flow as shown.
After installing, turn the fuel valve on and check that there are no fuel leaks.



(1) Throttle grip

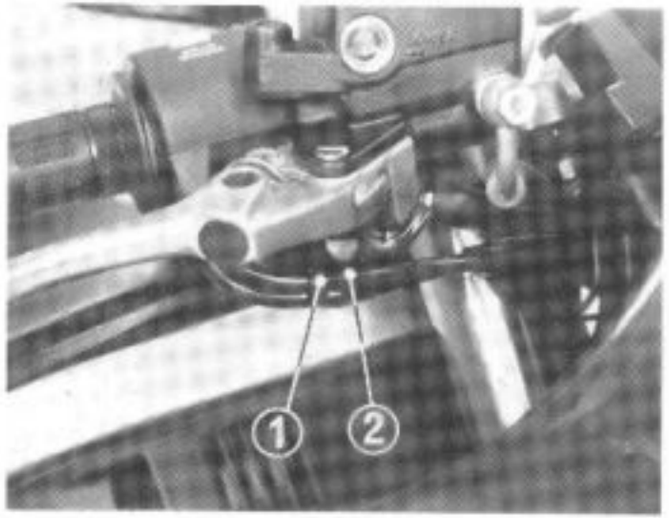
Throttle Operation

Check that the throttle grip opens smoothly to full throttle and fully closes automatically, in all steering positions. Check the throttle cables and replace them if they are deteriorated, kinked or damaged.

Lubricate the throttle cables, if throttle operation is not smooth.

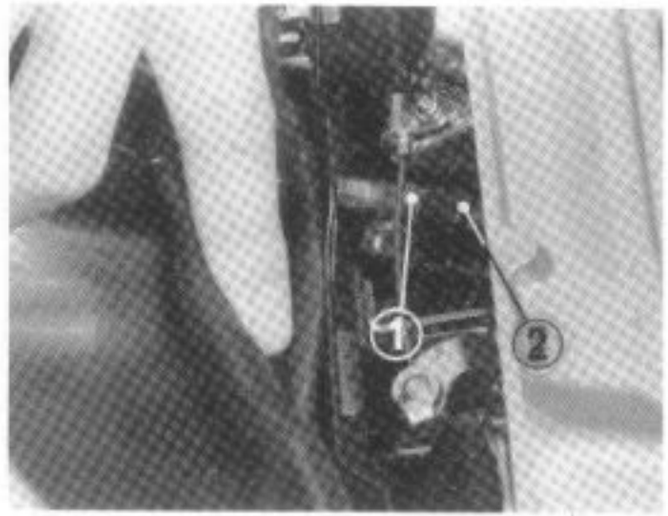
Measure throttle grip free play at the throttle grip flange.

FREE PLAY: 2–6 mm (1/8–1/4 in)



(1) Lock nut
(2) Upper adjuster

Adjustment can be made at either end of the throttle cable. Minor adjustments are made with the upper adjuster.



(1) Lower adjuster
(2) Lock nut

Major adjustments are made with the lower adjuster after removing the fuel tank and air cleaner case.

Adjust by loosening the lock nut and turning the adjuster.

Tighten the lock nut and recheck throttle operation.

Install the air cleaner case and fuel tank, and check throttle free play once more. Also check for fuel leaks.

(1) Choke lever

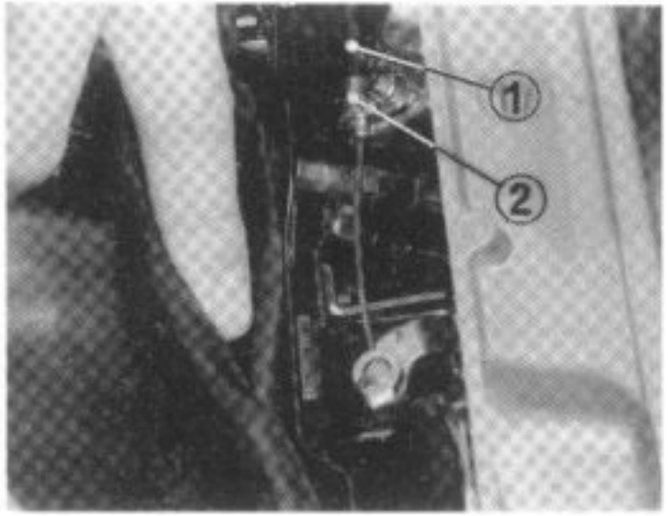
Carburetor Choke

The VF1000R choke system uses a fuel enrichening circuit controlled by a by-starter valve. The bystarter valve opens the enrichening circuit via cable when the choke lever on the handlebar is pulled back.

Check for smooth operation of the choke lever. Lubricate the choke cable, if the operation is not smooth.

Pull the choke lever on the handlebar all the way back to fully open. Make sure the choke valve is open by trying to move the choke lever on the carburetor, after removing the fuel tank and air cleaner case.

There should be no free play.



(1) Choke cable
(2) Cable clamp

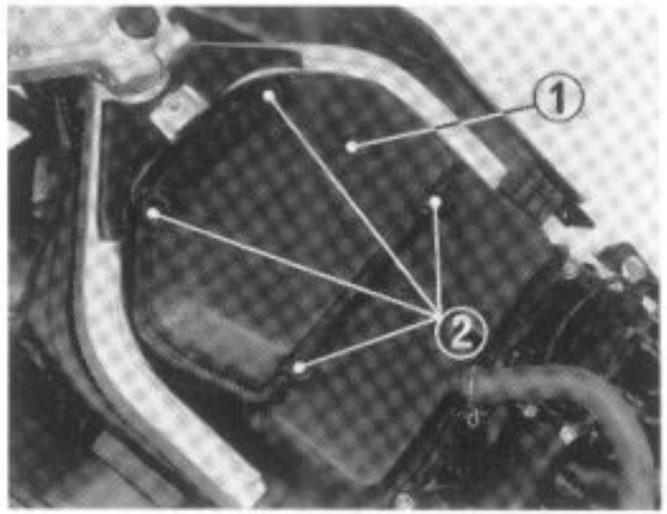
Adjust if necessary, by loosening the choke cable clamp on the carburetor and moving the choke cable casing so the choke lever is fully open.

Tighten the clamp.

Push the choke lever up all the way to fully closed.

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

Reinstall the removed parts in the reverse order of disassembly.

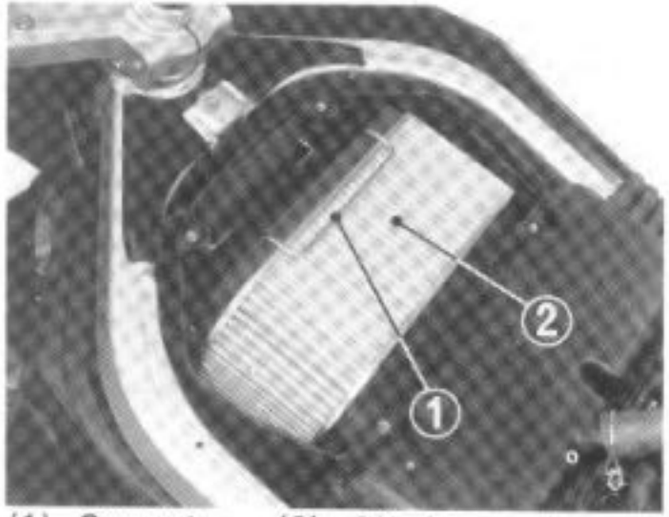


(1) Air cleaner cover
(2) Screws

Air Cleaner

Remove the fuel tank.

Remove the air cleaner cover screws and the cover.



(1) Set spring (2) Air cleaner element

Remove the spring clip and the air cleaner element.
Discard the element in accordance with the maintenance schedule.
Also, replace the element any time it is excessively dirty or damaged.
Install a new element and secure it with the set spring.
Install the air cleaner cover and fuel tank.

Crankcase Breather

Remove the left frame side cover.
Remove the plug from the drain tube to empty any deposits.
Install the drain plug.

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

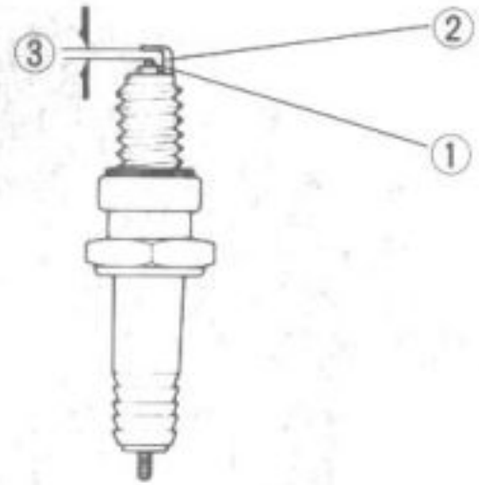
(1) Drain tube

Spark Plug

Recommended spark plugs:

	NGK	ND
Standard	DPR9EA-9	X27EPR-U9
For cold climate (Below 5°C, 41°F)	DPR8EA-9	X24EPR-U9

Disconnect the spark plug caps. Clean any dirt from around the spark plug bases. Remove the spark plugs.
Visually inspect the spark plug electrodes for wear. The center electrode should have square edges and the side electrode should have a constant thickness. Discard the spark plug if there is apparent wear or

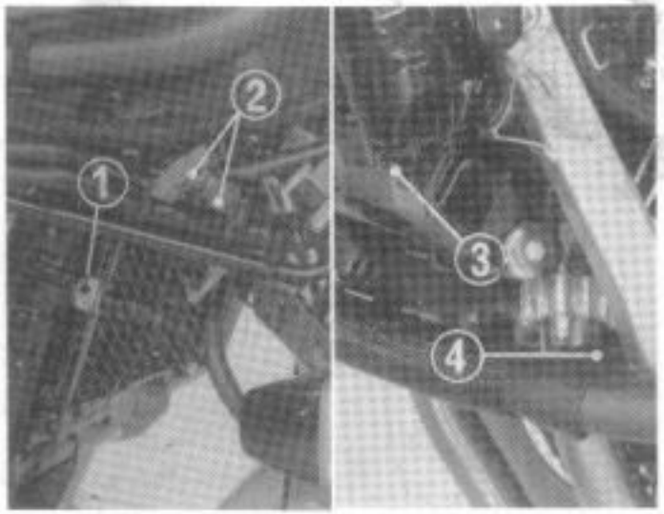


(1) Center electrode (3) Spark plug gap
(2) Side electrode

if the insulator is cracked or chipped. If the spark plug deposits can be removed by sandblasting, the spark plug can be reused. Measure the spark plug gaps using a wire-type feeler gauge.

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

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

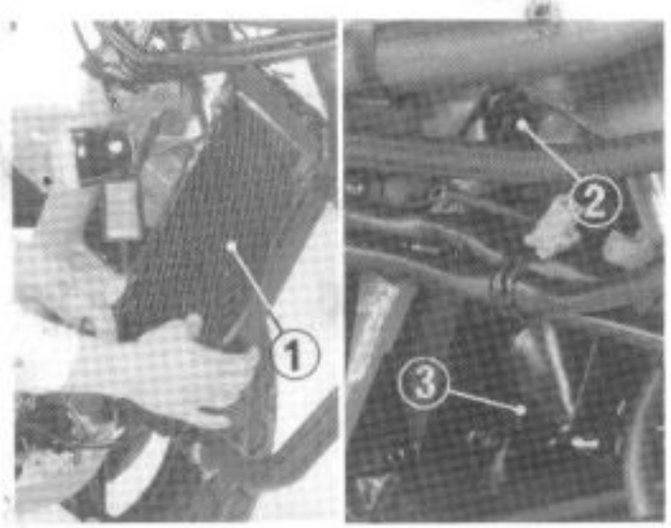


(1) Thermostatic switch
(2) Fan motor wire clamp
(3) Radiator bolt
(4) Radiator hose clamp

Valve Clearance

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

Remove the seat, fuel tank, air cleaner case and the fairing.
Disconnect the connectors from the thermostatic switch.
Disconnect the fan motor wire couplers and free the wires from the wire clamps.
Remove the radiator bolts.
Remove the radiator hose clamp from the frame.

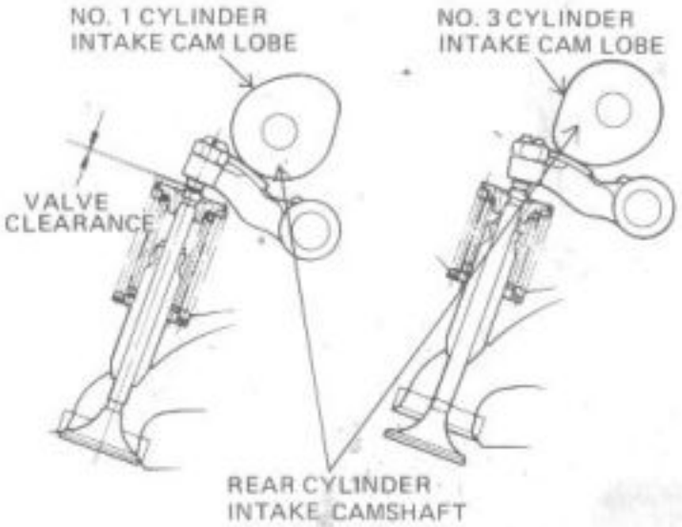


(1) Lower radiator
(2) Bolt
(3) Fan motor

Move the lower radiator to out of the frame without disconnect the hoses.

CAUTION;
Be careful not to damage the radiator fins during movement.

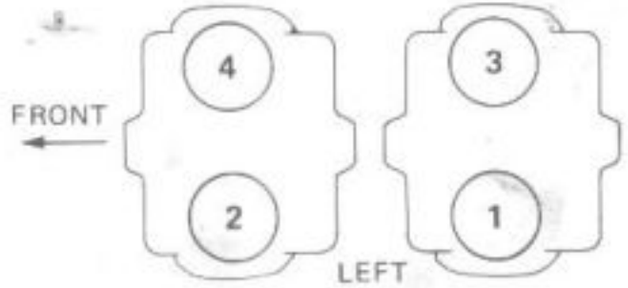
Remove the fan motor by removing bolts.
Remove the cylinder head covers.
Remove the alternator cover.

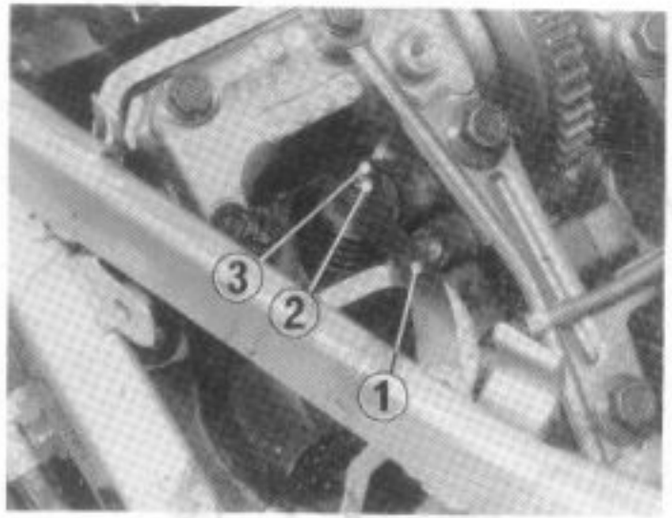


To inspect the No. 1 cylinder intake valves, rotate the crankshaft counter-clockwise so that the No. 3 cylinder intake valves are at maximum lift.

NOTE:
When checking and adjusting the valve clearance, the neighboring cam lobe of the same camshaft as to be adjusted must face to the rocker arm and their valves must be at maximum lift.

The cylinder numbering is given below:

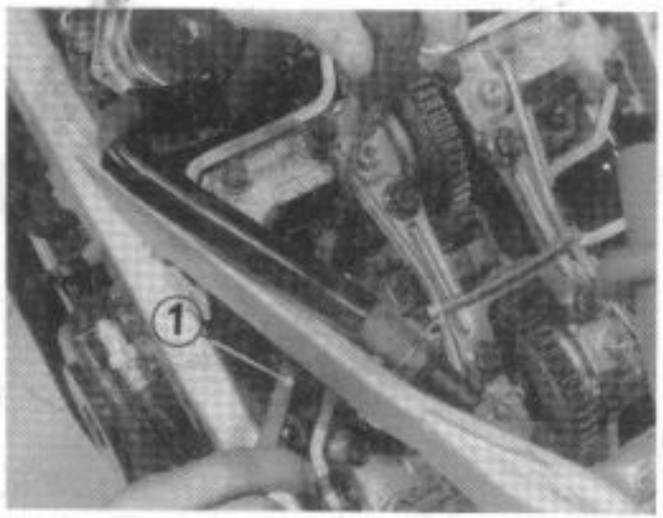




(1) Feeler gauge (3) Adjusting screw
(2) Lock nut

Check the valve clearances for the No. 1 cylinder intake valve using two feeler gauges for each pair of valves; one for each valve that shares a common rocker arm.

VALVE CLEARANCE (IN, EX):
0.14 ± 0.02 mm (0.006 ± 0.001 in)



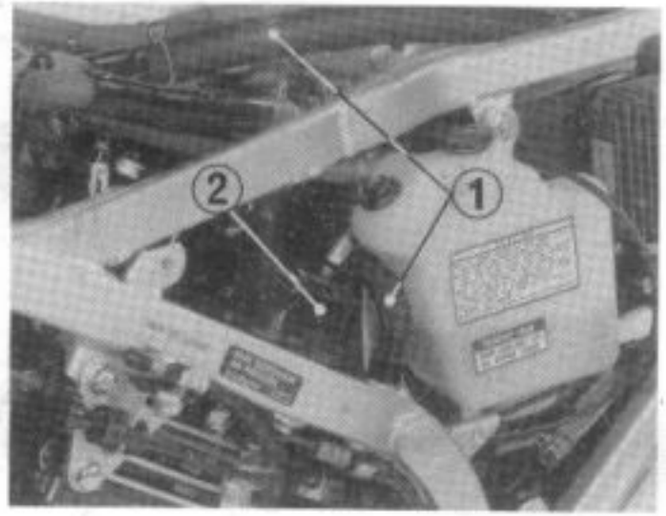
(1) Valve adjusting wrench
07908–MB00100

Loosen the lock nuts and turn the adjusting screws until there is a slight drag on both feeler gauges. Both feeler gauges should remain inserted during adjustment.
Hold the adjusting screws and tighten the lock nuts.

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

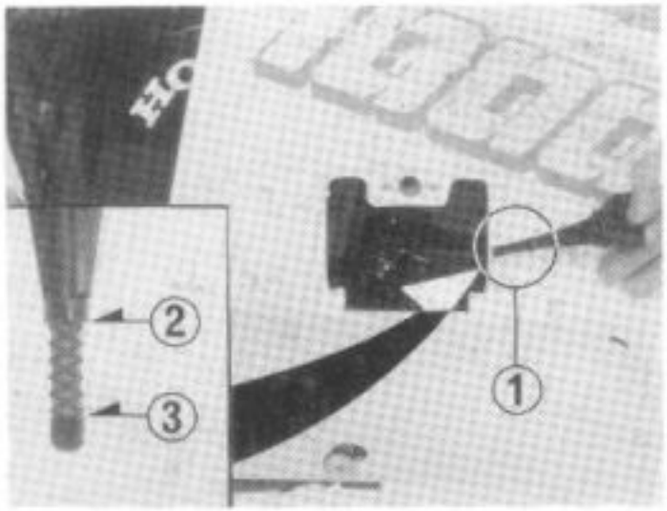
CAUTION:
The lock nuts will come loose if not tightened to the correct torque value.

Recheck the valve clearance.
Turn the crankshaft, and check and adjust the remaining valve clearances in the same method as for the No. 1 cylinder intake valves.



(1) Breather tubes
(2) Cylinder head cover

Clean the gasket and apply sealant between the gaskets and cylinder head covers.
Apply sealant to around the projections of the gasket.
Install the front cylinder head cover with its tabs facing up and tighten the cover bolts.
Install the rear cylinder head cover and tighten the cover bolts.
Connect the breather tubes to the cylinder head cover.
Install the fuel hose clamp and ignition coil.
Install the removed parts.



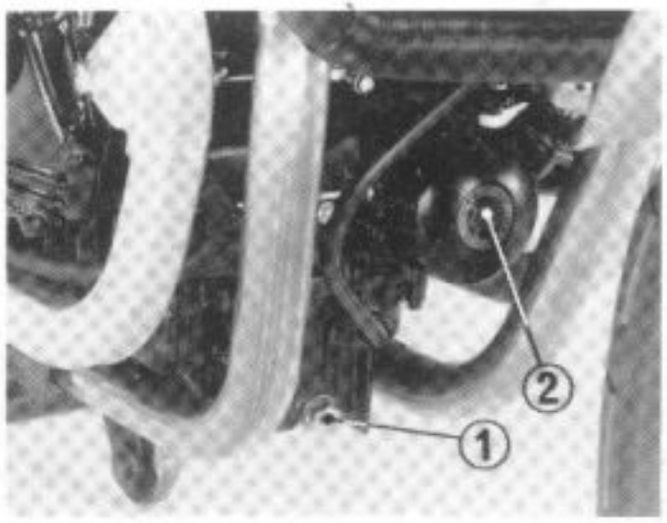
(1) Oil filler cap/dipstick
(2) Upper level mark
(3) Lower level mark

Engine Oil and Filter

Engine oil level check:

Start the engine and let it idle for 2-3 minutes. Turn off the engine. Remove the oil filler cap cover from the fairing. With the motorcycle upright on level ground, remove the filler cap/dipstick, wipe it clean and insert it without screwing it in. Remove the filler cap/dipstick and check the oil level.

If the level is below the lower level mark on the dipstick, fill to the upper level mark with recommended oil.



(1) Drain plug
(2) Oil filter

Engine oil and filter change:

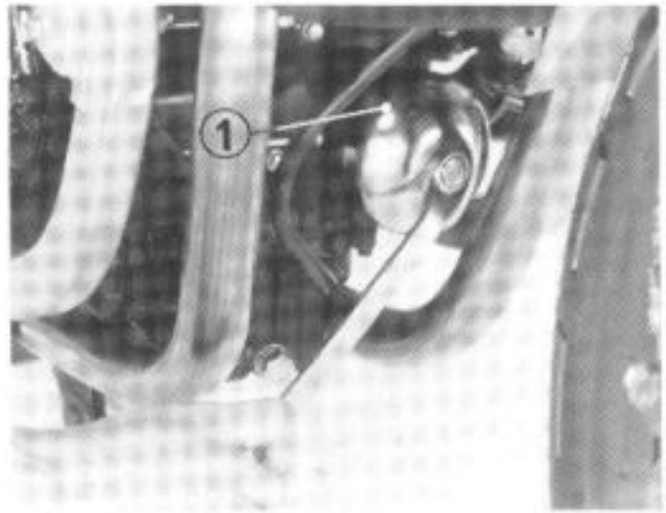
NOTE:
Change engine oil with the engine warm and the motorcycle on the center stand (special tool) to assure complete and rapid draining.

Remove the lower fairing.

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

Remove the oil filter with a filter wrench and let the remaining oil drain out. Discard the oil filter.

Check that the sealing washer on the drain plug is in good condition and install the plug. Replace the oil filter with a new one. Check that the oil filter O-ring is in good condition, and coat it with oil before installing it.



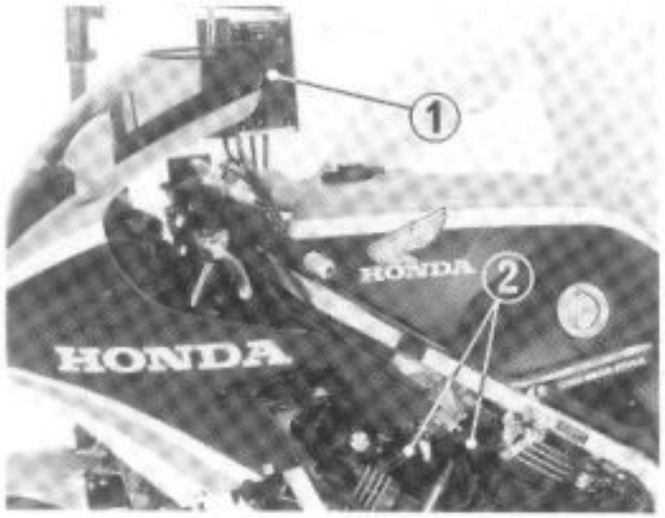
(1) Oil filter wrench
(07912–6110001)

Fill the crankcase with 3.0 liters (3.2 U.S. qt., 2.6 Imp. qt.) of the recommended oil (page 23). Reinstall the oil filler cap/dipstick.

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

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

Make sure that there are no oil leaks.

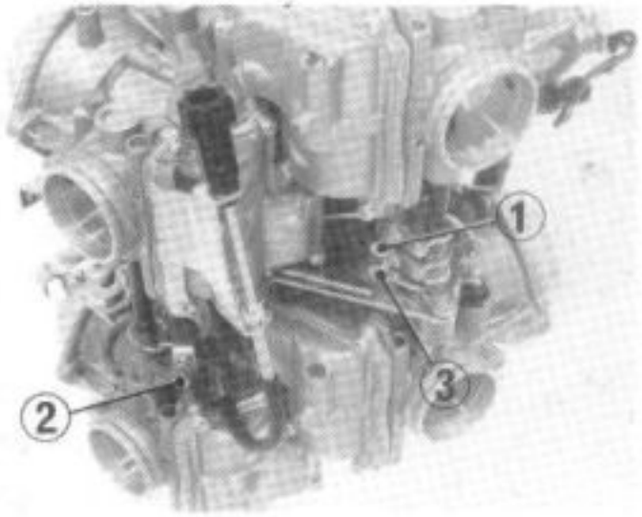


(1) Vacuum gauge (07404–0030000)
(2) Vacuum gauge adaptors

Carburetor Synchronization

NOTE:
Synchronize the carburetors with the engine at normal operating temperature, transmission in neutral and motorcycle on the center stand (special tool).

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



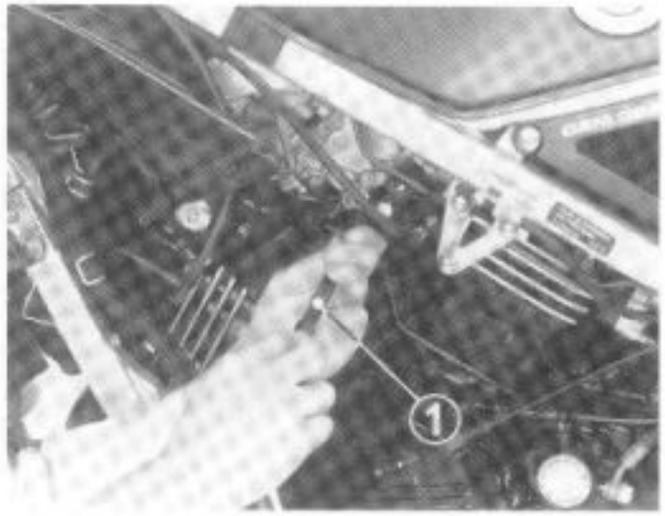
(1) No. 1 carburetor adjusting screw
(2) No. 2 carburetor adjusting screw
(3) No. 3 carburetor adjusting screw

NOTE:
The No. 4 carburetor cannot be adjusted; it is the base carburetor.

Start the engine and adjust the idle speed.

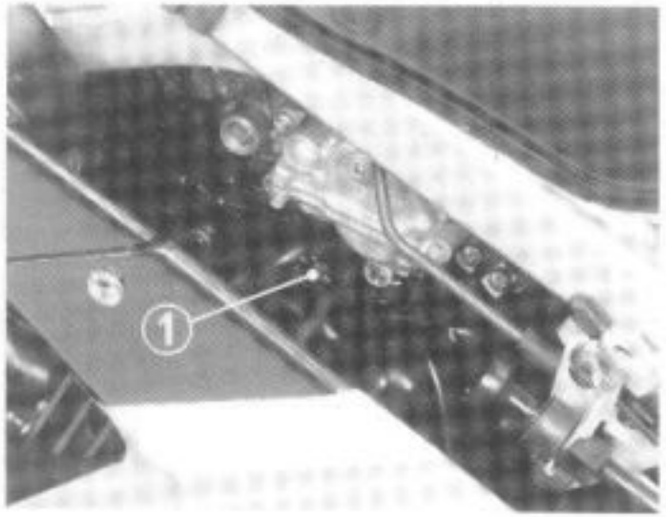
IDLE SPEED: 1,000 ± 100 min^{-1} (rpm)

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



(1) Carburetor pilot screw wrench (07908–4220201)

Synchronize to specification by turning the adjusting screws with carburetor pilot screw wrench.
Recheck the idle speed and synchronization.
Remove the gauge adapters and install the plugs.



(1) Throttle stop screw

Carburetor Idle Speed

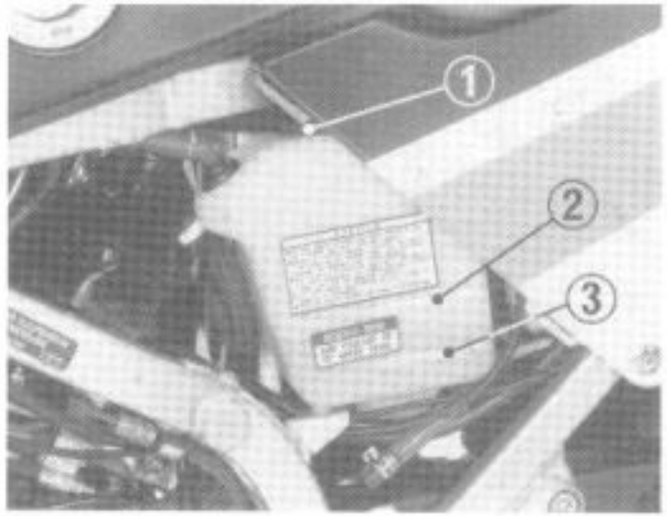
NOTE:

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

Warm up the engine, shift to NEUTRAL, and support the motorcycle upright on level ground.

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

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



(1) Reserve tank cap
(2) "UPPER" level line
(3) "LOWER" level line

Radiator Coolant

Remove the frame left side cover.

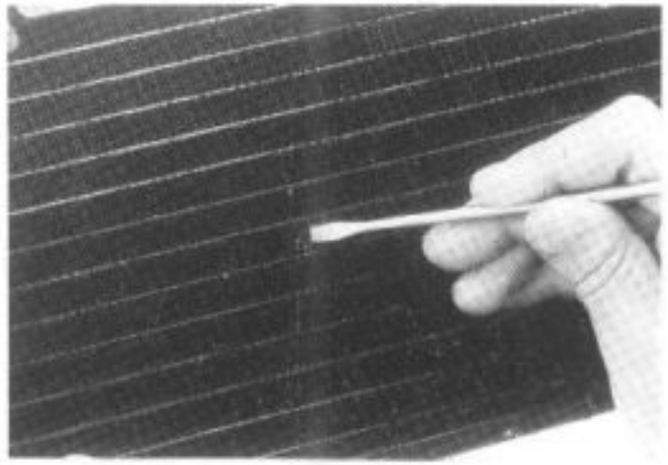
Support the motorcycle upright on level ground.

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

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

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

Reinstall the cap and frame side cover.



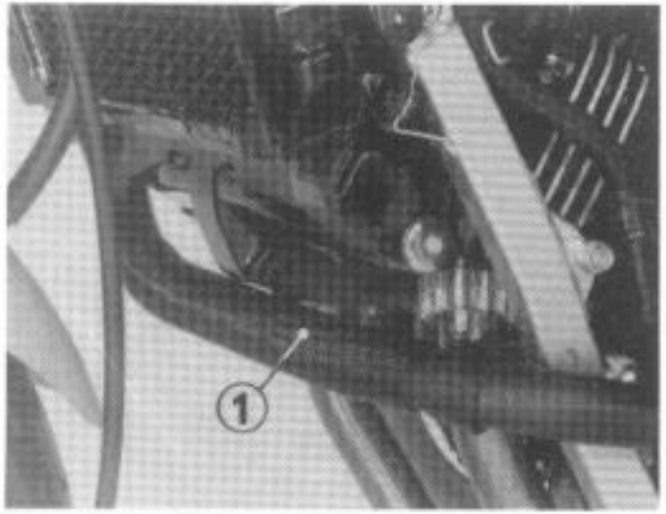
Radiator Core

Check the air passages for clogging or damage.

Straighten bent fins and collapsed core tubes.

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

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



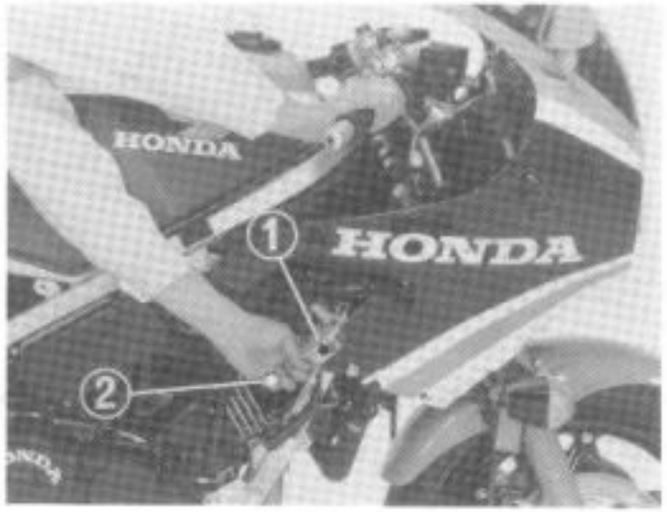
(1) Radiator hose

Cooling System Hoses and Connection

Remove the fairing.

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

Check the tightness of all hose clamps.



(1) Compression gauge
(2) Compression gauge attachment (07510–MB00101)

Cylinder Compression

Warm up the engine.

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

Insert the compression gauge.

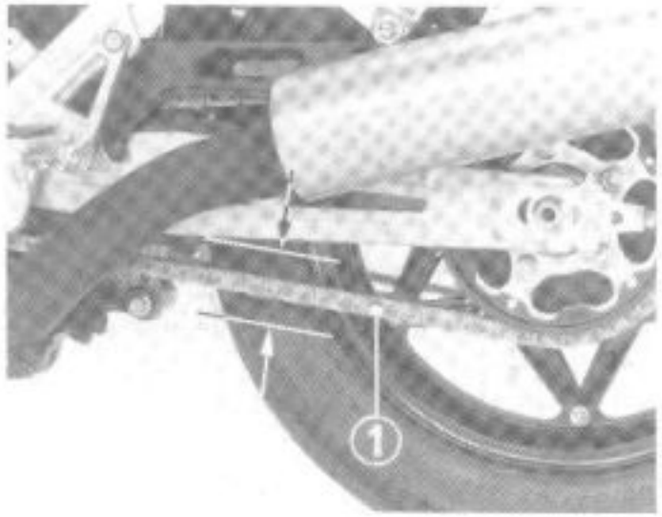
Open the throttle all the way and crank the engine with the starter motor.

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

COMPRESSION PRESSURE:
1,300 ± 200 kPa
(13.0 ± 2.0 kg/cm^2, 185 ± 28 psi)

If compression is low, check for the following:
- Improper valve clearance
- Leaky valves
- Leaking cylinder head gasket
- Worn piston/ring/cylinder

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



(1) Drive chain

Drive Chain/Sprockets

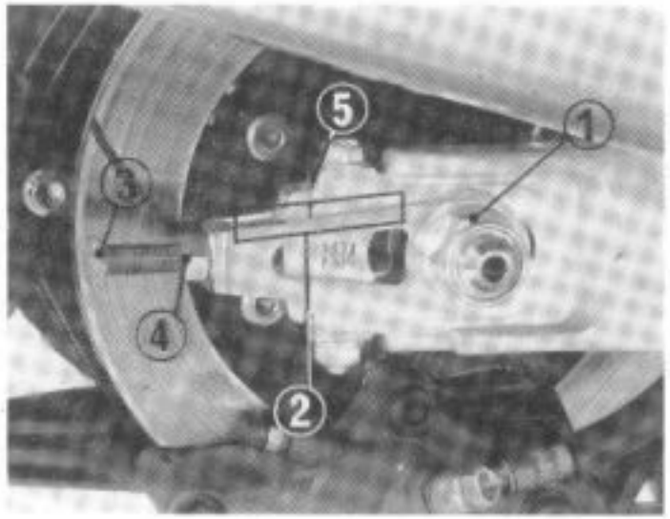
Turn the engine off, place the motorcycle on its side stand and shift the transmission into neutral.

Check slack in the drive chain lower run midway between the sprockets.

SLACK: 15–25 mm (5/8–1 in)

CAUTION:

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



(1) Axle nut
(2) Graduated scale
(3) Adjusting bolt
(4) Lock nut
(5) Rear end of swing arm

Drive chain slack adjustment:

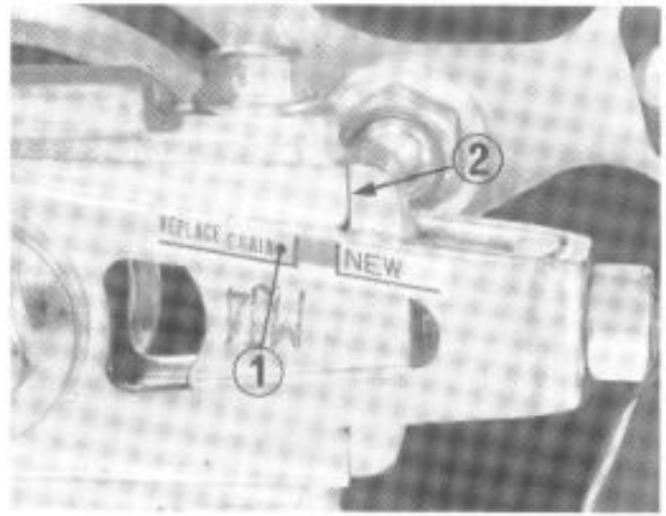
Loosen the axle nut.

Loosen the adjusting bolt lock nuts.

Turn both adjusting bolts and equal number of turns until the correct drive chain slack is obtained.

CAUTION:

Make sure that the same alignment marks on both adjusting plates align with the ends of the swing arm.



(1) Red zone
(2) Rear end of swing arm

Tighten the adjusting bolt lock nuts.

Tighten the rear axle nut.

TORQUE: 85–105 N·m (8.5–10.5 kg-m, 61–76 ft-lb)

Recheck chain slack and free wheel rotation.

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

Check the chain wear label. If the red zone on the label align, or is beyond, the rear end of the swing arm after the chain has been adjusted, the chain must be replaced.

REPLACEMENT CHAIN:
D.I.D. 50ZL or RK50LO

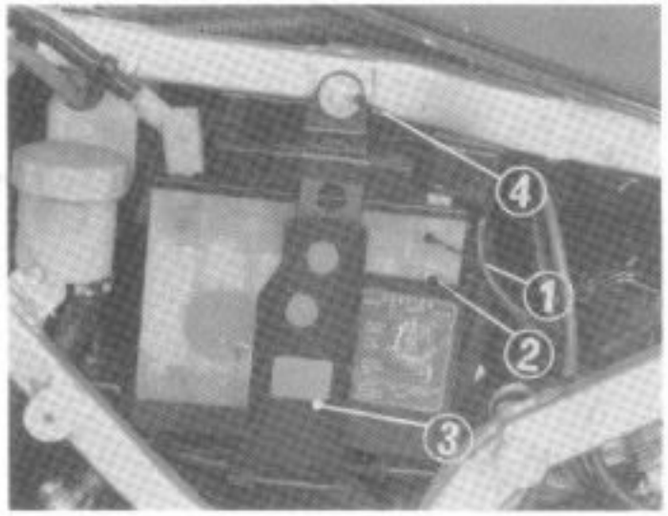
(1) Normal (2) Damaged (3) Worn

Inspection:

Inspect the drive chain and sprockets for damage or wear. A drive chain with damaged rollers, loose pins, or missing O-rings must be replaced. Replace any sprocket which is damaged or excessively worn.

NOTE:

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



(1) Upper level (3) Battery holder
(2) Lower level (4) Bolt

Battery

Support the motorcycle upright on level ground.

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

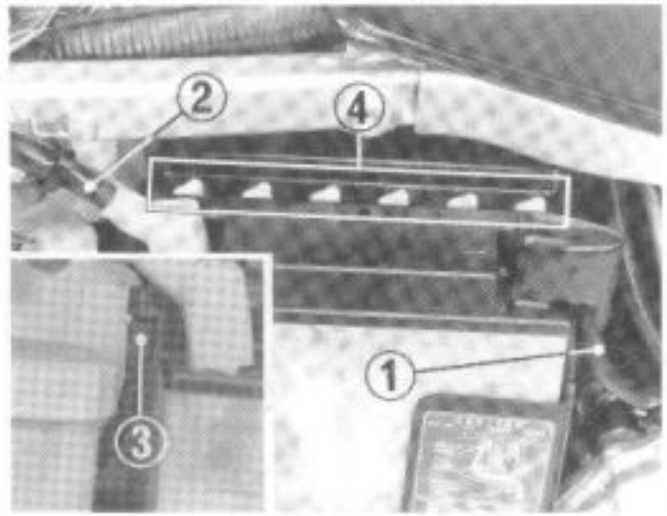
Remove seat and right frame side cover.

Remove the battery holder bolt, then swing the holder out of the way.

Disconnect the negative cable at the battery, then disconnect the positive cable.

Disconnect the battery breather tube from the battery.

Pull the battery out, remove the filler caps and add distilled water to the upper level line.



(1) Negative cable (3) Battery breather tube
(2) Positive cable (4) Filler caps

Reinstall the filler caps and the battery.

WARNING

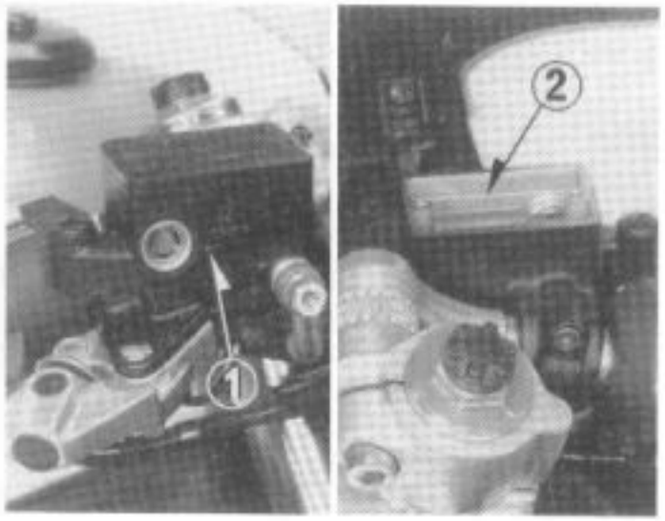
The battery electrolyte contains sulphuric acid. Protect your eyes, skin, and clothing. If electrolyte gets in your eyes, flush them thoroughly with water and get prompt medical attention.

CAUTION:

When checking the battery electrolyte level or adding distilled water, make sure the breather tube is connected to the battery breather outlet.

NOTE:

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



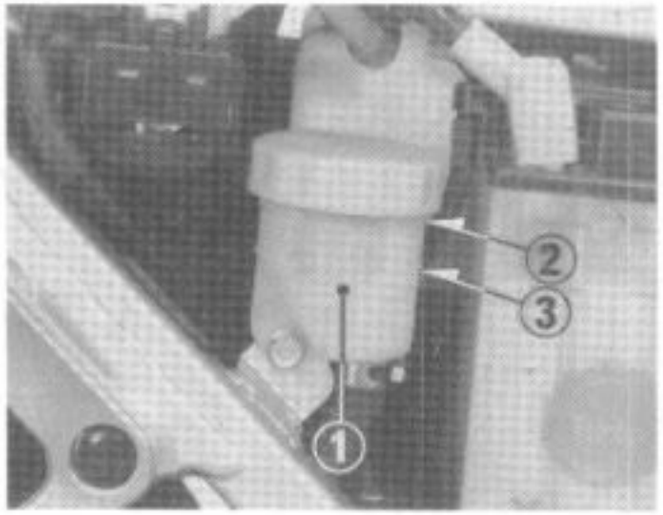
(1) Lower level
(2) Upper level

Brake Fluid

Check the front and rear brake fluid reservoir level.

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

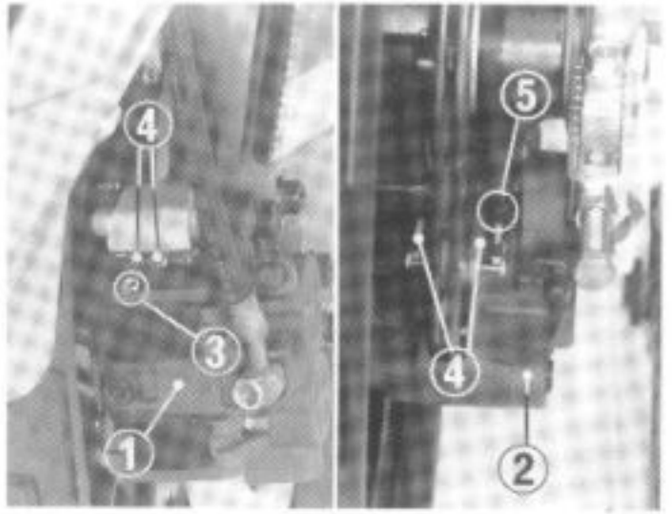
Check the entire system for leaks, if the level is low.



(1) Rear brake reservoir
(2) Upper level
(3) Lower level

CAUTION:

* *Do not remove the cover until the handlebar has been turned so that the reservoir is level.*
* *Avoid spilling brake fluid on painted surfaces. Place a rag over the fuel tank whenever the clutch system is serviced.*
* *Do not mix different types of fluid, as they are not compatible.*

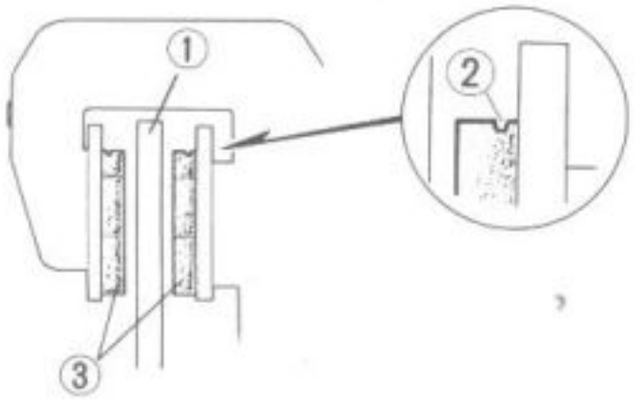


(1) Front caliper
(2) Rear caliper
(3) Arrow
(4) Brake pads
(5) Wear indicator

Brake Pad Wear

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

Check the rear brake pads for wear by looking from rear of the caliper.

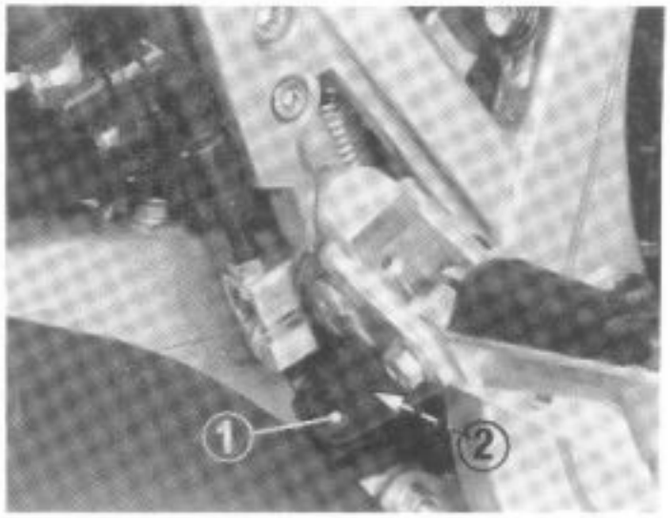


(1) Brake disc
(2) Wear indicator
(3) Brake pads

Replace the brake pads if the wear indicator on the pads reaches the edge of the brake disc.

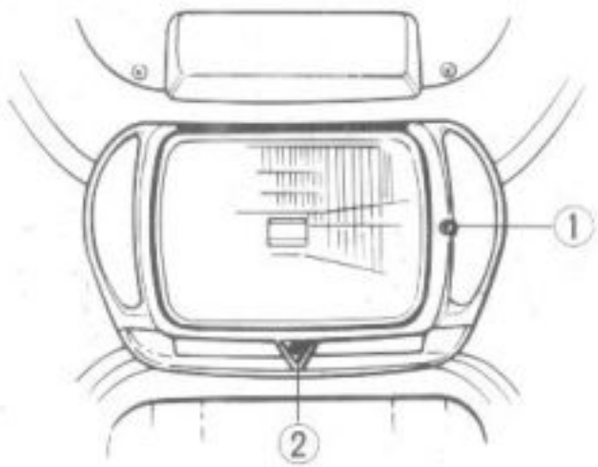
CAUTION:
Always replace the brake pads in pairs to assure even disc pressure.

Brake System
Inspect the brake hoses and fittings for deterioration, cracks and signs of leakage.
Tighten any loose fittings.
Replace hoses and fittings as required.



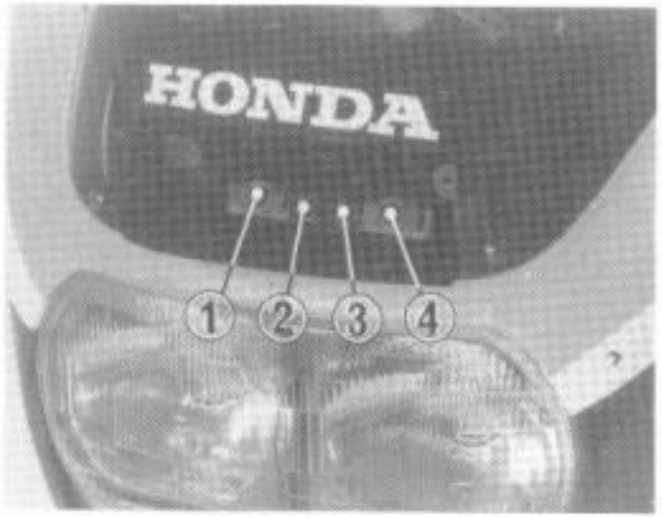
(1) Bolt
(2) Switch body

Brake Light Switch
Adjust the brake light switch so that the brake light will come on when the brake engagement begins.
Adjust by loosen the bolt and moving the switch body.
Tighten the bolt and recheck the brake light switch operation.



(1) Horizontal adjusting screw
(2) Vertical adjusting screw

Headlight Aim
(SW, IT types)
Adjust vertically by turning the vertical adjusting screw. Turn the adjusting screw clockwise to direct the beam down.
Adjust horizontally by turning the horizontal adjusting screw. Turn the adjusting screw clockwise to direct the beam toward the left side of the rider.



(1) R: headlight vertical adjusting screw
(2) R. headlight horizontal adjusting screw
(3) L. headlight horizontal adjusting screw
(4) L. headlight vertical adjusting screw

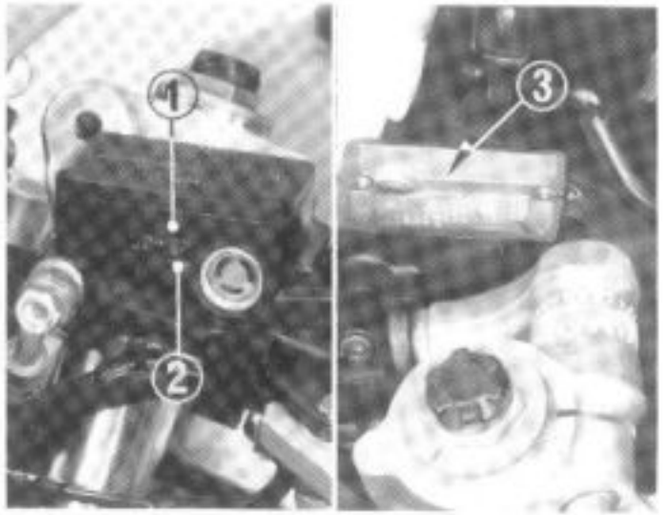
(E, G, ED, H, SA types)
Remove the air inlet screen by removing the two screws.
Adjust the each headlight beam by turning the adjusting screws.
Turn the right headlight horizontal adjusting screw clockwise to direct the beam toward the right side of the rider.
Turn the left headlight horizontal adjusting screw clockwise to direct the beam toward the left side of the rider.
Turn the each vertical adjusting screw clockwise to direct the beam down.

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

WARNING

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

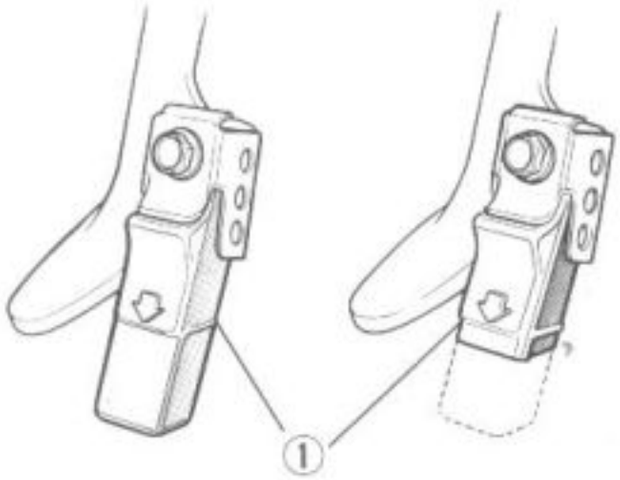
Clutch Fluid
Check the clutch fluid reservoir level.
If the level nears the lower level mark, fill the reservoir with DOT 4 BRAKE FLUID until the level is between the upper and lower level mark.
Check the entire system for leaks, if the level is low.



(1) Clutch reservoir (3) Upper level line
(2) Lower level line

CAUTION:
* ***Do not remove the cover until the handlebar has been turned so that the reservoir is level.***
* ***Avoid spilling brake fluid on painted surfaces. Place a rag over the fuel tank whenever the clutch system is serviced.***
* ***Do not mix different types of fluid, as they are not compatible.***

Clutch System
Inspect the clutch hoses and fittings for deterioration, cracks and signs of leakage.
Tighten any loose fittings.
Replace hoses and fittings as required.



(1) Wear line

Side Stand

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

NOTE:

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

Suspension

WARNING

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

Front:

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

Check the entire fork assembly for leaks or damage.

Replace damaged components which cannot be repaired.

Tighten all nuts and bolts.

Check the front fork air pressure (page 20).

Anti-dive system:

WARNING

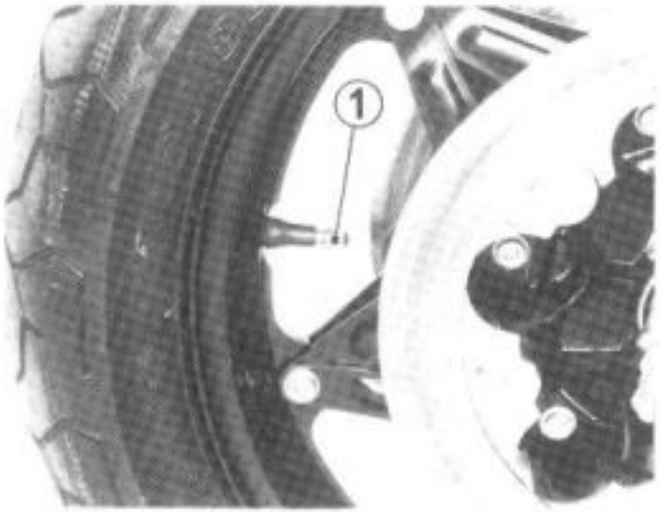
Select a safe place away from traffic to perform this inspection.

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

Rear:

Check the operation of the rear suspension and the entire suspension assembly. Be sure it is securely mounted and not damaged or leaking.

Move the rear wheel sideways with force to see if the swing arm bearings are worn. Replace the bearings if there is any looseness (page 171). Tighten all rear suspension nuts and bolts. Check the rear shock absorber air pressure (page 20).



(1) Air valve

Nuts, Bolts, Fasteners

Check that all chassis nuts and bolts are tightened to their correct torque values (page 209) at the intervals shown in the Maintenance Schedule (pages 28–29). Check all cotter pins, safety clips, hose clamps and cable stays.

Rear Wheel Damper

Remove the rear wheel (page 160).
Remove the driven sprocket flange from the wheel.
Inspect the damper rubber for wear, damage or deterioration.
Replace the damper rubbers if necessary.
Install the rear wheel (page 164).

Wheels

NOTE:
Tire pressure should be checked when tires are COLD.

Check the tires for cuts, imbedded nails, or other sharp objects.
Refer to page 6 for recommended tires and pressure.

Check the front and rear wheels for trueness.
Measure the tread depth at the center of the tires.
Replace the tires if the tread depth reaches the following limit:

MINIMUM TREAD DEPTH:
Front: 1.5 mm (1/16 in)
Rear: 2.0 mm (3/32 in)

Steering Head Bearing

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

Place the motorcycle on the center stand (special tool).
Raise the front wheel off the ground using a jack under the engine.
While holding the fork sliders, check that the front wheel turns freely and smoothly from full left to full right. Push and pull on the sliders and check that there is no free play or looseness.
If the handlebar moves unevenly, binds, or has vertical movement, adjust the steering head bearing by turning the steering head adjusting nut (page 158).

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.

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.

PRE-RACE CHECKS

Items to be checked	Ref. page
• Pre-ride inspection	Page 24
• Valve clearance check/adjustment	Pages 34–35
• Spark plug inspection	Page 33

PERIODICAL REPLACEMENT PARTS (COMPETITION USE)

1 race: 12 hours

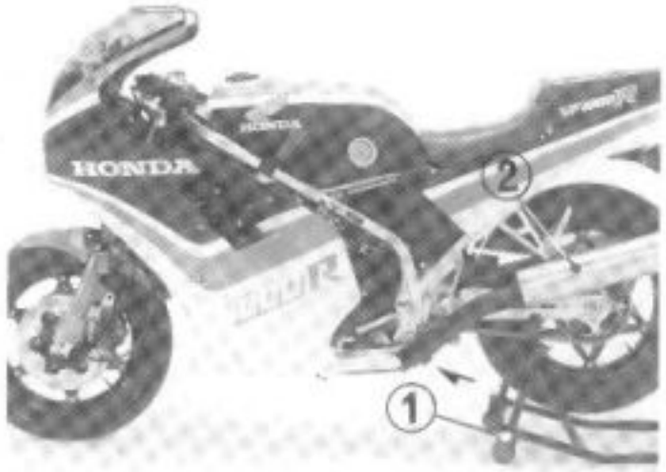
Part Name		Interval	Items to be checked	Service Limit
Spark plug		Every 5,000 km (2 races)	Worn electrodes, gap	
Piston ring (oil)		Every 10,000 km (4 races)		1.00 mm (0.039 in)
Piston		Every 10,000 km (4 races)	Damage, wear, O.D. at skirt	76.90 mm (3.028 in)
Piston ring	TOP	Every 10,000 km (4 races)	Wear or chipped end	0.55 mm (0.022 in)
	2ND	Every 10,000 km (4 races)	Wear or chipped end	0.55 mm (0.022 in)
Transmission bearings		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		Every 10,000 km (4 races)		
Valve stem seal		Every 10,000 km (4 races)		
Foot peg bank sensors		Every 5,000 km (2 races)	Wear	
Drive chain		Every 5,000 km (2 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	

ON-FRAME SERVICE POINTS

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

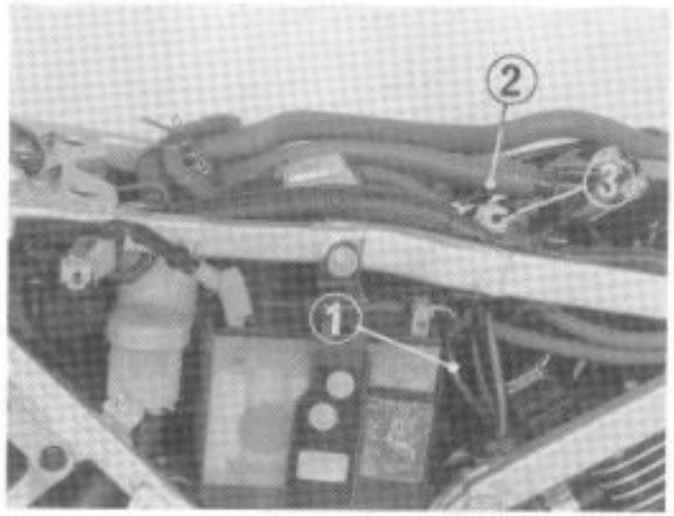
- **Clutch**
- **Gearshift linkage**
- **Front cylinder head**
- **Camshafts**
- **Alternator**
- **Starter motor**
- **Carburetors**
- **Cooling system**
- **Oil pump**

ENGINE REMOVAL



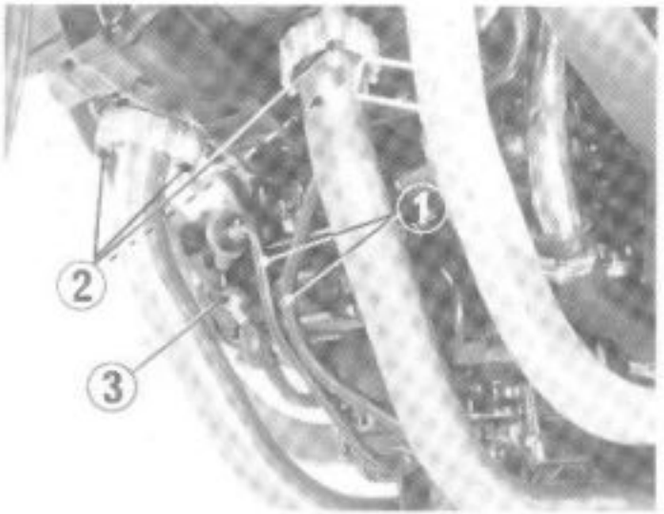
(1) Center stand (07965–MA30001)
(2) Mufflers

Place the motorcycle on the center stand (Tool No. 07965–MA30001). Drain oil from the engine. Turn the fuel valve "OFF".
Remove the fairing, seat and fuel tank.
Remove the carburetors and lower radiator.
Remove the mufflers from the exhaust chamber.



(1) Battery ground cable
(2) Breather tube
(3) Pulse generator coupler

Disconnect the battery ground cable.
Disconnect the pulse generator wire from the main wire harness.
Disconnect the breather tube from the cylinder head cover.
Remove the tool box.



(1) Oil hoses
(2) Exhaust pipe attaching nuts
(3) Starter motor cable

Drain the engine oil and disconnect the oil hoses from the oil pan.
Remove the front exhaust pipe attaching nuts at the front cylinder heads.
Disconnect the starter motor cable from the starter motor.

(1) Neutral switch and alternator couplers
(2) Clutch slave cylinder
(3) Gearshift pedal
(4) Drive sprocket cover

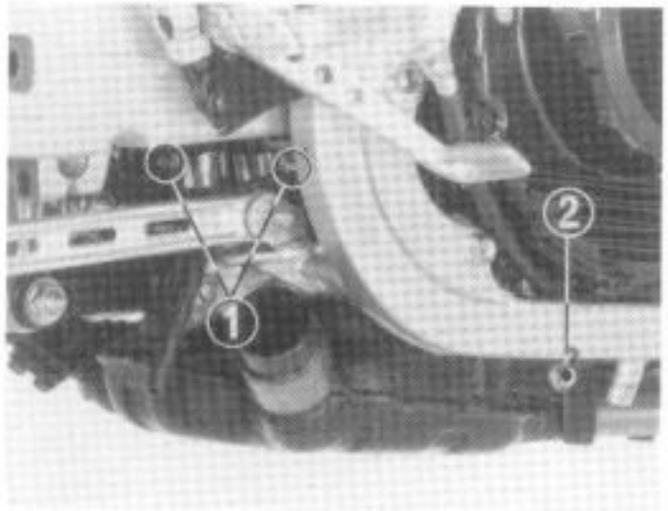
Disconnect the neutral switch wire connector and alternator wire coupler.
Remove the clutch slave cylinder from the engine.

NOTE:
Squeeze the clutch lever once and keep it in this position by tying it to the handlebar grip to prevent the slave cylinder piston from over stroke caused by fluid gravity.

Remove the drive sprocket cover.

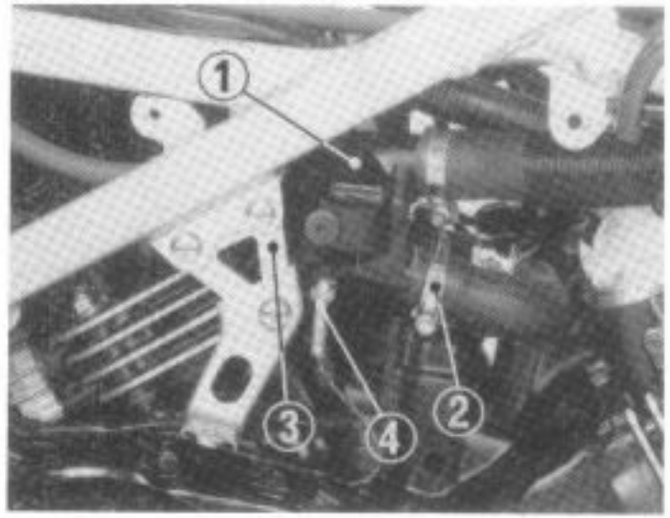
(1) Drive sprocket bolt
(2) Drive chain
(3) Bolt

Remove the drive sprocket bolt. Then remove the drive sprocket with the drive chain.
Remove the bolt attaching the exhaust chamber to the left side of the engine.



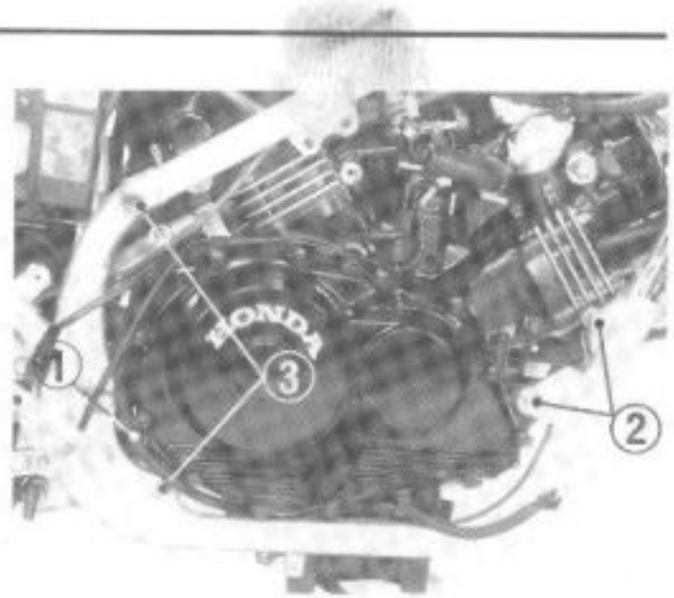
(1) Rear exhaust pipe clamp bolts
(2) Bolt

Bend down the washer tabs and remove the right chamber attaching bolt.
Remove the rear exhaust pipe clamp bolts.
Remove the exhaust chamber from the engine.



(1) Thermostat housing
(2) Radiator hose
(3) Engine hanger plate
(4) Temperature sensor wire

Disconnect the radiator hose and the temperature sensor wire from the thermostat housing.
Remove the left engine hanger plate by three engine mount bolts.

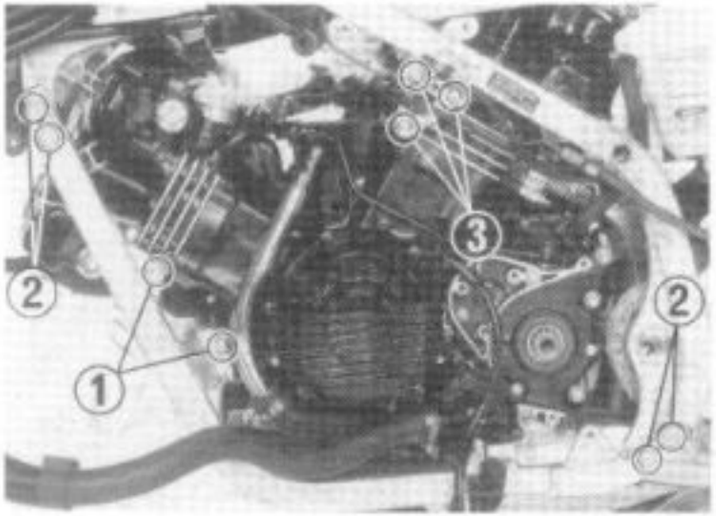


(1) Starter motor cable
(2) Front hanger bolts
(3) Rear hanger bolts (10 mm)

Free the starter motor cable from the clamps.
Place the floor jack or other adjustable support under the engine.

NOTE:
The jack height must be continuously adjusted to relieve stress from bolts that are being removed.

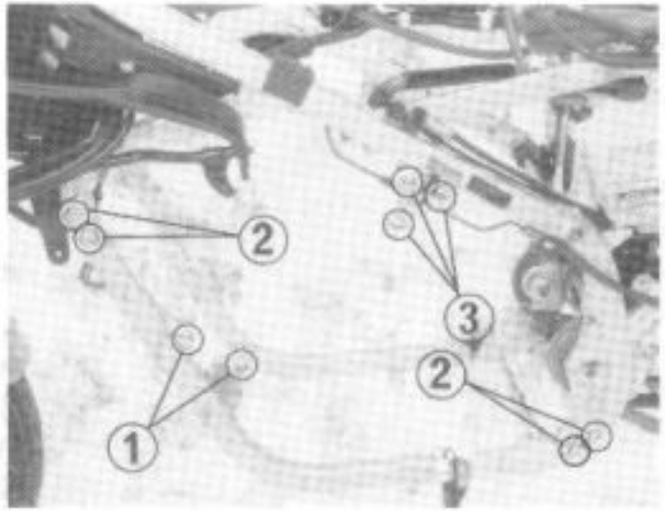
Remove the engine hanger bolts from the right side.



(1) Front hanger bolts
(2) Sub-frame mount bolts (10 mm)
(3) Center hanger bolts (8 mm)

Remove the engine hanger bolts and nuts from the left side.
Remove the sub-frame bolts.
Carefully lower the engine and remove it from the left side.

Engine installation is essentially the reverse of removal.
Use a floor jack or other adjustable support to carefully maneuver the engine into place.

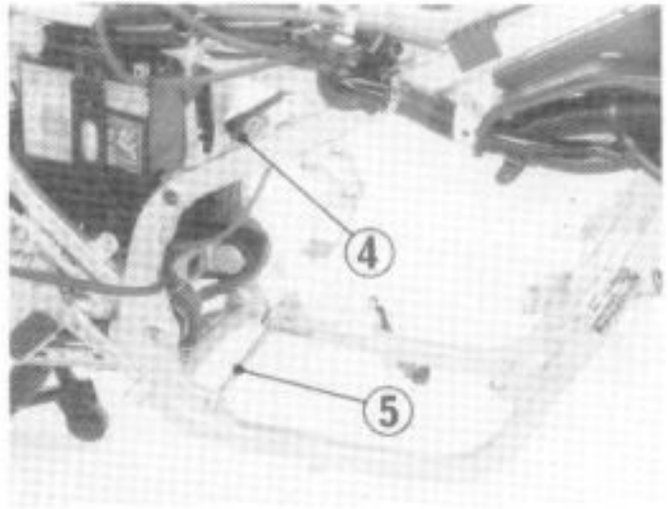


(1) Front hanger bolts (10mm and 8mm)
(2) Sub-frame mount bolts (10 mm)
(3) Center hanger bolts (8 mm)

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

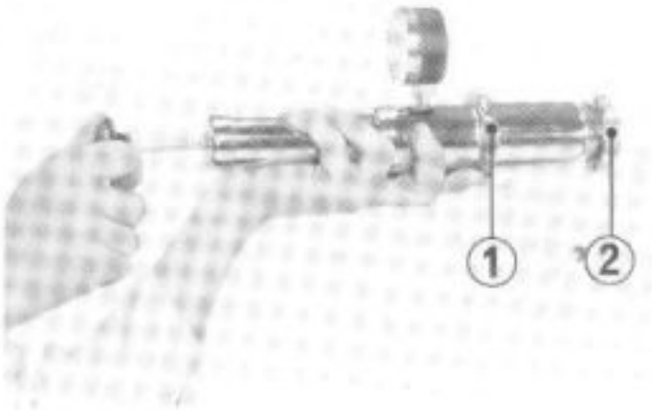
NOTE:
Apply engine oil to the threads of the rear hanger upper bolt and sub-frame 10 mm socket bolts.

TORQUE:
Rear hanger lower bolt (10 mm):
35–45 N·m
(3.5–4.5 kg-m, 25–33 ft-lb)



(4) Rear hanger upper bolt (10 mm)
(5) Rear hanger lower bolt (10 mm)

Rear hanger upper bolt (10 mm):
60–70 N·m
(6.0–7.0 kg-m, 43–51 ft-lb)
Front hanger bolt (10 mm):
35–45 N·m
(3.5–4.5 kg-m, 25–33 ft-lb)
Front hanger bolt (8 mm):
24–30 N·m
(2.4–3.0 kg-m, 17–22 ft-lb)
Center hanger bolts (8 mm):
24–30 N·m
(2.4–3.0 kg-m, 17–22 ft-lb)
Sub-frame mount bolts (10 mm):
60–70 N·m
(6.0–7.0 kg-m, 43–51 ft-lb)



(1) Cooling system tester (Commercially available)

(2) Radiator cap

Radiator Cap Inspection

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

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

RADIATOR CAP RELIEF PRESSURE:
95–125 kPa
(0.95–1.25 kg/cm^2, 13.5–17.8 psi)

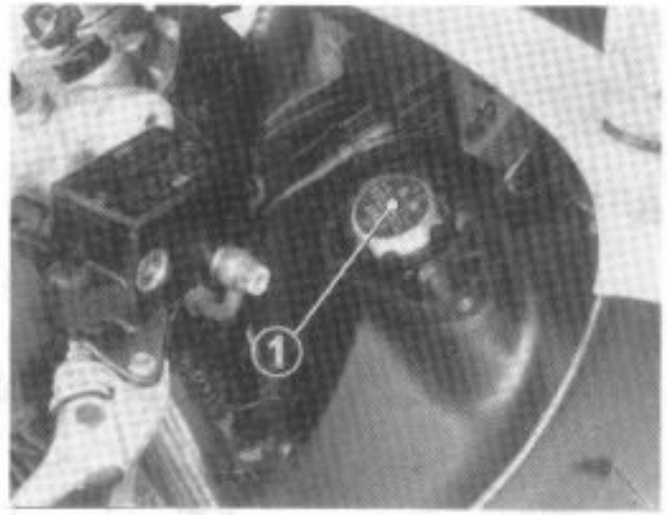
(1) Cooling system tester (Commercially available)

Cooling System Inspection

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

CAUTION:
Excessive pressure can damage the radiator. Do not exceed 125 kPa (1.25 kg/cm^2, 17.8 psi).

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

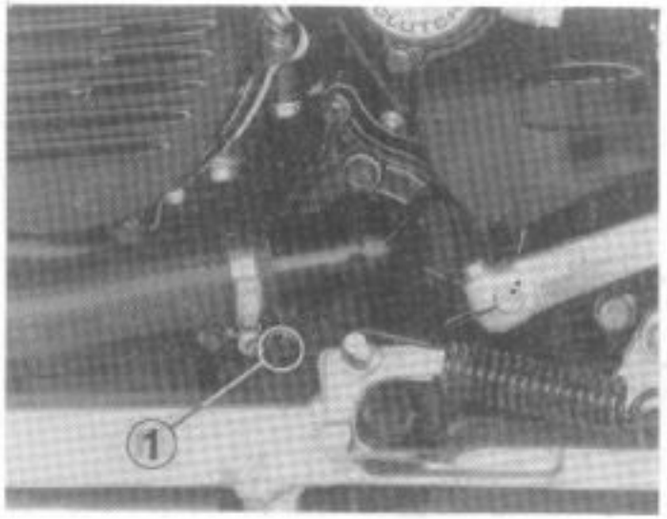


(1) Radiator cap

Coolant Replacement

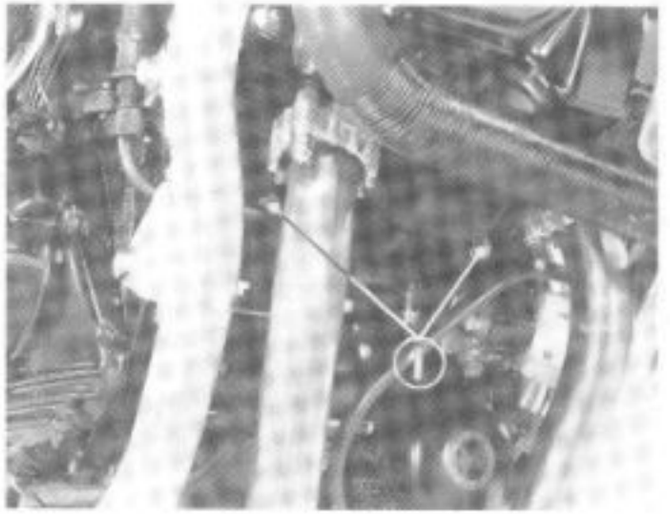
CAUTION:
The engine must be cool before servicing the cooling system, or severe scalding may result.

Remove the radiator cap cover.
Remove the radiator cap.



(1) Drain plug

Drain the coolant from the radiator by removing the drain plug at the water pump.



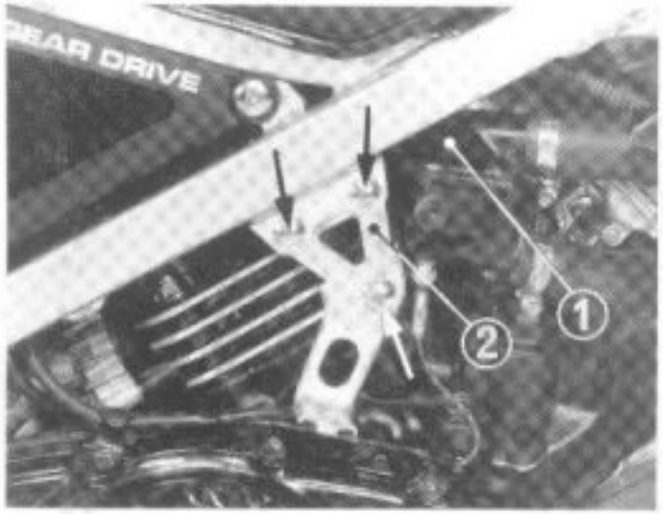
(1) Cylinder drain plugs

Drain the coolant from the engine by removing the drain bolts at the cylinder heads.
Reinstall the drain plug and bolts.
Fill the system with a 50–50 mixture of distilled water and ethylene glycol.

(1) Radiator cap

Bleed air from the radiator.

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



(1) Thermostat housing cover
(2) Engine plate

Thermostat

Removal:
Remove the fairing.
Drain the coolant.
Remove the engine plate.
Remove the thermostat housing cover by removing two bolts.
Remove the thermostat from the housing.

(1) Thermostat
(2) Thermometer

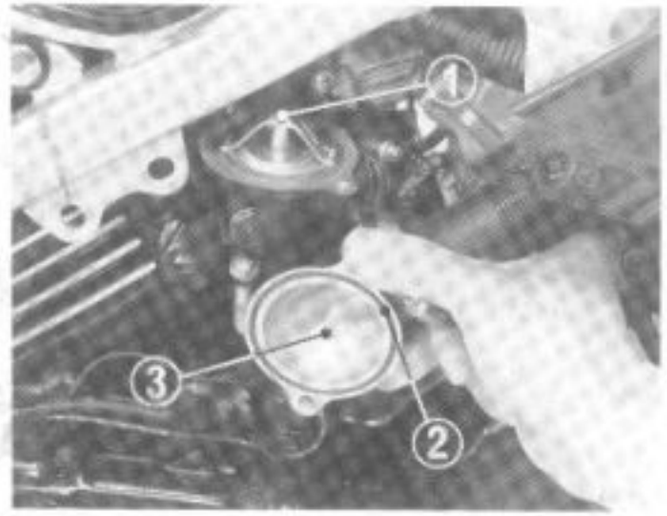
Inspection:
Inspect thermostat visually for damage. Suspend the thermostat in heated water to check its operation.

NOTE:
If the thermostat or thermometer touches the pan, you'll get a false reading.

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

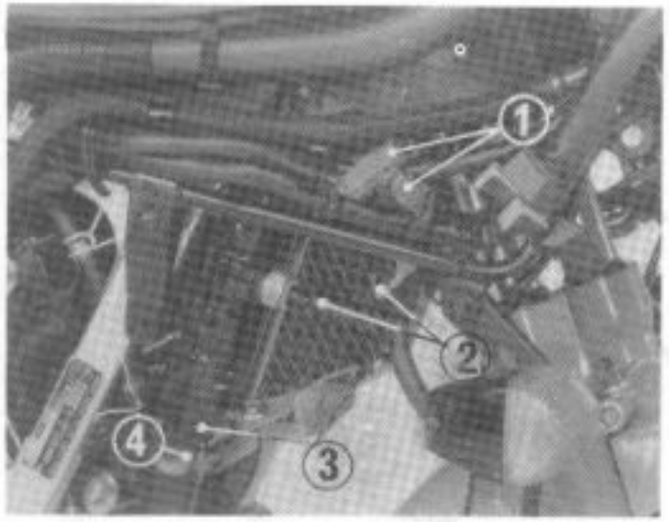
Technical Data:

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



(1) Thermostat
(2) O-ring
(3) Thermostat housing cover

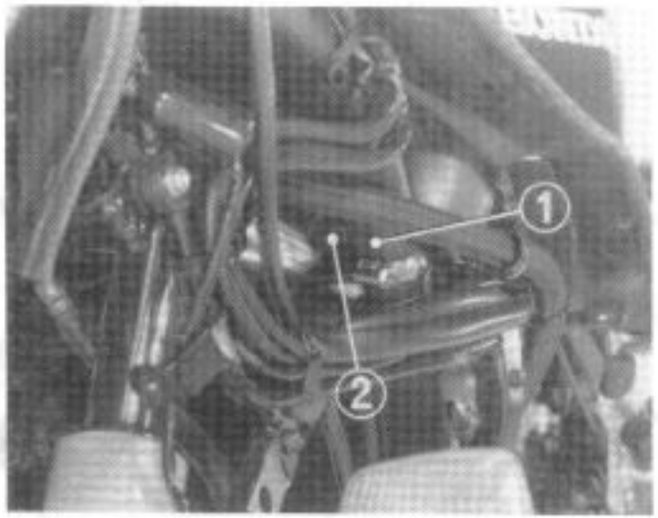
Installation:
Install the thermostat into the housing.
Install the thermostat housing cover with a new O-ring.
Install the engine plate and the fairing.
Fill the cooling system (page 54).



(1) Fan motor wire couplers
(2) Thermostatic switch connectors
(3) Radiator bolt
(4) Radiator lower hose

Lower Radiator

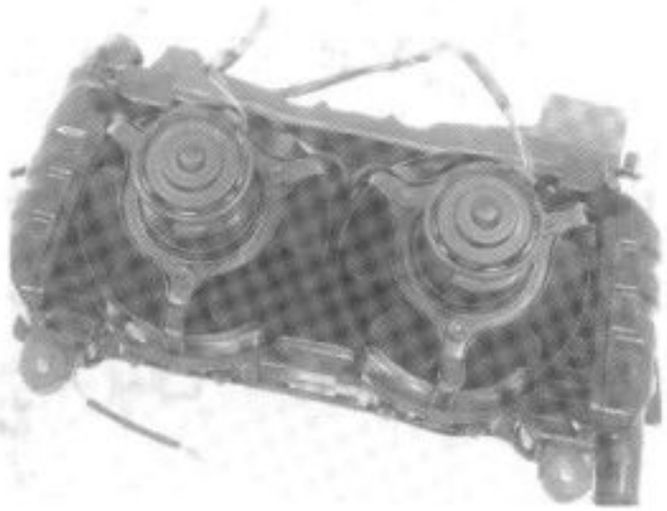
Remove the fairing, seat, fuel tank and air cleaner case.
Drain the coolant (page 53).
Disconnect the connectors from the thermostatic switch.
Disconnect the fan motor wire couplers and free the wires from the wire clamps.
Disconnect the radiator lower hose from the radiator.



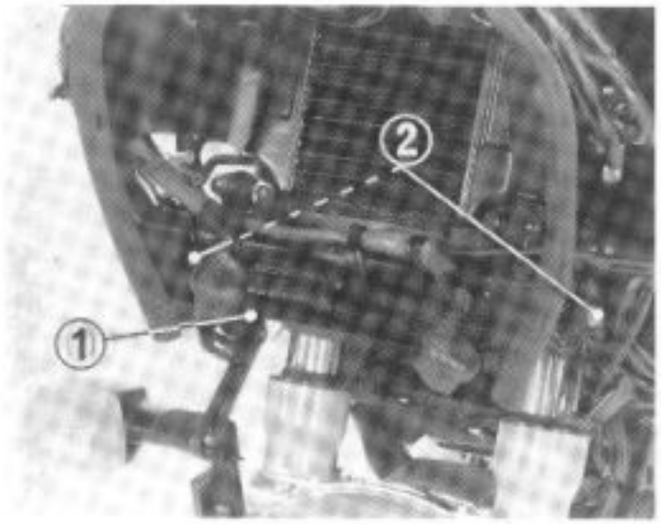
(1) Radiator upper hose
(2) Bolt

Remove the radiator bolts.
Disconnect the radiator upper hose from the radiator.
Remove the bolts.
Remove the radiator and fan motor.

CAUTION:
Be careful not to damage the radiator fins during removal.



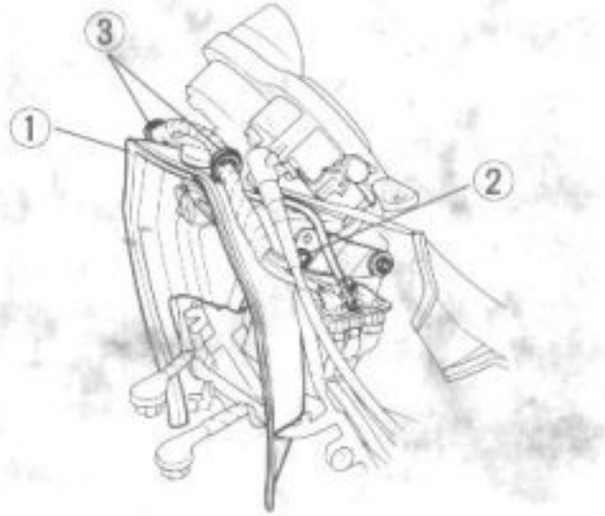
Remove the fan motors from the radiator.
Remove the cooling fan from the motor.
Use a 12V battery to energize the motor and check its operation. The motor should run freely.
Assembly and installations in reverse order of removal.
After installation, fill the cooling system (page 54).



(1) Air guide plate
(2) Oil cooler mounting bolt

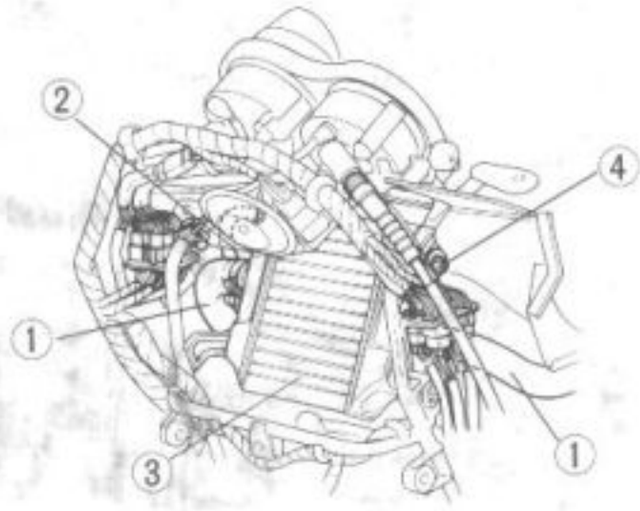
Upper Radiator

Remove the fairing and headlight.
Drain the coolant (page 53–54).
Remove the oil cooler mounting bolts and free the oil hoses from the hose clamps (page 58).
Move the oil cooler out of the fairing stay without disconnect the oil hoses.
Remove the air guide plate.
Remove the headlight bracket.
(SW, IT types).



(1) Radiator shroud
(2) 6 mm bolt
(3) Clamps

Disconnect the horn wires, and wire harness clamps from the shroud.
Remove the radiator shroud by removing the two 6 mm bolts.

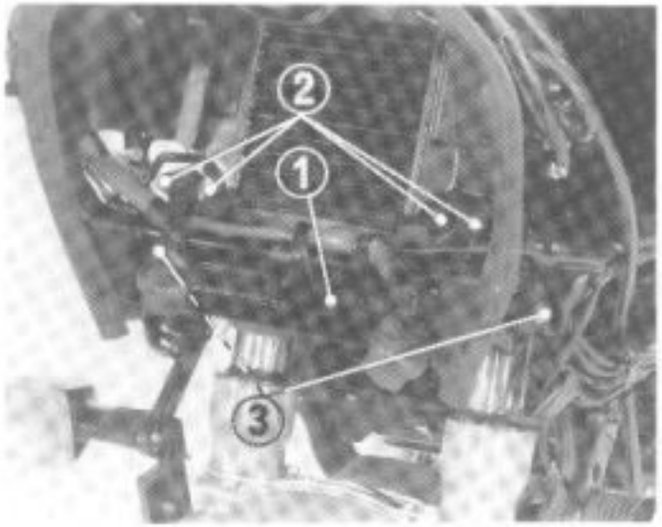


(1) Water hoses
(2) Siphon tube
(3) Upper radiator
(4) Radiator mounting bolt

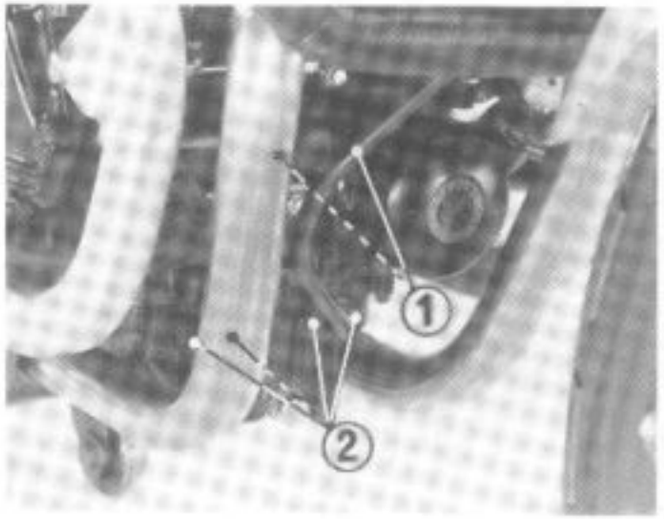
Remove the water hoses from the radiator.
Disconnect the siphon tube from the radiator.
Remove the radiator.

CAUTION:
Be careful not to damage the radiator fins during removal.

Assemble and install the radiators in the reverse order of removal.
After installation, fill the cooling system (page 54).



(1) Oil cooler
(2) Bolt
(3) Oil cooler mounting bolt



(1) Oil pipe
(2) Bolt

(1) Bolt
(2) Oil cooler mounting bolt
(3) O-rings

Oil Cooler

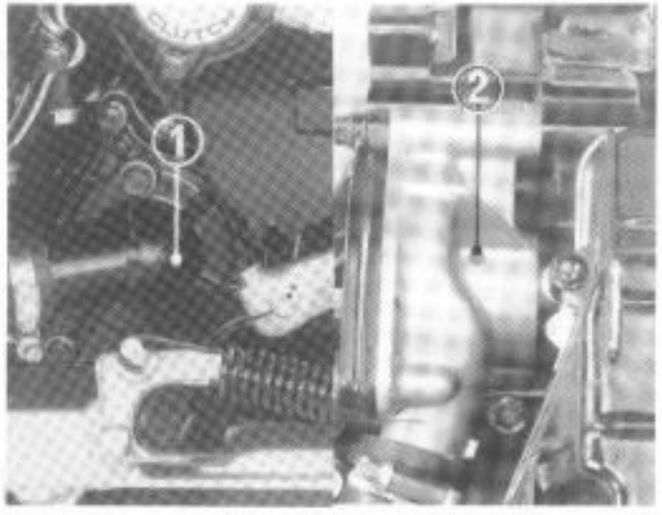
Removal:

Drain the engine oil.
Remove the fairing (page 139).
Remove the headlight.
Remove the oil cooler mounting bolts and bolts.

Remove the oil pipe bolts and disconnect the oil pipes from the oil pan.
Check that air passage clogging or damage for the oil cooler core.
For the oil pump inspection, refer to page 77.

Installation:

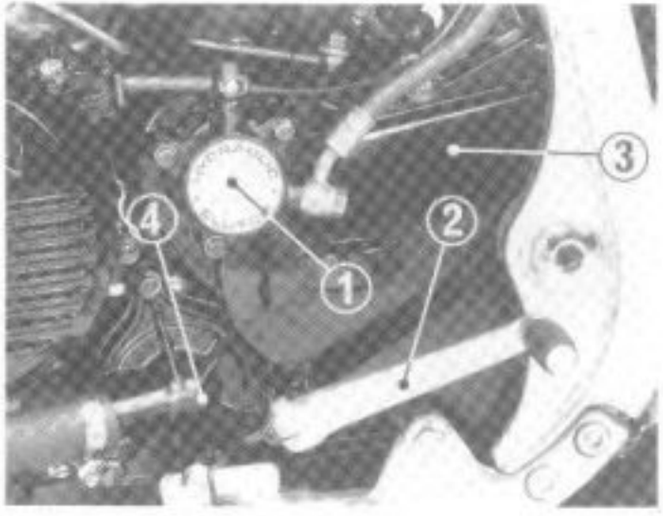
Replace the O-rings on the hose ends with new ones.
Connect the oil hoses and oil pipes and tighten the bolts securely.
Fill the engine oil (page 23).
Start the engine and check for oil leaks.
Install the headlight and the fairing (page 141).



(1) Water pump
(2) Telltale hole (bottom of the water pump body)

Water Pump

Mechanical seal inspection:
Inspect the telltale hole for signs of mechanical seal coolant leakage.
Replace the water pump as an assembly if the mechanical seal is leaking.

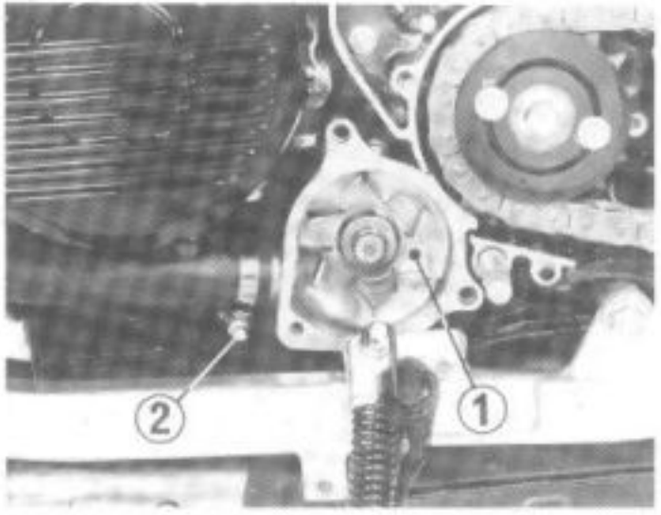


(1) Clutch slave cylinder
(2) Gearshift pedal
(3) Drive sprocket cover
(4) Water pump cover

Removal:
Drain the coolant (pages 53–54).
Remove the clutch slave cylinder.

NOTE:
Squeeze the clutch lever once and keep it in this position by tying it to the handlebar grip to prevent the slave cylinder piston from over stroke caused by fluid gravity.

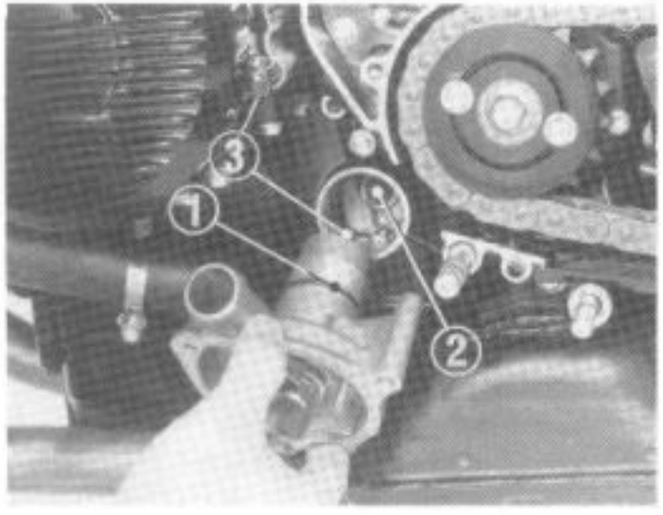
Remove the gearshift pedal from the shift shaft.
Remove the drive sprocket cover.



(1) Water pump
(2) Water hose bands

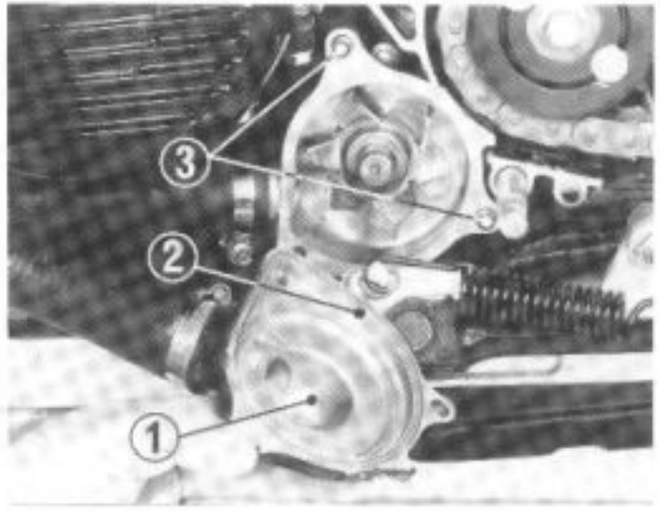
Remove the water pump cover bolt and cover.

Pull off the water pump from the crankcase.
Remove the water hose from the water pump.
Replace the water pump as an assembly if necessary.



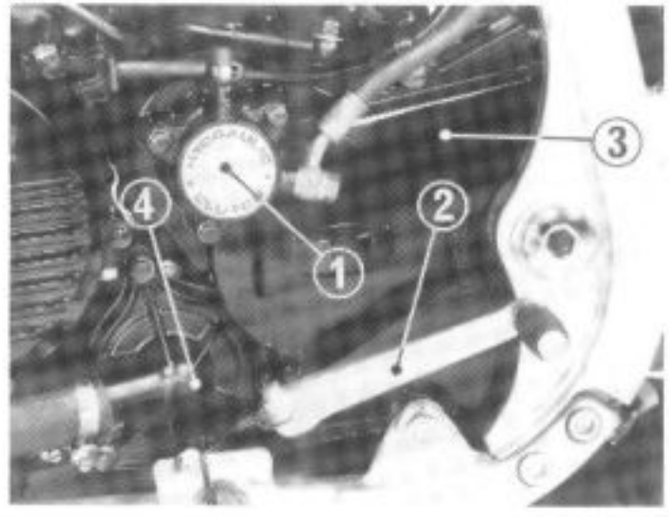
(1) O-ring
(2) Drive shaft
(3) Pump shaft

Installation:
Apply a coat of clean engine oil to a new O-ring and install it in the water pump groove.
Align the water pump shaft groove with the drive shaft and insert the water pump in the crankcase.
Install the water hose and torque the hose band.



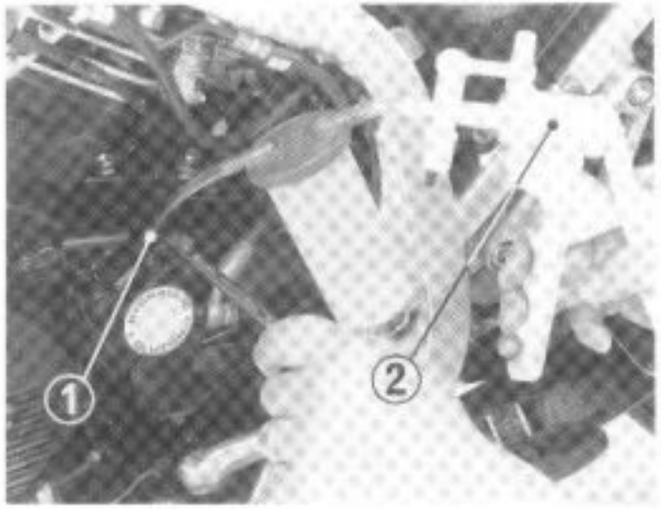
(1) Water pump cover
(2) Seal ring
(3) Dowel pin

Install the dowel pins and install a new seal ring in the groove of the water pump cover.

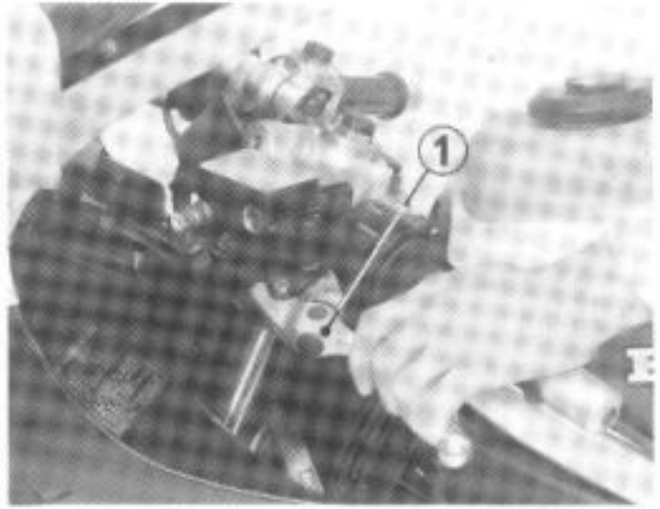


(1) Clutch slave cylinder
(2) Gearshift pedal
(3) Drive sprocket cover
(4) Water pump cover

Install the water pump cover and torque the bolts.
Install the drive sprocket cover, gearshift pedal and clutch slave cylinder.
Fill the cooling system (page 54).



(1) Bleed valve (2) Brake breeder (Commercially available)



(1) Clutch lever

Clutch Fluid Replacement

Draining:

CAUTION:

- *Use only DOT4 brake fluid from a sealed container.*
- *Do not mix different types of fluid since they may not be compatible.*
- *Avoid spilling fluid on painted surfaces. Place a rag over the fuel tank and fairing whenever the system is serviced.*

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

Filling:

Connect the Brake Bleeder to the bleeder valve.
Pump the brake bleeder and loosen the bleeder valve. Add fluid when the fluid level in the master cylinder reservoir is low.
Repeat above procedures until air bubbles do not appear in the bleed hose.

NOTE:
If air is entering the bleeder from around the bleeder valve threads, seal the threads with teflon tape.

If a Brake Bleeder not available, fill the system as follows:
Close the bleed valve, fill the reservoir, and install the diaphragm.
Pump up the system pressure with the lever until there are no air bubbles in the fluid flowing out of the reservoir small hole and lever resistance is felt. Then bleed the system.

Air bleeding:

NOTE:
Check the fluid level often while bleeding the clutch to prevent air from being pumped into the system.

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

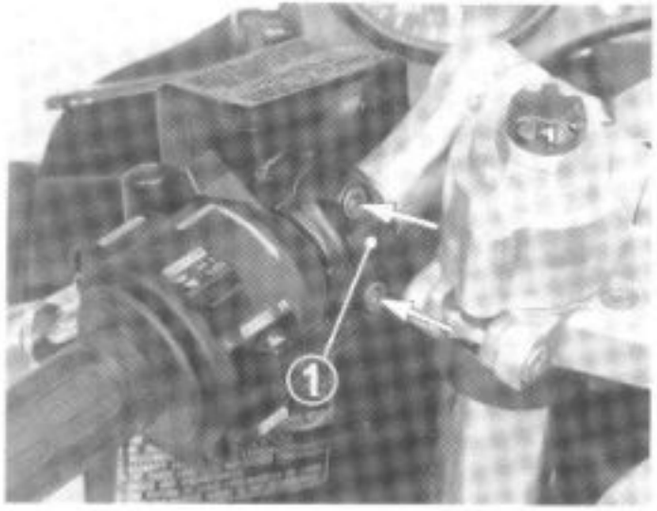
NOTE:
Do not release the clutch lever until the bleed valve has been closed again.

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

Repeat the above steps until bubbles cease to appear in the fluid at the end of the hose.
Tighten the bleed valve.

TORQUE:
4–7 N·m (40–70 kg-cm, 35–61 in-lb)

Fill the fluid reservoir to the upper level.



(1) Master cylinder holder

Clutch Master Cylinder

Disassembly:

Drain clutch fluid from the hydraulic system.

Remove the clutch lever.

Disconnect the clutch switch wires and remove the clutch hose.

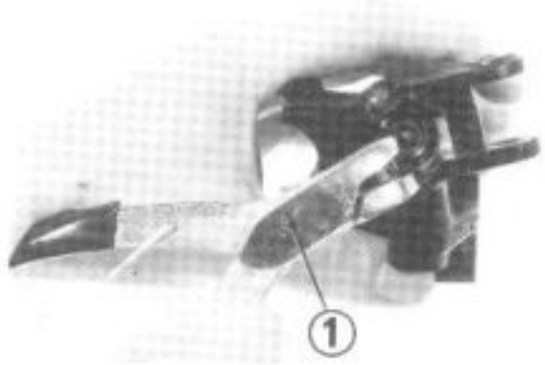
CAUTION:

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

NOTE:

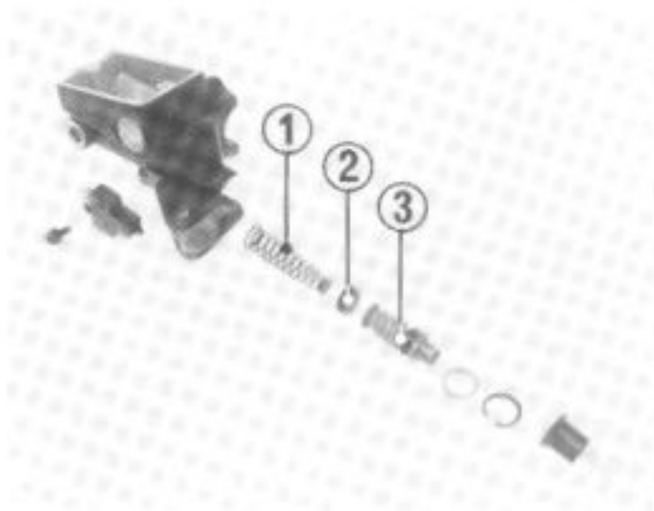
When removing the oil bolt, cover the end of the hose to prevent contamination and secure the hose.

Remove the master cylinder holder and master cylinder.



(1) Snap ring pliers (07914–3230001)

Remove the push rod boot and snap ring from the master cylinder body.



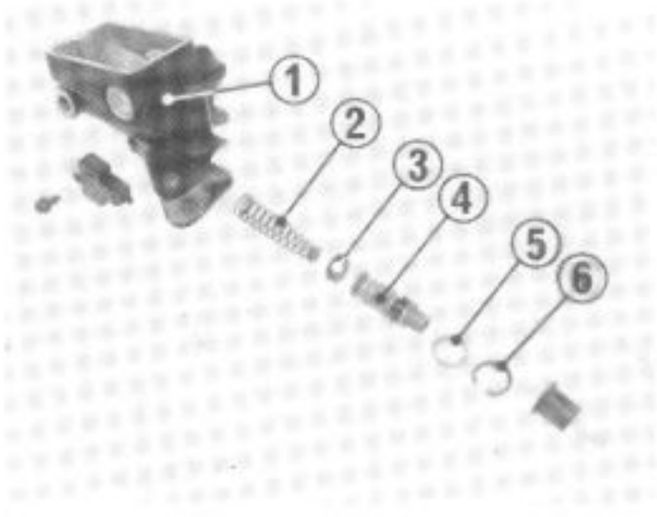
(1) Spring
(2) Primary cup
(3) Piston and secondary cup

Remove the following:

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

Master cylinder I.D. inspection:
Check the master cylinder for scores, scratches or nicks.
Measure the master cylinder I.D. (page 213).

Master piston O.D. inspection:
Check the primary and secondary cups for damage or deterioration.
Measure the master piston O.D. (page 213).



(1) Master cylinder
(2) Spring
(3) Primary cup
(4) Piston and secondary cup
(5) Washer
(6) Snap ring

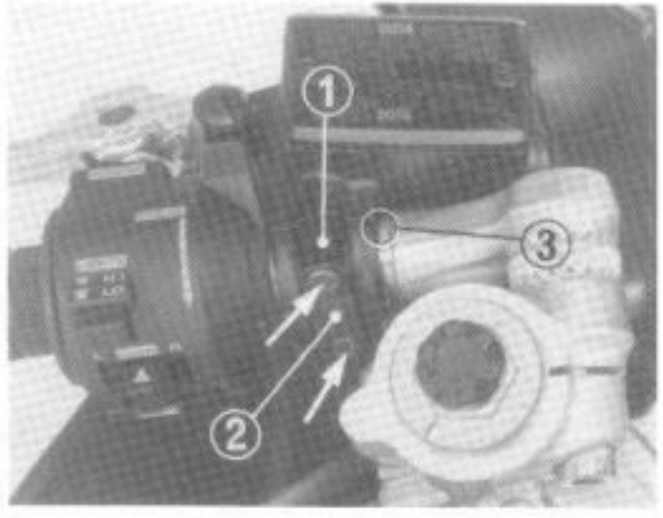
Assembly:

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

Dip the piston cups in brake fluid before assembly.
Install the spring, primary cup and piston.

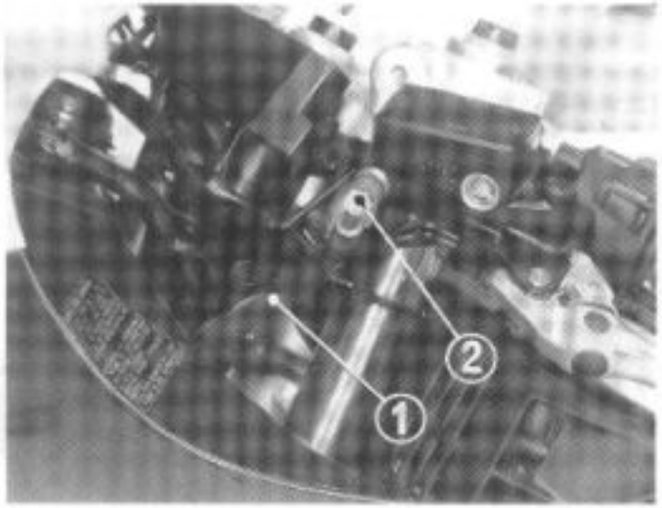
CAUTION:
When installing the cups, do not allow the lips to turn inside out.

Install the snap ring making sure it is seated firmly in the groove. Then install the boot and push rod. Install the clutch switch, if it was removed.



(1) Master cylinder holder
(2) "UP" mark
(3) Punch mark

Place the master cylinder on the handlebar and install the holder with the "UP" mark facing up and the two mounting bolts.
Align the end of the holder with the handlebar punch mark.
Tighten the top bolt first, then the bottom bolt.

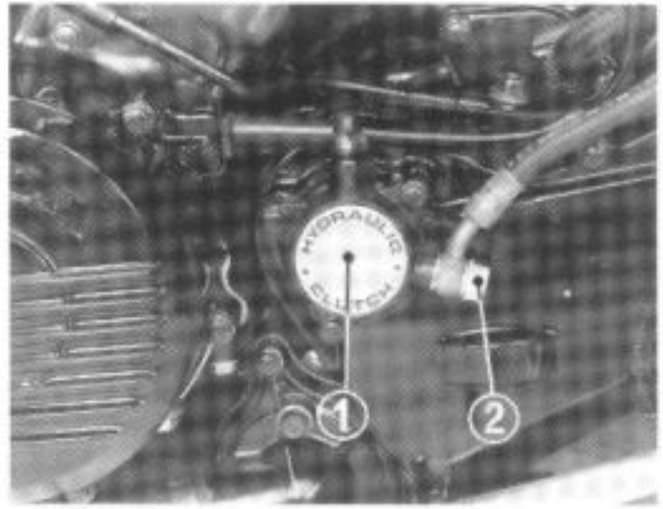


(1) Clutch hose
(2) Oil bolt

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

TORQUE: 25–35 N·m (2.5–3.5 kg-m, 18–25 ft-lb)

Install the push rod end piece into the clutch lever hole and install the clutch lever.
Connect the clutch switch wires to the switch terminals.
Fill the reservoir and bleed the clutch system (page 61).



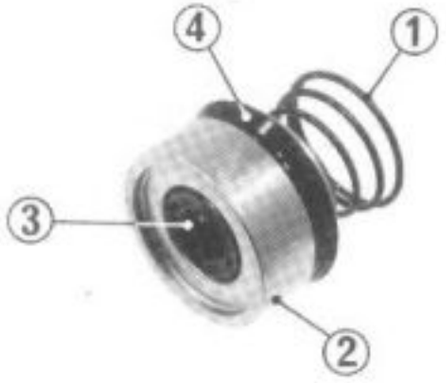
(1) Clutch slave cylinder
(2) Oil bolt

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

NOTE:
Avoid spilling clutch fluid on painted surfaces.

Remove the slave cylinder.

Remove the piston from the cylinder. If piston removal is hard, place a shop towel over the piston to cushion the piston when it is expelled, and position the cylinder with the piston down.
Apply compressed air to the fluid inlet to remove the piston. Use the air in short spurts.

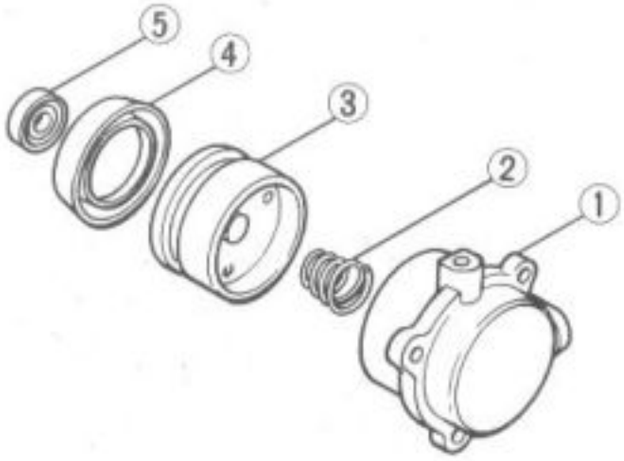


(1) Spring
(2) Piston
(3) Oil seal
(4) Piston seal

Remove the spring from the slave cylinder.
Check the piston spring for weakness or damage.
Inspect the oil and piston seals for damage or deterioration.
Remove the oil and piston seals.
Clean the piston groove with clutch fluid.

Piston O.D. inspection:
Check the piston for scoring or scratches.
Measure the outside diameter of the piston with a micrometer (page 213).

Cylinder I.D. inspection:
Check the slave cylinder for scoring or scratches.
Measure the inside diameter of the cylinder bore (page 213).



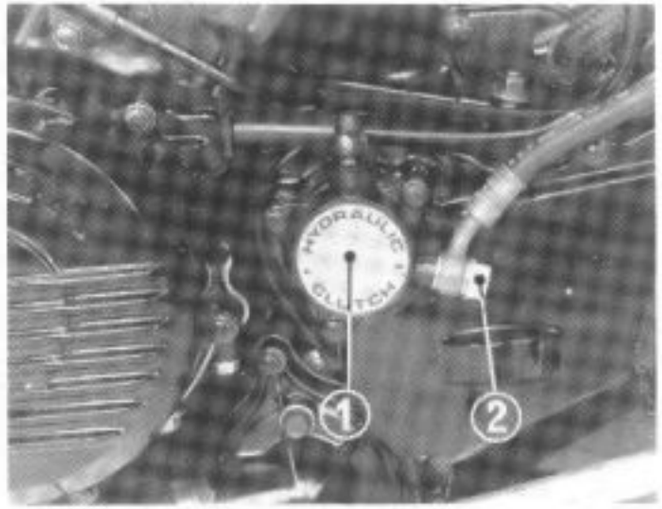
(1) Cylinder body
(2) Spring
(3) Piston
(4) Piston seal
(5) Oil seal

Assembly:

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

Lubricate the piston and piston seal with a brake fluid before assembly.

Be certain the piston seal is seated in the piston groove. Place the piston in the cylinder with the seal end facing out.



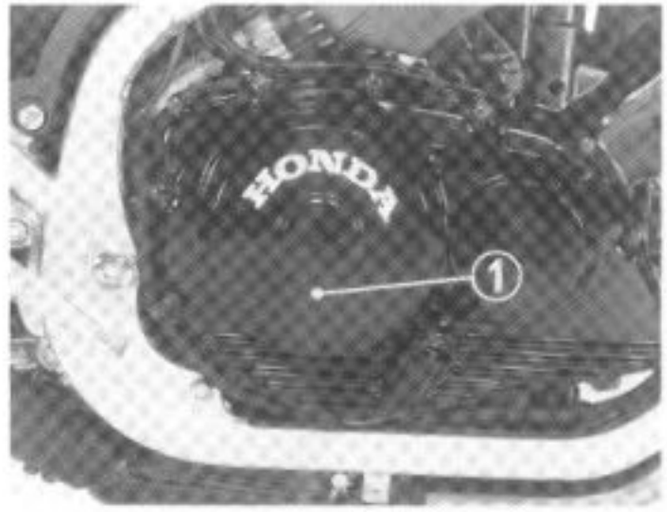
(1) Slave cylinder
(2) Oil bolt

Install the slave cylinder.

Connect the clutch hose with the oil bolt and the two sealing washers.

TORQUE: 25–35 N·m
(2.5–3.0 kg-m, 18–25 ft-lb)

Fill the clutch fluid reservoir and bleed the clutch system (page 61).



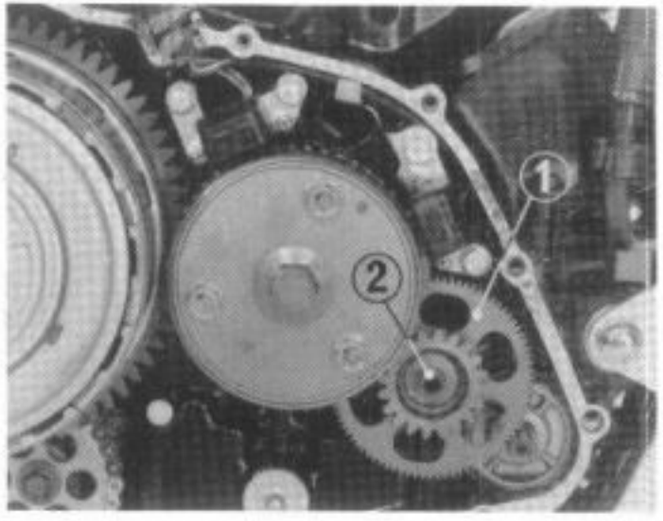
(1) Right crankcase cover

Clutch

Right crankcase cover removal:

Drain the engine oil.

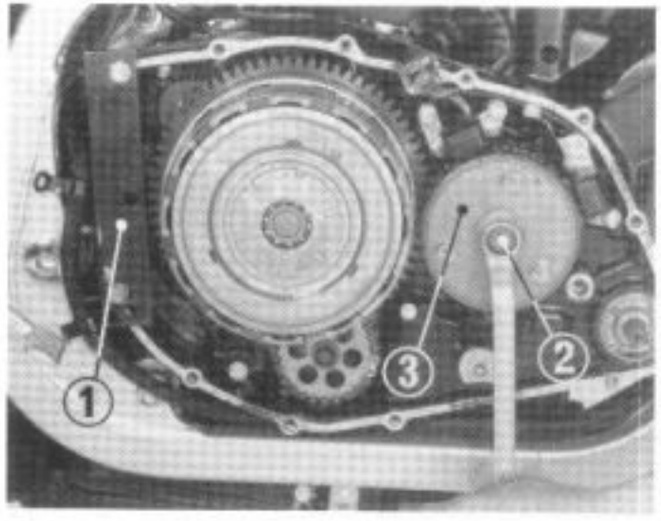
Remove the right crankcase cover, gasket and dowel pins.



(1) Starter idler gear
(2) Shaft

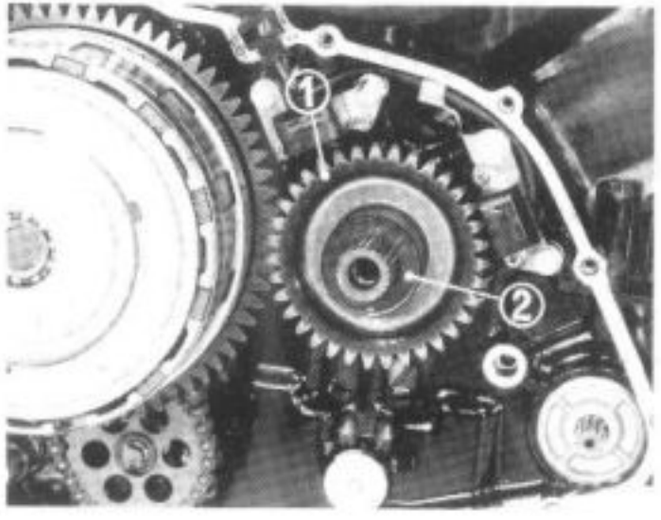
Starter clutch disassembly:

Remove the shaft and starter idle gear. Remove the idler gear by rotating the starter clutch clockwise with a wrench, or by rotating the idler gear clockwise to turn the starter motor shaft counterclockwise.



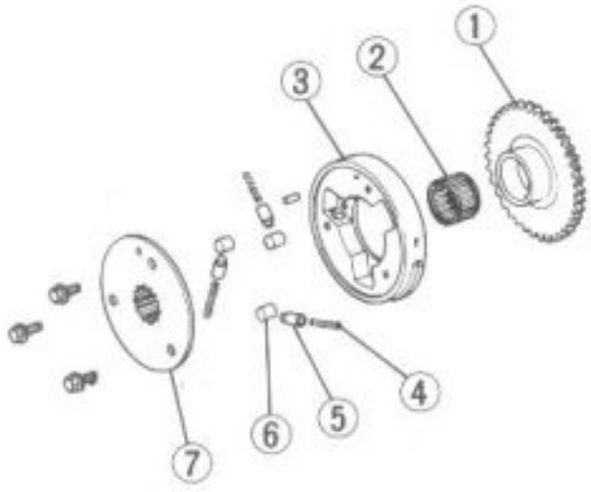
(1) Primary gear holder
07924–ME90000
(2) Primary gear bolt
(3) Starter clutch

Set up the special tool as shown.
Hold the primary drive gear with the primary gear holder.
Remove the starter clutch and primary gear holder.



(1) Primary drive gear
(2) Thrust washer

Remove the thrust washer.
Shift the primary driven sub gear with a screwdriver to take preload off the primary drive gear and remove the primary drive gear.



(1) Starter driven gear
(2) Needle bearing
(3) Clutch body
(4) Spring
(5) Plunger
(6) Roller
(7) Cover

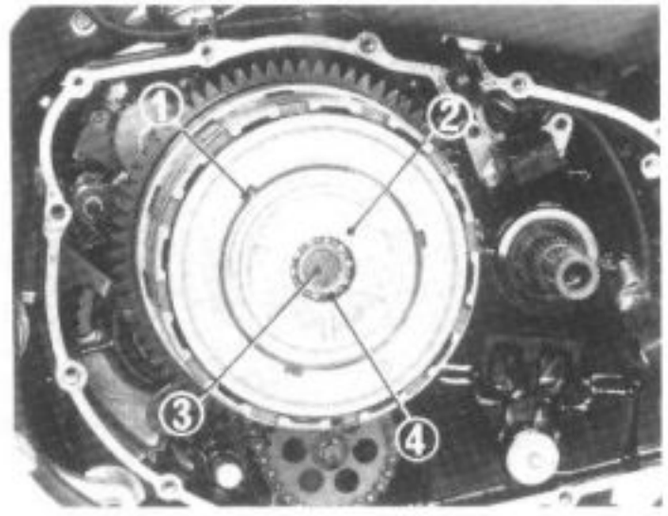
Remove the starter driven gear and needle bearing from the clutch body.

Starter clutch inspection:

Inspect the rollers for smooth operation.
Remove the starter clutch cover by removing the three bolts.
Remove the clutch rollers, plungers and springs.
Check the rollers, plungers and clutch body for excessive wear.

Starter driven gear inspection:

Inspect the driven gear for damage or excessive wear.
Measure the driven gear O.D. (page 213).



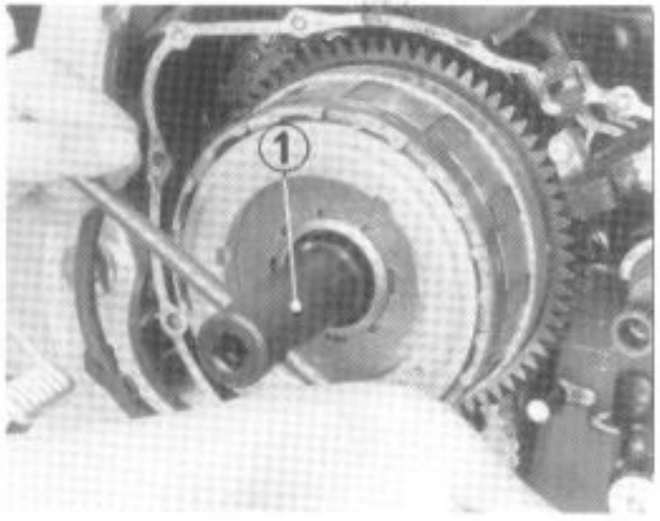
(1) Snap ring
(2) Lifter plate
(3) Lifter guide
(4) Bearing

Clutch Disassembly

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

NOTE:
Squeeze the clutch lever once and keep it in this position by tying it to the handlebar grip to prevent the slave cylinder piston from over stroke caused by fluid gravity.

Check the bearing for excessive play. Replace the bearing with new one if they are noisy or have excessive play.
Remove the clutch lifter push rod from the mainshaft.
Check the push rod for wear or bend.

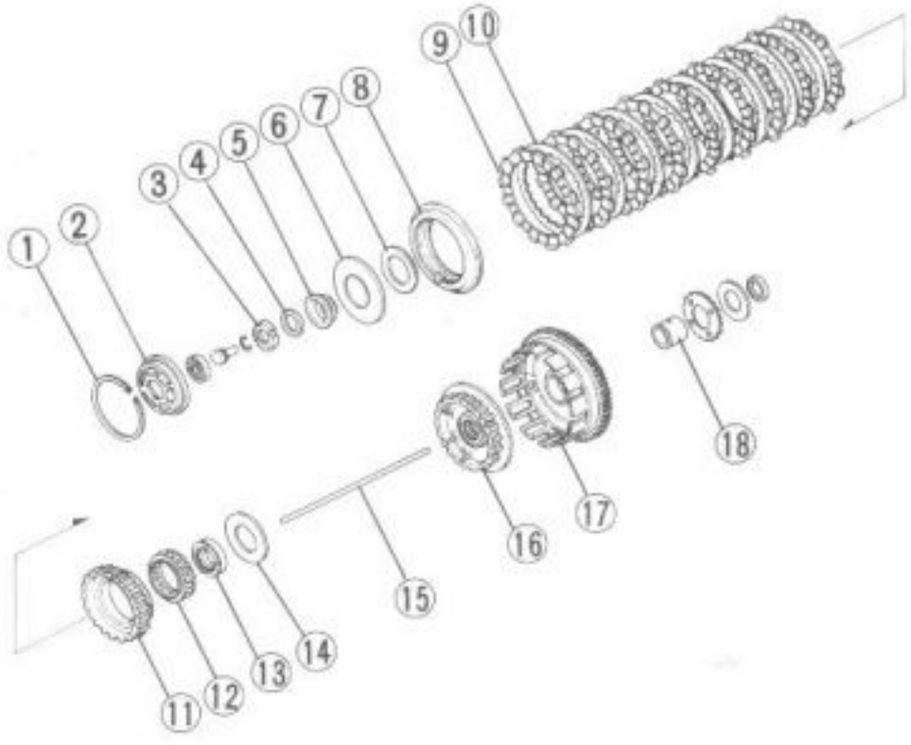


(1) Lock nut wrench (07916–4220000)

Shift the transmission into 5th gear and apply the rear brake.

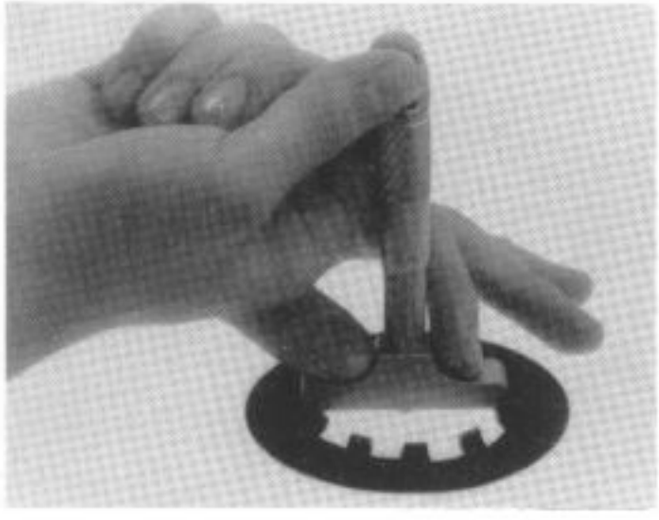
NOTE:
If the engine is not in the frame, shift the transmission into gear and use the universal holder (07725–0030000) to hold the drive sprocket.

Remove the lock nut and lock washer.



Remove the clutch spring set plate, clutch spring and washer.
Remove the clutch pressure plate.
Remove the clutch plates and discs.
Remove clutch center B and the one-way clutch as an assembly.
Remove clutch center A and washer.
Remove the clutch outer and outer guide.

(1) Snap ring
(2) Clutch lifter plate
(3) Lock nut
(4) Lock washer
(5) Clutch spring set plate
(6) Clutch spring
(7) Washer
(8) Pressure plate
(9) Clutch discs
(10) Clutch plates
(11) Clutch center B
(12) One way clutch
(13) One way clutch inner
(14) Washer
(15) Lifter push rod
(16) Clutch center A
(17) Clutch outer
(18) Clutch outer guide



Clutch Inspection

Clutch spring:
Measure the height of the clutch spring (page 213).
Replace the spring if it is shorter than the service limit.

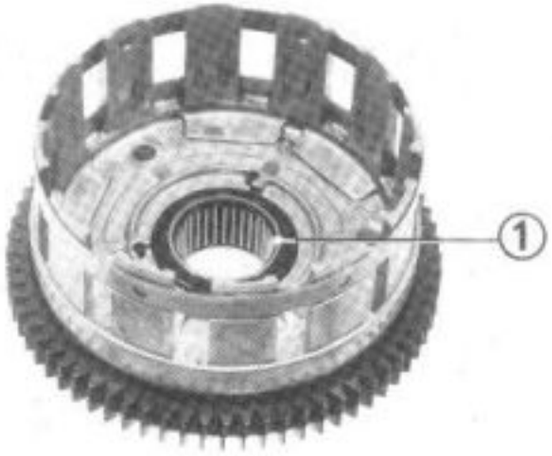
Clutch disc:
Replace the clutch discs if they show signs of scoring or discoloration.
Measure the thickness of each disc (page 213).
Replace any discs that are thinner than the service limit.

Clutch plate:
Check for plate warpage on a surface plate, using a feeler gauge (page 213).

One way clutch:
Inspect the one way clutch for smooth operation.
Check the rollers for excessive wear.

Measure the I.D. of clutch center B (page 213).

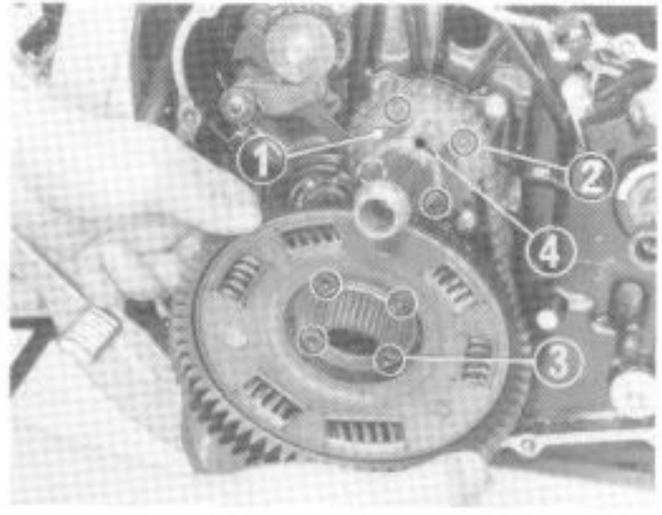
Measure the O.D. of the one way clutch inner (page 213).



(1) Needle bearing

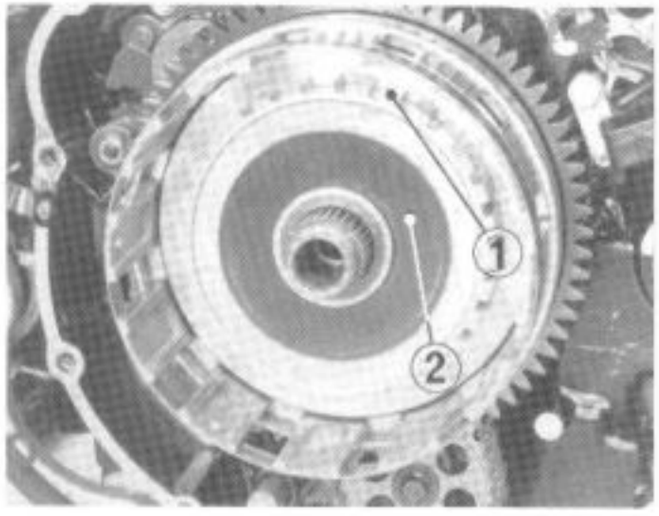
Clutch outer:
Check the slots in the clutch outer for nicks, cuts or indentations made by the friction discs.
Check the clutch outer needle bearing for damage or excessive play.

Clutch outer guide:
Measure the I.D. of the clutch outer guide (page 213).



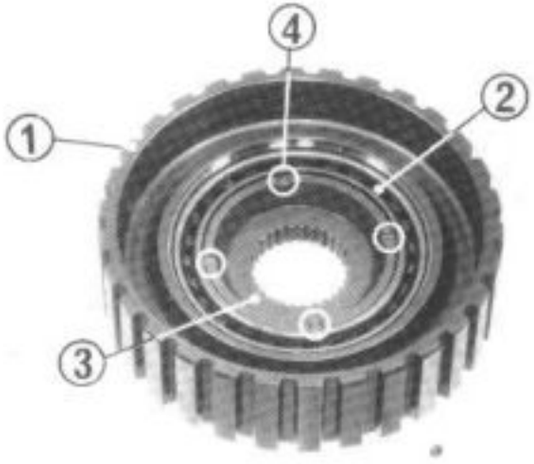
(1) Oil pump drive sprocket
(2) Pins
(3) Holes
(4) Clutch outer guide

Clutch assembly:
Install the clutch outer guide over the mainshaft.
Install the needle bearing into the clutch outer.
Align the holes in the clutch outer with the pins on the oil pump drive sprocket and install the clutch outer over the guide.



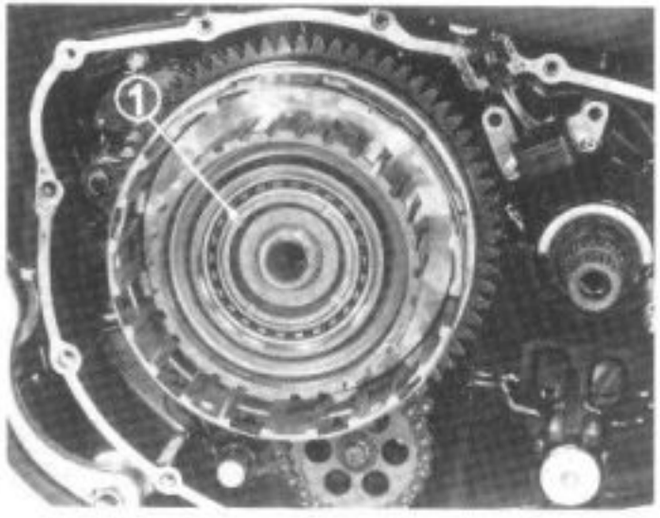
(1) Clutch center A
(2) Washer

Install clutch center A and the washer.



(1) Clutch center B
(2) One-way clutch
(3) Clutch inner
(4) Grooves

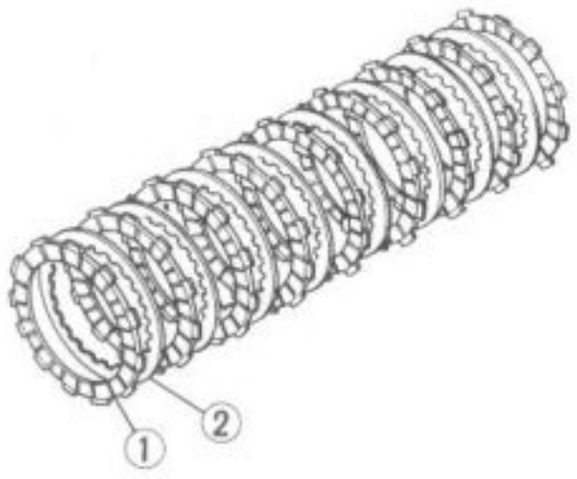
Place the clutch center B with the grooved side facing down.
Install the one-way clutch into the clutch center B with its flanged cage facing up.
Install the clutch inner into the one-way clutch with its grooves facing up. Turn it counterclockwise as you install it.



(1) One-way clutch/clutch center B assembly

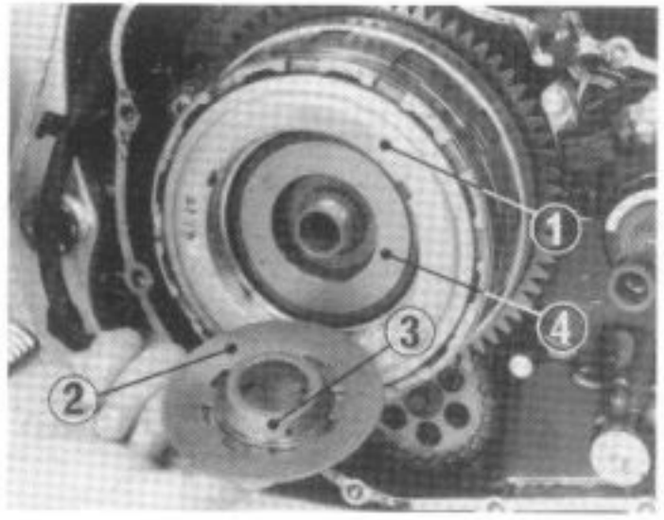
Install the one-way clutch/clutch center B assembly over the mainshaft.

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



(1) Clutch disc (9 pcs.)
(2) Clutch plate (8 pcs.)

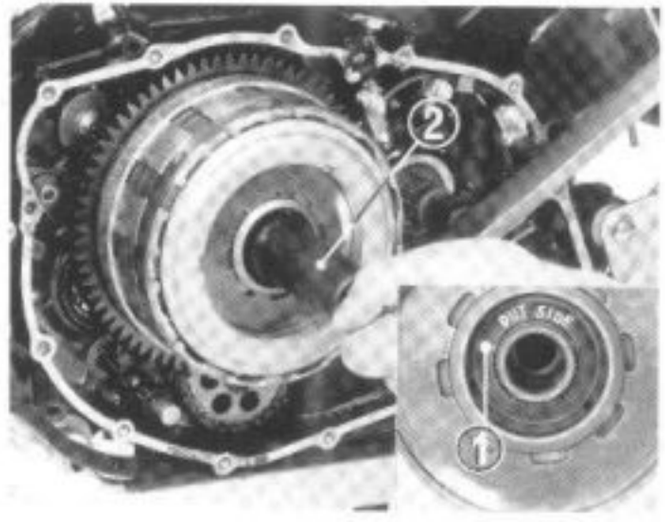
Coat the discs and plates with clean engine oil, and install them.



(1) Clutch pressure plate
(2) Clutch spring
(3) Clutch spring set plate
(4) Washer

Install the clutch pressure plate.
Install the clutch spring set plate, clutch spring, and washer.

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



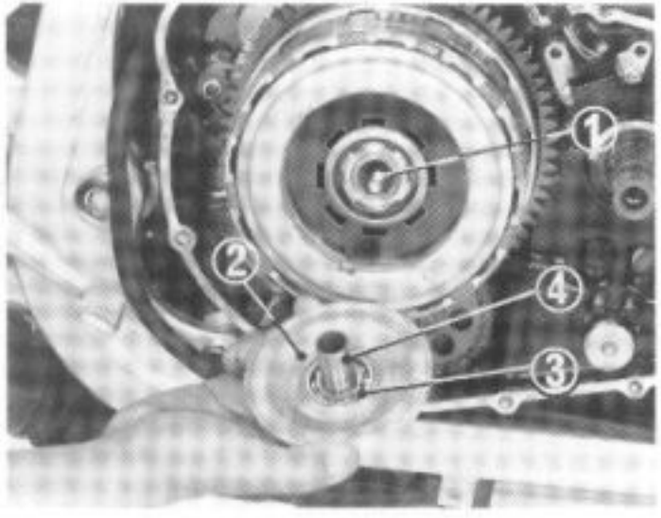
(1) Lock washer
(2) Lock nut wrench (07916–4220000)

Install the lock washer with the mark "OUTSIDE" facing out.
Shift the transmission into 5th gear.

NOTE:
If servicing the clutch with the engine out of the frame, shift the transmission into gear and hold the drive sprocket with the HOLDER 07725–0030000.

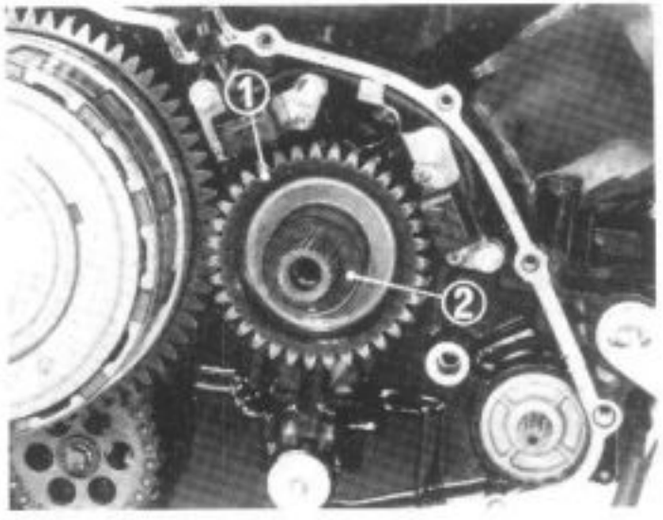
Install and tighten the clutch lock nut.

TORQUE: 80–90 N·m (8.0–9.0 kg-m, 58–65 ft-lb)



(1) Lifter push rod
(2) Lifter plate
(3) Bearing
(4) Lifter guide

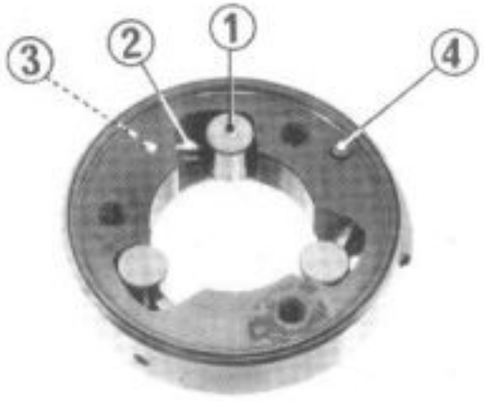
Install the clutch lifter push rod.
Install the clutch lifter plate, lifter guide and bearing.
Install the snap ring.



(1) Primary drive gear
(2) Thrust washer

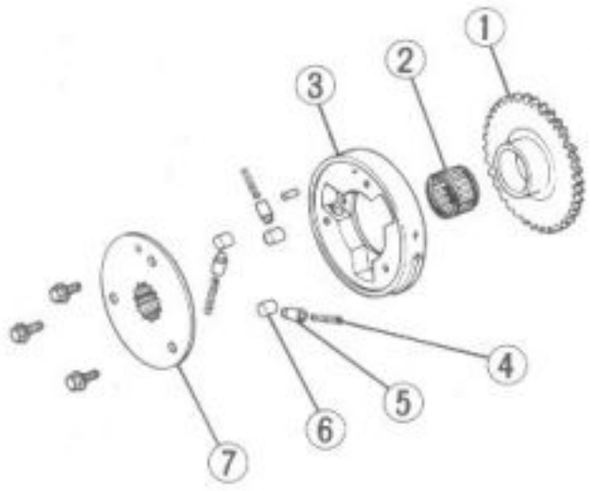
Starter Clutch Assembly

Install the primary drive gear onto the crankshaft while moving the primary driven gear with a screwdriver.
Install the thrust washer on the crankshaft.



(1) Roller
(2) Plunger
(3) Spring
(4) Dowel pin

Install the springs, plungers and rollers into the starter clutch.
Install the dowel pin.
Install the starter clutch cover aligning the dowel pin hole with the dowel pin.

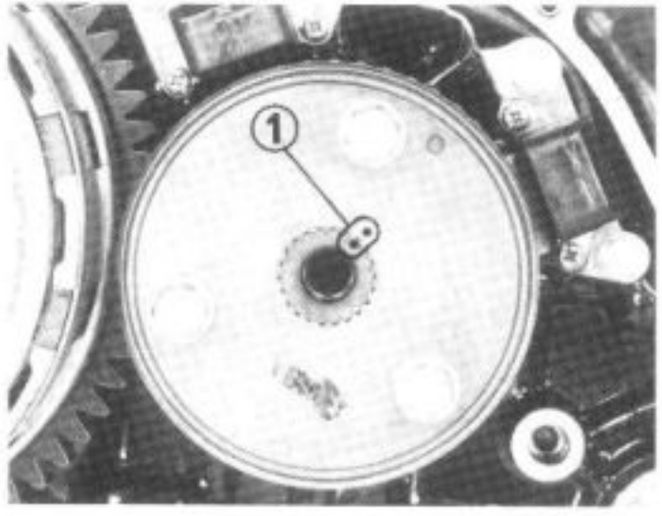


(1) Starter driven gear
(2) Needle bearing
(3) Clutch body
(4) Spring
(5) Plunger
(6) Roller
(7) Cover

Apply a locking agent to the cover bolt threads and tighten the bolts.

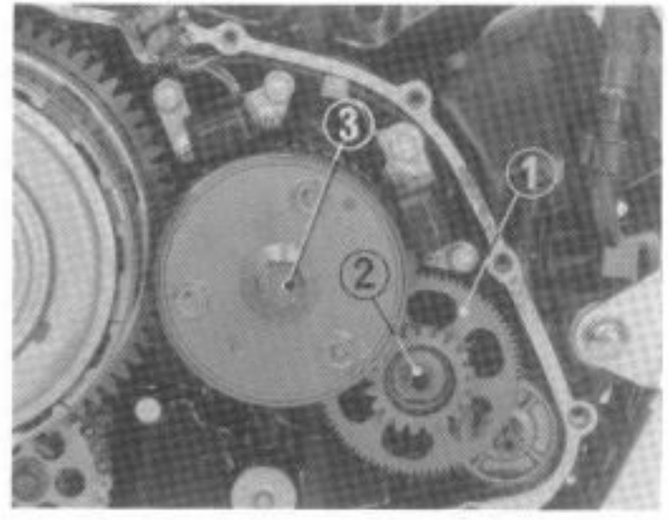
TORQUE: 26–30 N·m (2.6–3.0 kg-m, 19–22 ft-lb)

Install the needle bearing.
Install the starter driven gear by turning it clockwise.



(1) Punch marks

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

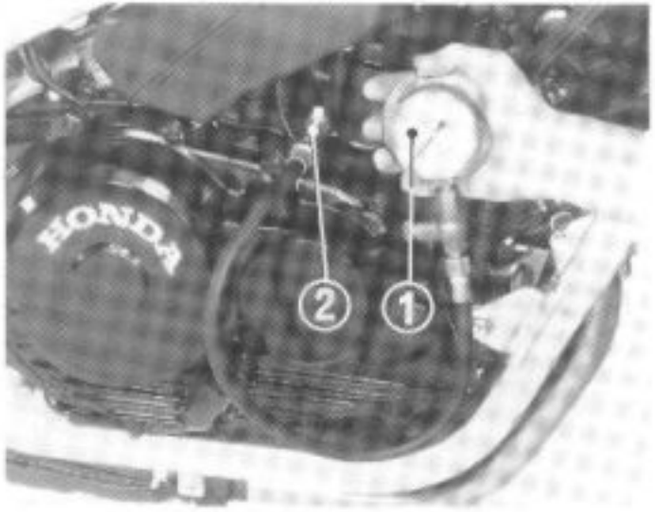


(1) Starter idler gear
(2) Shaft
(3) Primary gear bolt

Hold the primary drive gear with the primary gear holder (page 67) and tighten the primary gear bolt.

TORQUE: 85–105 N·m (8.5–10.5 kg-m, 61–76 ft-lb)

Install the starter idler gear and shaft.
Install the dowel pins and a new gasket on the crankcase and install the right crankcase cover.



(1) Oil pressure gauge (07506–3000000 or equivalent)
(2) Attachment (07510–4220100)

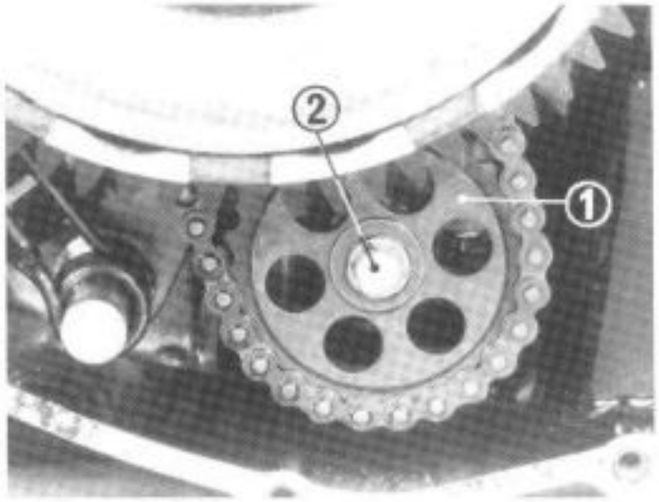
Oil Pressure Check

Check the oil level.
Warm the engine up to normal operating temperature (approximately 80°C/176°F).
Remove the oil pressure switch and connect an oil pressure gauge to the pressure switch hole.
Start the engine and check the oil pressure at 5,000 min^{-1} (rpm).

OIL PRESSURE: 470–610 kPa (4.7–6.1 kg/cm^2, 67–87 psi)

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

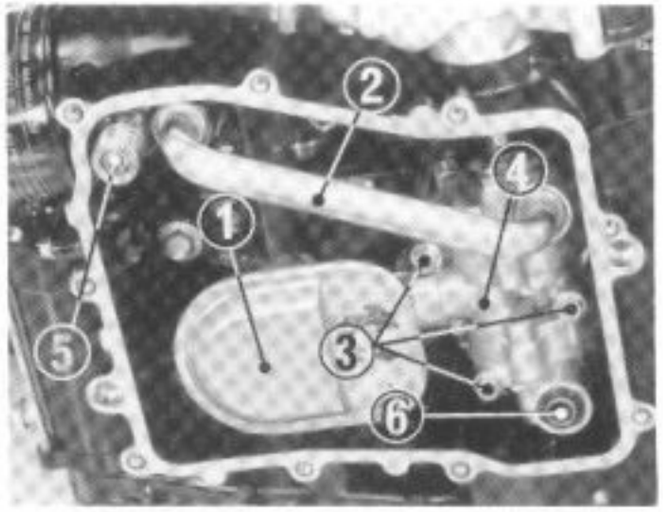
TORQUE: 10–14 N·m (1.0–1.4 kg-m, 7–10 ft-lb)



(1) Oil pump driven sprocket
(2) Bolt

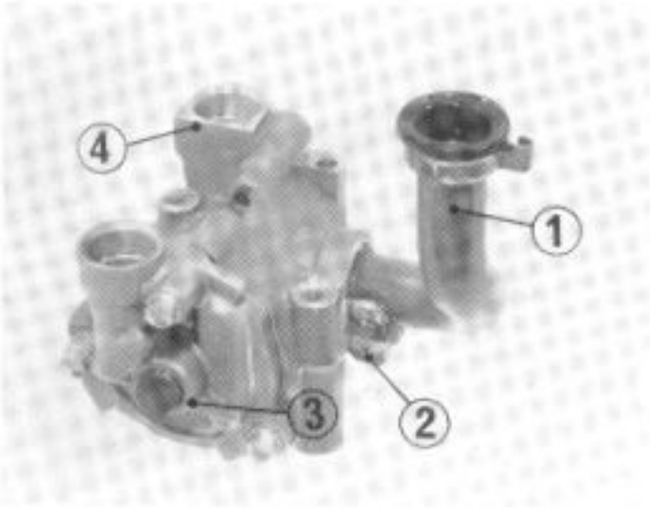
Oil Pump Disassembly

Drain the engine oil from the crankcase.
Remove the lower fairing, exhaust chamber and right crankcase cover.
Remove the oil pump driven sprocket by removing the bolt and washer.



(1) Oil strainer
(2) Oil pass pipe
(3) Bolts
(4) Oil pump
(5) Oil pressure relief valve
(6) Collar and O-ring

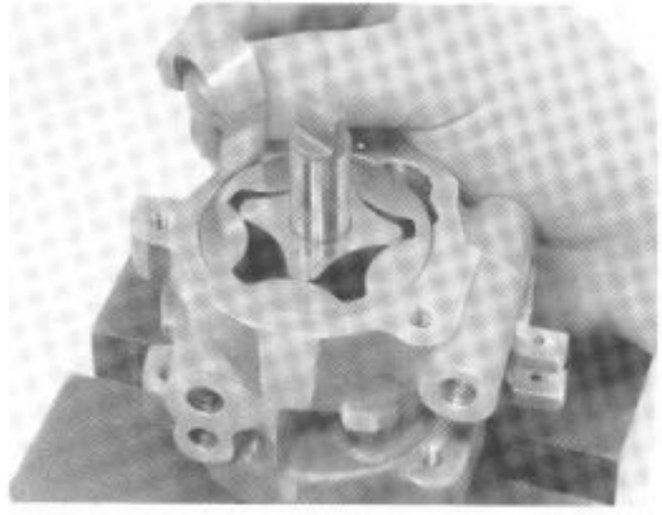
Remove the oil pan bolts and oil pan.
Remove the oil strainer and the oil pass pipe.
Make sure the O-rings are in good condition.
Remove the oil pump by removing the mounting bolts.
Remove the oil pressure relief valve, collar and O-ring if necessary.



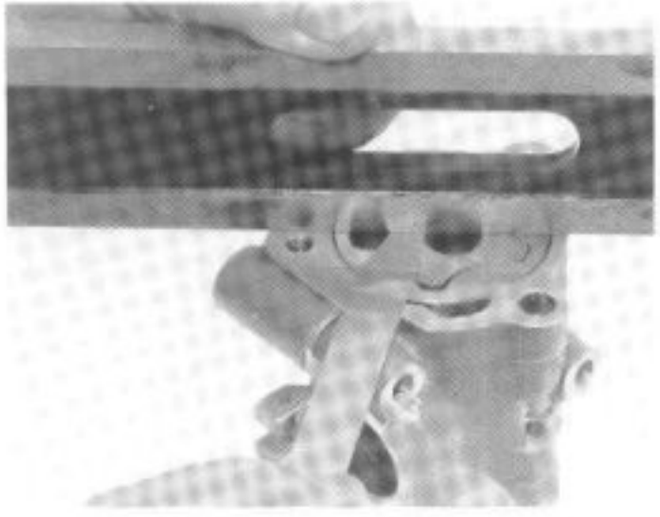
(1) Oil strainer tube
(2) Cotter pin
(3) Oil pump body cover
(4) Oil cooler pump cover

Straighten and remove the cotter pin holding the oil strainer tube.
Remove the oil strainer tube.
Remove the oil pump body cover and cooler pump cover.
Remove the dowel pins from the pump body.

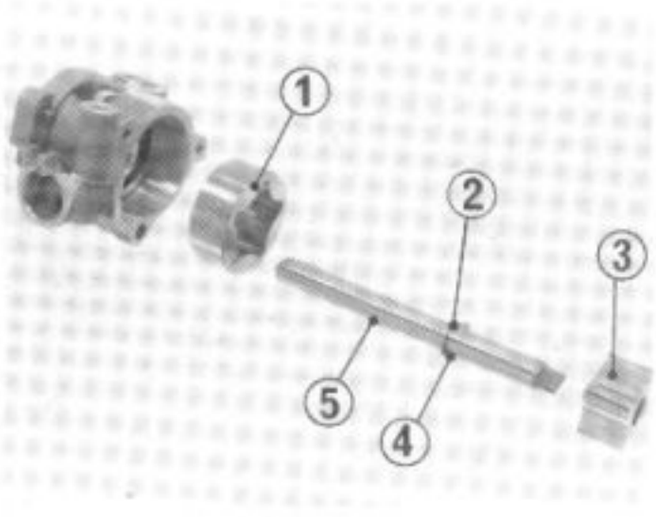
Oil pump inspection:
Measure the rotor tip clearance (page 213).



Measure the pump body clearance (page 214).



Remove the rotor shaft and measure the pump end clearance (page 214).



(1) Outer rotor
(2) Washer
(3) Inner rotor
(4) Drive pin
(5) Shaft

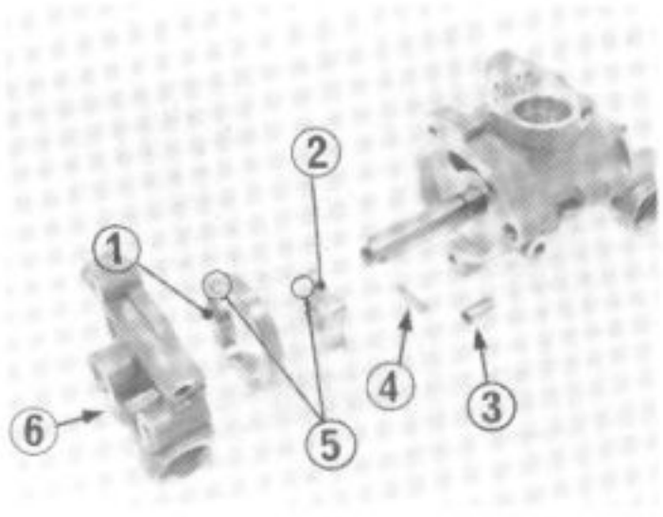
Oil Pump Assembly

Install the outer rotor into the body and insert the rotor shaft.

Insert the washer and drive pin into the rotor shaft.

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

Install the dowel pin and the pump body cover.



(1) Outer rotor
(2) Inner rotor
(3) Dowel pin
(4) Drive pin
(5) Punch mark
(6) Cooler pump cover

Insert the drive pin into the rotor shaft.

Install the outer rotor with the punch mark facing out.

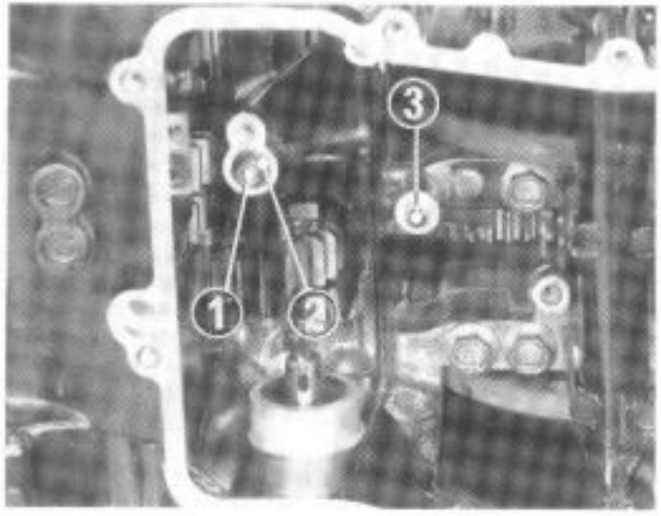
Install the inner rotor with the punch mark facing out, aligning the cutouts with the drive pin.

Install the dowel pin.

Install the oil cooler pump cover.

Make sure the oil strainer tube O-rings are in good condition.

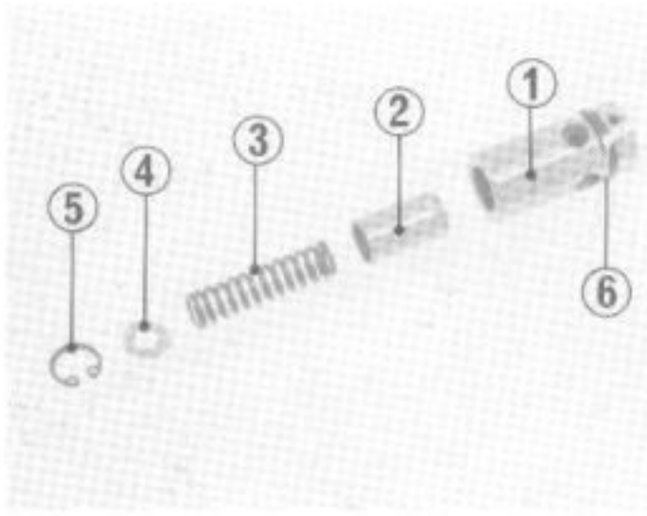
Install the oil strainer tube with a new cotter pin.



(1) Orifice
(2) O-ring
(3) Dowel pin

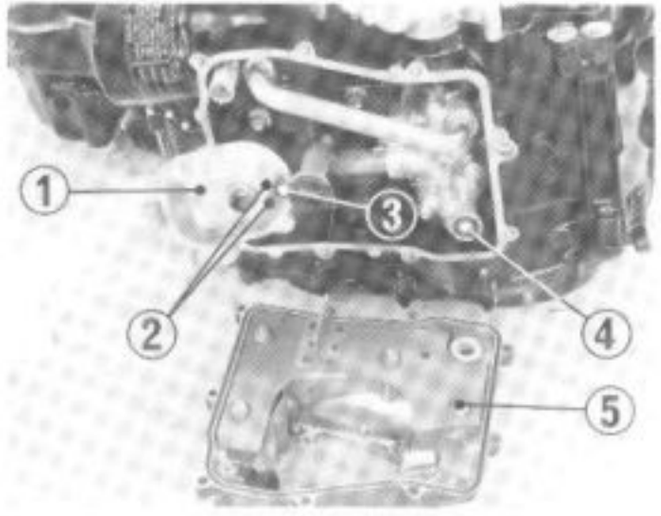
Install the orifice, O-ring and dowel pin.
Install the oil pump and oil pipe.

NOTE:
Make sure the O-rings are installed on the oil pipe.



(1) Relief valve body
(2) Piston
(3) Spring
(4) Spring seat
(5) Snap ring
(6) O-ring

Check the operation of the pressure relief valve.
Disassemble the relief valve by removing the snap ring.
Inspect the piston for wear, damage or sticking. Inspect the spring for weak or damage.
Make sure the O-ring is in good condition whenever the relief valve is removed.



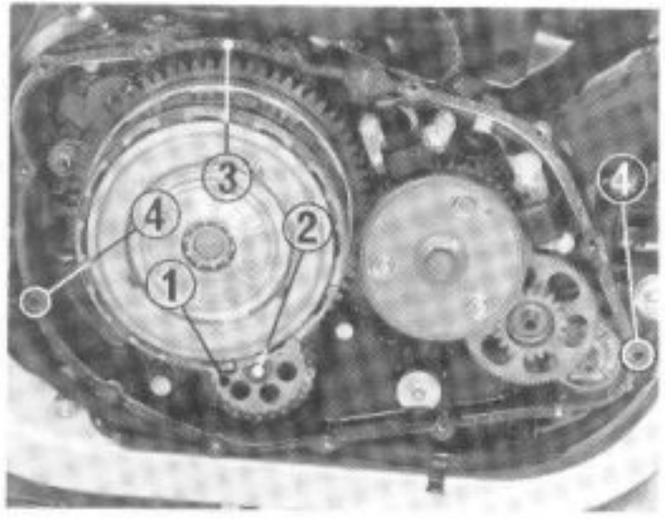
(1) Strainer
(2) Tabs
(3) Lug
(4) Collar and O-ring
(5) Oil pan

Install the collar and O-ring onto the oil pump.

Clean and install the oil strainer screen.

NOTE:
Align the tabs of the strainer body with lug on the strainer tube.

Install the oil pan.

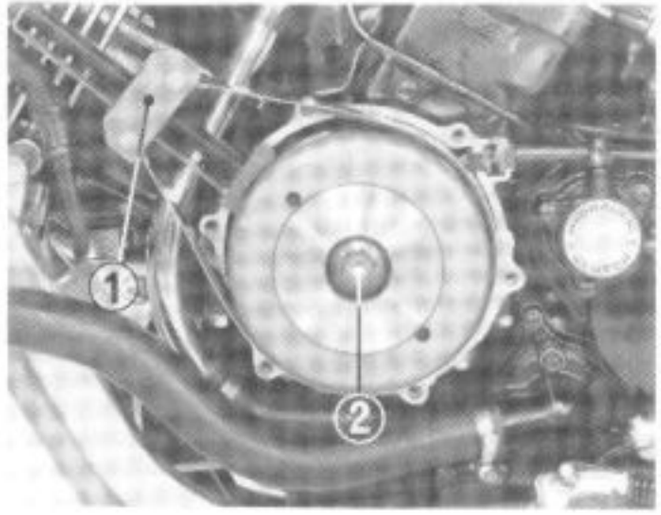


(1) Oil pump driven sprocket
(2) Bolt
(3) Gasket
(4) Dowel pin

Place the oil pump driven sprocket into the drive chain.

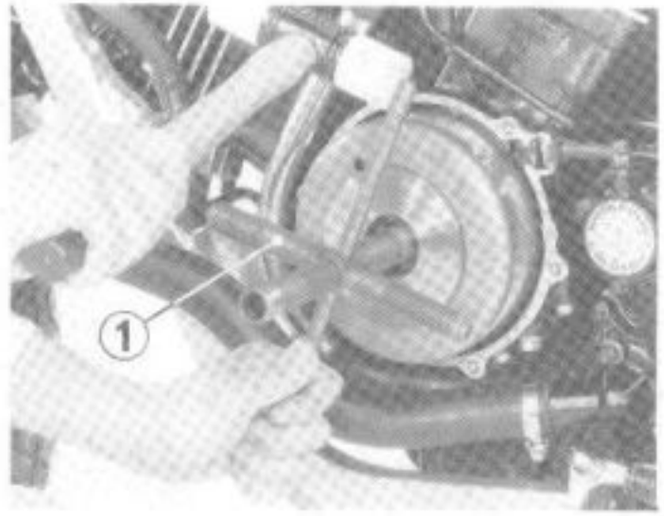
NOTE:
The "IN" mark on the driven sprocket should face the crankcase.

Install the washer and tighten the bolt.
Install the dowel pins and a new gasket.
Install the right crankcase cover.
Install the exhaust system.
Fill the engine with the recommended oil.



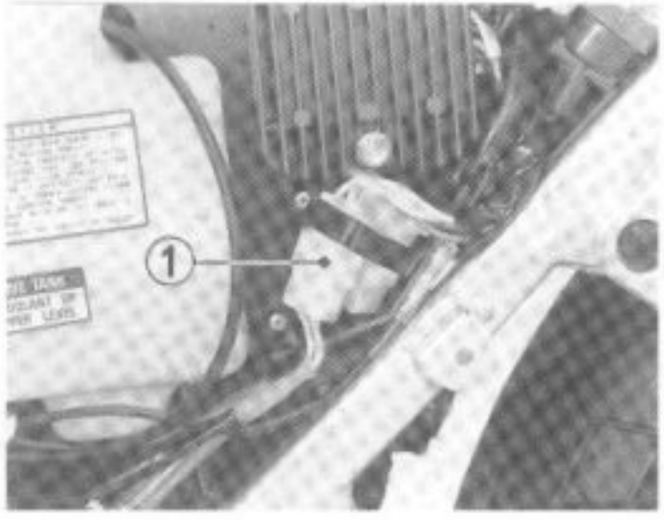
(1) Flywheel holder (07725–0040000)
(2) Rotor bolt

Flywheel Removal
Place a container under the alternator cover to catch engine oil.
Remove the alternator cover.
Hold the flywheel with the flywheel holder and remove the flywheel bolt.



(1) Rotor puller (07733–0020001)

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

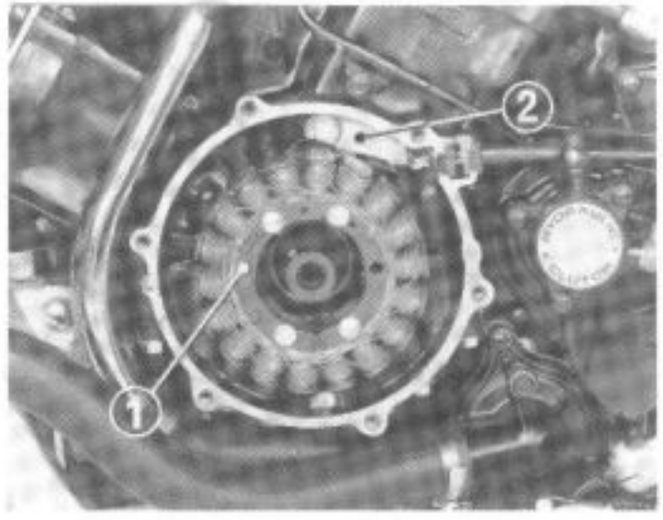


(1) Alternator wire coupler

Stator Removal

Remove the seat and frame left side cover.

Disconnect the alternator wire coupler and free the alternator wire from the clamp.



(1) Stator
(2) Wire clamp

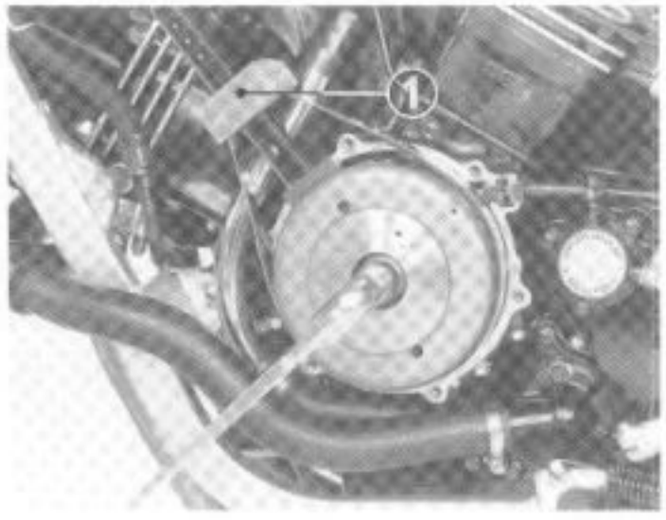
Remove the stator by removing the bolts and wire clamp.

Stator Installation

Install the stator and wire clamp.

Route the alternator wire properly, secure it with clamp and connect the alternator wire coupler to the main harness.

Install the frame left side cover and seat.



(1) Flywheel holder (07725–0040000)

Flywheel Installation

Install the woodruff key into the crankshaft.

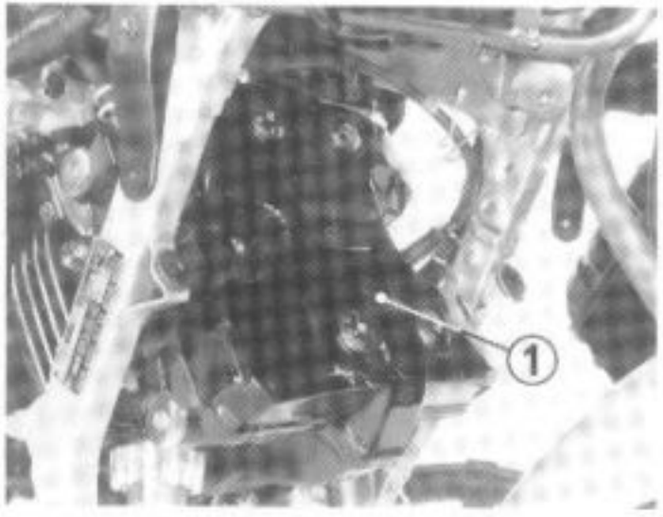
Install the flywheel by aligning its keyway with the key in the crankshaft.

Hold the flywheel with the flywheel holder and torque the flywheel bolt.

TORQUE: 85–105 N·m
(8.5–10.5 kg-m, 61–76 ft-lb)

Install the alternator cover.

Check engine oil level and add if necessary.

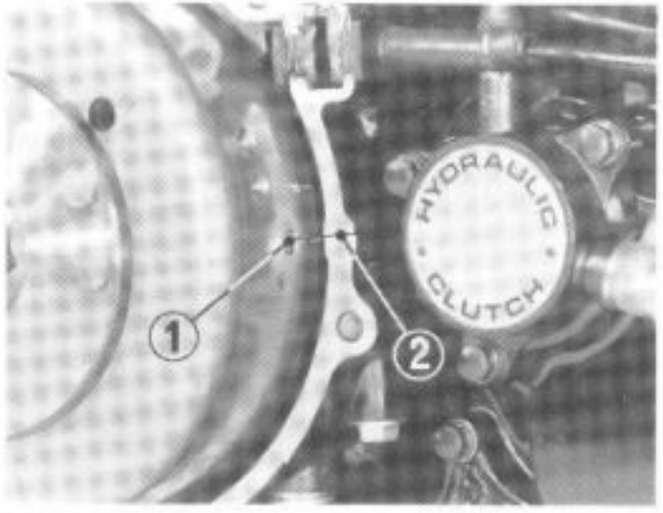


(1) Cylinder head cover

Camshaft Removal

Remove the seat, fuel tank and fairing.

Remove the cylinder head cover.

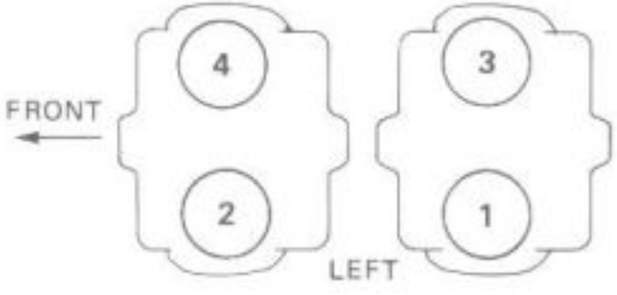


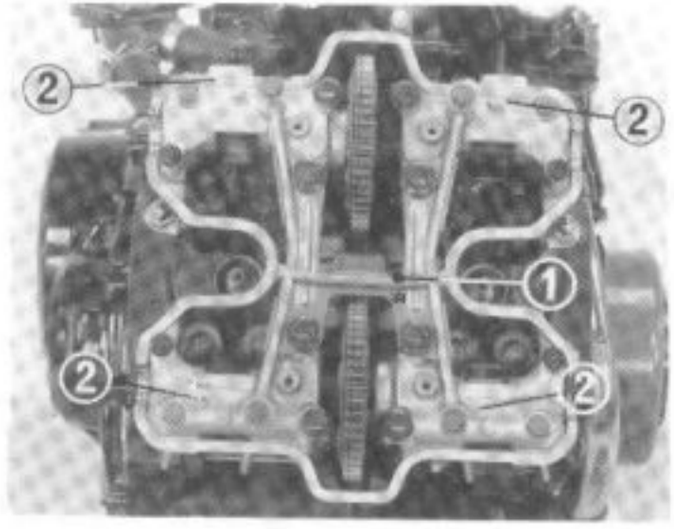
(1) "T" mark (T1-3 or T2-4)
(2) Crankcase mating surfaces

Remove the alternator cover.

Turn the crankshaft counterclockwise until the "T" mark ("T1-3" for rear cylinders, "T2-4" for front cylinders) on the flywheel rotor aligns with the rear crankcase mating surfaces.

The cylinder numbering is given below:





(1) Oil line plate
(2) Camshaft holders

Back the valve clearance adjuster out all the way.

Remove the oil line plate.

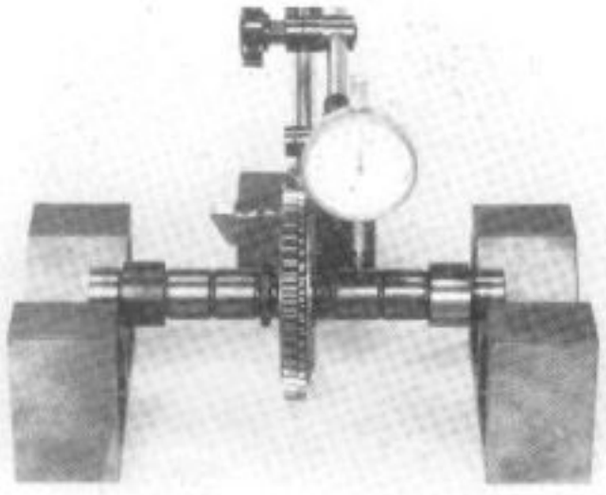
Loosen the camshaft holder bolts in an X pattern in two or more steps.

Remove the camshaft holders.

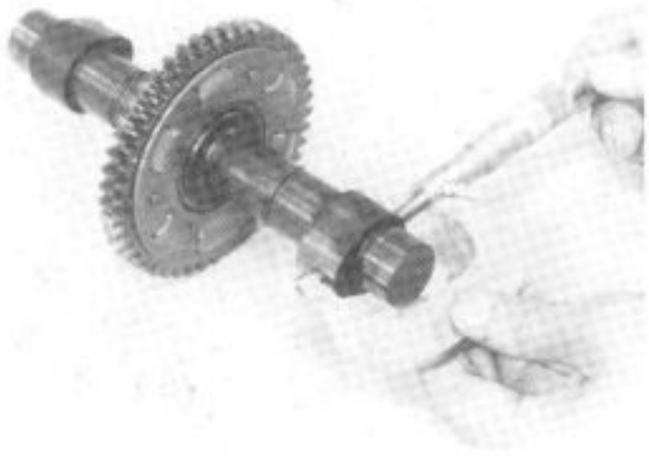
NOTE:

* *Mark the camshaft holders so that they can be installed in their original positions.*
* *Place rags or shop towels in the rear cylinder head to prevent parts from being dropped into the crankcase.*

Remove the camshafts.

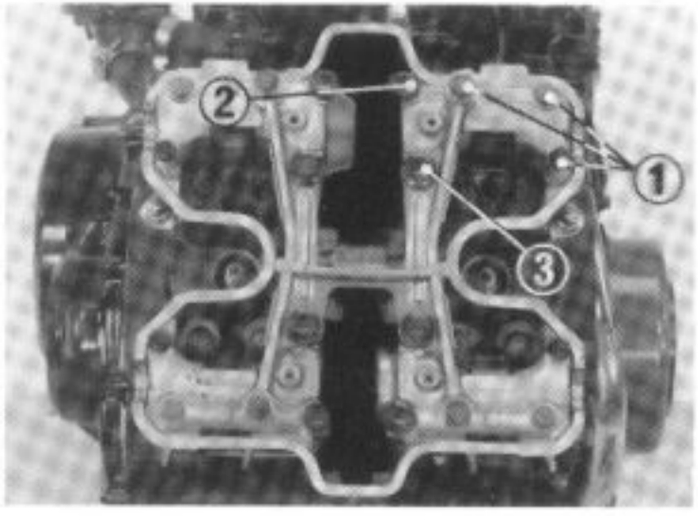


Inspection:
Support both ends of the camshaft with V-blocks.
Check camshaft runout with a dial indicator (page 214).



Check the cam lobes for wear or damage. Using a micrometer, measure each cam lobe (page 214).

Inspect the camshaft and holder surfaces for scoring scratches, or evidence of insufficient lubrication.
Wipe any oil from the journals.
Measure the each camshaft journal O.D. (page 214).

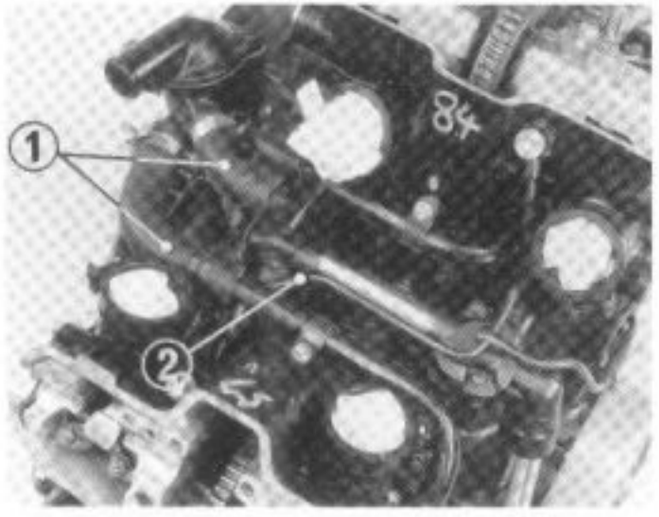


(1) 6 mm bolts
(2) 8 mm bolt
(3) 9 mm bolt

Install the camshaft holders and tighten the bolts in a crisscross pattern.

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

Measure the camshaft journal both ends and center I.D. (page 214).
Check the oil clearance (page 214).
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.

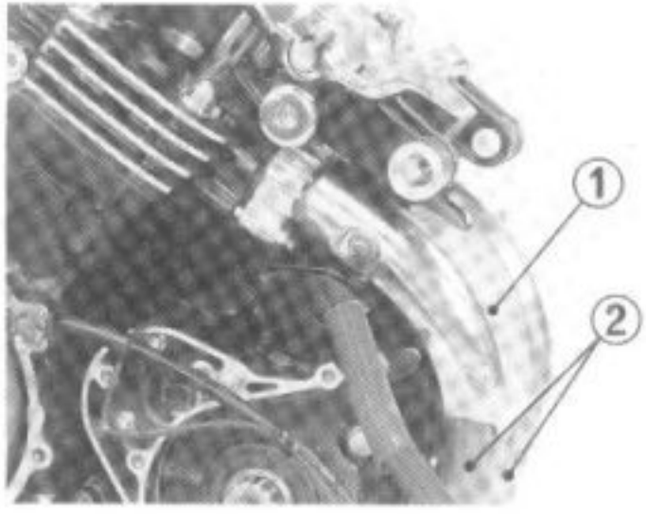


(1) Water hoses and pipes
(2) Oil pipe

Cylinder Head Removal

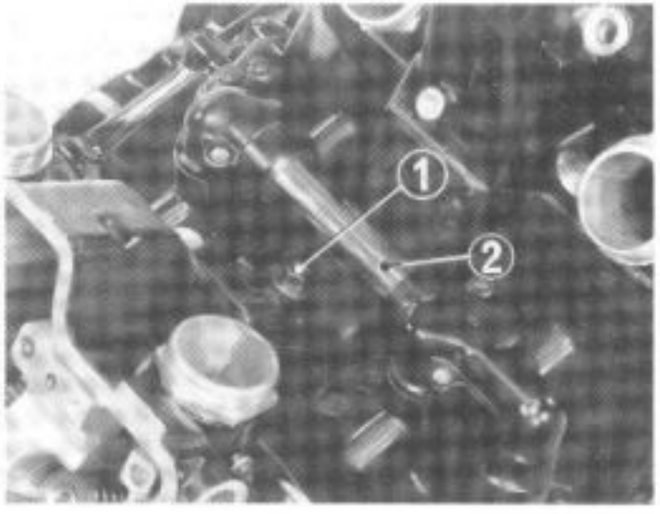
NOTE:
Drain the coolant from the front cylinders by removing the drain plugs (page 54).

Loosen the water hose clamps.
Remove the water pipes and hoses.
Remove the water pipe O-rings.
Remove the oil pipe and sealing washers.



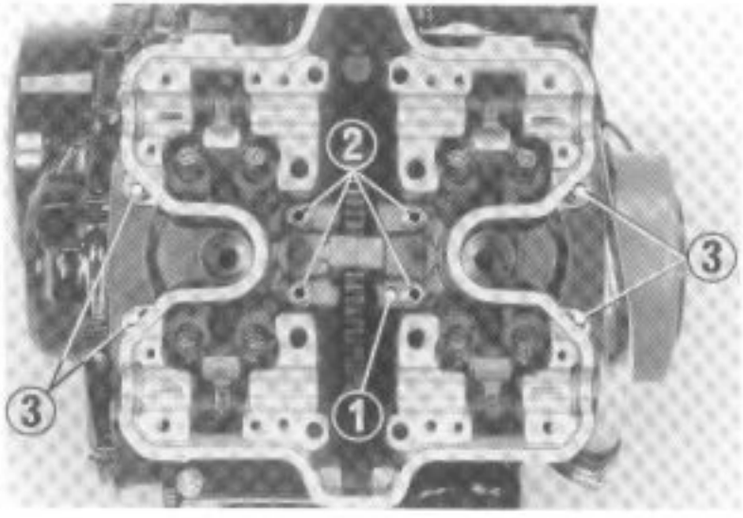
(1) Exhaust pipe protector
(2) Exhaust pipes

Remove the exhaust pipe protector and exhaust pipes.



(1) 8 mm bolt
(2) Water pipe

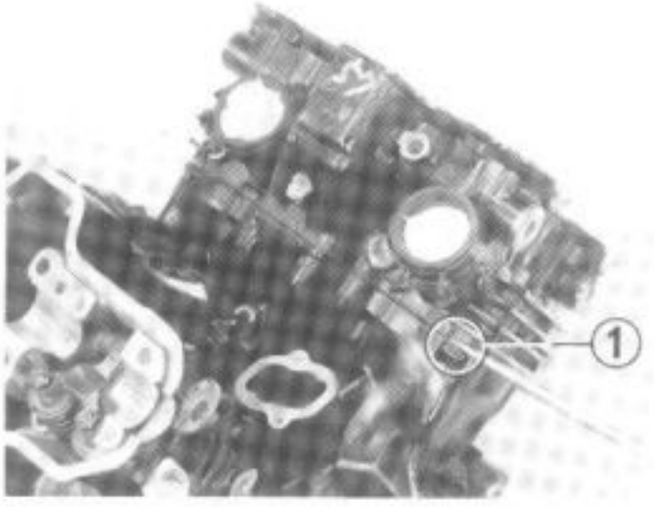
Remove the water pipe.
Remove the 8 mm bolt and sealing washer.



(1) Gear case
(2) 6 mm bolts
(3) Cylinder head nuts

Remove the gear case by removing the four 6 mm bolts.
Remove the four cylinder head nuts.

NOTE:
Do not disassemble the gear case.

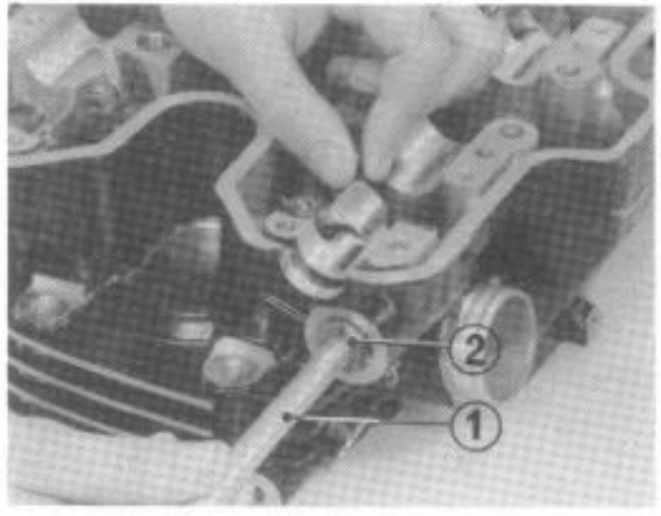


(1) Pry point

Remove the cylinder heads using a screwdriver at the pry points.
Remove the head gasket and dowel pins.
Remove carbon deposits from the combustion chamber and clean off the head gasket surfaces.

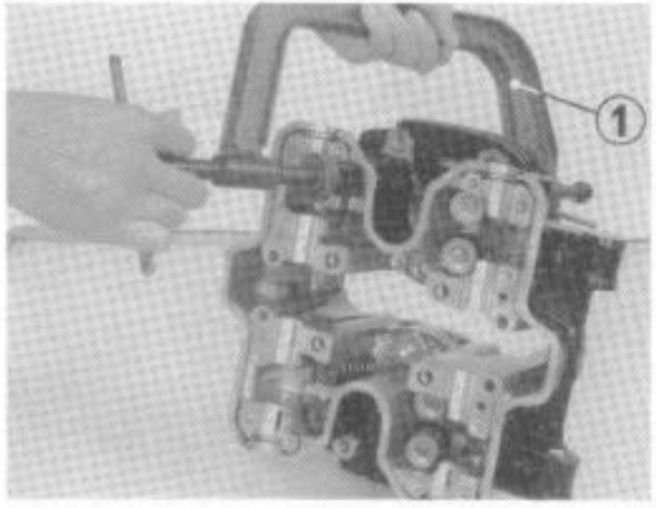
NOTE:
Gaskets will come off easier if soaked in solvent.

CAUTION:
Do not damage the gasket surfaces.



(1) 10 mm bolt
(2) Rocker arm shaft

Cylinder Head Disassembly
Remove the rocker arm cap and spring.
Install the 10 mm bolt to the rocker arm shaft, and pull out the rocker arm shaft.
Remove the rocker arm from the cylinder head.



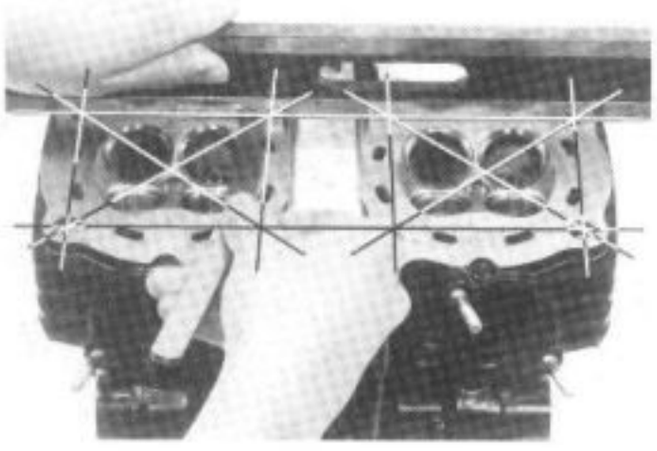
(1) Valve spring compressor (07757–0010000)

To keep the valve spring compressor from interfering with the cylinder head, remove the large retainer from the compressor attachment.
Remove the valve spring cotters, retainers, springs and valves.

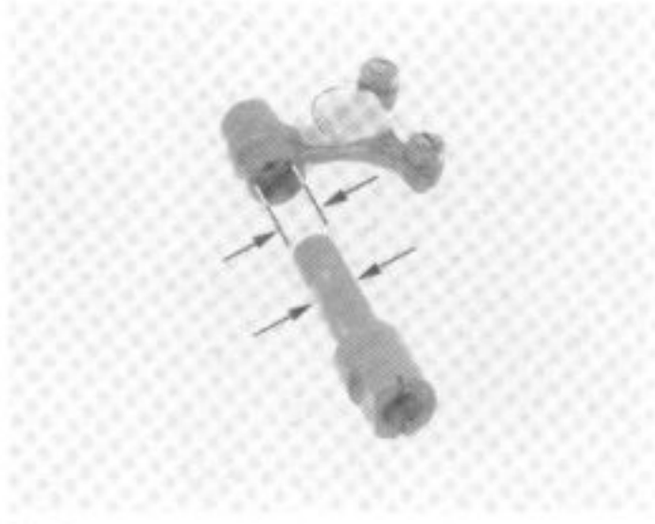
CAUTION:
To prevent a loss of tension, do not compress the valve springs more than necessary to remove the cotters.

NOTE:
Mark all disassembled parts to ensure correct reassembly.

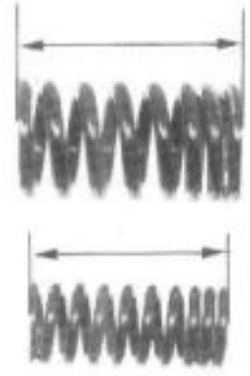
Remove the valve stem seals.



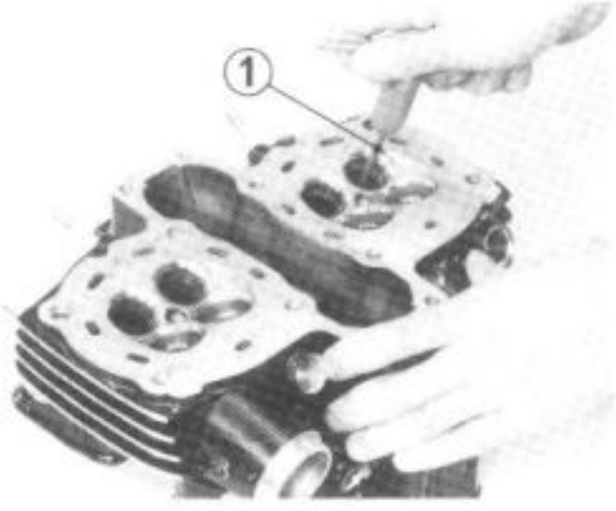
Cylinder head inspection:
Check the spark plug hole and valve areas for cracks.
Check the cylinder head for warpage with a straight edge and feeler gauge (page 214).

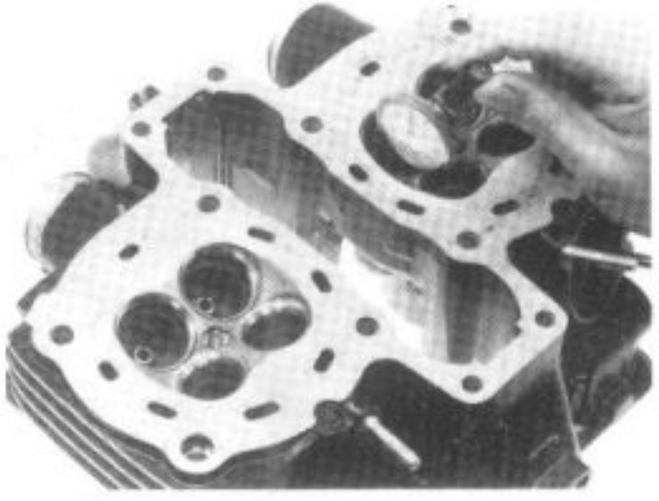


Rocker arm and shaft inspection:
Inspect the rocker arms for wear or damage to the camshaft contact surface or for a clogged oil hole.
Measure the I.D. of each rocker arm (page 214).
Inspect the rocker arm shaft for wear or damage.
Measure each rocker arm shaft O.D. (page 214).
Inspect the shaft for wear or damage and calculate the shaft to rocker arm clearance (page 214).



Measure the free length of the inner and outer valve springs (page 214).





Valve/valve guide inspection:

Inspect each valve for bending, burning, scratches or abnormal stem wear. Check valve movement in the guide and measure and record each valve stem O.D. (page 214).

Measure the valve length (page 214).

(1) Valve guide reamer (07984–2000000)

NOTE:

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

Measure and record each valve guide I.D. using a ball gauge or inside micrometer (page 214).

Subtract each valve stem O.D. from the corresponding guide I.D. to obtain the stem to guide clearance (page 214).

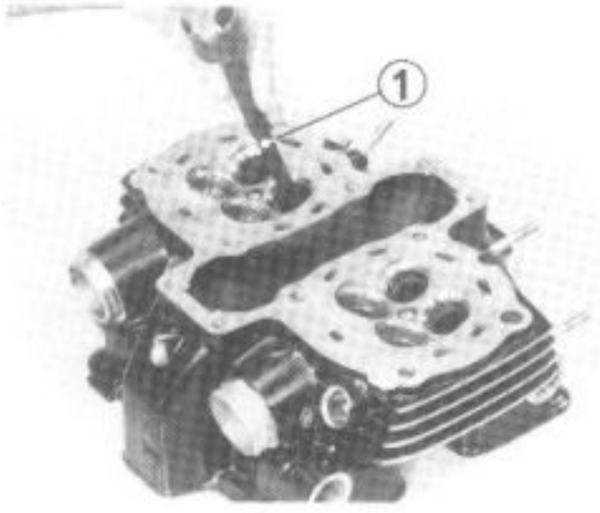
NOTE:

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

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

NOTE:

Reface the valve seats whenever the valve guides are replaced (page 91).



(1) Valve guide remover, 5.5 mm (07742–0010100)

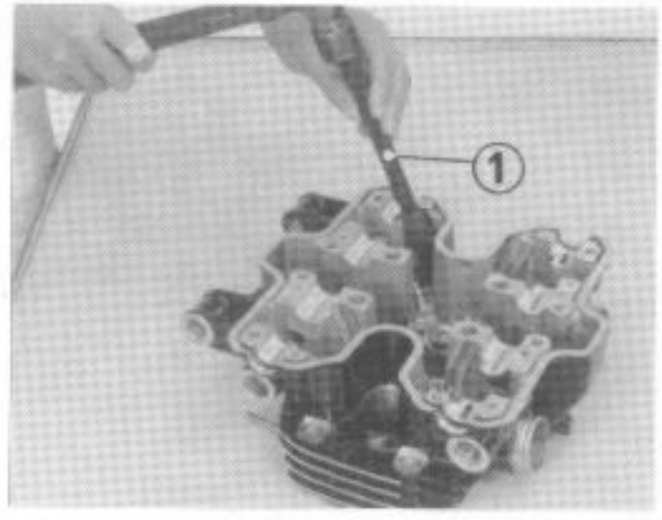
Valve Guide Replacement

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

CAUTION:

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

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

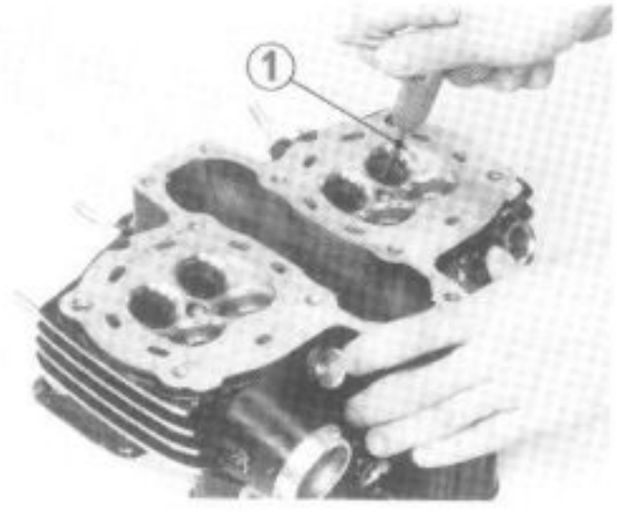


(1) Valve guide driver (07743–0020000)

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

NOTE:

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



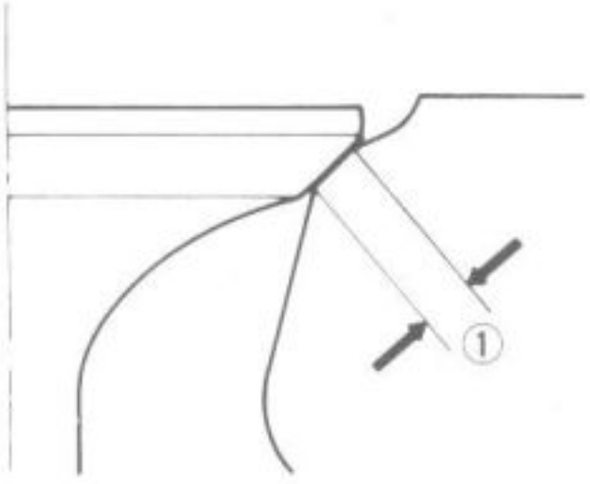
(1) Valve guide reamer (07984–2000000)

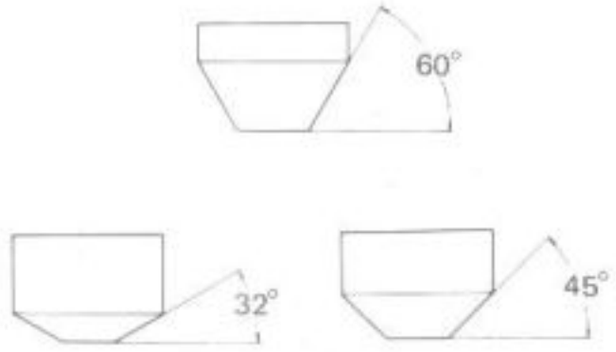
Let the cylinder head cool to room temperature and ream the new valve guides.

NOTE:

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

Reface the valve seats (page 91) and clean the cylinder head thoroughly to remove any metal particles.





Valve Seat Inspection

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

Remove and inspect each valve.

CAUTION:

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

(1) Valve seat width

Inspect the valve seat.

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

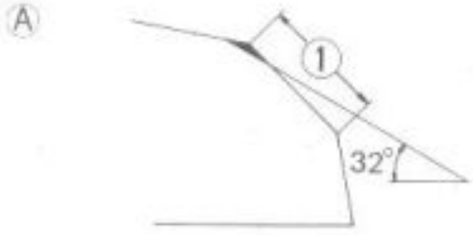
Valve Seat Refacing

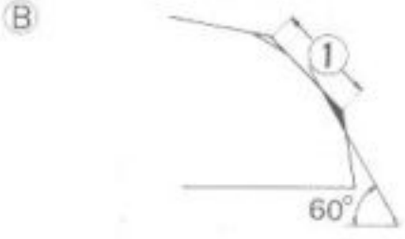
Honda Valve Seat Cutters, grinder or equivalent valve seat refacing equipment is recommended to correct a worn valve seat.

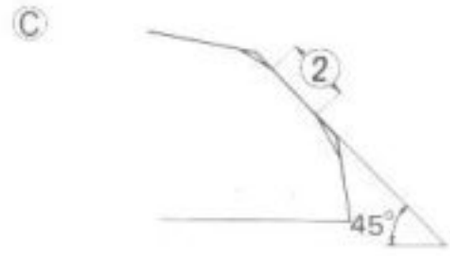
NOTE:

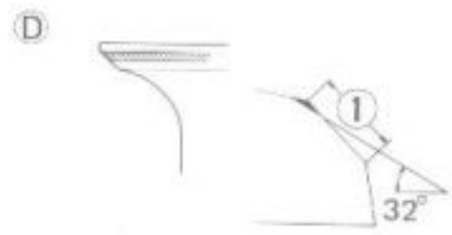
Follow the refacer manufacturer's operating instructions.

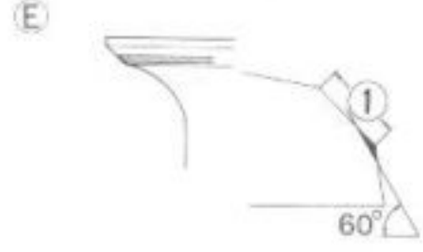
Cutter holder:	**07781–0010101**
45° cutter (IN):	**07780–0010800**
(EX):	**07780–0010300**
60° cutter (IN/EX):	**07780–0014000**
32° cutter (IN):	**07780–0012900**
(EX):	**07780–0012100**











(1) Old seat width

Ⓐ Use a 45 degree cutter to remove any roughness or irregularities from the seat.

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

Use a 32 degree cutter to remove the top 1/4 of the existing valve seat material.

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

(2) Specific seat width

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

STANDARD:
1.0 mm (0.04 in)

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

Apply a thin coating of Prussian Blue to the valve seat.
Press the valve through the valve guide and onto the seat to make a clear pattern.

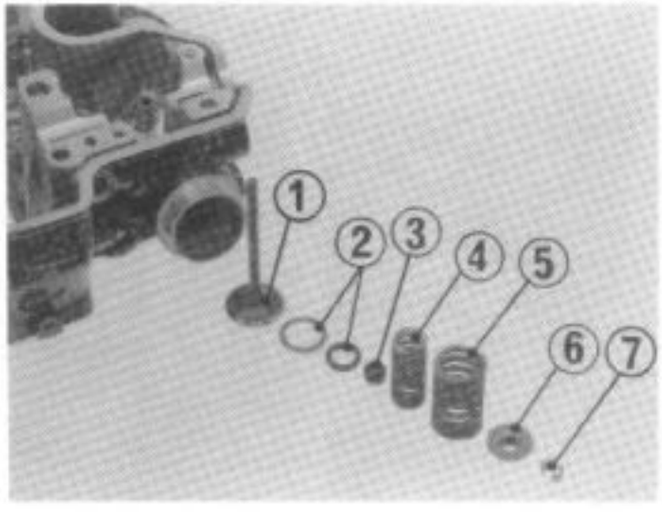
NOTE:
The location of the valve seat in relation to the valve face is very important for good sealing.

Ⓓ CONTACT TOO HIGH:
If the contact area is too high on the valve, the seat must be lowered using a 32 degree flat cutter.

Ⓔ CONTACT TOO LOW:
If the contact area is too low on the valve, the seat must be raised using a 60 degree inner cutter.

Refinish the seat to specifications, using a 45 degree finish cutter.
After cutting the seat, apply lapping compound to the valve face, and lap the valve using light pressure.
After lapping, wash all residual compound off the cylinder head and valve.

NOTE:
Do not allow lapping compound to enter the guides.

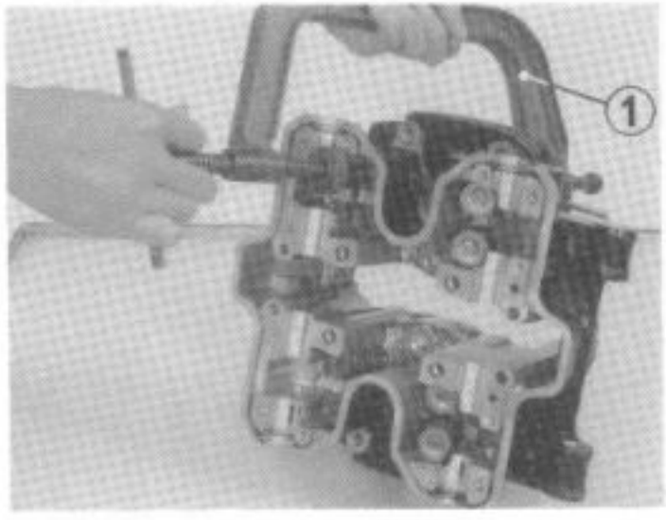


(1) Valve (2) Valve seats
(3) Stem seal (4) Inner valve spring
(5) Outer valve spring (6) Retainer
(7) Valve cotters

Cylinder Head Assembly

NOTE:
Install new valve stem seals when assembling.

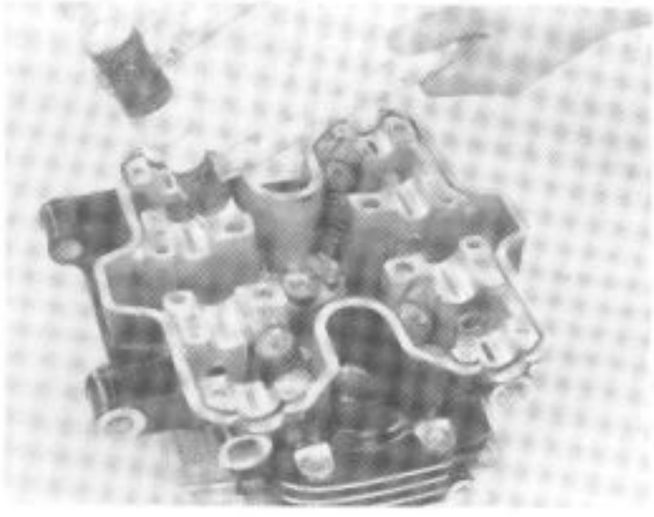
Lubricate each valve stem with molybdenum disulfide grease and insert the valve into the valve guide. To avoid damage to the stem seal, turn the valve slowly when inserting.
Install the spring seats, valve springs and retainers. The spring's tightly wound coils should face toward the cylinder head.



(1) Valve spring compressor (07757–0010000)

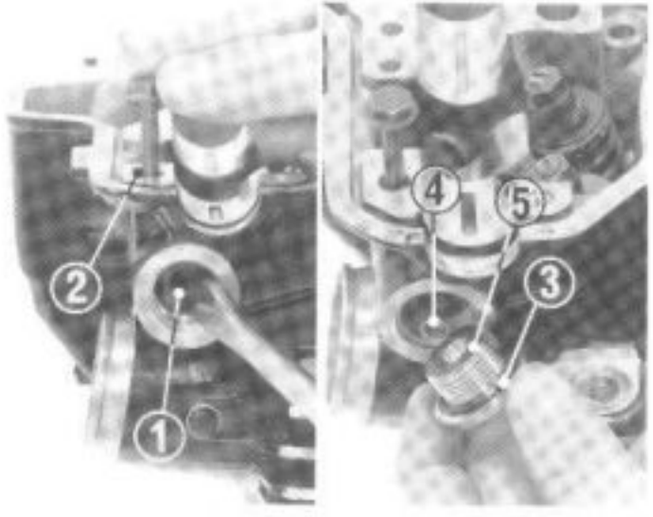
Install the valve cotters.

CAUTION:
To prevent a loss of tension, do not compress the valve spring more than necessary to install the valve cotters.



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

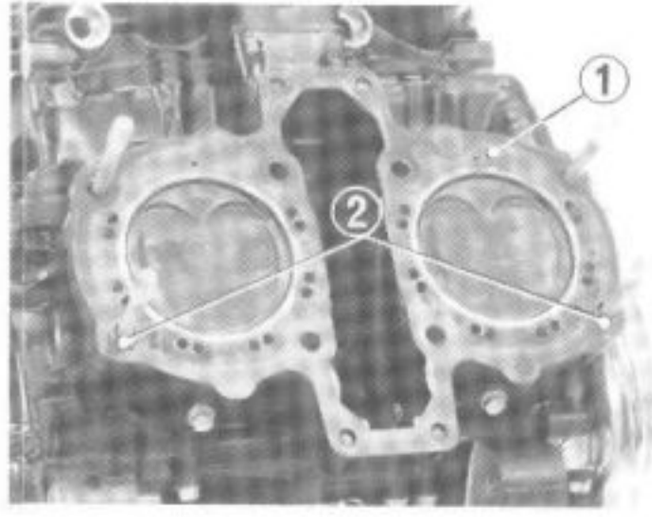
NOTE:
Support the cylinder head above the work bench surface to prevent possible valve damage.



(1) Rocker arm shaft
(2) Bolt hole
(3) O-ring
(4) Spring
(5) Rocker arm cap

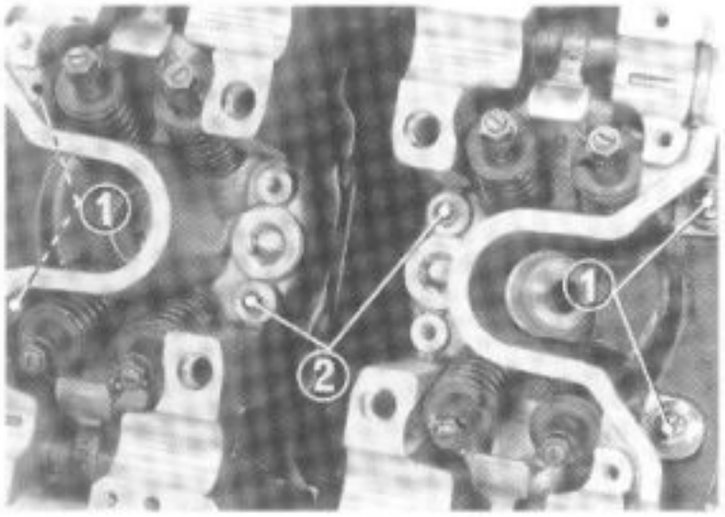
Cylinder Head Installation
Apply molybdenum disulfide grease to the rocker arm shaft, and install the rocker arm onto the cylinder head.
Insert the rocker shaft, align the cut-out in the rocker arm shaft with bolt hole as shown.
Install the spring and rocker arm cap with O-ring.
Tighten the rocker arm cap.

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



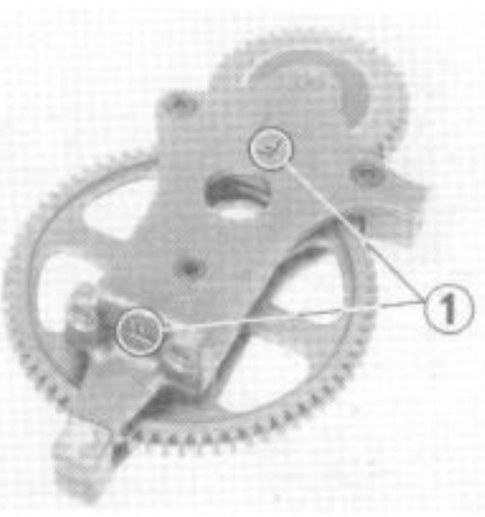
(1) Gasket
(2) Dowel pins

Cylinder Head Installation
Clean the cylinder head surface of any gasket material.
Install the dowel pins and new head gaskets.



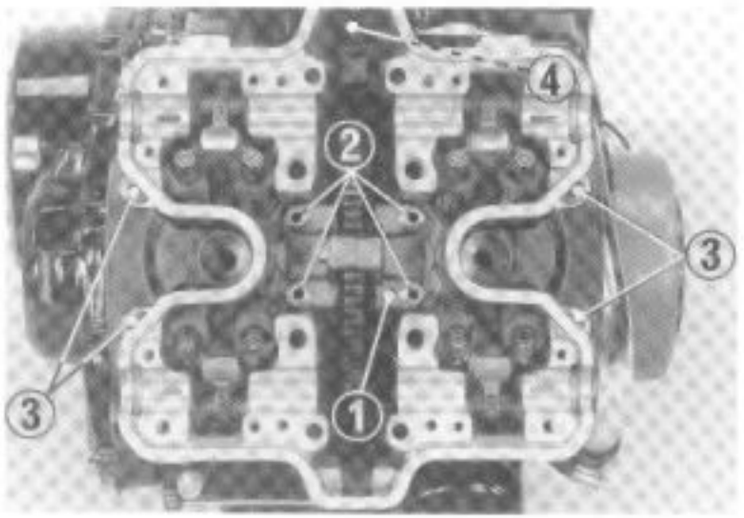
(1) Cylinder head nut
(2) Dowel pins

Install the cylinder head on the cylinder.
Tighten the cylinder head nuts loosely.
Install the gear case dowel pins.



(1) Index mark

Make sure the gear case index marks so that you install each gear case in its correct location.
The marks "F" for the front cylinders, "R" for the rear cylinders.

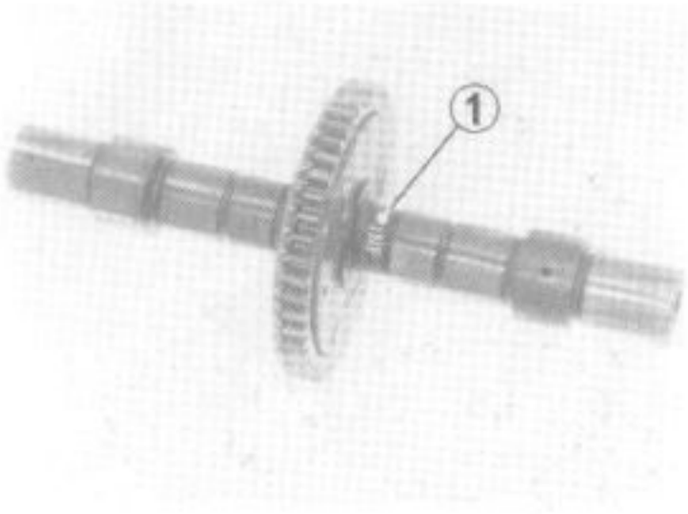


(1) Gear case
(2) 6 mm bolts
(3) Cylinder head nuts
(4) 8 mm bolt and sealing washer

Install the gear case into the cylinder head.
Tighten the four 6 mm bolts and 8 mm bolts.

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

Install the cylinder head bolts loosely.

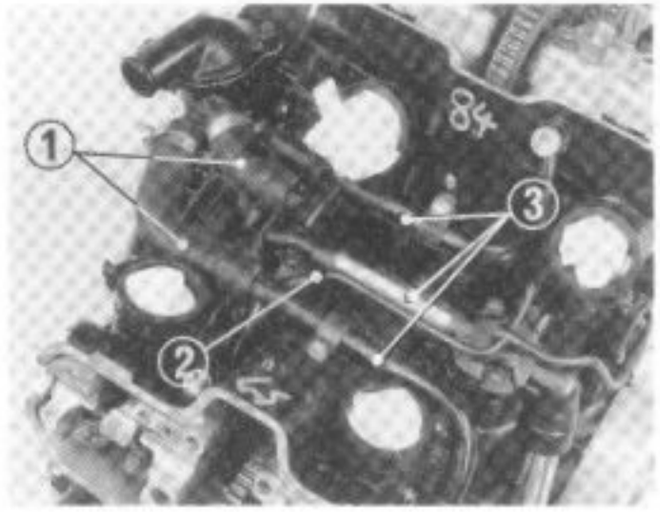


(1) Index mark

Camshaft Installation

CAUTION:

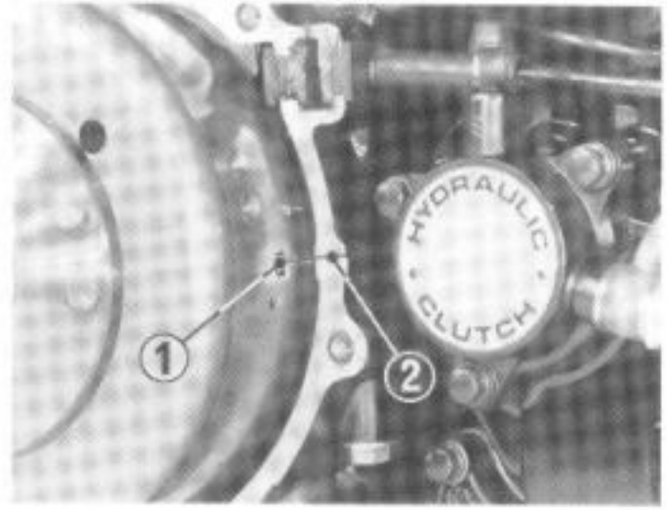
- *Follow this procedure from beginning to end, even if you are only servicing one cylinder head.*
- *Check the camshaft marks so that you install each camshaft in its correct location.*
- *The marks on the camshaft mean:*
  EX R: Rear cylinder exhaust
  IN R: Rear cylinder intake
  EX F: Front cylinder exhaust
  IN F: Front cylinder intake



(1) Water hoses (3) Water pipes
(2) Oil pipe

Install the O-rings onto the water pipes.
Install the water pipes.
Install the exterior oil pipe with washers onto the cylinder and cylinder head.
Install the water pipes and hoses and tighten the hose clamps securely.

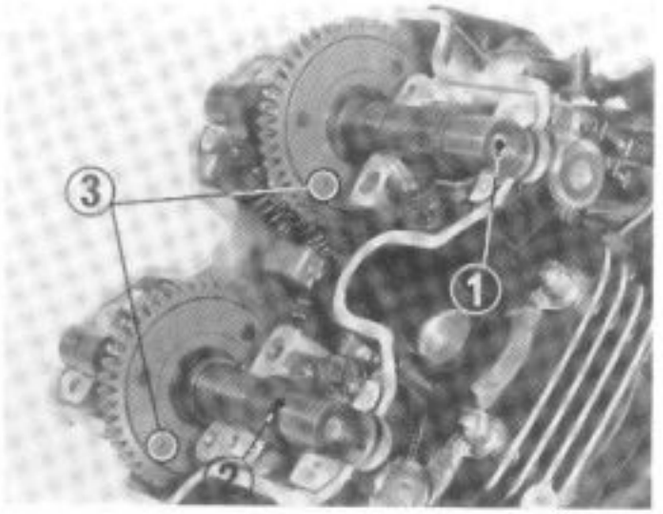
Turn the crankshaft counterclockwise until the "T1-3" mark on the flywheel rotor aligns with the rear crankcase mating surfaces.
Lubricate the cylinder head cam bearing surfaces with molybdenum disulfide grease.



(1) "T1-3" mark
(2) Crankcase mating surfaces

NOTE:

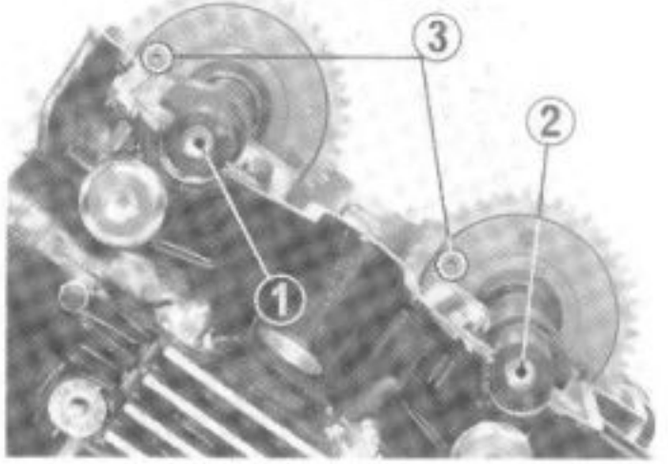
- *When assembling only the front cylinder, remove the rear cylinder head cover and make sure that the No. 1 cylinder is at the Top Dead Center of compression stroke.*
- *When assembling only the rear cylinder, remove the front cylinder head cover and bring the No. 2 cylinder in compression stroke and align the "T2-4" mark with the crankcase mating surfaces. Then turn the crankshaft counterclockwise 270° and align the "T1-3" mark with the crankcase mating surfaces.*



(1) Front cylinder intake camshaft
(2) Front cylinder exhaust camshaft
(3) Holes

Back the valve clearance adjuster out all the way.
Install the camshafts on the cylinder head with their hole facing the left side.

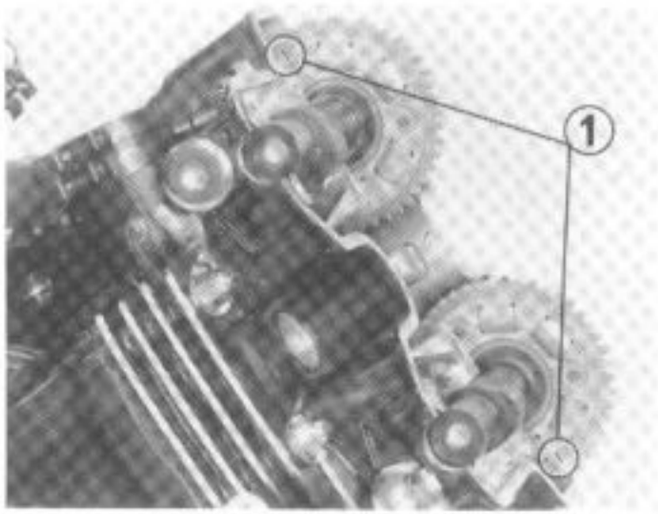
NOTE:
Face the hole in the front cylinder camshaft toward the exhaust side and hole in the rear cylinder camshaft toward the intake side.



(1) Rear cylinder intake camshaft
(2) Rear cylinder exhaust camshaft
(3) Holes

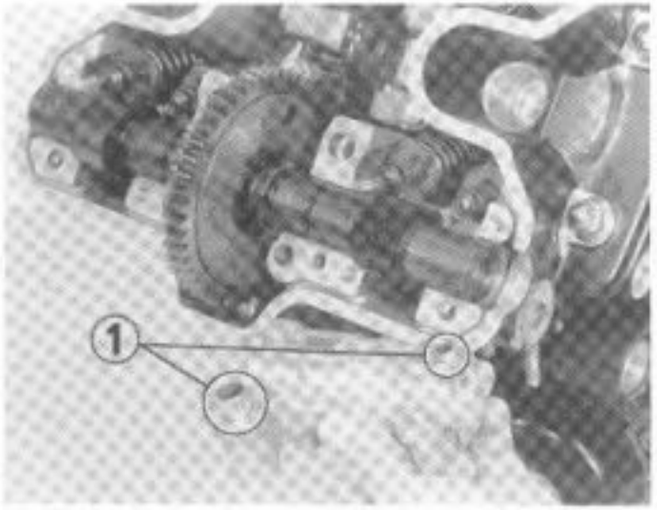
Align the index lines on the right side of the camshaft driven gear with the camshaft holder mating surfaces. Engage the sub-gears of the camshaft driven gears with the idle gear by depressing the camshaft with a hand and rotating the crankshaft slightly right and left.
Re-align the "T1-3" mark with the crankcase mating surfaces after engaging the gears correctly. Recheck the timing.

NOTE:
Do not align the "T1-3" mark by rotating the crankshaft 360°.



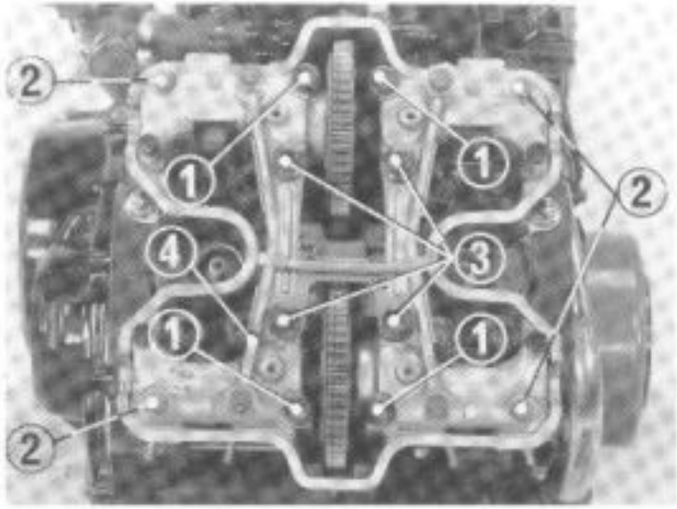
(1) Index lines

CAUTION:
If the camshaft holder is tightened with the camshaft driven gear is not engaged properly, out of valve timing or camshaft breakage may result.



(1) Dowel pins

Install the dowel pins on the cylinder head.

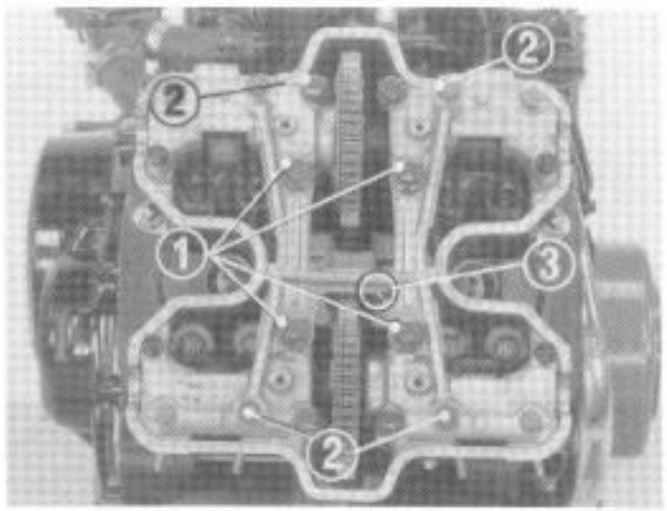


(1) 8 mm bolts (2) 6 mm pin nose bolt
(3) 9 mm bolts (temporarily install)
(4) Oil pipe plate

Install the camshaft holders and oil pipe plate onto the camshaft holders. Tighten the 9 mm bolts, 8 mm bolts and 6 mm pin nose bolts gradually in criss-cross pattern.

NOTE:
* *Use 6 mm bolts which have pin at their end.*
* *Use 9 mm bolts which tighten the oil pipe plate together.*
* *Do not tighten the bolts to the specified torque at this time.*

CAUTION:
Tighten the bolts gradually while making sure that the engagement between the camshaft driven gear and the idle gear.

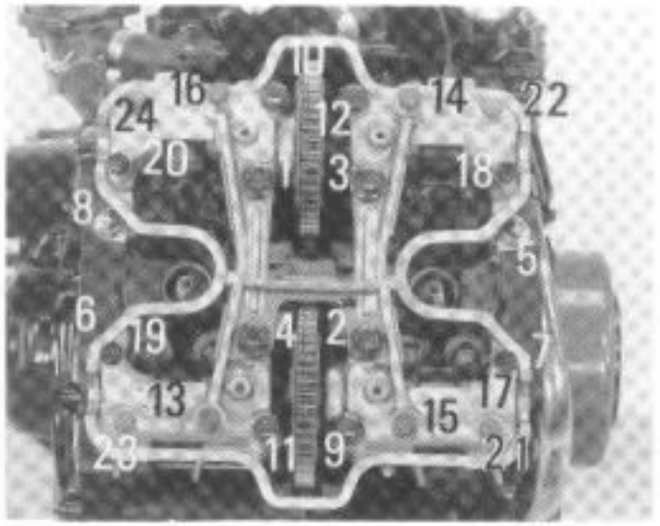


(1) 9 mm bolts
(2) 6 mm oil bolts
(3) Center plate
"RR" mark

Recheck the valve timing by rotating the crankshaft counterclockwise.
Install the oil bolts and tighten them.

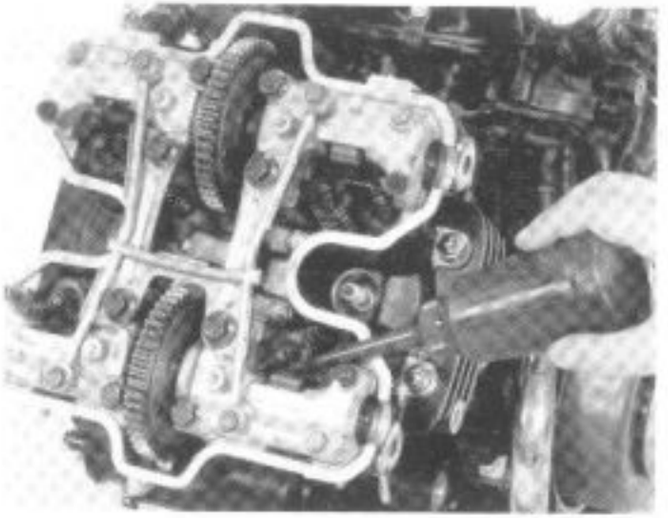
CAUTION:
Install the cylinder oil pipe so that the "RR" mark on center plate toward the exhaust side.

NOTE:
The oil pipe plate 6 mm bolts have special shape to facilitate oil passage. Do not replace them with other bolts.

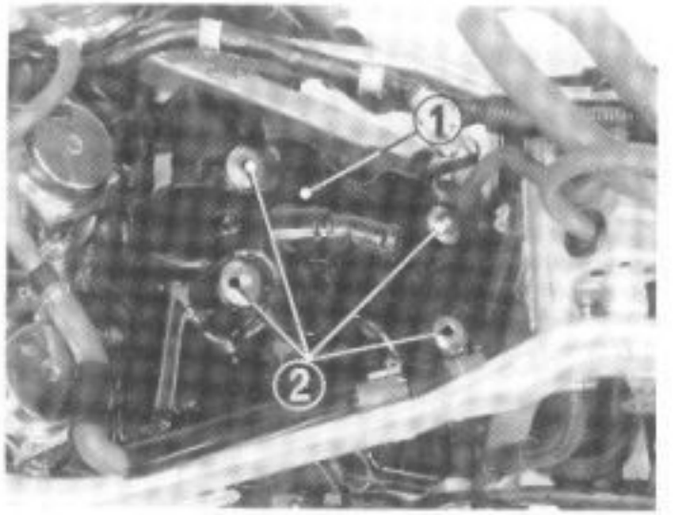


Tighten the cylinder head and camshaft holder bolts in a criss-cross pattern in 2-3 steps.

TORQUE: 9 mm: 43–47 N·m
(4.3–4.7 kg-m, 31–34 ft-lb)
8 mm: 21–25 N·m
(2.1–2.5 kg-m, 15–18 ft-lb)
6 mm: 10–14 N·m
(1.0–1.4 kg-m, 7–10 ft-lb)



Lubricate the cam lobes with clean engine oil.



(1) Cylinder head cover
(2) Cylinder cover bolts

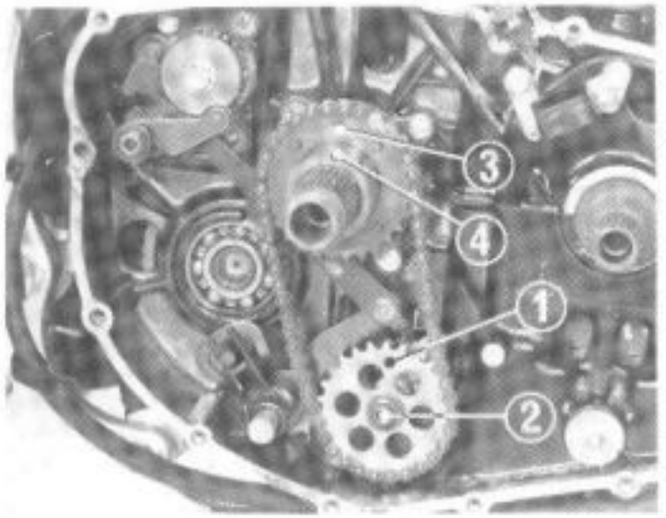
Adjust the valve clearance (page 34).
Check the cylinder head cover gasket for damage or deterioration.

NOTE:
Clean the gasket before applying sealant.

Apply sealant to the cylinder head cover gasket.
Install the front cylinder head cover with its tabs facing up.
Tighten the cylinder head cover bolts.

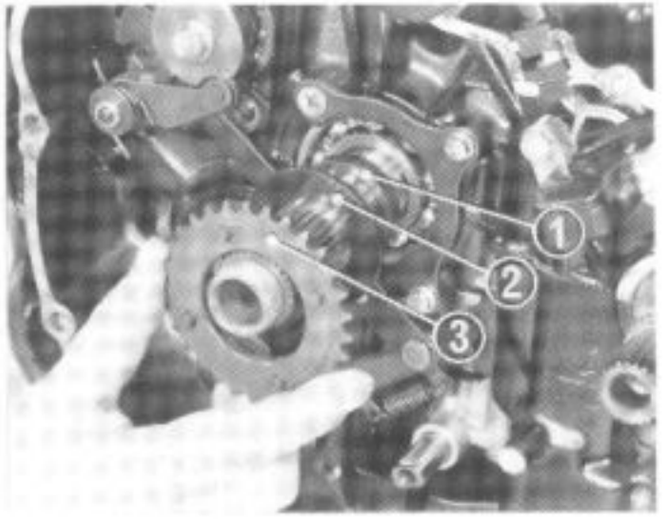
TORQUE: 8–12 N·m
(0.8–1.2 kg-m, 6–9 ft-lb)

Install the remaining parts in the reverse order of removal.



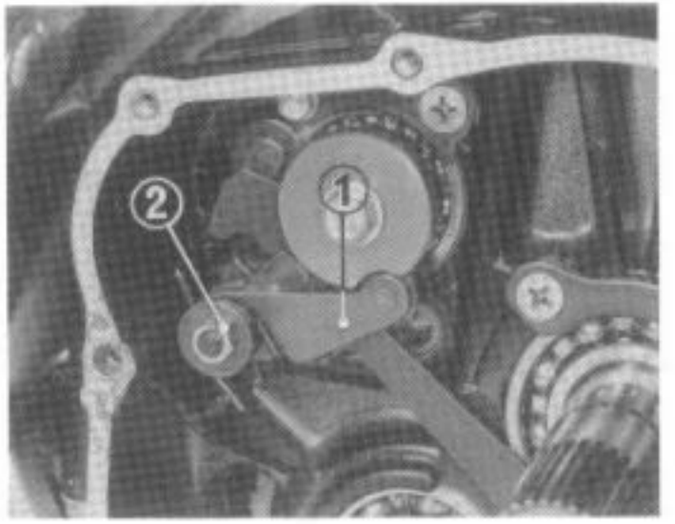
(1) Oil pump driven sprocket
(2) Bolt
(3) Oil pump drive sprocket
(4) Clutch outer guide

Gear shift linkage removal:
Remove the gearshift pedal.
Remove the clutch assembly.
Remove the oil pump driven sprocket bolt.
Remove the collar from the mainshaft.
Remove the oil pump drive chain and driven sprockets.



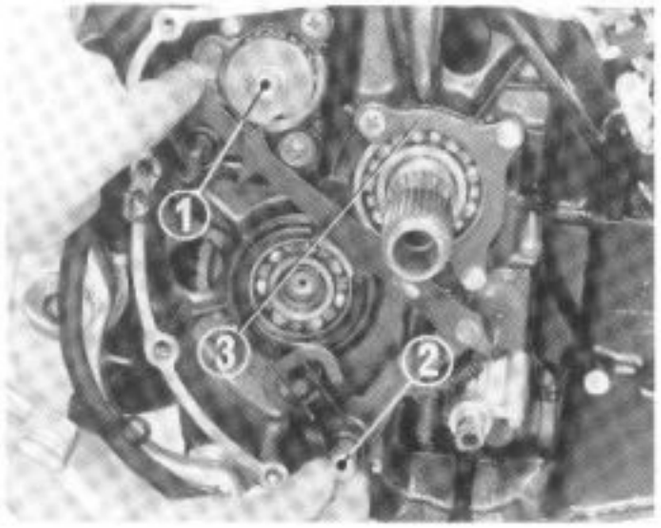
(1) Spacer
(2) Thrust washer
(3) Drive sprocket

Remove the drive sprocket, thrust washer and spacer.



(1) Neutral stopper arm
(2) Nut

Remove the neutral stopper arm, washer, spring, collar and tab washer by removing nut.



(1) Bolt
(2) Gearshift spindle
(3) Bearing holder

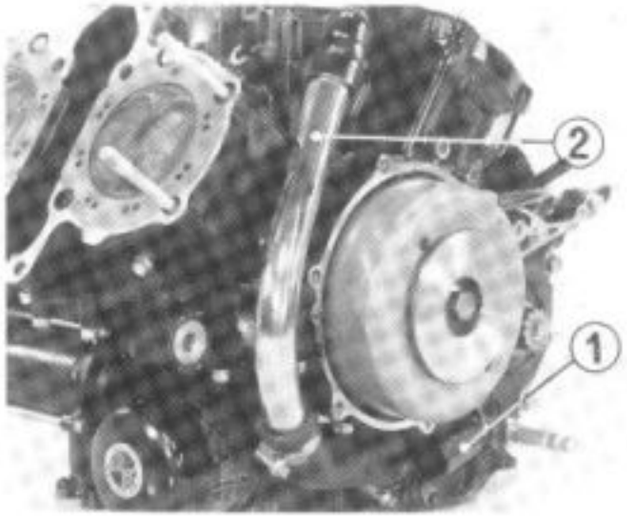
Crankcase Separation

Transmission removal:

Remove the following parts before separating the crankcase.

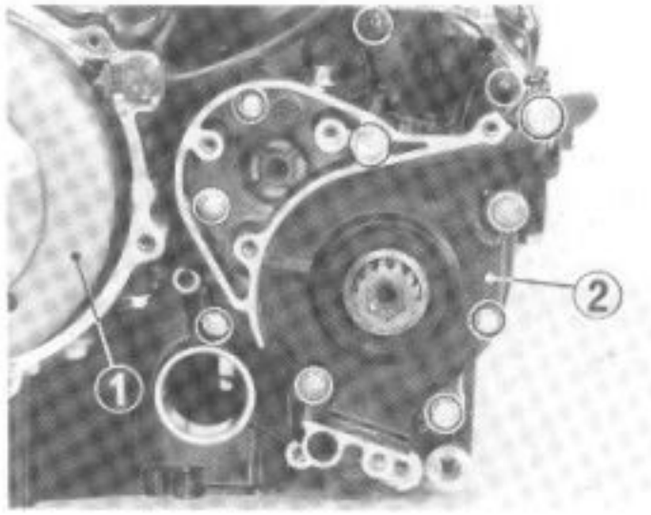
ENGINE REMOVAL	Page 49–52
CYLINDER HEAD	Page 83–87
CLUTCH	Page 61

Pull out the gearshift spindle assembly out of the crankcase.
Remove the stopper cam by removing the bolt.
Remove the mainshaft bearing holder by removing the screw and bolts.



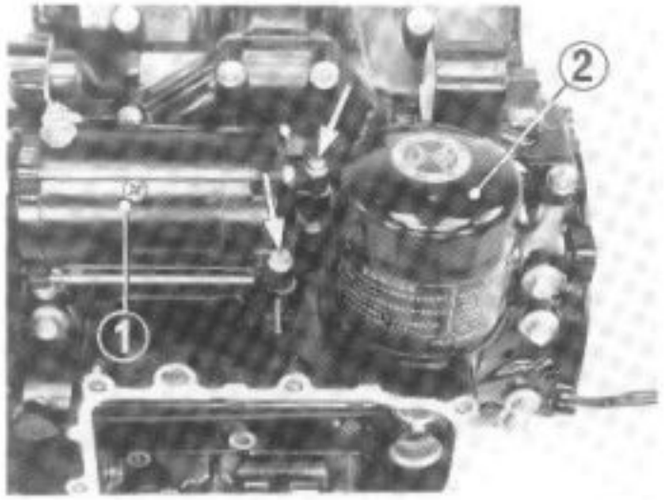
(1) Water pump
(2) Water pipe

Remove the water pump (page 59) and water pipe.



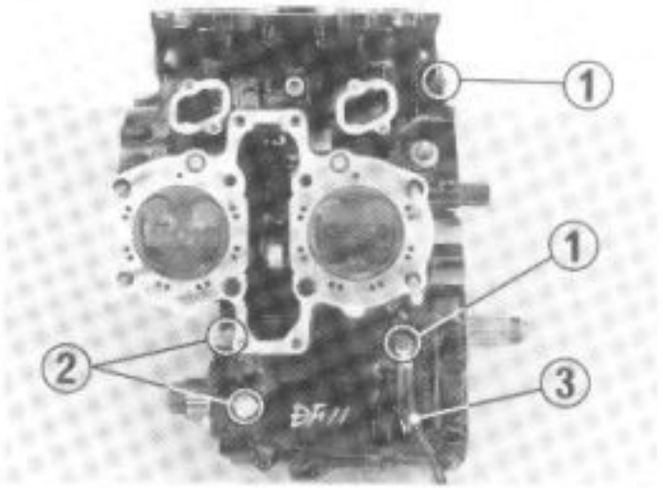
(1) Flywheel
(2) Counter oil seal cover

Remove the flywheel (page 81) and the neutral switch cover and the switch.
Remove the counter oil seal cover.



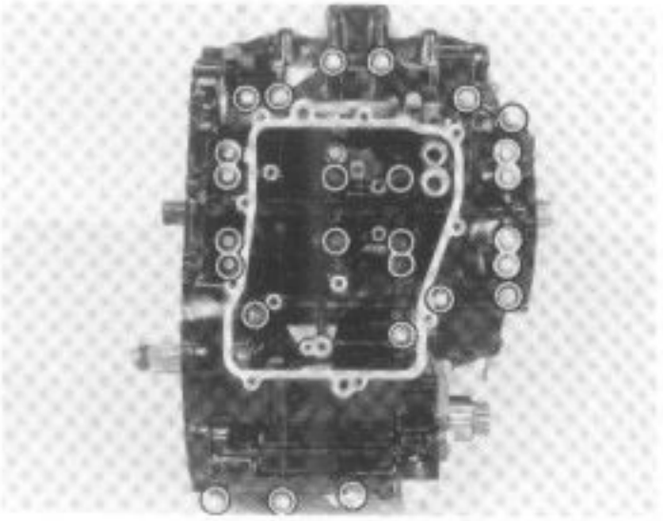
(1) Starter motor
(2) Oil filter

Remove the oil filter and starter motor.



(1) 6 mm bolt
(2) 8 mm bolt
(3) Ground cable

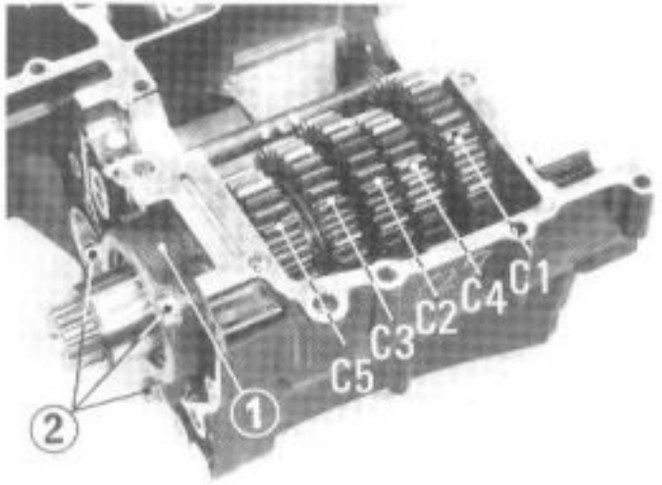
Remove the upper crankcase bolts.



Turn the engine over and remove the lower crankcase bolts.

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

Separate the crankcase.



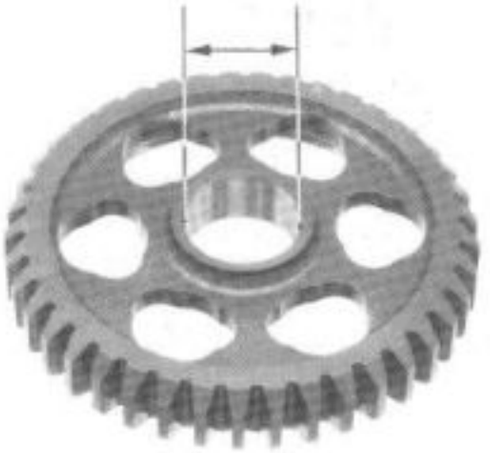
(1) Countershaft bearing holder
(2) Bolts

Transmission Disassembly

Remove the mainshaft from the upper crankcase.

Remove the three countershaft bearing holder bolts.

Pull the countershaft out of the crankcase while removing C1, C4, C2, C3, and the spline washers and bushings.



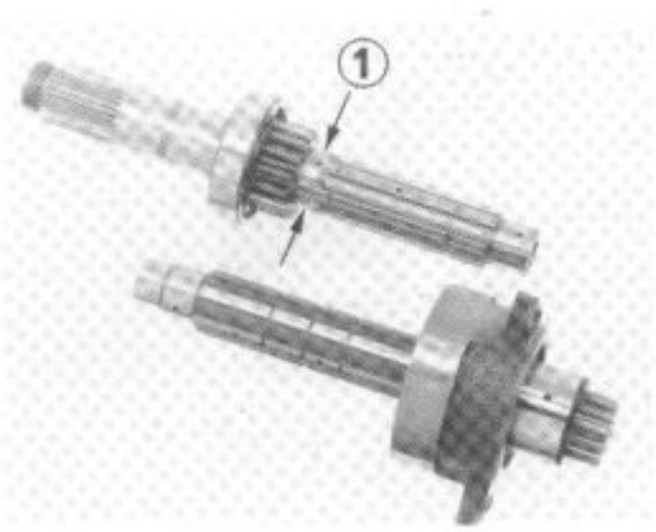
Check gear dogs, dog holes and gear teeth for excessive or abnormal wear, or evidence of insufficient lubrication.

Measure the I.D. of each gear (page 215).

Measure the O.D. of the gear bushings (page 215).

Calculate the clearance between the gear bushings and the gears (page 215).

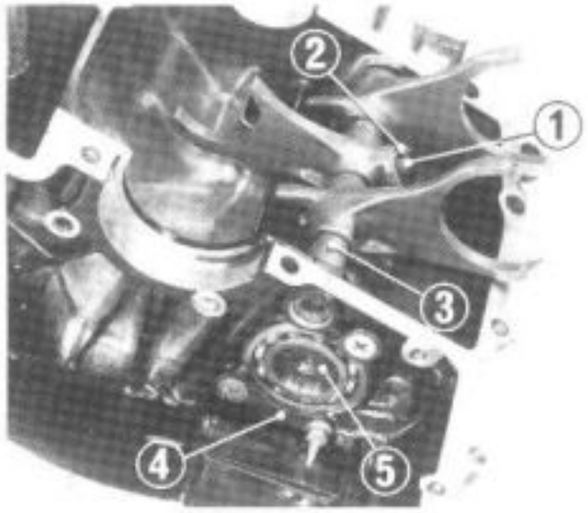
Measure the I.D. of the gear bushings (page 215).



(1) O.D. at M4 bushing

Measure the O.D. of the mainshaft and countershaft (page 215).
Calculate the clearance between the bushing and shaft (page 215).

NOTE:
Do not remove the countershaft from the bearing holder.

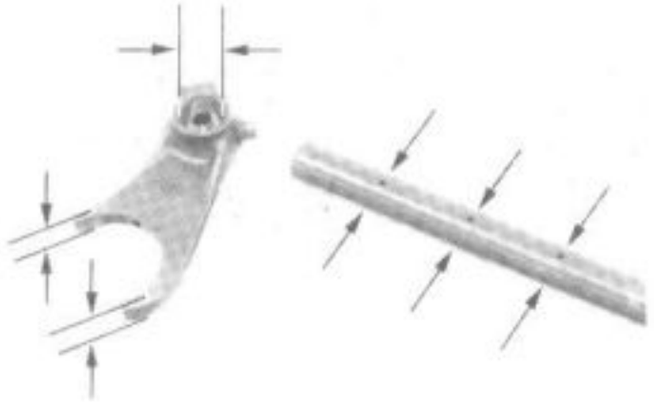


(1) Lock bolt
(2) Lock washer
(3) Shift fork shaft
(4) Stopper plate
(5) Shift drum

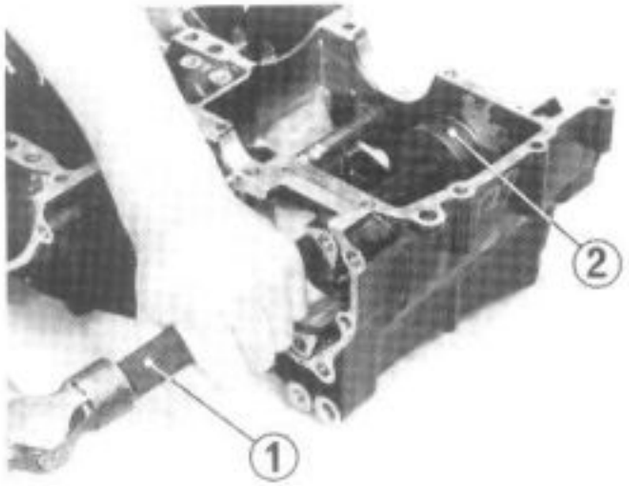
Shift Fork/Shift Drum

Removal:
Bend the lock washer tab down and remove the center fork lock bolt.
Remove the shift fork shaft and shift forks.
Remove the bearing stopper plates.
Remove the shift drum.

Inspection:
Inspect the shift drum end for scoring, scratches, or evidence of insufficient lubrication.
Check the shift drum grooves for damage.
Inspect the shift drum hole and shift fork shaft hole for scoring or scratches.

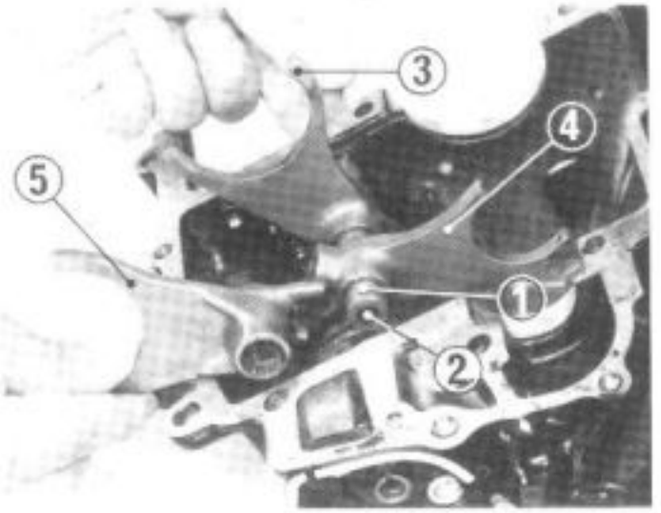


Check the shaft for scratches, scoring or evidence of insufficient lubrication.
Measure the shift fork shaft O.D. at right and left shift fork surfaces (page 215).
Measure the shift fork claw thickness and shift fork shaft hole I.D. (page 215).



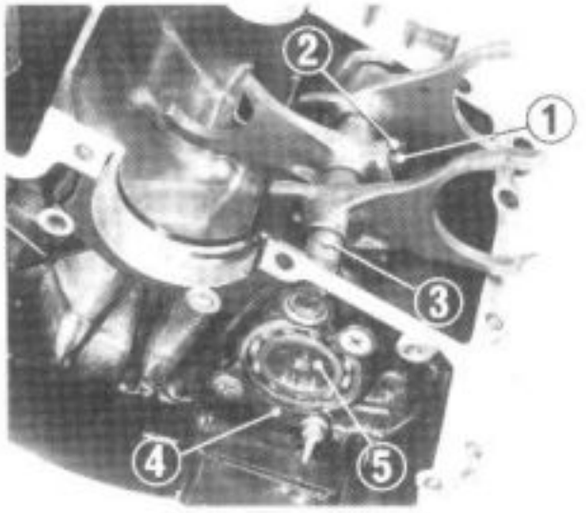
(1) Driver (07949–3710001)
(2) Attachment, 52 x 55 mm (07746–0010400)
Pilot, 20 mm (07746–0040500)

Replace the countershaft bearing if necessary as follows:
Drive the countershaft bearing out of the case.
Drive the countershaft bearing into the crankcase using driver and attachment.



(1) Shift fork shaft
(2) Oil hole
(3) Right shift fork
(4) Center shift fork
(5) Left shift fork

Installation:
Install the shift drum.
Install the shift fork shaft so that the oil hole end is toward the right.



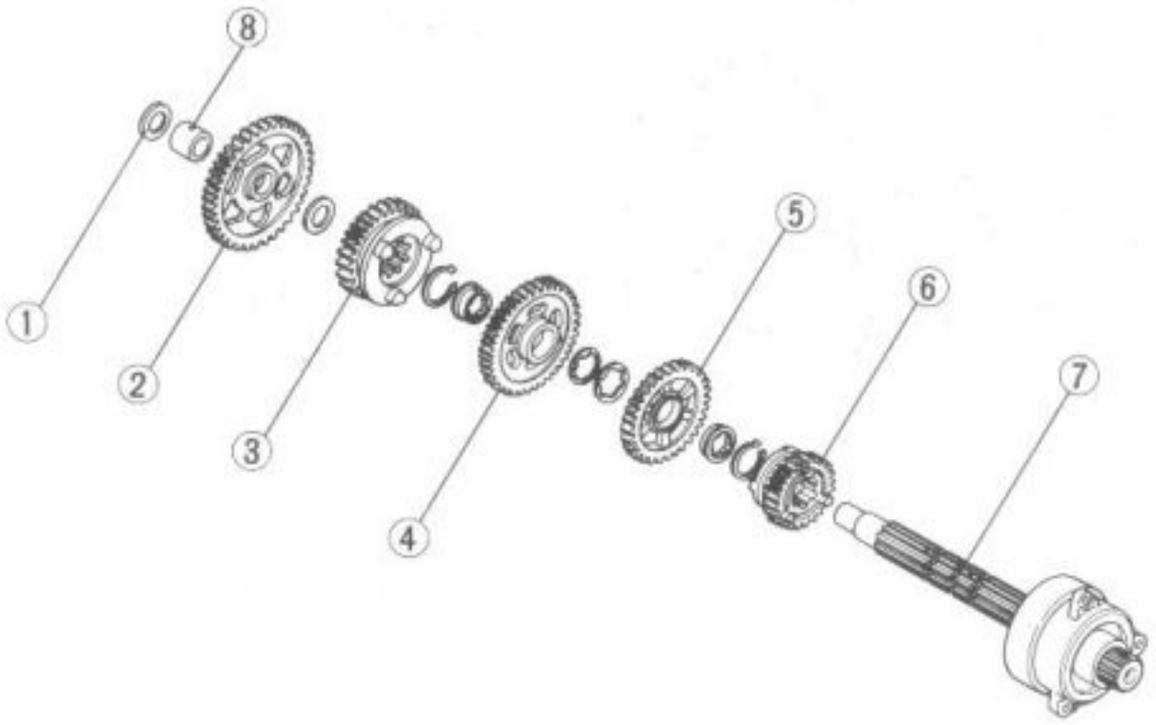
(1) Lock bolt
(2) Lock washer
(3) Shift fork shaft
(4) Stopper plate
(5) Shift drum

Install a new lock washer and the bolt to the center shift fork and tighten the bolt.

TORQUE: 16–20 N·m (1.6–2.0 kg-m, 12–14 ft-lb)

Bend up the lock washer's tabs.
Install the shift drum.
Apply a locking agent to the screw threads and install the bearing stopper plates.
Tighten the screw first, then tighten the bolt.

TORQUE: 7–11 N·m (0.7–1.1 kg-m, 5–8 ft-lb)



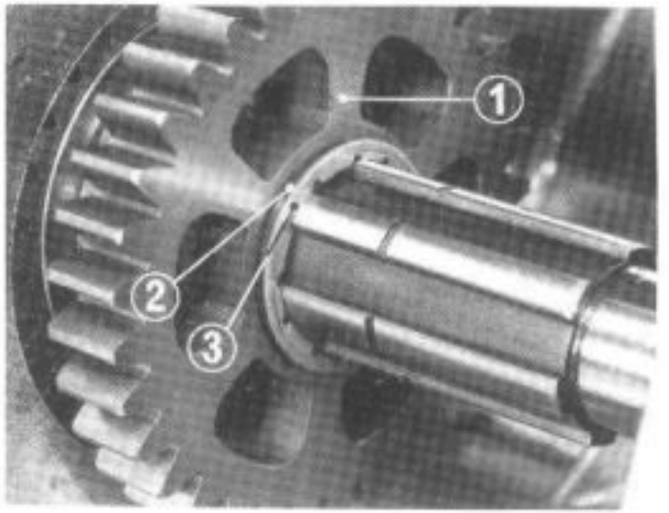
Transmission Assembly

Countershaft:

Before installing the countershaft in the crankcase, install the C5 gear and snap ring.

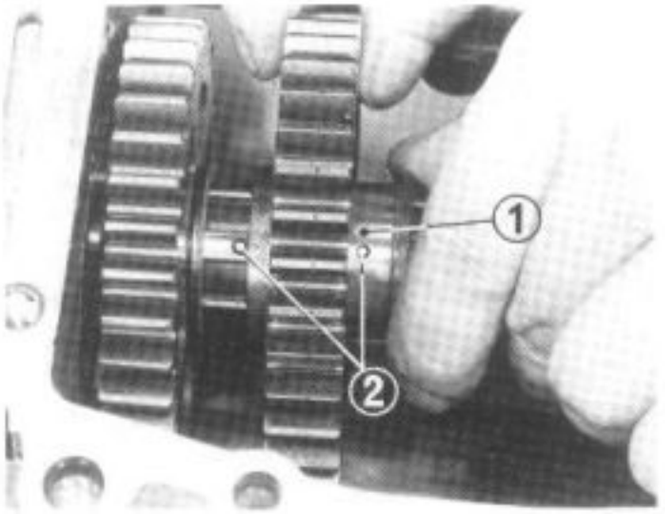
NOTE:
Lubricate the sliding surfaces of the gears with engine oil.

(1) Spacer
(2) C1 gear (41T)
(3) C4 gear (31T)
(4) C2 gear (32T)
(5) C3 gear (30T)
(6) C5 gear (28T)
(7) Countershaft
(8) Needle bearing



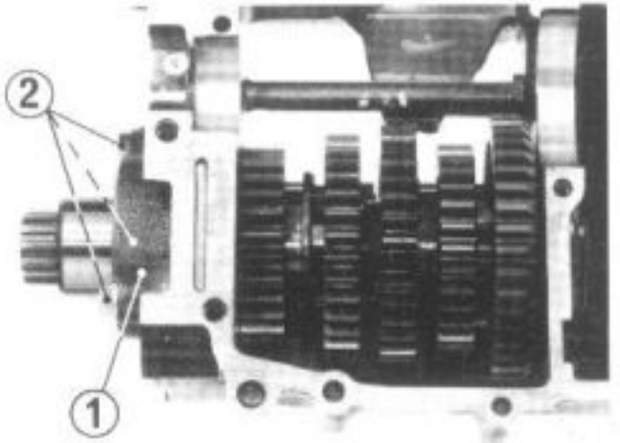
(1) C3 gear
(2) Splined bushing
(3) Stopper washer

Install the C3 gear and splined bushing. Install the stopper washer while aligning the tab of the stopper washer with the groove in the splined bushing.
Assemble the C2, C4 and C1 gears, washers and bushings.



(1) Bushing
(2) Oil holes

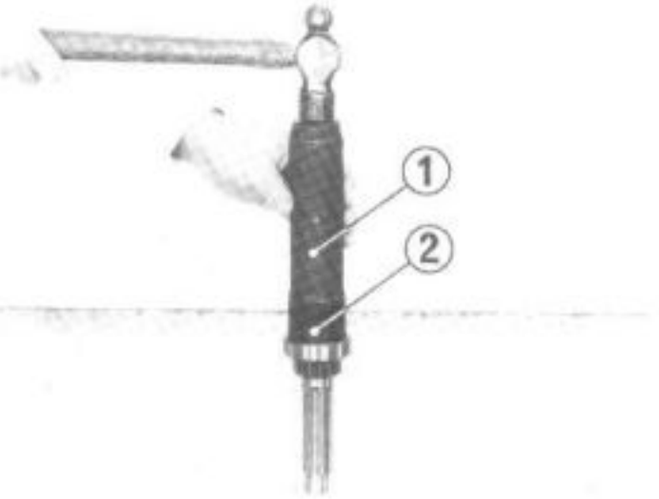
CAUTION:
Align the oil holes in the splined bushings with the oil holes in the shaft.



(1) Countershaft bearing holder
(2) Bolts

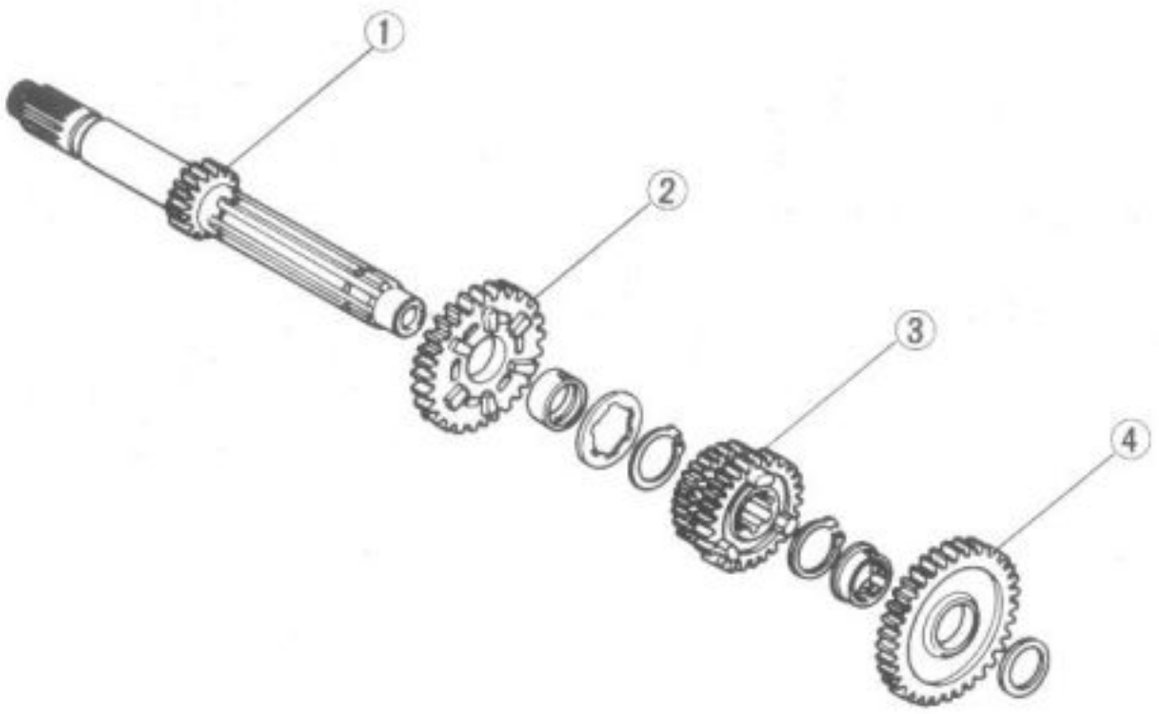
Install the countershaft bearing holder bolts and tighten them.

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



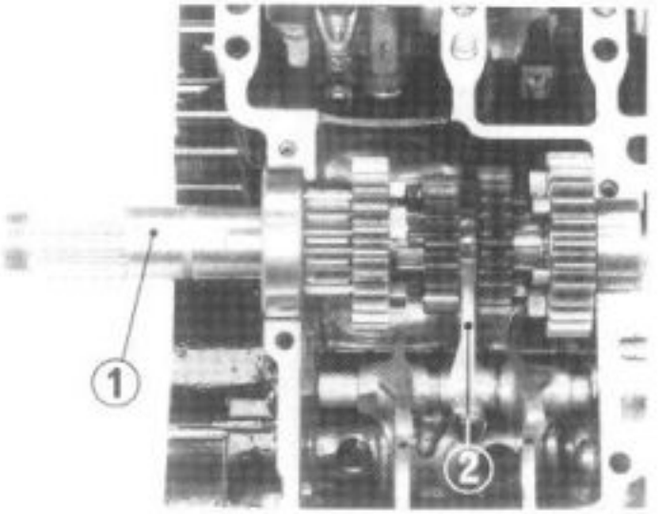
(1) Driver (07746–0030100)
(2) Attachment, 30 mm I.D. (07746–0030300)

Mainshaft:
Install the mainshaft bearing with the special tools.



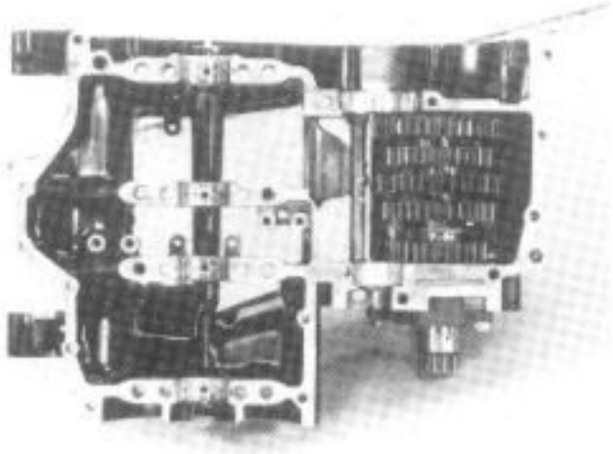
Assemble the mainshaft as shown.
Check the gears for freedom of movement or rotation on the shaft.
Check that the snap rings are seated in the grooves.

(1) Mainshaft/M1 gear (15T)
(2) M4 gear (25T)
(3) M2/M3 gear (17/20T)
(4) M5 gear (27T)



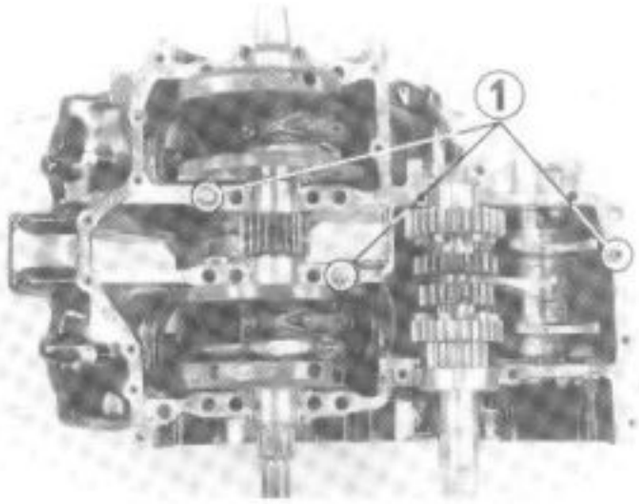
(1) Mainshaft
(2) Center shift fork

Insert the center shift fork into the M2/3 gears.
Install the mainshaft onto the upper crankcase.



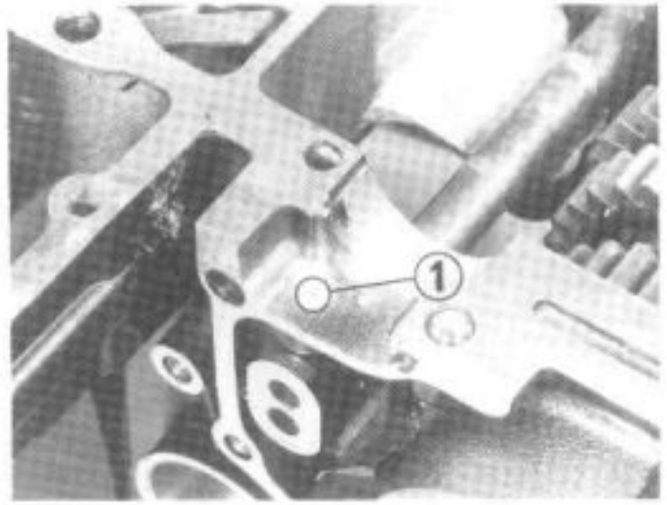
Crankcase Assembly
Clean the crankcase mating surfaces.
Apply liquid sealant to the mating surface of the lower and upper crankcase.

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



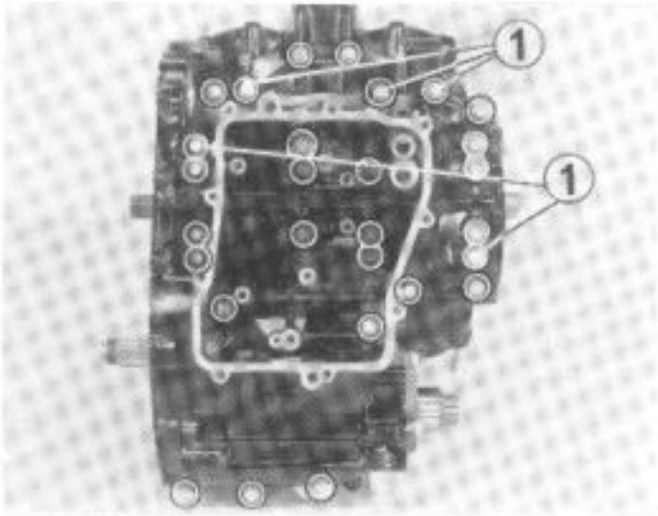
(1) Dowel pins

Install the dowel pins onto the upper crankcase.



(1) Orifice

Check that the oil orifice is clear.

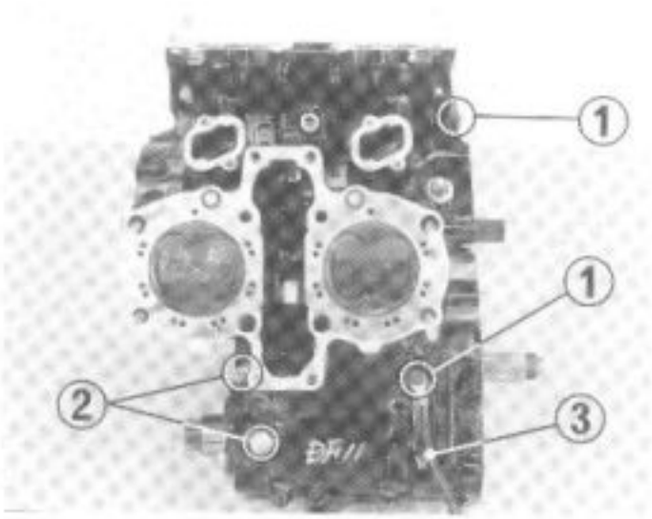


(1) Sealing washers

Assemble the crankcase halves, aligning the shift forks with the gears.
Tighten the lower crankcase bolts to the specified torque in a crisscross pattern and in 2–3 steps.

TORQUE: 9 mm bolt: 38–42 N·m (3.8–4.2 kg-m, 27–30 ft-lb)
6 mm bolt: 10–14 N·m (1.0–1.4 kg-m, 7–10 ft-lb)

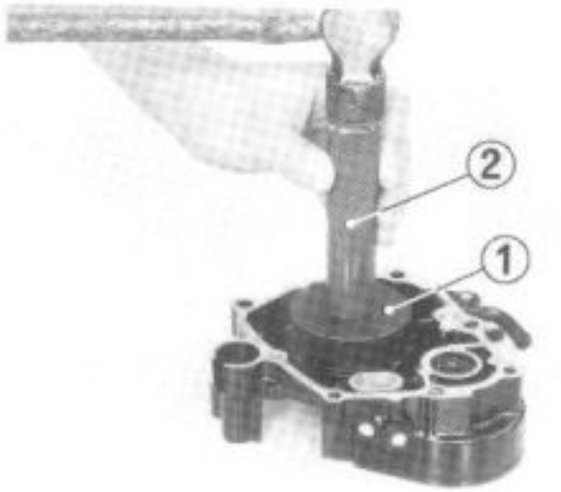
NOTE:
Make sure that the sealing washers are under the crankcase bolt heads and the battery ground cable is under the 6 mm bolt head as shown.



(1) 6 mm bolts
(2) 8 mm bolts
(3) Ground cable

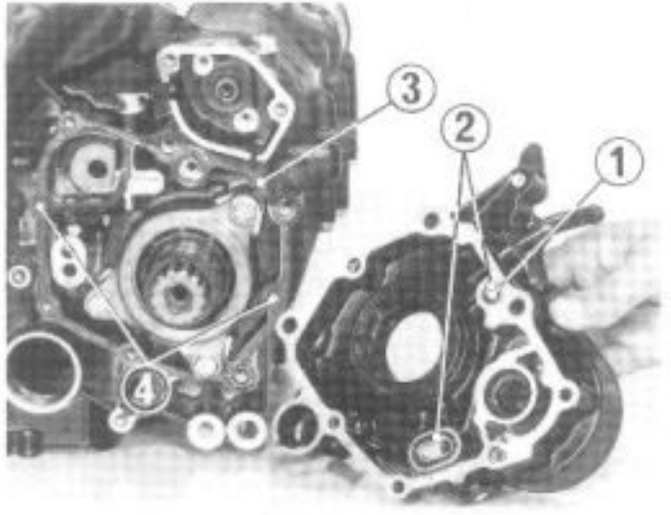
Tighten the upper crankcase bolts to the specified torque in a crisscross pattern and in 2–3 steps.

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



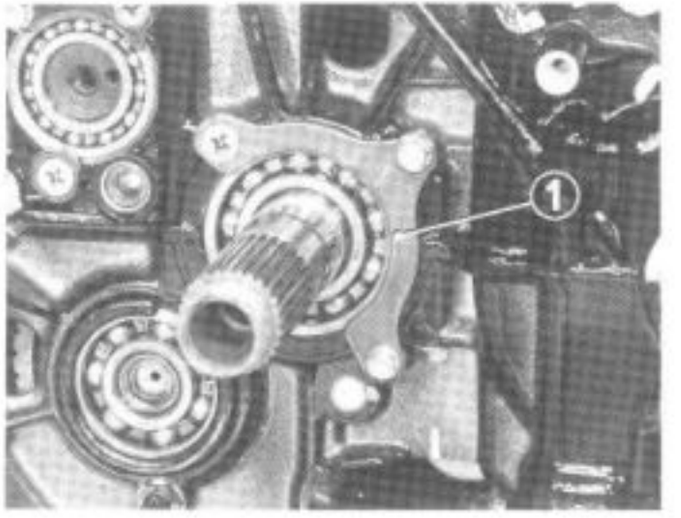
(1) Attachment, 62 x 68 mm (07746–0010500)
Pilot, 40 mm (07746–0040900)
(2) Driver (07749–0010000)

Drive the new oil seals into the countershaft oil seal cover, if oil seals are removed.
Clean the oil passages by compressed air.



(1) Orifice
(2) O-rings
(3) Gasket
(4) Dowel pins

Install the oil control orifice and O-rings into the countershaft oil seal cover.
Install the dowel pins and a new gasket on the countershaft oil seal cover mounting surface.
Apply grease to the countershaft oil seal lip in the countershaft oil seal cover, then install it being careful not to damage the oil seal lip.
Install the neutral switch and cover.

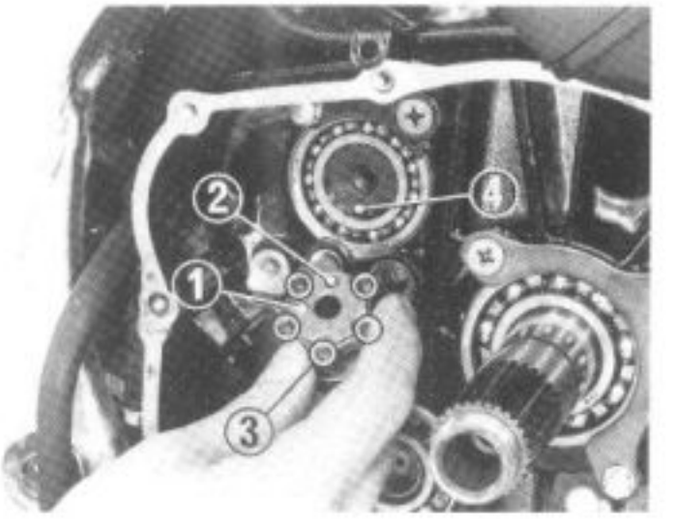


(1) Bearing holder

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

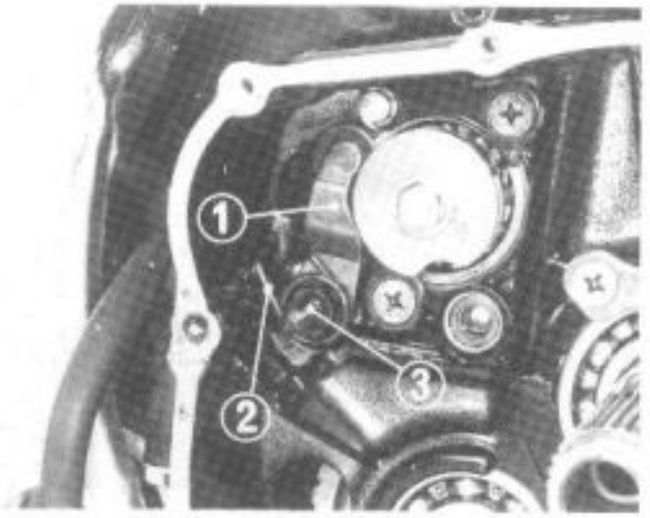
TORQUE: 7–11 N·m
(0.7–1.1 kg-m, 5–8 ft-lb)

NOTE:
* *Tighten the screw first, then tighten the bolt.*
* *Apply a locking agent to the thread of the screw and bolts.*



(1) Stopper cam
(2) Hole
(3) Pin
(4) Dowel pin

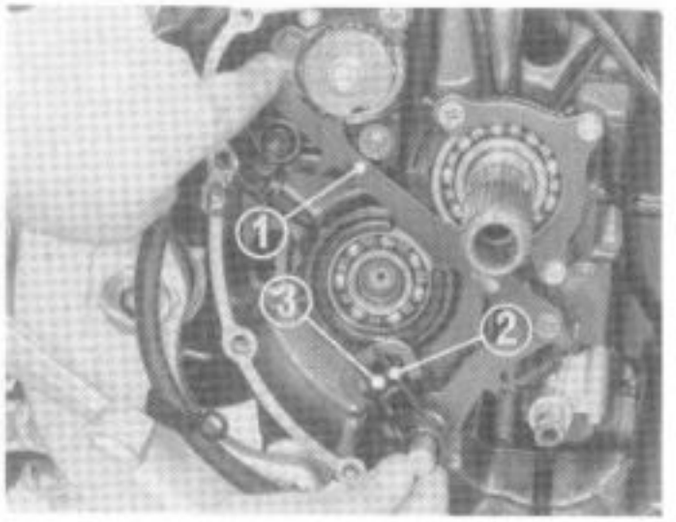
Install the dowel pin in the hole of the shift drum.
Insert the five pins in the holes of the stopper cam.
Align the stopper plate hole with the dowel pin on the shift drum and install the stopper plate.
Tighten the bolt securely.



(1) Shift drum stopper arm
(2) Spring
(3) Arm bolt

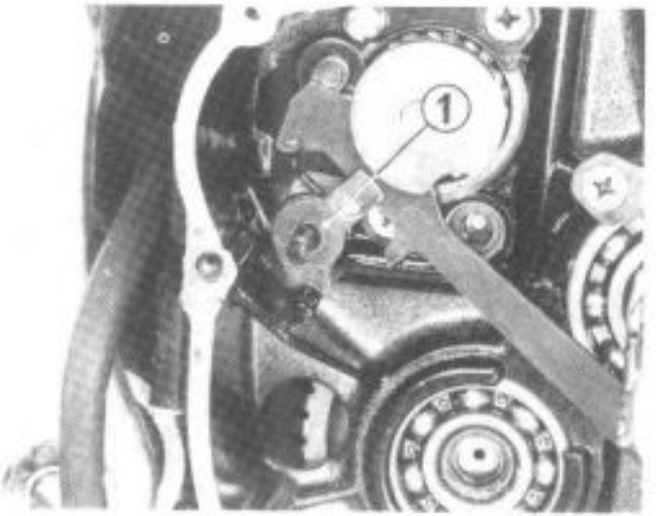
Gearshift linkage installation:

Install the washer, shift drum stopper arm, spring and arm bolt.
Tighten the arm bolt securely.



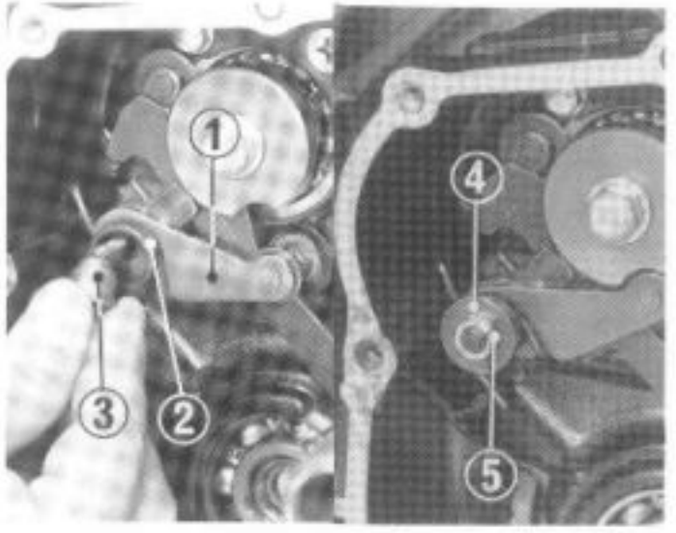
(1) Gearshift spindle
(2) Return spring
(3) Spring stopper

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



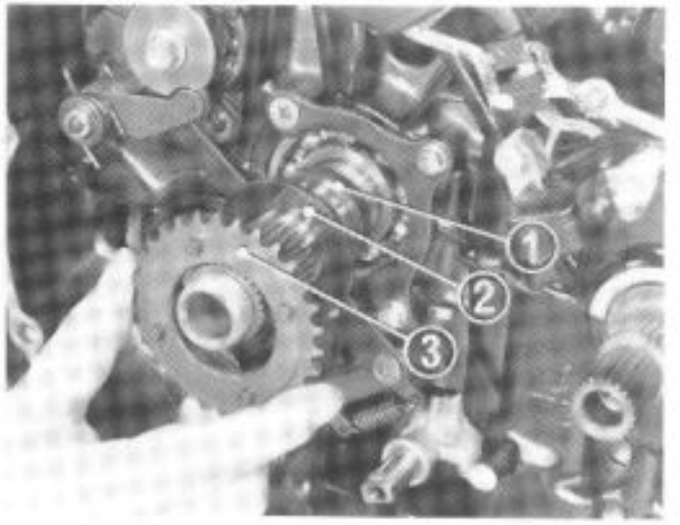
(1) Tab washer

Install the tab washer onto the stopper arm bolt.



(1) Neutral stopper arm
(2) Spring
(3) Collar
(4) Washer
(5) Nut

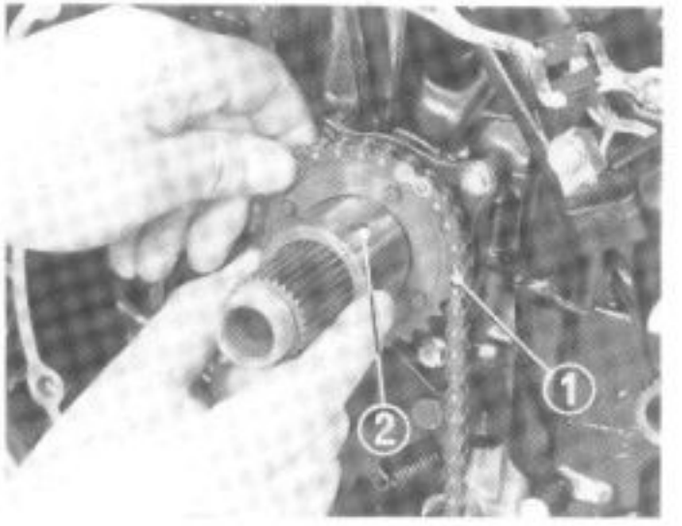
Install the neutral stopper arm, collar, spring, washer and nut over the arm bolt. Tighten the nut securely.
Rotate the gearshift spindle and check the linkage for smooth operation.



(1) Spacer
(2) Thrust washer
(3) Oil pump drive sprocket

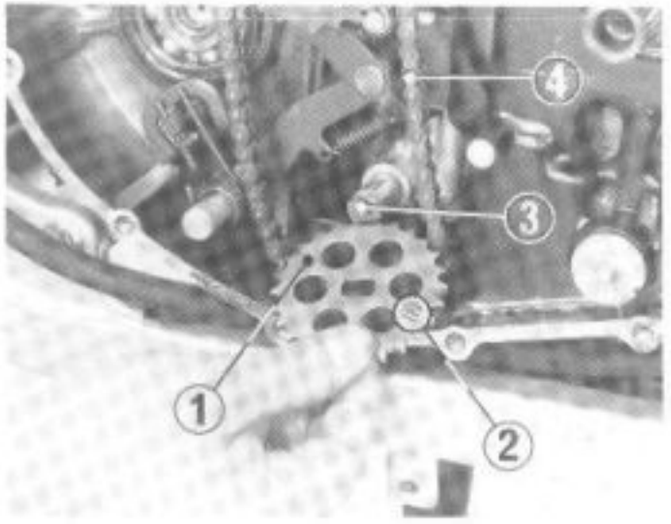
Install the spacer, thrust washer and oil pump drive sprocket onto the mainshaft.

NOTE:
Install the oil pump driven sprocket with the pins facing out.



(1) Oil pump drive chain
(2) Clutch outer guide

Install the oil pump drive chain and the clutch outer guide as shown.

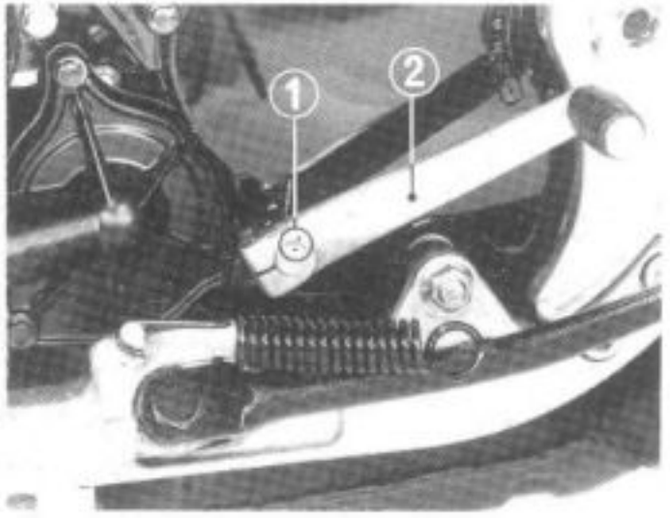


(1) Oil pump driven sprocket
(2) "IN" mark
(3) Oil pump shaft
(4) Oil pump drive chain

Install the oil pump driven sprocket with the drive chain onto the oil pump shaft.

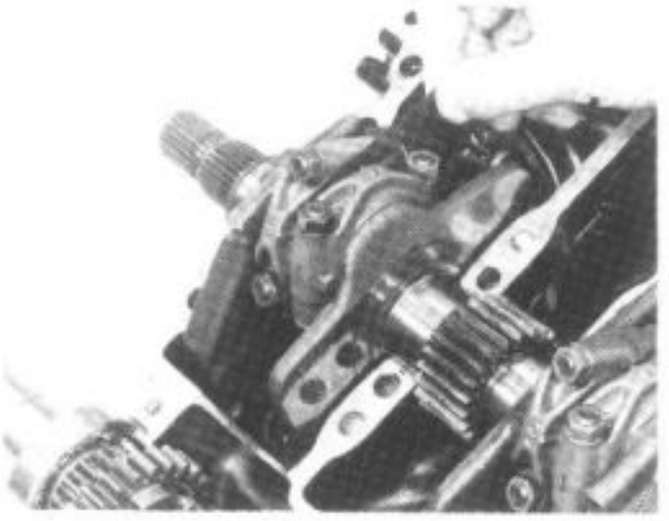
NOTE:
The driven sprocket has an "IN" mark that must face the crankcase.

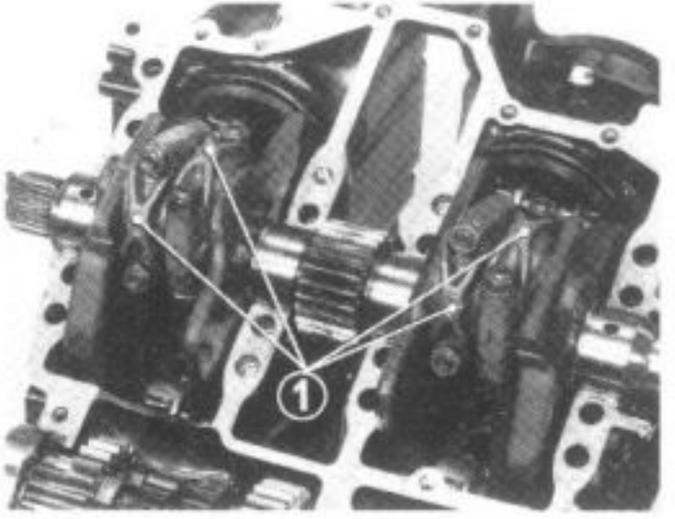
Install the clutch assembly.
Install the dowel pins and a new gasket.
Install the right crankcase cover.

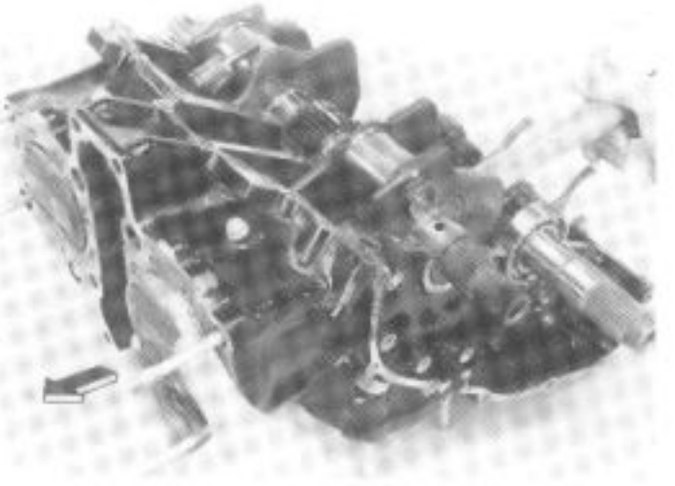


(1) Punch marks
(2) Gearshift pedal

Align the punch marks on the gearshift pedal and gearshift spindle. Tighten the bolt securely.







Connecting Rod Removal

Separate the crankcase assembly (page 101).

Check the connecting rod side clearance (page 215).

(1) Bearing caps

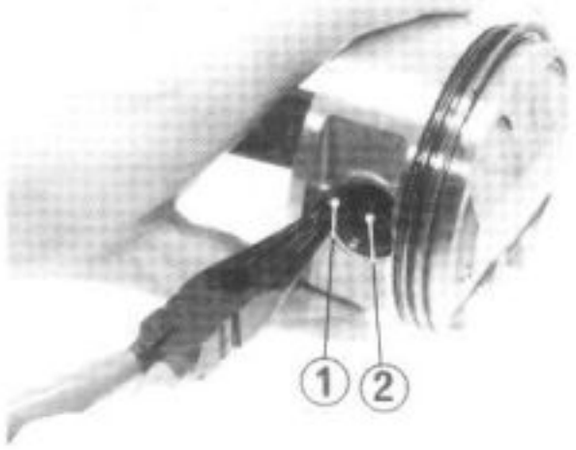
Remove the connecting rod bearing caps and note their locations.

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

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

CAUTION:

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

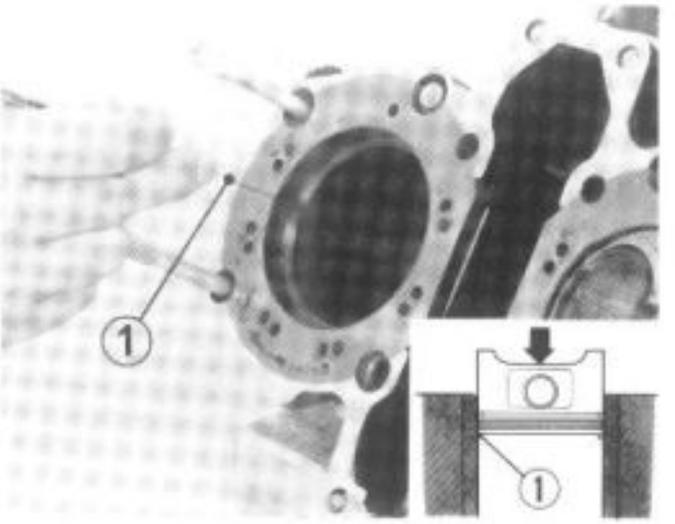


(1) Piston pin clip

(2) Piston pin

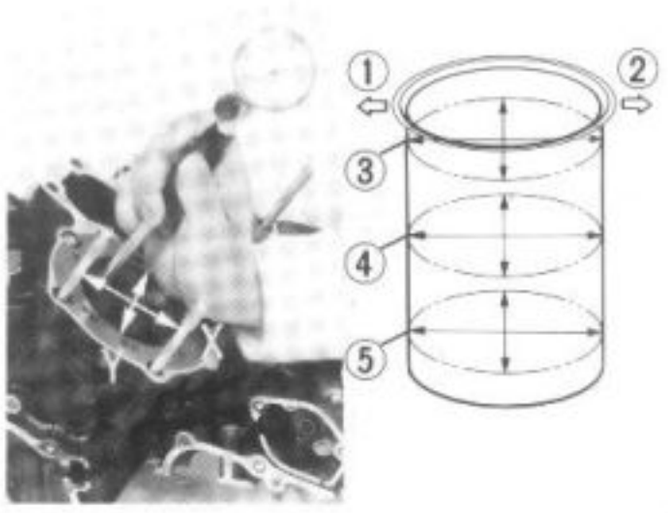
Remove the piston pin clips. Push the piston pin out and remove the piston.
Mark the piston pins to indicate their correct piston position.

Measure the piston ring-to-groove clearance (page 216).
Remove the piston rings and mark them to indicate the correct cylinder and piston position.
Clean the piston crown, removing all carbon deposits.
Inspect the piston for cracks or other damage and the ring grooves for excessive wear and carbon build-up.



(1) Piston ring

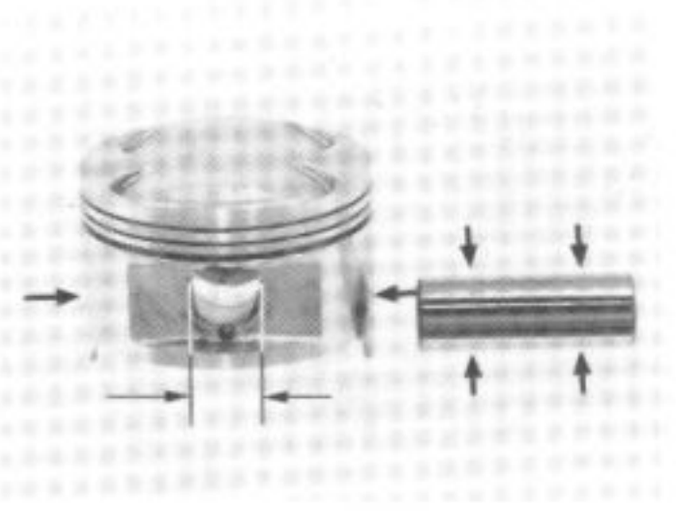
Using a piston, push the ring into the cylinder squarely and measure the end gap (page 216).



(1) Intake side
(2) Exhaust side
(3) Top
(4) Middle
(5) Bottom

Inspect the cylinder bores for wear or damage.
Measure the cylinder I.D. at three levels in X and Y axis (page 216).
Oversize pistons are available in the following sizes:

0.25 and 0.50 mm

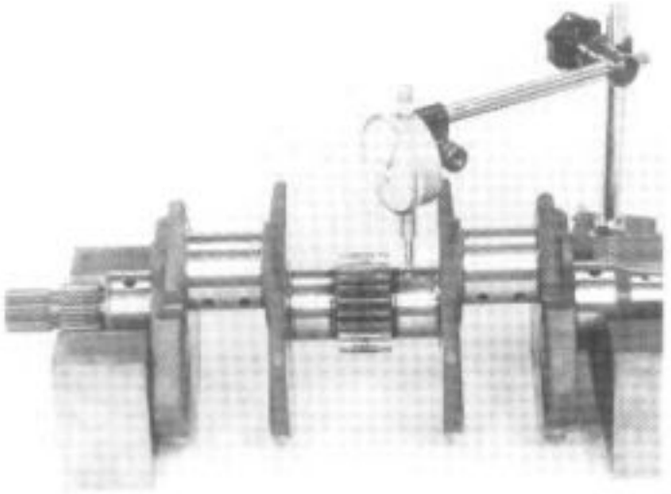


Measure the piston O.D. (page 216).

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

Calculate the piston-to-cylinder clearance (page 216).
Measure each piston pin O.D. (page 216).
Measure each piston pin hole I.D. (page 216).
Calculate the piston pin-to-piston clearance (page 216).

Measure the connecting rod small end I.D. (page 216). If the reading exceeds the service limit, replace the rod (page 122).



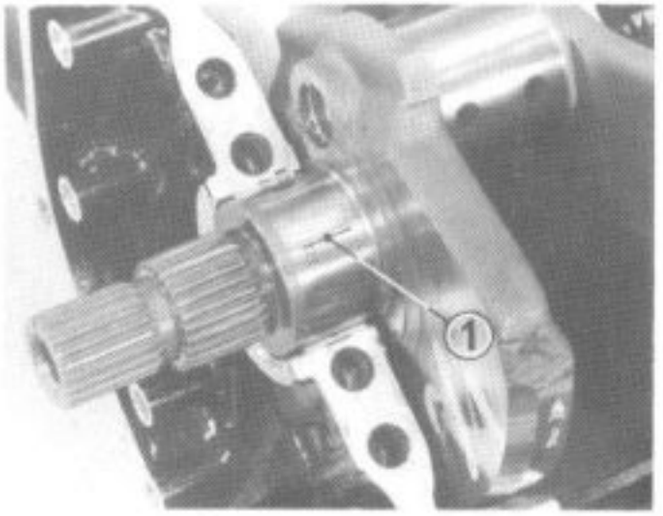
Crankshaft

Inspection:

Inspect the crank pin and main journal for abnormal wear or damage.

Set the crankshaft on a stand or Vee blocks.

Set a dial indicator on the center main bearing journal. Rotate the crankshaft two revolutions and read the runout (page 215).



(1) Plastigauge

Crankshaft Bearing Inspection

Main bearing:

Inspect the bearing inserts for unusual wear or damage.

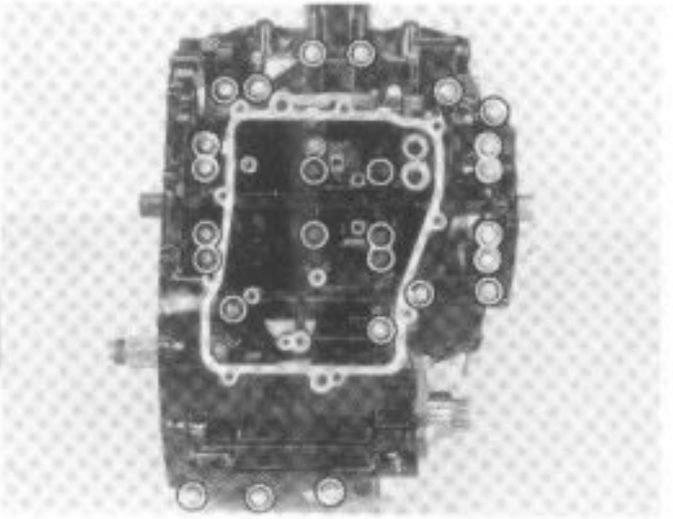
Reinstall the upper crankcase's main bearing inserts, then carefully lower the crankshaft in place.

Wipe all oil from the bearing inserts and journals.

Put a piece of plastigauge on each journal.

NOTE:

Do not put the plastigauge over the oil hole in the main bearing journal of the crankshaft.

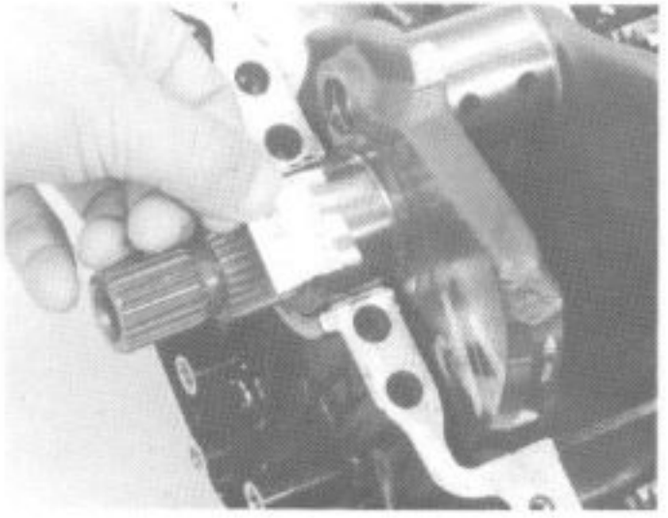


Assemble the crankcase halves, aligning the shift forks with the gears.

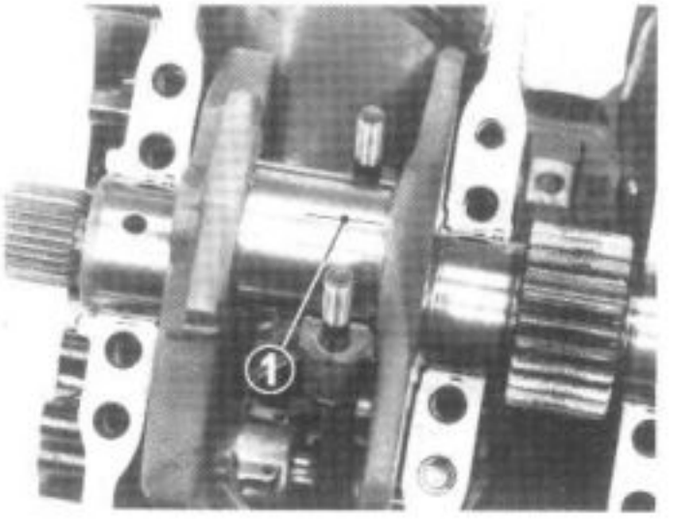
Tighten the crankcase bolts to the specifield torque in a crisscross pattern and in 2–3 steps (page 110).

NOTE:

Do not rotate the crankshaft during inspection.



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



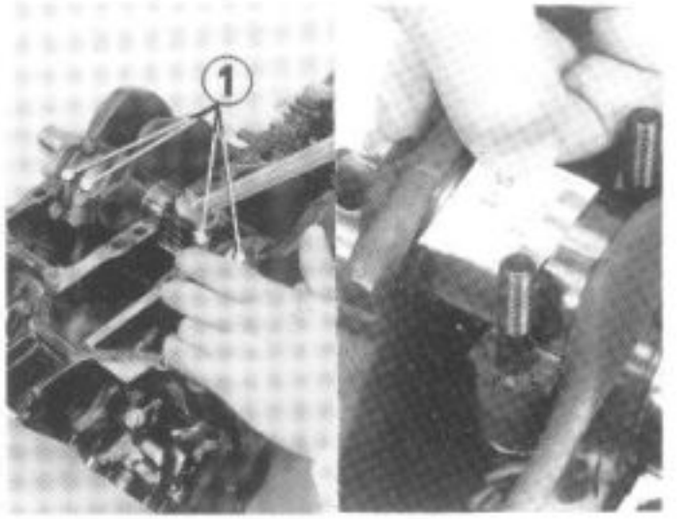
(1) Plastigauge

Crankpin bearing:

Inspect the bearing inserts for unusual wear or damage.
Wipe all oil from the bearing inserts and crankpins.
Put a piece of plastigauge on each crankpin.

NOTE:

* *Do not put the plastigauge over the oil hole in the crankpin.*
* *The bearing tabs should face toward the exhaust ports. Remember the front and rear cylinder exhaust ports face opposite directions.*



(1) Bearing caps

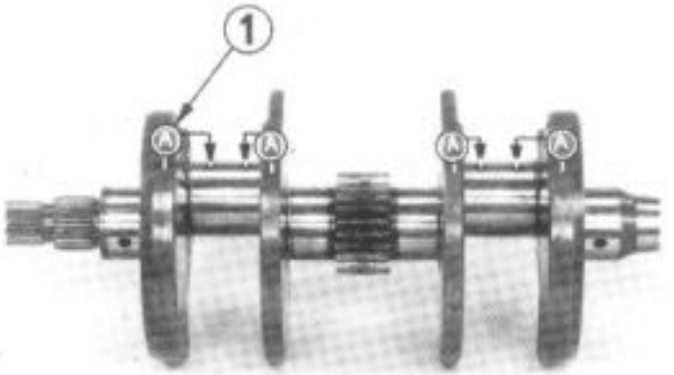
Install the bearing caps and rods on the correct crankpins, and tighten them evenly.

TORQUE: 36–40 N·m
(3.6–4.0 kg-m, 26–29 ft-lb)

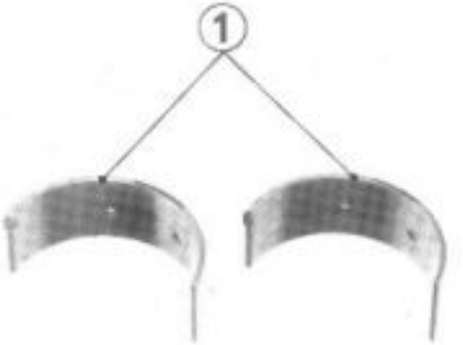
NOTE:
Do not rotate the crankshaft during inspection.

Remove the caps and measure the compressed plastigauge on each crankpin (page 215).

(1) I.D. code letter



(1) O.D. code letters



(1) Color code

Bearing Section

Crankpin bearing:

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

The code numbers (1 or 2) stamped on each connecting rod identifies its inside diameter (I.D.).

The code letters (A or B) stamped on each crankshaft counter weight identifies the outside diameter (O.D.) of its crankpin.

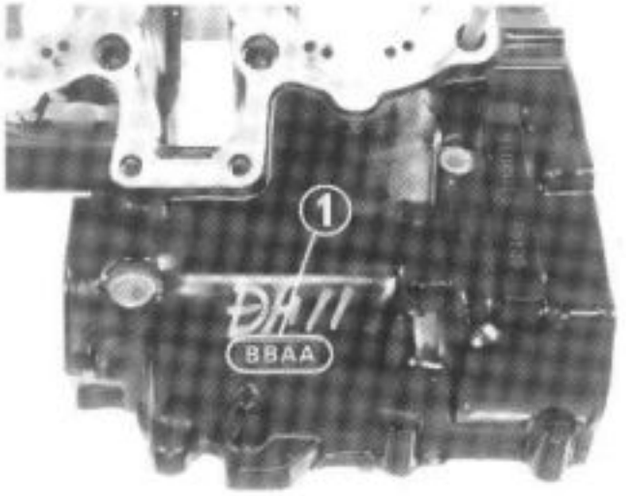
Cross reference the crankpin and rod codes to select the correct replacement bearing.

CAUTION:

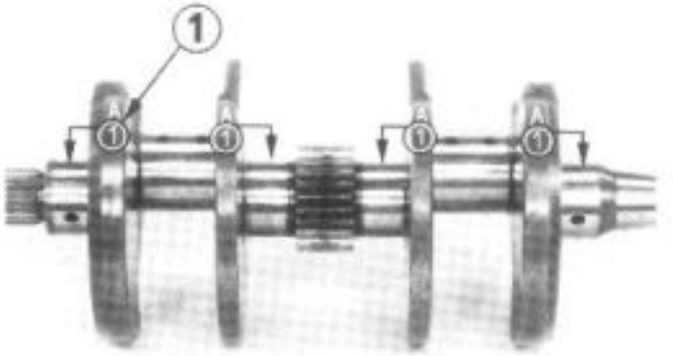
* *The crankpin bearings of the front cylinders have one color code for each, and bearings of the rear cylinders have two color codes for each. Do not interchange the bearings between the front and rear cylinders.*
* *The bearings and bearing caps must be installed in their correct locations or correct bearing oil clearance may not be obtained and engine damage may result.*

CRANKPIN BEARING SELECTION TABLE

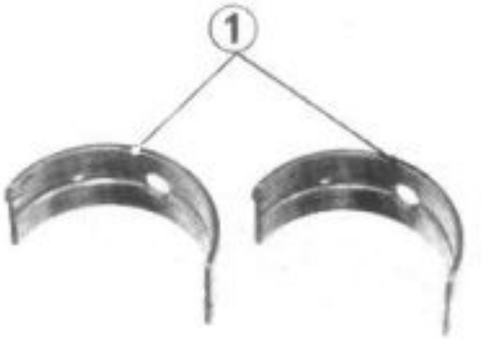
ROD I.D. CODE LETTER \ CRANKPIN O.D. CODE LETTER	A	B
1	Pink	Yellow
2	Yellow	Green



(1) I.D. code letters



(1) O.D. code letters



(1) Color code

Main bearing:

The code letters (A or B) stamped on the rear portion of the upper crankcase identifies the inside diameter (I.D.) of each main bearing journal, from left-to-right. In this example, the I.D. code for the right main journal is "A".

The code numbers (1 or 2) stamped on each crankshaft counter weight identifies the outside diameter (O.D.) of its main journal.

Cross reference the crankcase and crank journal codes to select the correct replacement bearing.

NOTE:
The main bearings are arranged in the order of No. 1, 2, 3, 4, from the alternator side.

#1, 4 (BOTH END) MAIN BEARINGS SELECTION TABLE

CRANKSHAFT O.D. CODE LETTER / CASE I.D. CODE LETTER	1	2
A	Pink	Yellow
B	Yellow	Green

#2, 3 (CENTER) MAIN BEARINGS SELECTION TABLE

CRANKSHAFT O.D. CODE LETTER / CASE I.D. CODE LETTER	1	2
A	Brown	Black
B	Black	Blue

CAUTION:
The bearings must be installed in their correct locations or correct bearing oil clearance may not be obtained and engine damage may result.

(1) Weight code (alphabetical code)

Connecting Rod Replacement

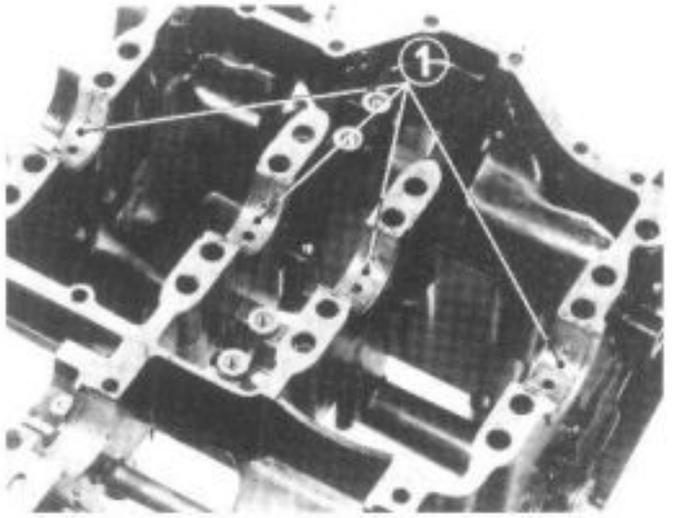
The weight code is stamped on the connecting rod by the alphabetical code. When replacing the connecting rod, perform the weight selection between the No. 1 and 2 connecting rods, or No. 3 and 4 connecting rods in accordance with the selection table.

SELECTION TABLE

#1, #2 CONNECTING RODS						#3, #4 CONNECTING RODS					
#1 ROD CODE \ #2 ROD CODE	A	B	C	D	E	#3 ROD CODE \ #4 ROD CODE	A	B	C	D	E
A				○	○	A				○	○
B			○	○	○	B			○	○	○
C		○	○	○		C		○	○	○	
D	○	○	○			D	○	○	○		
E	○	○				E	○	○			

NOTE:

* *It is not necessary to perform the weight selection between the No. 1 and 3, or No. 2 and 4 connecting rods.*
* *The "○" mark in the table indicates that the matching is possible in the crossed codes.*
* *The cylinders are arranged in the order of No. 1, 2, 3, 4 from the alternator side.*



(1) Main bearings

Crankshaft Installation

Install the main bearings into the upper crankcase.

Apply molybdenum disulfide grease to the upper and lower main bearings.

Install the crankshaft.

Piston and Rod Installation

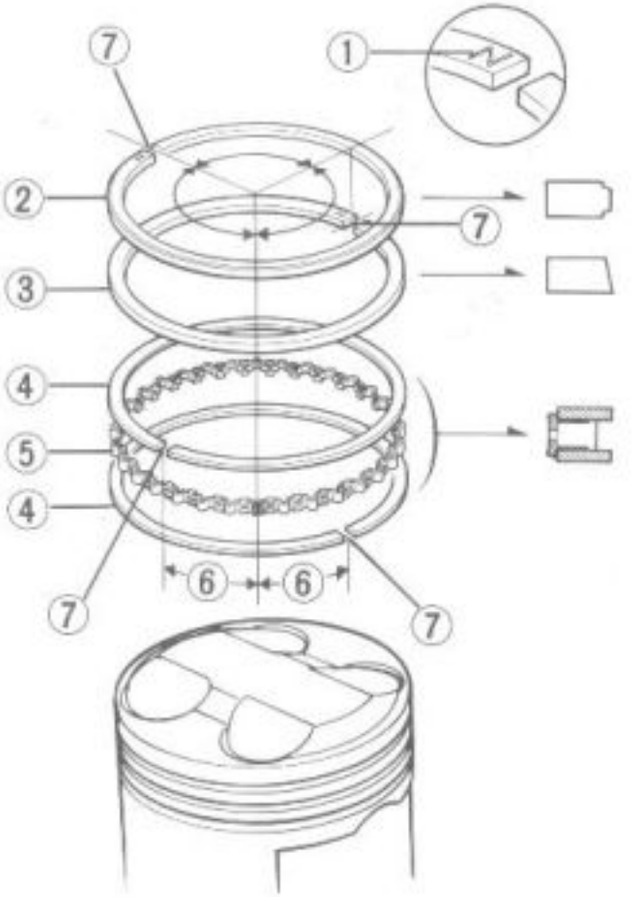
Clean the piston domes, ring lands, and skirts.

Carefully install the position rings onto the piston.

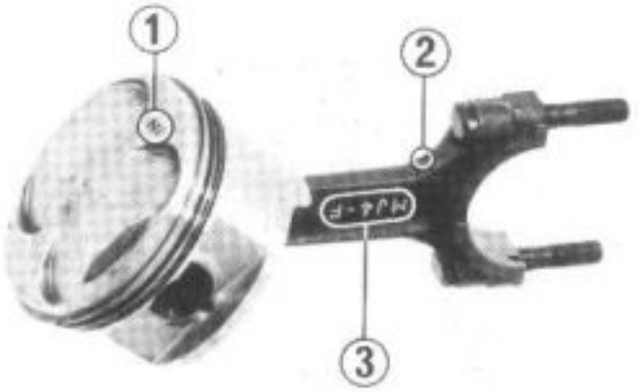
Stagger the ring end gaps as shown.

NOTE:

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



(1) Piston ring mark
(2) Top ring
(3) Second ring
(4) Oil ring side rail
(5) Oil ring spacer
(6) 20 mm or more
(7) Gap

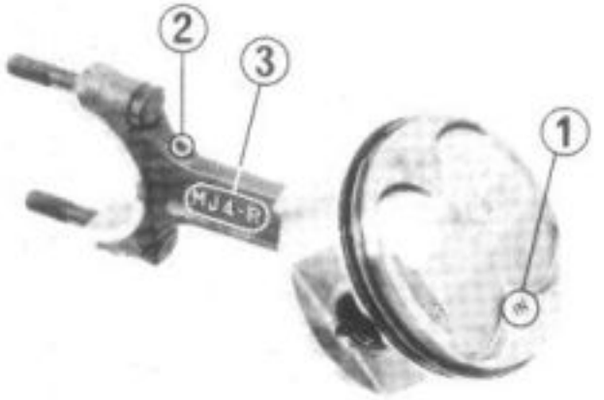


(1) "IN" mark
(2) Oil hole
(3) Identification mark

Coat the rod's small end with molybdenum disulfide grease.

NOTE:
Do not interchange the pistons, piston pins or connecting rods.

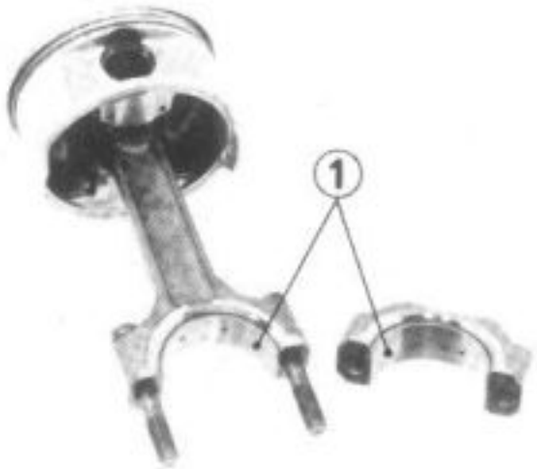
Front cylinders:
Note that the front cylinder connecting rods are marked "MJ4F".
Install the pistons on the front rods so that the intake "IN" mark is facing the same direction as the oil hole in the rod.



(1) "IN" mark
(2) Oil hole
(3) Identification mark

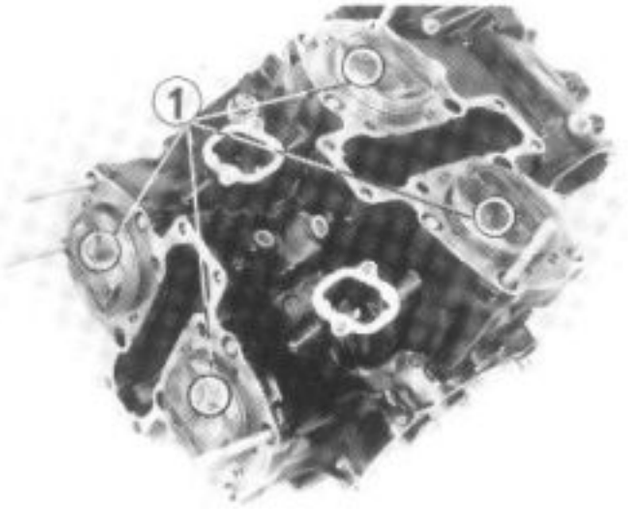
Rear cylinders:
Note that the rear cylinder connecting rods are marked "MJ4R".
Install the pistons on the rear connecting rods so that the intake "IN" mark is facing opposite the oil hole in the rod.
Install new piston pin clips.

NOTE:
* *Make sure that the piston pin clips are properly seated.*
* *Do not align the piston pin clip end gap with the piston cut-out.*



(1) Connecting rod bearings

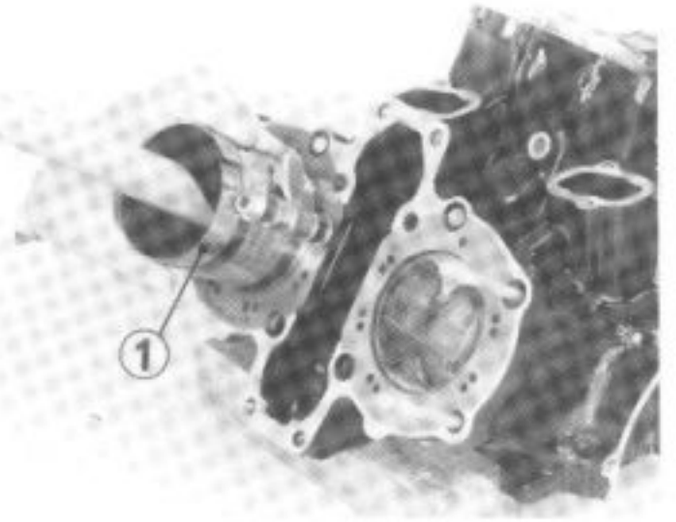
Align the hole in the connecting rod bearing insert with the hole in the connecting rod and install the insert.
Install the connecting rod cap bearing insert.
Apply molybdenum disulfide grease to the connecting rod bearings.



(1) "IN" marks

Stagger the piston rings before installation (page 117).
Coat the cylinders, piston rings/grooves and piston with oil. To prevent damaging the crankshaft, slip short sections of rubber hose over the rod bolts before installation.
Install the rod and piston assemblies into the cylinders from the top of the crankcase. Be sure each assembly is returned to its original position as noted during removal.

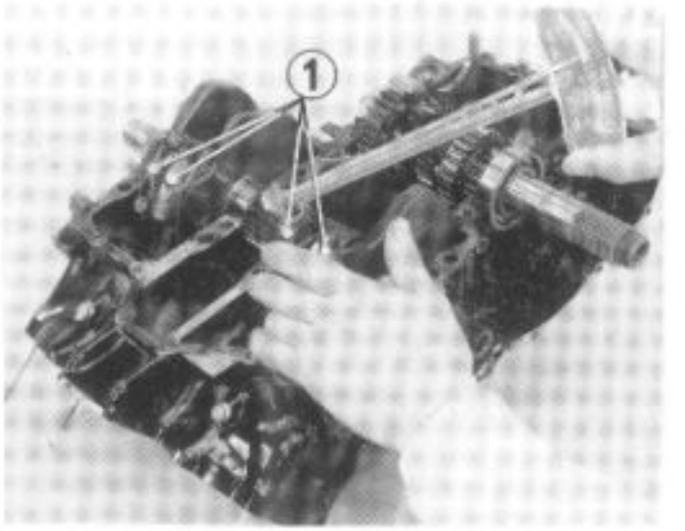
NOTE:
The piston intake "IN" marks should be facing each other as shown.



(1) Piston ring compressor
(Commercially available)

Compress the piston rings with a ring compressor and insert the piston and rod into the cylinder until the rod seats on the crankpin.

NOTE:
Be careful not to damage the crankpins or bearings during assembly.



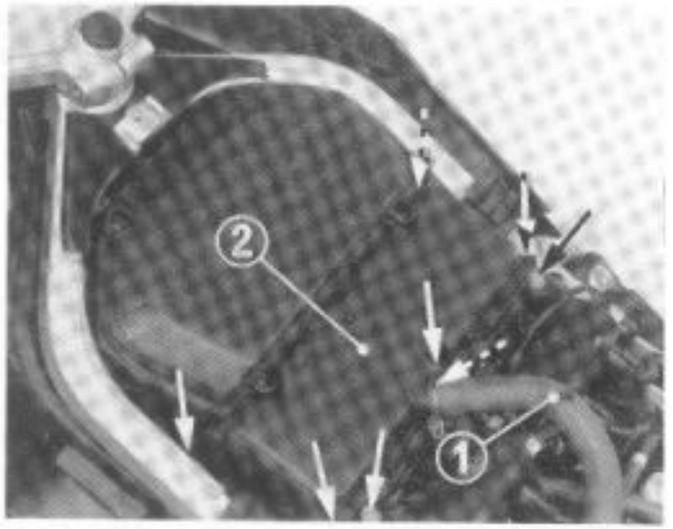
(1) Connecting rod caps

Flip the upper crankcase over.
Install and torque the connecting rod bearing caps.

TORQUE: 36–40 N·m
(3.6–4.0 kg-m, 26–29 ft-lb)

NOTE:
* *Be sure the bearing caps are installed in their correct location as marked during removal.*
* *Tighten the nuts in two or more steps.*
* *After tightening the bolts, check that the rods move freely without binding.*

Assemble the crankcase (page 109).



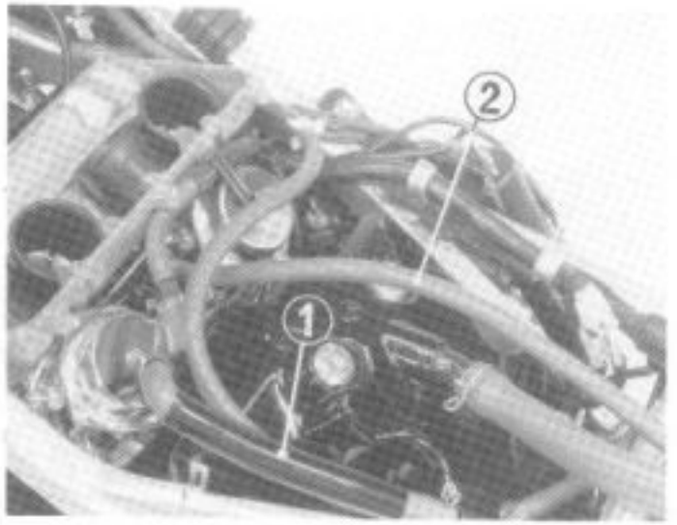
(1) Breather hose
(2) Air cleaner case
(3) Ignition coil stay

Carburetor Removal

WARNING

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

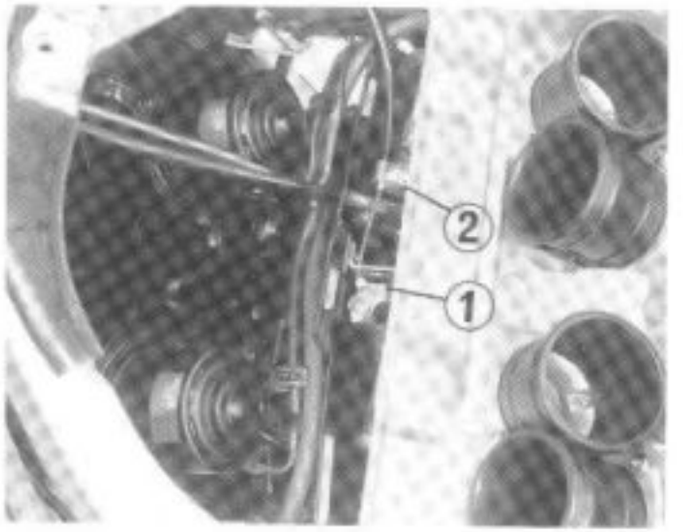
Turn the fuel valve off.
Remove the both side covers, seat and fuel tank.
Remove the lower and upper fairing (page 139).
Disconnect the breather hose and remove the air cleaner case by removing five screws.



(1) Fuel tube
(2) Carburetor air vent tube

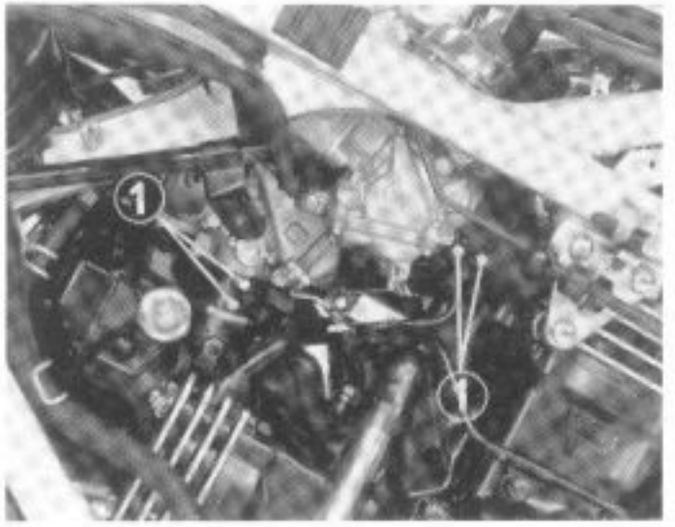
Remove the ignition coil stay by removing the three bolts.

Disconnect the fuel tube and carburetor air vent tube from the carburetor.



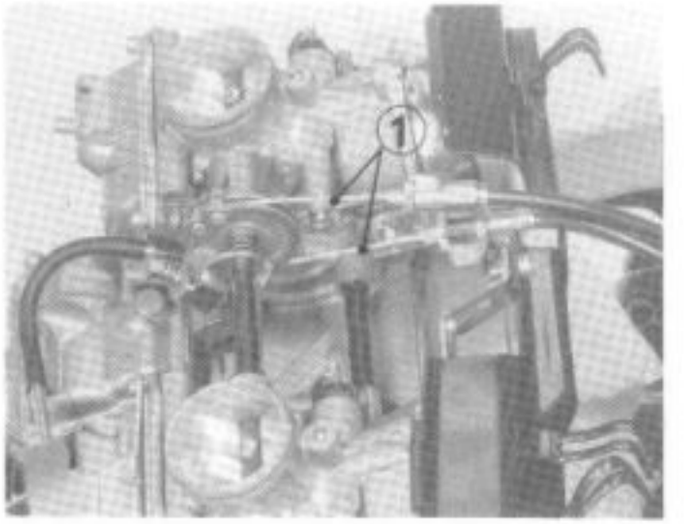
(1) Choke cable
(2) Wire clamp

Disconnect the choke cable from the carburetor.
Bend up the wire clamps and disconnect the wires from the clamps.



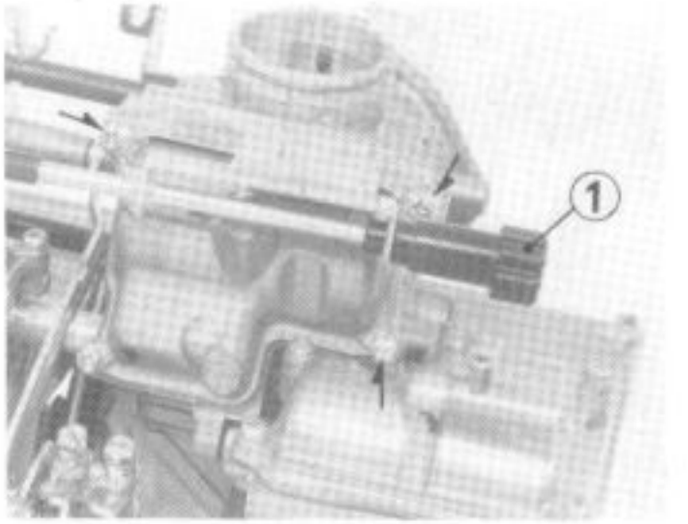
(1) Carburetor bands

Loosen all carburetor bands and remove the carburetor from the intake pipes.



(1) Throttle cables

Lift the carburetor out of the frame and disconnect the choke and throttle cables from the carburetor.

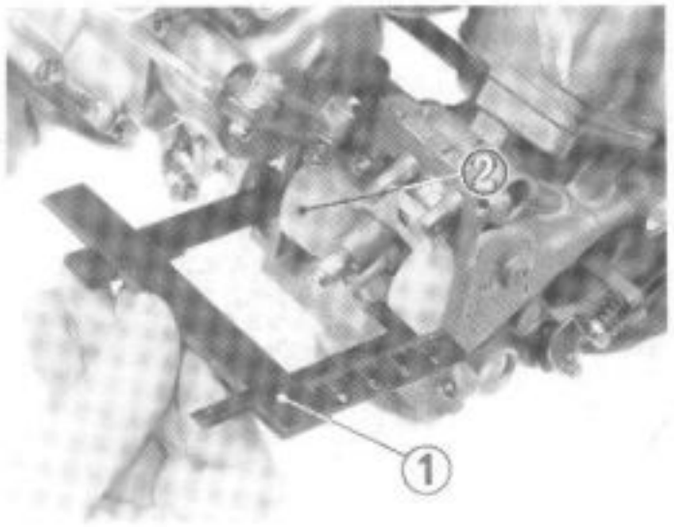


(1) Throttle stop screw

Float Chamber Removal

Remove the throttle stop screw bracket from the No. 2 carburetor.

Remove the four float chamber screws and the float chamber.

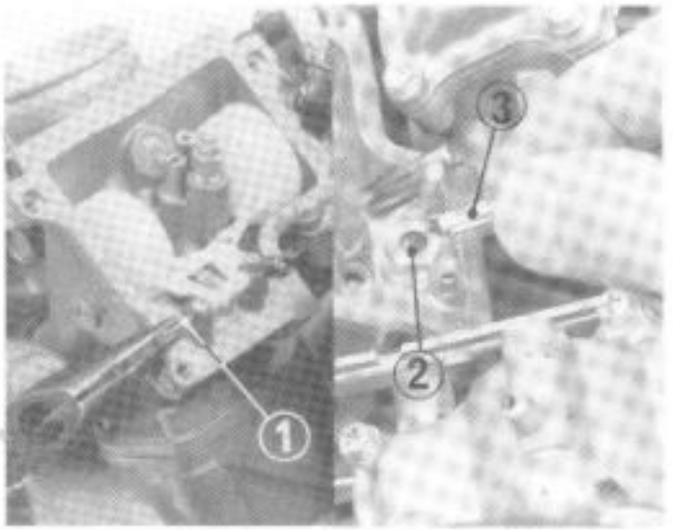


(1) Float level gauge (07401–0010000)
(2) Float

Float Level

Measure the float level with the carburetor inclined 15–45° from vertical and float tang just contacting the float valve (page 218).

If the float level is not within specification, adjust the float level by carefully bending the float tang.



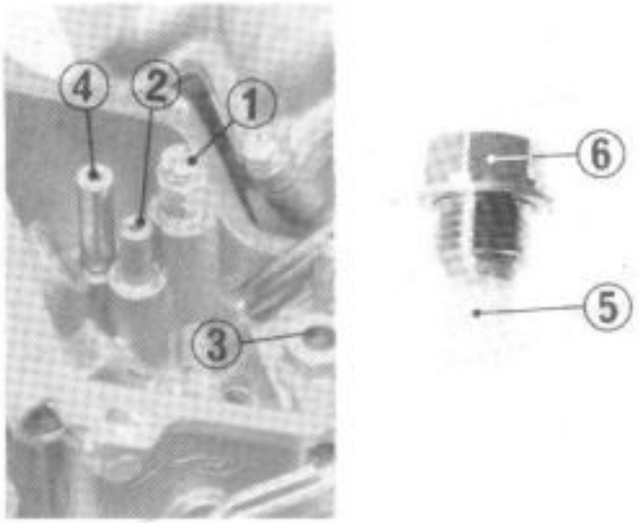
(1) Float pin
(2) Float valve seat
(3) Float valve

Float and Jets

Remove the float pin, float and float valve.

Inspect the float valve for grooves and nicks.

Inspect the operation of the float valve.



(1) Main jet
(2) Slow jet
(3) Float valve seat
(4) Starter jet
(5) Filter
(6) Float valve seat

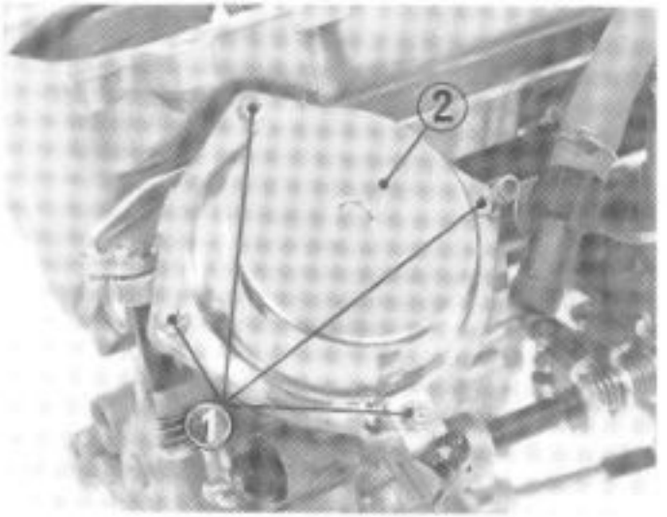
Remove the main jet and slow jet.

Remove the float valve seat and filter.

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

Assembly

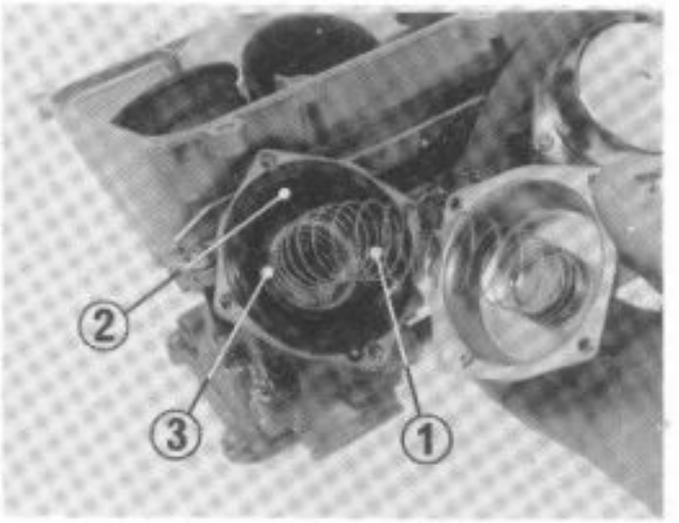
Assemble the float chamber components in the reverse order of disassembly.



(1) Screws
(2) Cover

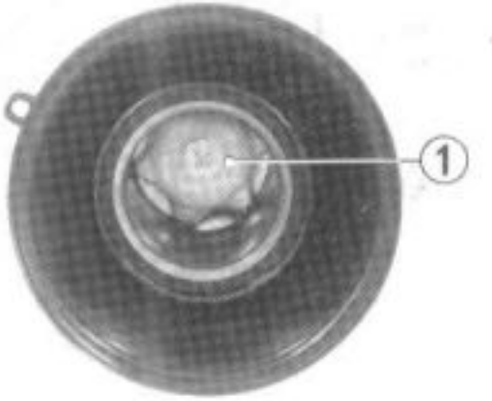
Vacuum Chamber Removal
Remove the four vacuum chamber cover screws and cover.

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



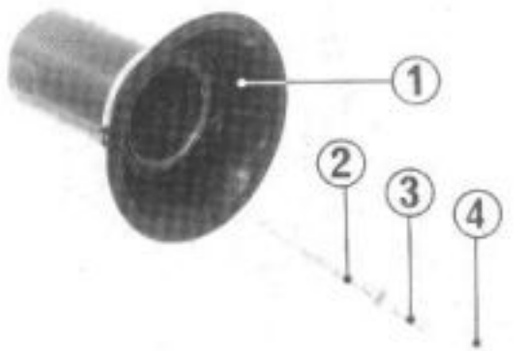
(1) Compression spring
(2) Diaphragm
(3) Vacuum piston

Remove the compression spring, diaphragm and vacuum piston.
Inspect the vacuum piston for wear, nicks scratches or other damage.
Make sure the piston moves up and down freely in the chamber.



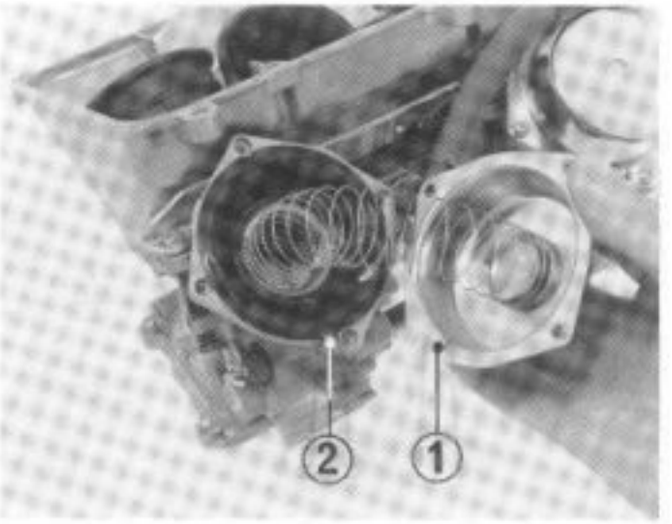
(1) Needle holder

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



(1) Diaphragm
(2) Needle
(3) Spring
(4) Needle holder

Inspect the needle for excessive wear at the tip and for bending, or other damage. Check for a torn diaphragm or other deterioration.

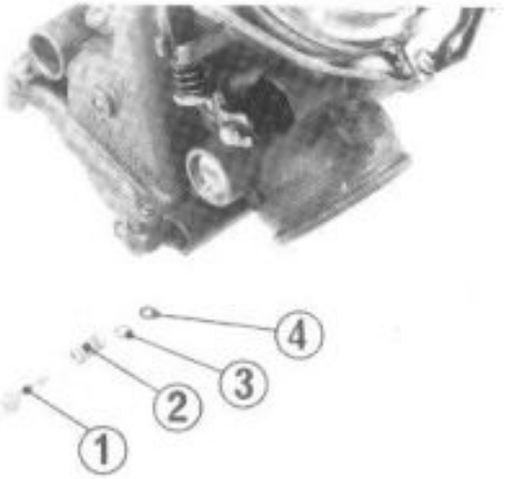


(1) Cavity
(2) Hole

Vacuum Chamber Installation

Installation is essentially the reverse of removal, but to keep from distorting the diaphragm, install the vacuum piston/diaphragm as follows:

Insert the vacuum piston into the carburetor. Stick your finger into the carburetor bore and hold the vacuum piston in the full throttle position, then turn down the diaphragm so its lip fits into the carburetor groove. Install the chamber cover, aligning its cavity with the hole in the carburetor, and secure with at least two screws before releasing the vacuum piston.



(1) Pilot screw
(2) Spring
(3) Washer
(4) O-Ring

Pilot Screw

Removal:

NOTE:

The pilot screws are factory pre-set and should not be removed unless the carburetors are overhauled.

Turn each pilot screw in and carefully count the number of turns before it seats lightly. Make a note of this to use as a reference when reinstalling the pilot screws.

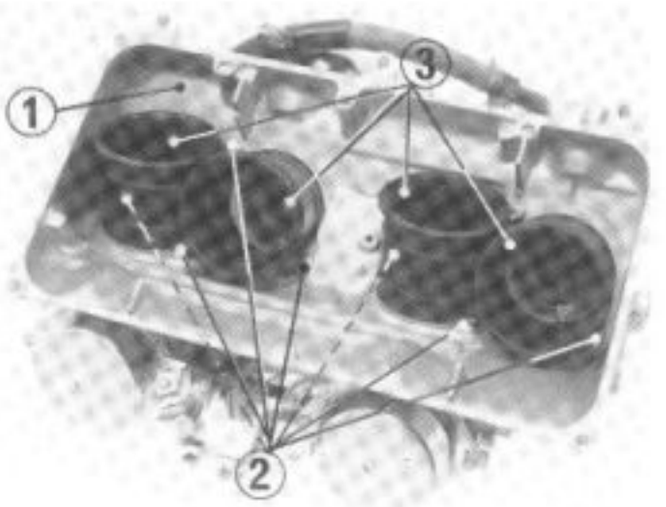
CAUTION:

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

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

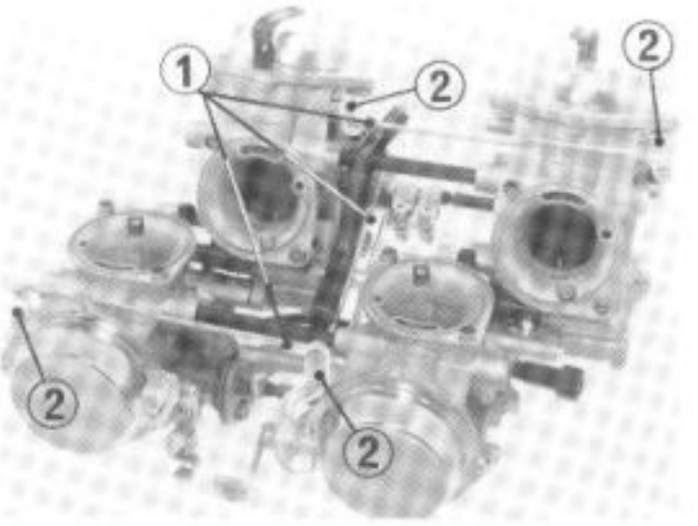
Installation:
Install the pilot screws and return them to their original position as noted during removal.
Perform pilot screw adjustment if new pilot screws are installed.

NOTE:
If you replace the pilot screw in one carburetor, you must replace the pilot screws in the other carburetors for proper pilot screw adjustment.



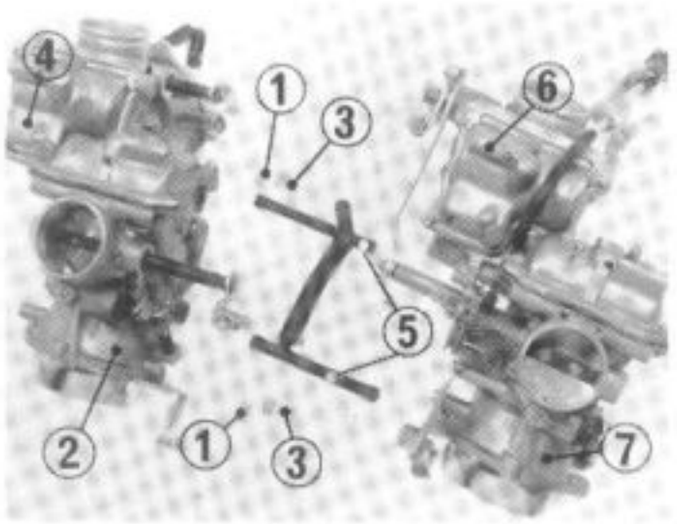
(1) Air chamber
(2) Screws
(3) Funnels

Carburetor Separation
Remove the screws attaching the air chamber to the carburetors and separate the chamber and carburetor.
Remove the throttle stop screw bracket from the No. 2 carburetor.
Remove the fuel tubes from the carburetor.



(1) Choke rods (2) Nut

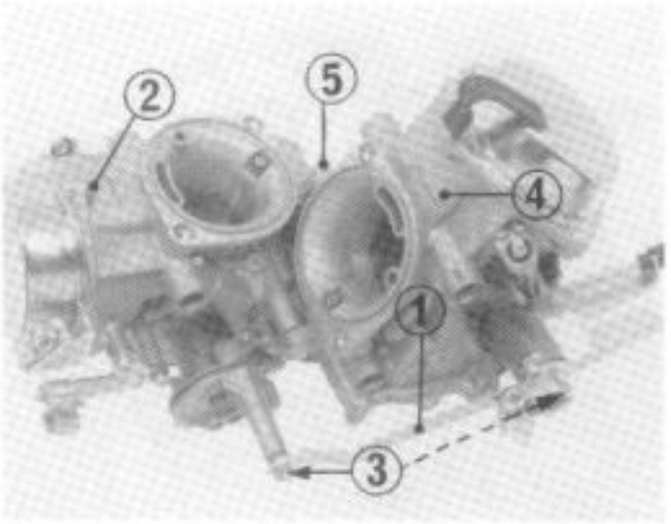
Remove the nuts and washers, and disconnect the choke rods from the choke levers.



(1) Synchronization spring
(2) No. 2 carburetor
(3) Thrust spring
(4) No. 1 carburetor
(5) Air joint pipes
(6) No. 3 carburetor
(7) No. 4 carburetor

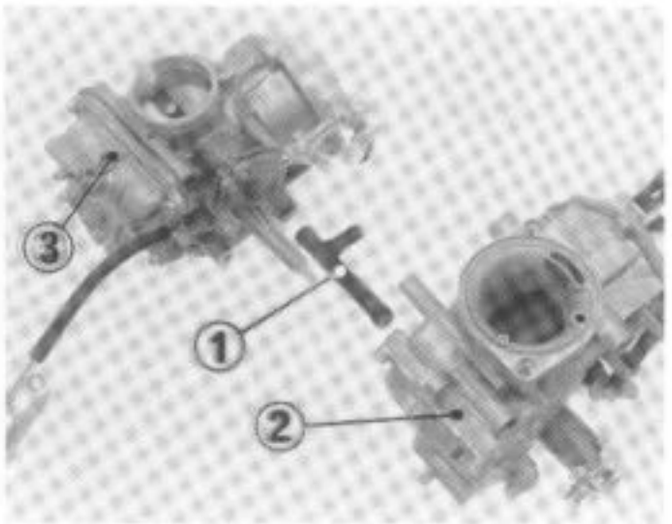
Carefully separate the No. 1 carburetor from the assembly. Then separate the No. 2 carburetor.

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



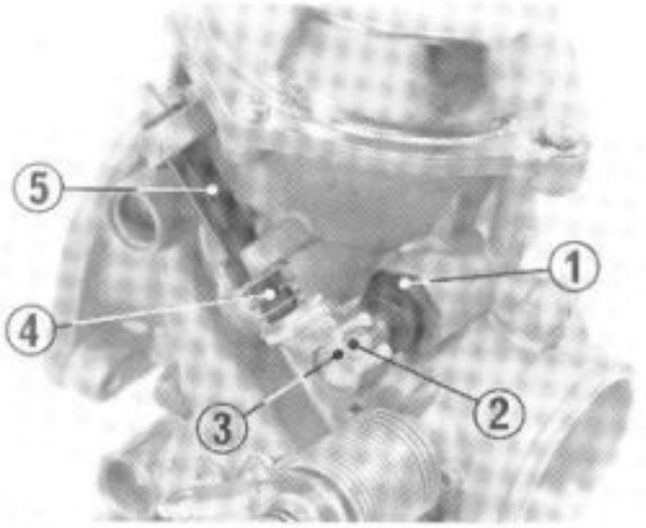
(1) Throttle link
(2) No. 4 carburetor
(3) Cotter pins
(4) No. 3 carburetor
(5) Screw

Remove the cotter pins, washer and screw, and remove the throttle link from the No. 3 and 4 carburetor.



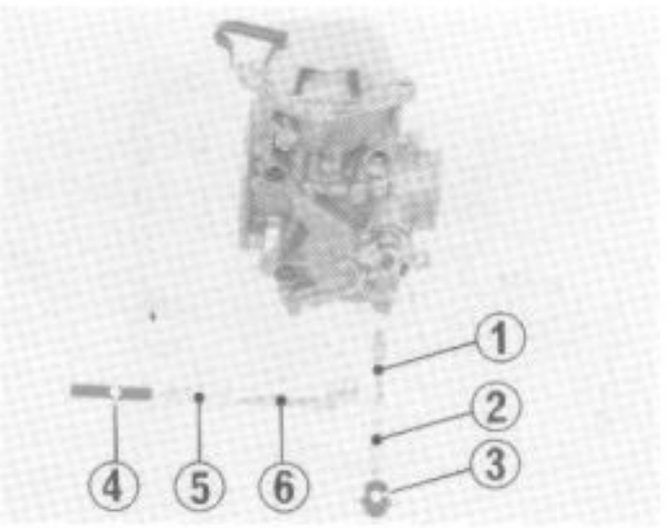
(1) Fuel joint pipe
(2) No. 3 carburetor
(3) No. 4 carburetor

Carefully separate the No. 3 and 4 carburetor.



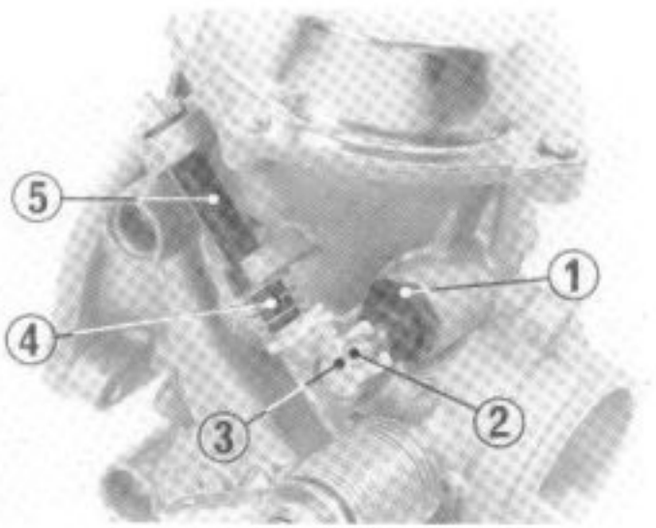
(1) Valve nut
(2) Starter valve
(3) Choke arm
(4) Spring
(5) Collar

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



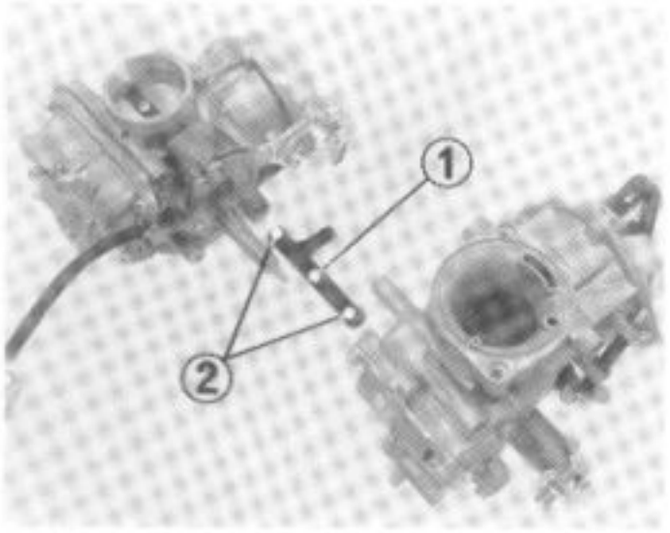
(1) Starter valve
(2) Spring
(3) Valve nut
(4) Collar
(5) Spring
(6) Choke arm

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



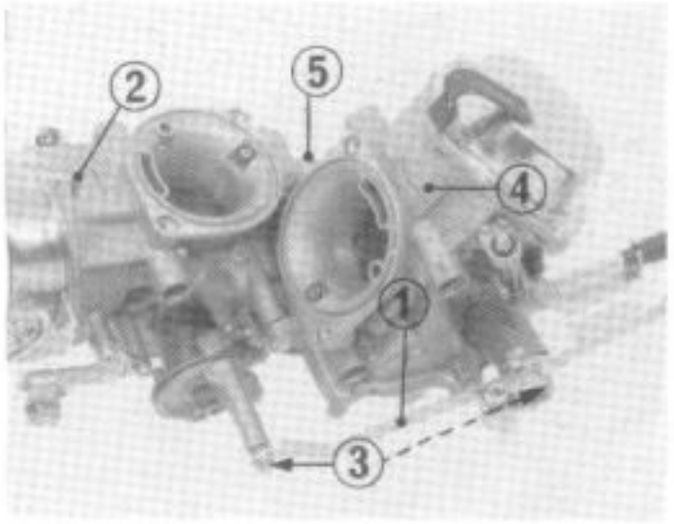
(1) Valve nut
(2) Starter valve
(3) Choke arm
(4) Spring
(5) Collar

Carburetor Assembly
Install the choke valve, valve spring and nut and tighten the nut.
Install the choke arm and spring while hooking the arm to the groove in the choke valve. Install the choke arm collar.



(1) Fuel joint pipe
(2) O-rings

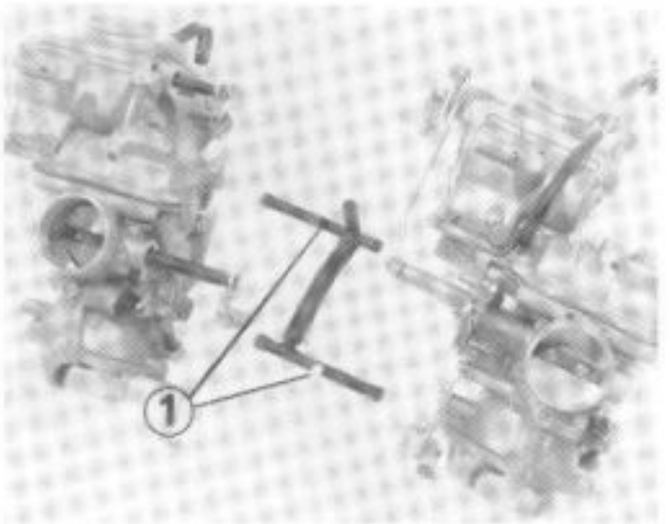
Coat the new O-rings with oil and install them on the fuel joint pipe for No. 3 and No. 4 carburetors.
Install the fuel joint pipe to the No. 3 and No. 4 carburetors.



(1) Throttle link
(2) No. 4 carburetor
(3) Cotter pins
(4) No. 3 carburetor
(5) Screw

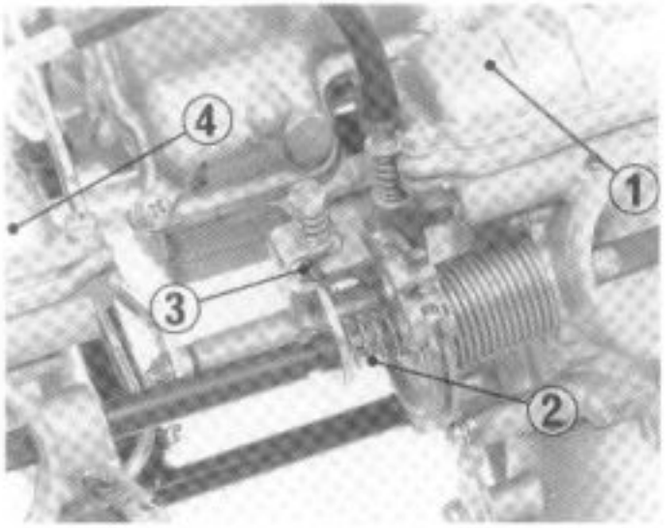
Reconnect the throttle linkage between the No. 3 and No. 4 carburetors, using new cotter pins and the screw.

NOTE:
Tighten the screw lightly.
After installing the air chamber over the carburetor, tighten the screw securely (page 136).



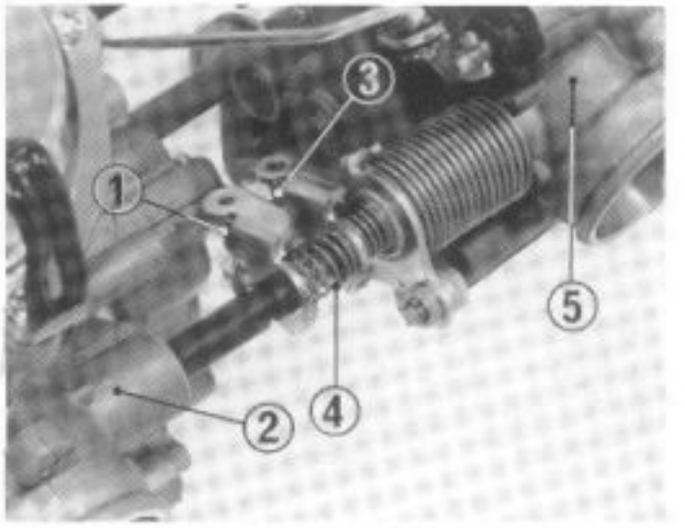
(1) Air joint pipe

Coat new O-rings with oil and install them on the air joint pipes.
Put the No. 1 and No. 2 carburetors together with the joint pipes.



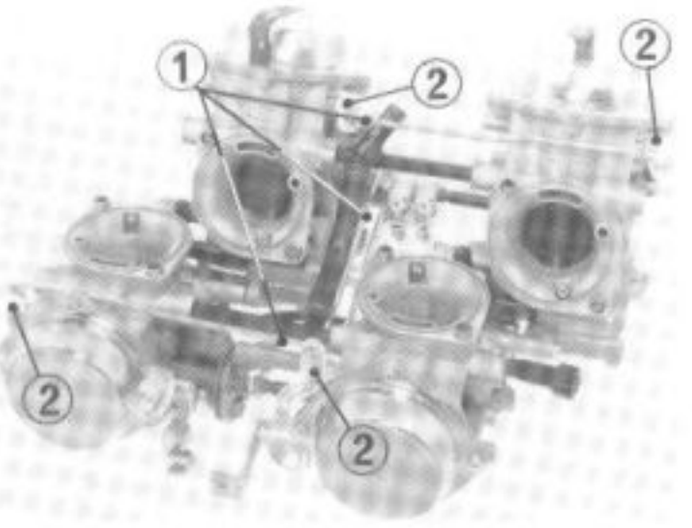
(1) No. 4 carburetor
(2) Thrust spring
(3) No. 2 synchronization spring
(4) No. 2 carburetor

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



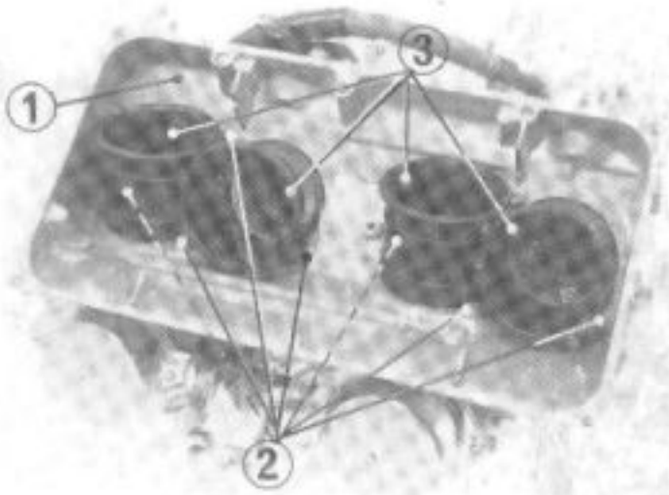
(1) No. 1 synchronization spring
(2) No. 1 carburetor
(3) No. 3 synchronization spring
(4) Thrust spring
(5) No. 3 carburetor

Make sure the air joint pipes are securely installed.



(1) Choke rods (2) Nut

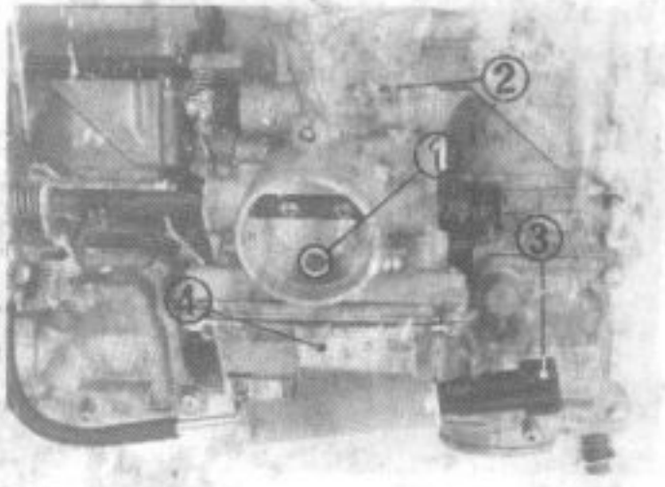
Install the choke rods to the choke arms with washers and nuts.



(1) Air chamber
(2) Screws
(3) Funnels

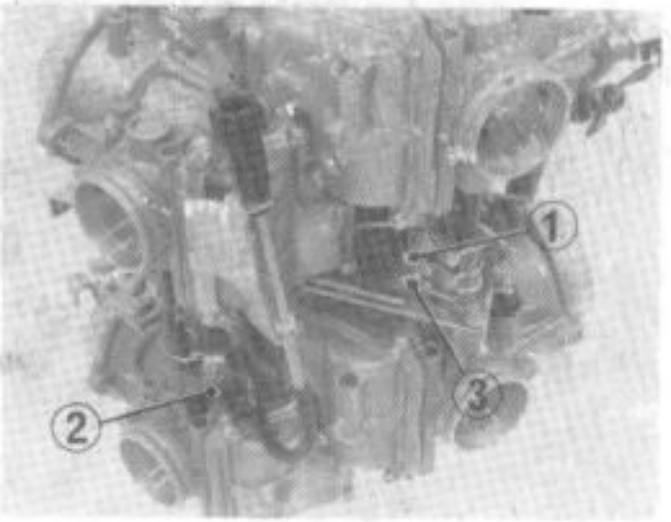
Make sure the air chamber funnels, grommets and dowel pins are in place.
Place the air chamber over the carburetor aligning the dowel pins with the carburetor holes.
Attach the air chamber to the carburetor with the eight screws.
Tighten the screw (page 134) to the specified torque.

TORQUE:
6–8 N·m
(0.6–0.8 kg-m, 4.3–5.8 ft-lb)



(1) By-pass hole
(2) No. 2 carburetor
(3) Throttle stop screw
(4) Throttle stop screw bracket

Install the throttle stop screw bracket to the No. 2 carburetor.
Turn the throttle stop screw to align the No. 4 throttle valve with the edge of the by-pass hole.
Connect the fuel tubes to the fuel joint tubes and the clamps securely.
Align each throttle valve with the by-pass hole edge by turning the synchronization adjusting screws.



(1) No. 1 adjusting screw
(2) No. 2 adjusting screw
(3) No. 3 adjusting screw

Inspect throttle operation as described below:

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

Make sure that choke valve operation is smooth by moving the choke linkage. Close the choke valve by turning the choke linkage. Release the choke linkage and make sure that it returns smoothly.

Carburetor Installation
Install the carburetor in the reverse order of removal.

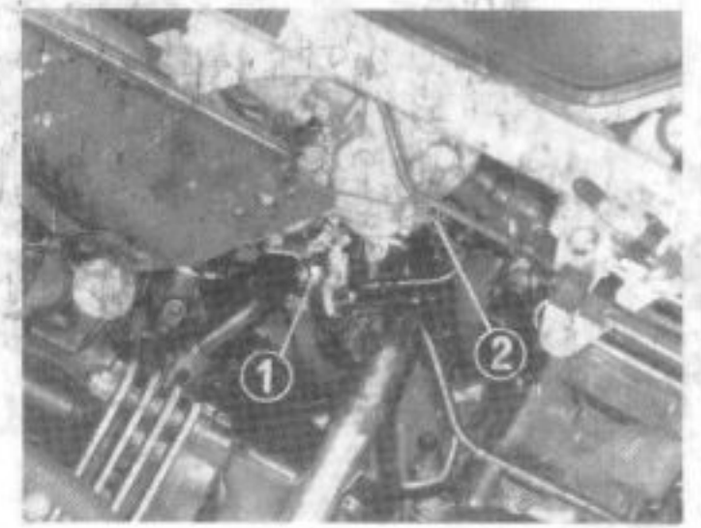
NOTE:
* *Route the throttle and choke cables properly (page 222).*
* *Perform the following inspections and adjustments.*
  Throttle operation (page 31).
  Carburetor choke (page 32).
  Carburetor idle speed (page 38).
  Carburetor synchronization (page 37).

Pilot Screw Adjustment
See page 218 for carburetor specifications.

NOTE:
* *The pilot screws are factory pre-set and no adjustment is necessary unless the pilot screws are replaced.*
* *Use a tachometer with graduations of 50 min^{-1} (rpm) or smaller that will accurately indicate a 50 min^{-1} (rpm) change.*

1. Turn each pilot screw clockwise until it seats lightly and back it out to the specification given (page 218). This is an initial setting prior to the final pilot screw adjustment.

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



(1) Throttle stop screw (2) Pilot screw

2. Warm up the engine to operating temperature. Stop and go driving for 10 minutes is sufficient.
3. Attach a tachometer according to its manufacturer's instructions.
4. Adjust the idle speed with the throttle stop screw (page 38).
5. Turn each pilot screw 1/2 turn out from the initial setting.
6. If the engine speed increases by 50 min^{-1} (rpm) or more, turn each pilot screw out by successive 1/2 turn until engine speed drops by 50 min^{-1} (rpm) or less.
7. Adjust the idle speed with the throttle stop screw.
8. Turn the No. 1 carburetor pilot screw in until the engine speed drops 50 min^{-1} (rpm).
9. Turn the No. 1 carburetor pilot screw 1 turn out from the position obtained in step 8.
10. Adjust the idle speed with the throttle stop screw.
11. Perform steps 8, 9 and 10 for the No. 2, 3 and 4 carburetor pilot screws.

Main Jet Adjustment
See page 218 for carburetor specifications.

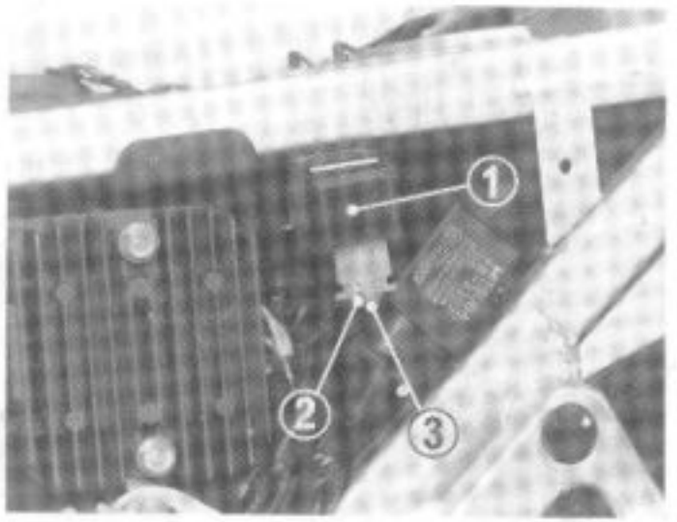
Poor acceleration at full throttle:
Raise Main Jets number for 5 from the standard number (to enrich mixture).

NOTE:
Mixture is leaned when air cleaner is removed.

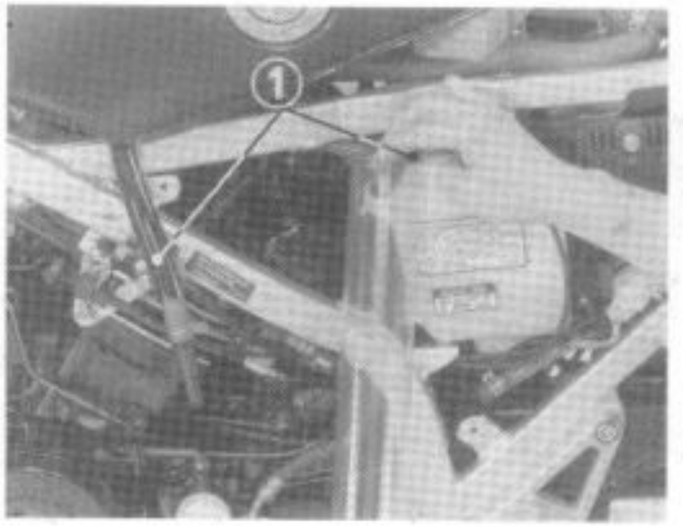
Unstable performance at high speed with excessive black smoke:
Lower Main Jets number for 5 from the standard number (to lean mixture).

NOTE:
Mixture is enriched when air cleaner is clogged or at high altitude (over 1,500m, 5,000 feets).

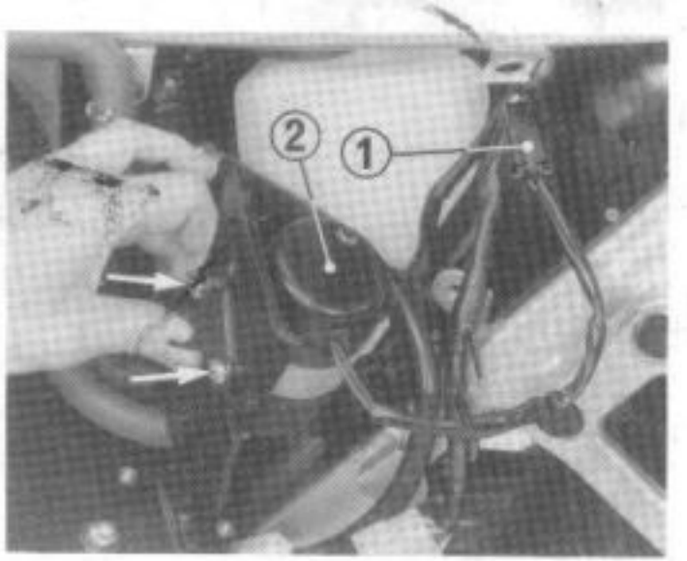
Optional Main Jets:
#115, #120, #130, #135



(1) Fuel pump relay
(2) White wire
(3) Black wire



(1) Fuel tube (To carburetor)



(1) Fuel pump coupler
(2) Fuel pump

Fuel Pump Inspection

Turn the ignition switch off. Disconnect the fuel pump relay coupler.

Short the white and black wire terminals at the fuel pump relay coupler with a jamper wire.

Disconnect the fuel line at the carburetor and hold a graduated beaker under the tube.

WARNING

Do not allow flames or sparks near gasoline.

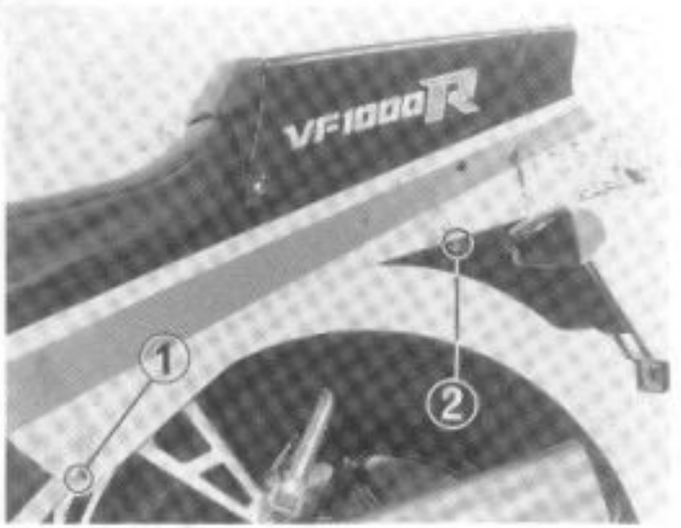
Turn the ignition switch on and let fuel flows into the beaker for 5 seconds, then turn the ignition switch off. Multiply the amount in the beaker by 12 to determine the fuel pump flow capacity per minute.

FUEL PUMP FLOW CAPACITY:
900 cc (30 U.S. oz, 32 Imp. oz) ± 10%/minute

Fuel Pump Removal/Installation

Remove the seat and left side cover. Turn the fuel valve off. Remove the breather separator, reserve tank and electric panel. Clip the fuel inlet line, then disconnect the fuel inlet and outlet lines from the fuel pump. Disconnect the fuel pump coupler. Remove the fuel pump mounting bolts and fuel pump. Install the fuel pump in the reverse order of removal.

FAIRING AND SEAT

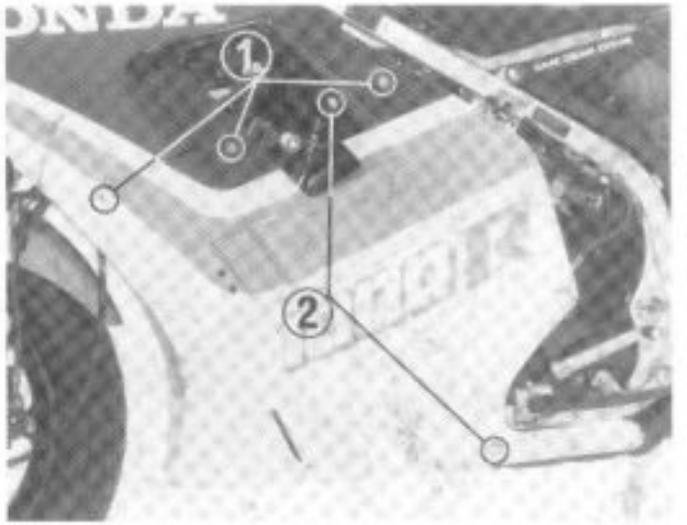


(1) Screw
(2) Nut

Seat Removal/Installation

Remove the seat mounting screws and nuts and the seat.

Install the seat in the reverse order of removal.



(1) Clips
(2) Screws

Fairing Removal

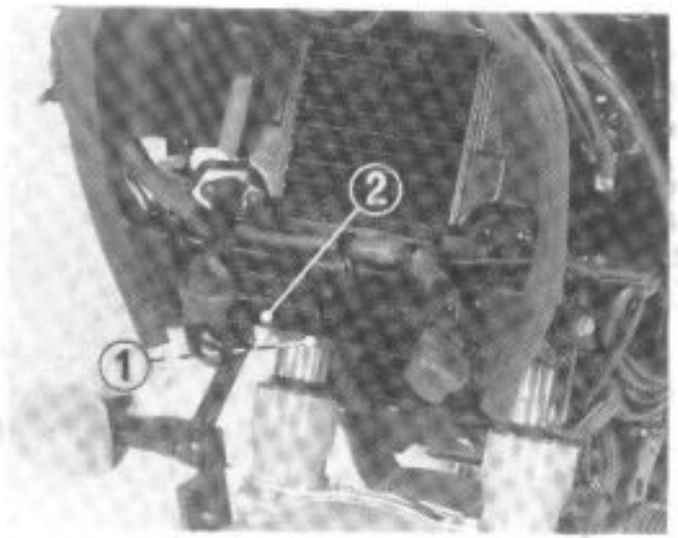
Remove the lower fairing mounting screws.

Loosen the lower fairing clips by turning it 90° counterclockwise and remove the lower fairing.

(1) Rearview mirrors
(2) Screws

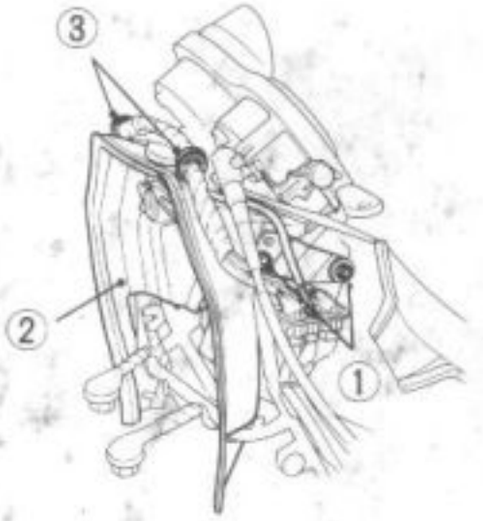
Remove the right and left rearview mirrors by removing the mounting nuts.

Remove the fairing mounting screws and the fairing.



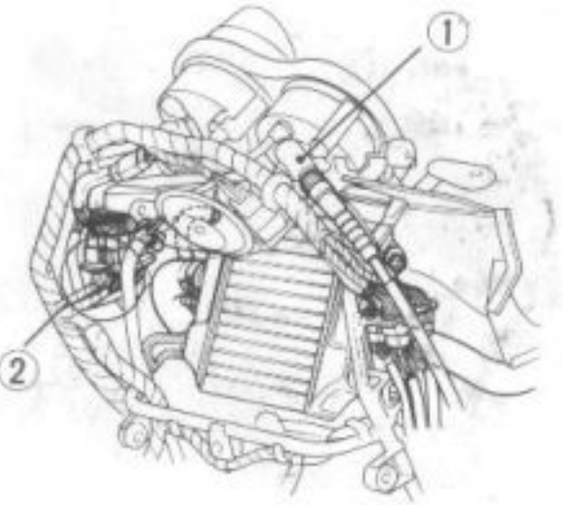
(1) Screws
(2) Air guide plate

Fairing Stay Removal
Remove the fairings.
Remove the headlight.
Remove the screw attaching the air guide plate and the plate.
Remove the oil cooler mounting bolts and disconnect the front turn signal and horn wires.



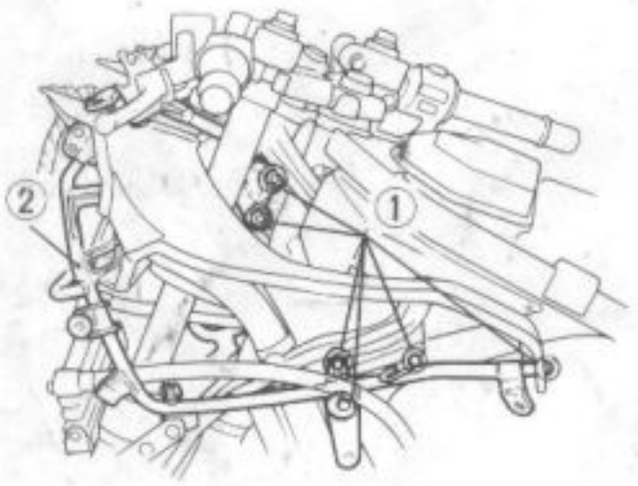
(1) Bolts
(2) Radiator shroud
(3) Clamps

Disconnect the wire harness clamps from the shroud.
Remove the two bolts mounting the radiator and radiator shroud and remove the shroud.



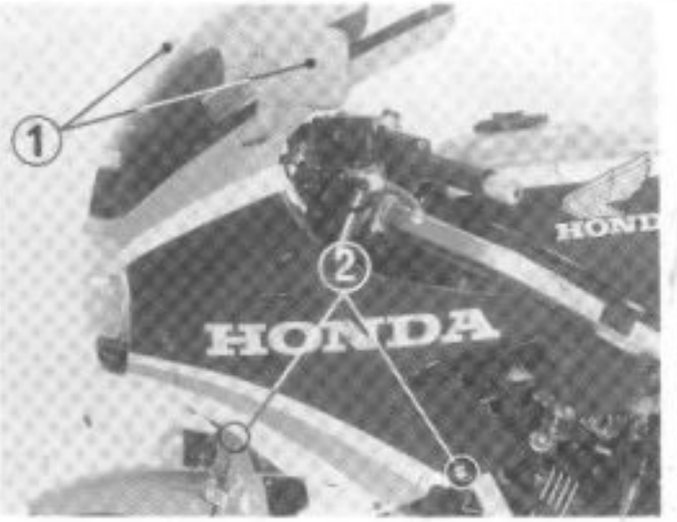
(1) Speedometer cable
(2) Couplers

Disconnect the speedometer cable.
Disconnect the wire couplers at the coupler bracket.
Remove the wire bands securing the wire harnesses to the fairing stay.



(1) Bolts
(2) Fairing stay assembly

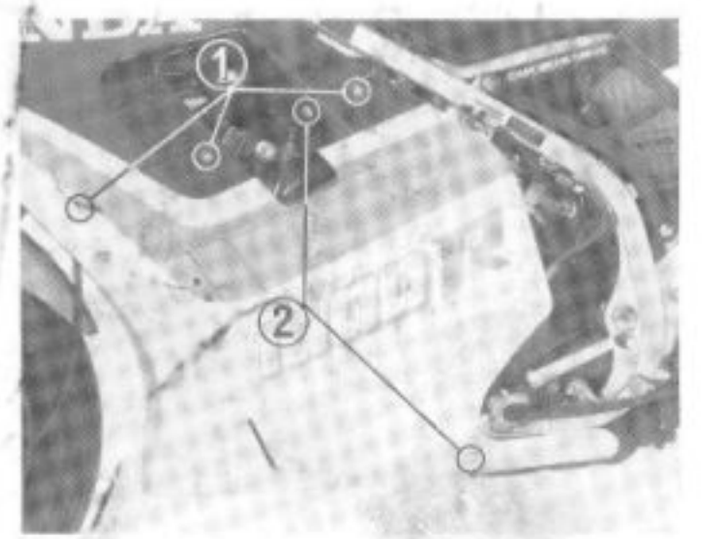
Remove the fairing stay mounting bolts and the fairing stay assembly from the frame.



(1) Rearview mirrors
(2) Screws

Fairing Stay and Fairing Installation
Install the fairing stay assembly onto the frame and tighten the bolts.
Install the removed parts in the reverse order of removal.

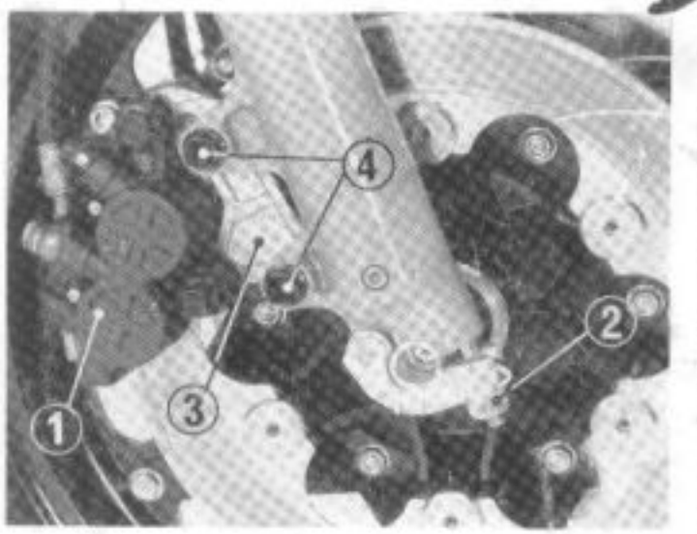
CAUTION:
* *Route the wire harnesses and cables properly (page 222).*
* *Position the front radiator into place securely.*



(1) Clips
(2) Screw

Install the fairing and lower fairing.

NOTE:
Neutralize the fairing stay if fairing installation is difficult.



(1) Caliper
(2) Axle holder nut
(3) Bracket
(4) Bolts

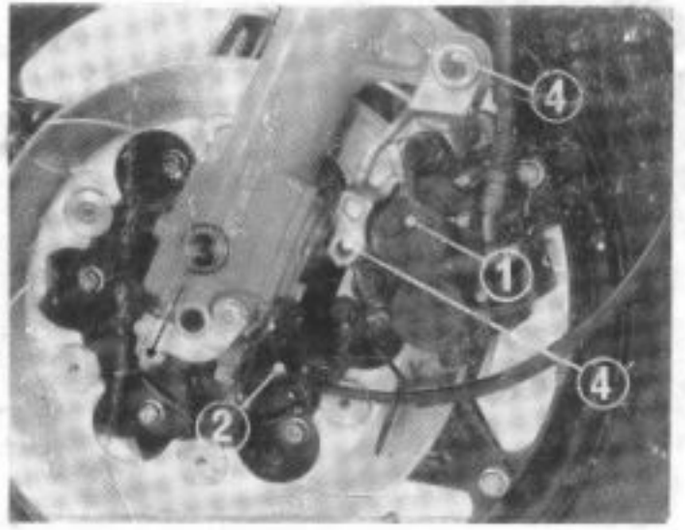
Removal

Remove the right front brake caliper and bracket from the fork.

Remove the right axle holder nut.

NOTE:

If you squeeze the front brake lever after the caliper is removed, the caliper piston will move out and make reassembly difficult.

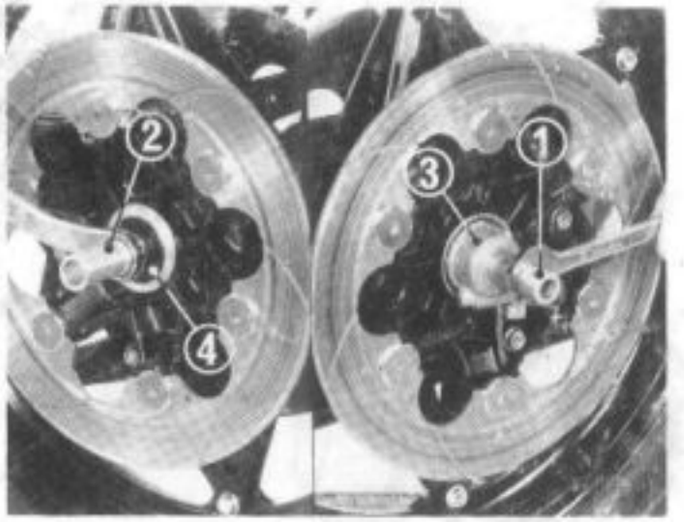


(1) Caliper
(2) Speedometer cable
(3) Axle holder nut
(4) Bolt

Remove the speedometer cable set screw and disconnect the speedometer cable.

Remove the left front caliper and bracket from the fork.

Remove the left axle holder nut and remove the front wheel.

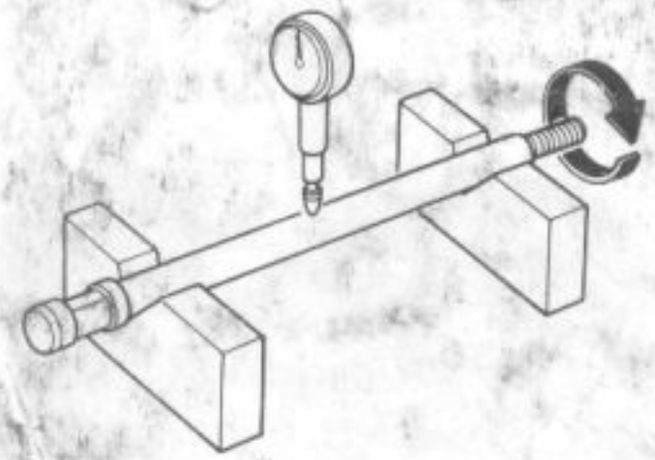


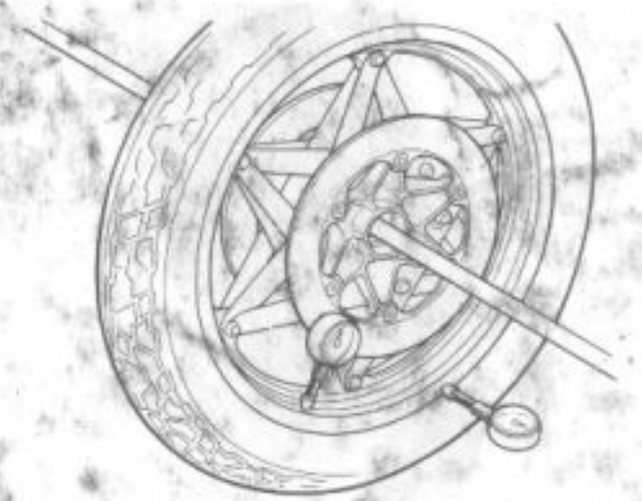
(1) Axle
(2) Axle nut
(3) Speedometer gearbox
(4) Axle spacer

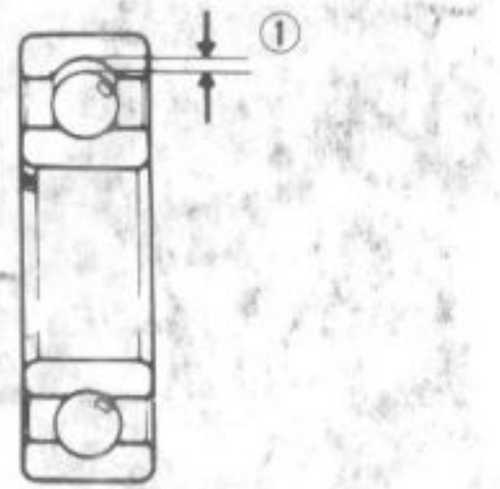
Wheel Inspection

Remove the front axle nut and axle.

Remove the speedometer gearbox and axle spacer.







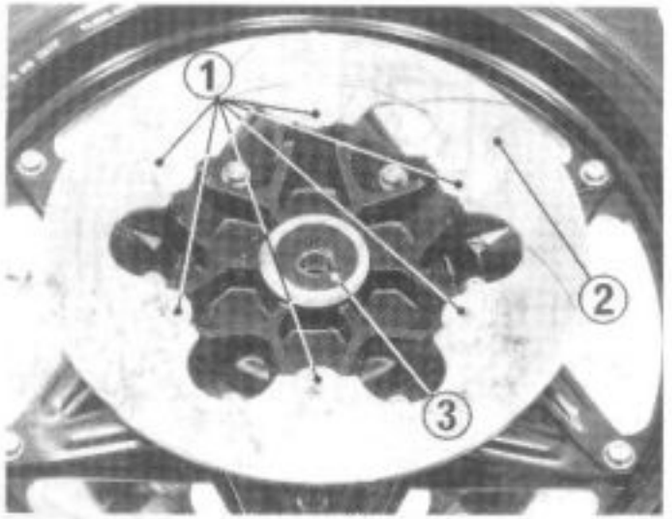
Axle inspection:
Set the axle in V blocks and measure the runout (page 216).

Wheel inspection:
Check the rim runout by placing the wheel in a turning stand. Spin the wheel slowly and read the runout using a dial indicator (page 216).

NOTE:
The wheel cannot be repaired and must be replaced with a new one if the runout is exceeded than service limit.

(1) Play

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

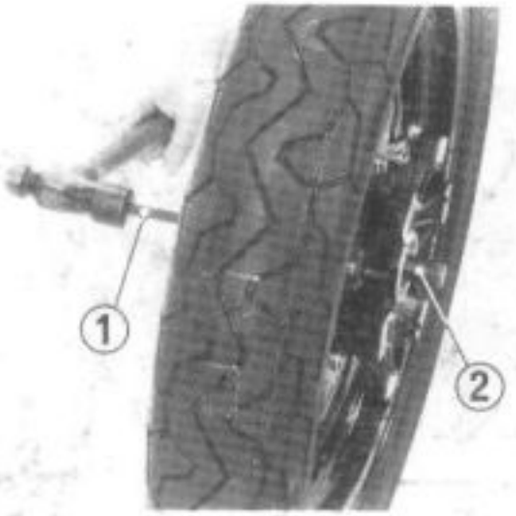


(1) Mount bolt
(2) Disc
(3) Dust seal

Wheel Disassembly

Remove the spacer from right side. Remove the speedometer gear box from left side. Remove the left and right brake disc mounting bolts and discs. Remove the dust seals from both sides. Remove the speedometer retainer from left side.

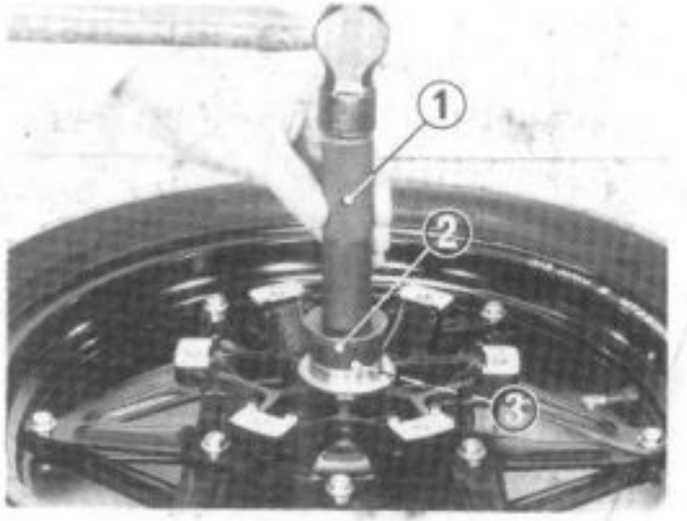
NOTE:
If the discs are removed from the wheel, replace the wave washers with new ones.



(1) Bearing remover shaft (07746–0050100)
(2) Bearing remover head, 15 mm (07746–0050400)

Remove the bearing with bearing remover and remove the distance collar.

NOTE:
Never reinstall old bearings; once the bearings are removed, they must be replaced with new ones.



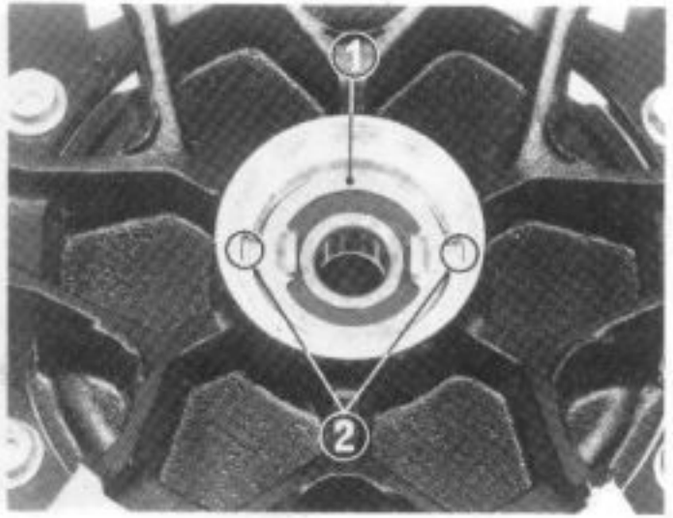
(1) Driver (07749–0010000)
(2) Attachment, 42 x 47 mm (07746–0010300)
(3) Pilot, 15 mm (07746–0040300)

Wheel Assembly

Drive in the right bearing first, then press the distance collar into place.

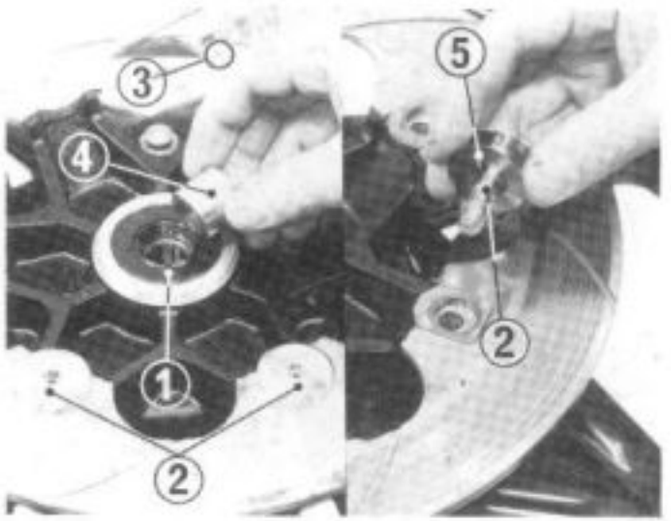
NOTE:
Be certain the distance collar is in position before installing the left bearing.

Drive in the left bearing squarely, making sure that it is fully seated.



(1) Speedometer gear retainer
(2) Tangs

Install the speedometer gear retainer in the left side of the wheel hub, aligning the tangs with the slots in the hub.



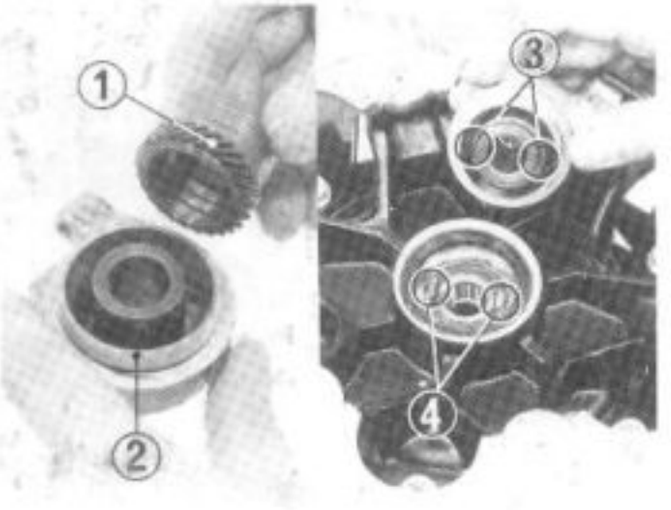
(1) Dust seal
(2) Bolts
(3) R mark
(4) Spacer
(5) Wave washer

Install the dust seals in the both side of the wheel hub. Install the spacer in the right side of the wheel hub.
Install the disc with its "L" or "R" mark facing out.

NOTE:
Never reinstall old wave washers; once the brake discs are removed, they must be replaced with new ones.

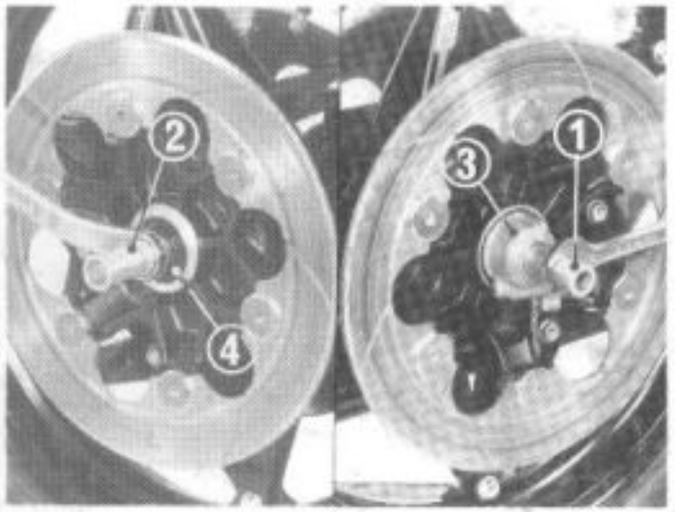
Tighten the disc mount bolts.

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



(1) Drive gear
(2) Gear box
(3) Tangs
(4) Slots

Fill the speedometer gear box with grease and install the plain washer and drive gear.
Install the speedometer gear box in the wheel hub, aligning the tangs with the slots.



(1) Axle (3) Speedometer gearbox
(2) Axle nut (4) Axle spacer

Install the axle into hub from speedometer gearbox side. Install the axle nut with hex head out, on the axle spacer side.

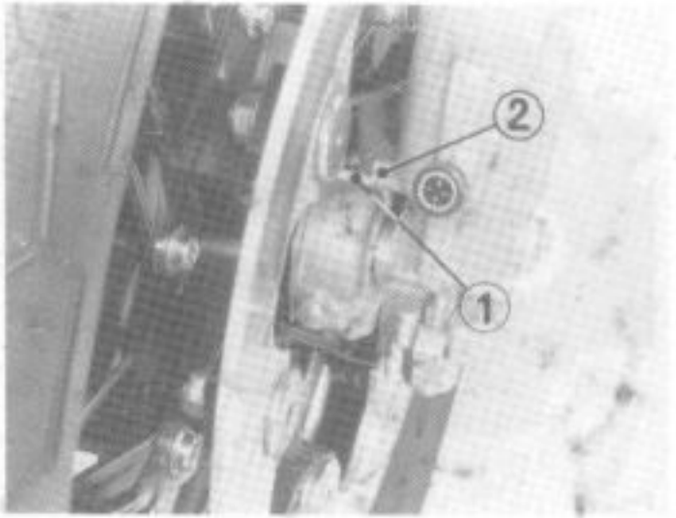
Tighten the axle nut.

TORQUE: 55–65 N·m
(5.5–6.5 kg-m, 40–47 ft-lb)

NOTE:
There are flats on the opposite end of the axle, so you can hold the axle while torquing the axle nut.

Clean the brake discs with a high quality degreasing agent.

For wheel balance, refer to page 164.



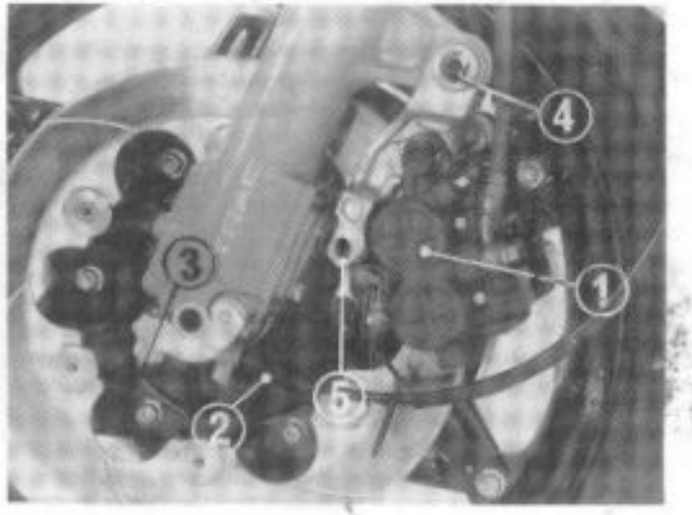
(1) Tang
(2) Lug

Installation

Position the front wheel between the fork legs. Lower the engine so the fork legs rest on the top of the axle. Position the tang on the speedometer gear box against the lug on the left fork leg.

Install the right front caliper and tighten the mount bolts.

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



(1) Caliper
(2) Speedometer cable
(3) Axle holder nut
(4) Caliper bracket pivot bolt
(5) Anti-dive pin bolt

Tighten the right axle holder nut to the specified torque.

TORQUE: 35–45 N·m
(3.5–4.5 kg-m, 25–33 ft-lb)

Install the left front caliper.

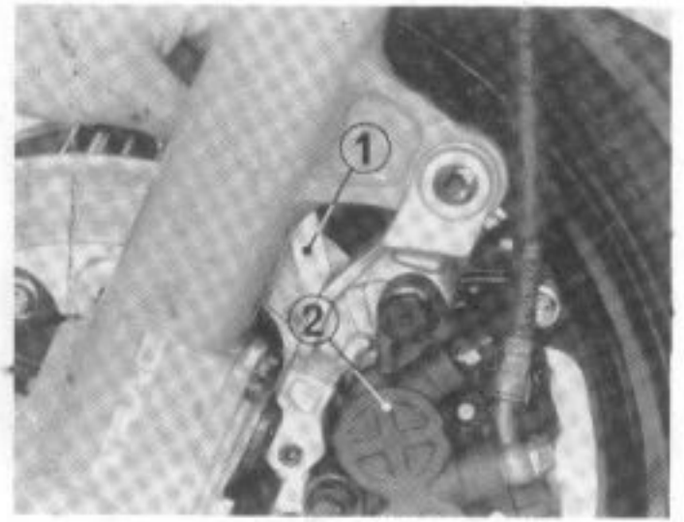
Tighten the caliper bracket pivot bolt.

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

Tighten the anti-dive pin bolt.

TORQUE: 10–15 N·m
(1.0–1.5 kg-m, 7–11 ft-lb)

Connect the speedometer cable and secure it with the set screw.



(1) Feeler gauge
(2) Caliper

Measure the clearance between each 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 left axle holder nut to the specified torque.

TORQUE: 35–45 N·m (3.5–4.5 kg-m, 25–33 ft-lb)

If the feeler gauge cannot be inserted easily, pull the left fork out or push it in until the gauge can be inserted. After installing the wheel, apply the brake several times, then recheck both discs for caliper holder to disc clearance.

WARNING

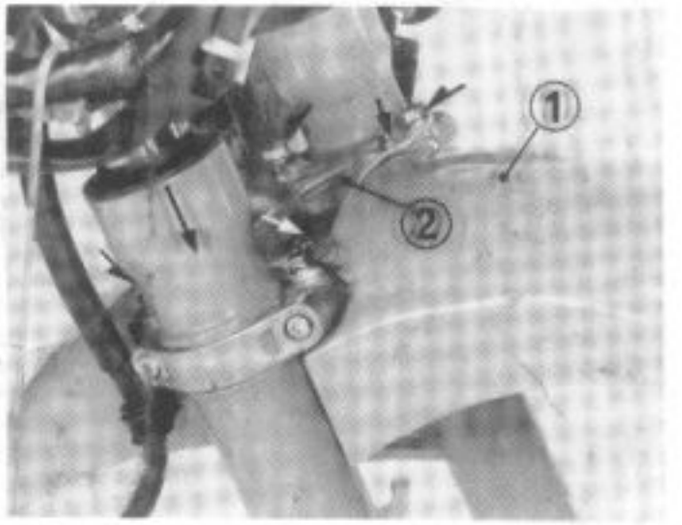
Failure to provide adequate disc to caliper holder clearance may damage the brake disc and impair brake efficiency.

(1) Retainer ring
(2) Handlebar mounting bolt

Removal

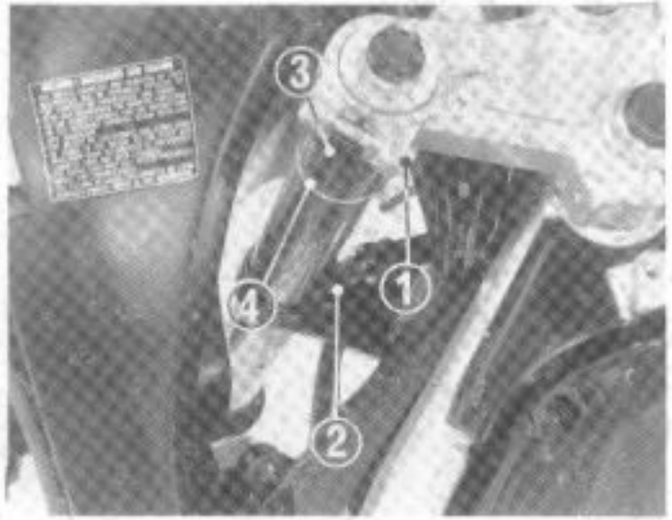
Remove the front wheel (page 142).

Remove the left and right retainer ring and handlebar mounting bolts, and remove the both handlebars.



(1) Front fender
(2) Fork brace.

Remove the front fender and fork brace.

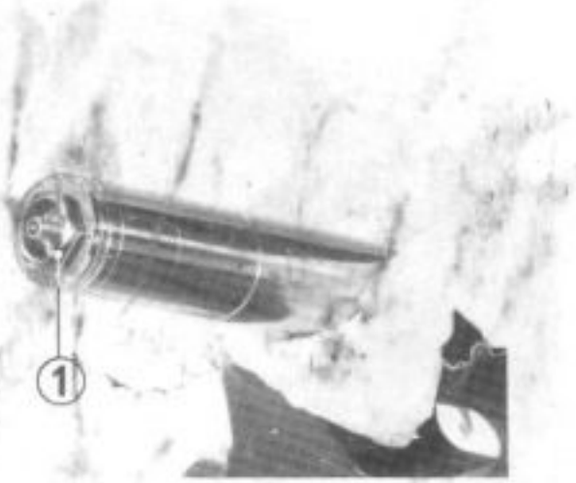


(1) Top pinch bolt
(2) Bottom pinch bolt
(3) Air joint
(4) Stop ring

Loosen the fork top and bottom pinch bolts and pull each fork tube out of the top bridge.

NOTE:
Because of the friction caused by the air joint O-rings, you'll have to turn the tubes while pulling down.

Remove the fork stop rings. Pull each fork tube out of the fork bottom bridge.

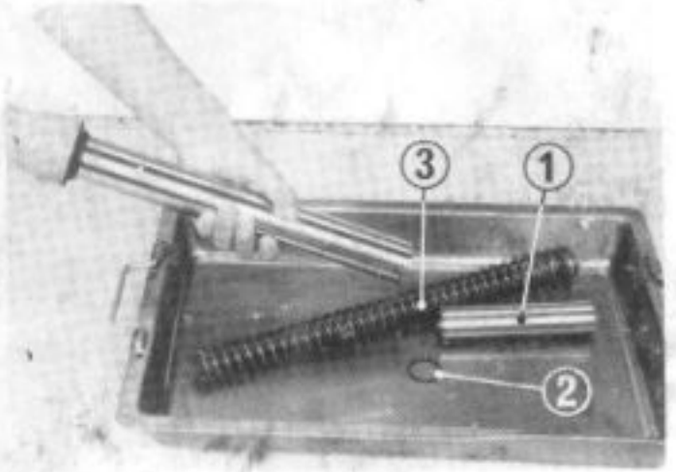


(1) Fork tube cap

Disassembly

Hold the fork tube in a vice, with soft jaws or a shop towel. Remove the fork tube cap.

CAUTION:
Do not damage the sliding surface.

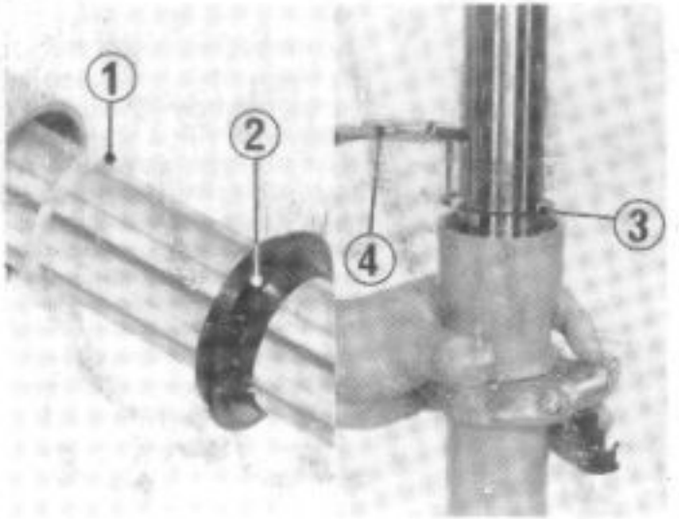


(1) Spacer
(2) Washer
(3) Spring

Remove the spacer, washer and fork spring. Drain the fork oil by pumping the fork up and down several times.

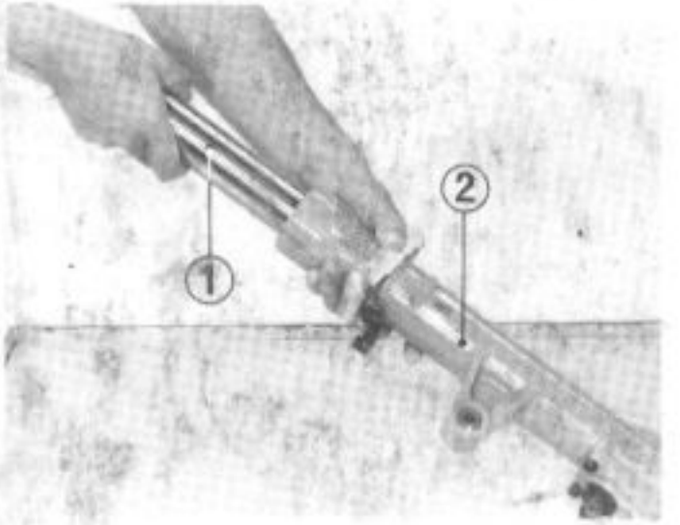
(1) Hex wrench (07917–3230000 or equivalent)

Hold the fork slider in a vice with soft jaws or a shop towel.
Remove the socket bolt with a hex wrench.
The piston and rebound spring can be removed from right fork.



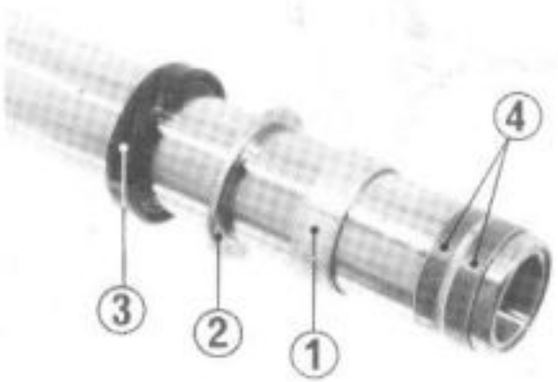
(1) Washer
(2) Dust seal
(3) Snap ring
(4) Snap ring pliers (07914–3230001)

Remove the dust seal and washer.
Remove the snap ring.



(1) Fork tube
(2) Fork slider

Pull the fork tube out until resistance from the slider bushing is felt. Then move it in and out, tapping the bushing lightly until the fork tube separates from the slider. The slider bushing will be forced out by the fork tube bushing.
Remove the oil lock piece from the right fork slider.



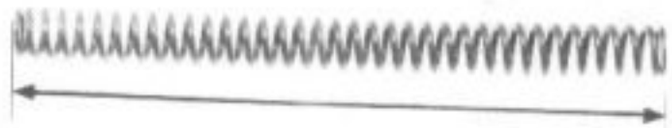
(1) Slider bushing
(2) Back-up ring
(3) Oil seal
(4) Fork tube bushings

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 new one.

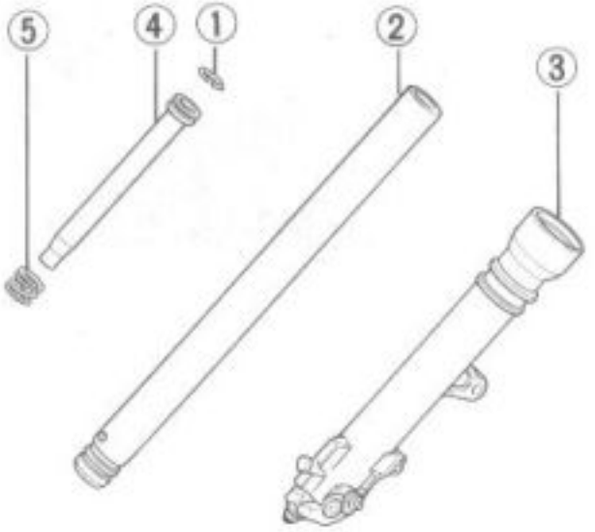
(1) Spring seat
(2) Piston
(3) Spring
(4) Oil lock valve
(5) Circlip

On the left fork, remove the circlip, oil lock valve, spring and spring seat from the piston.
Remove the piston and rebound spring from the fork tube.



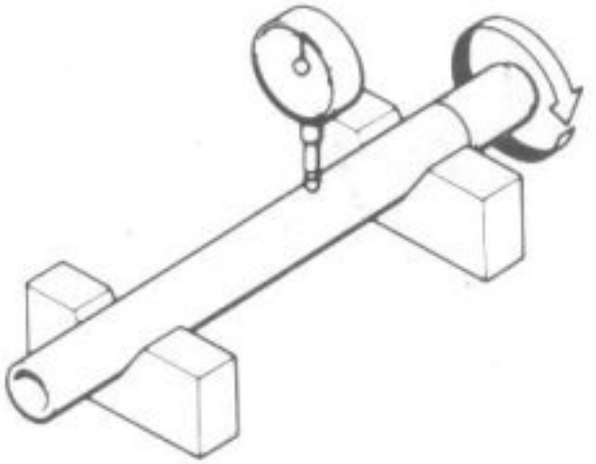
Inspection

Fork spring free length:
Measure the fork spring free length (page 216).

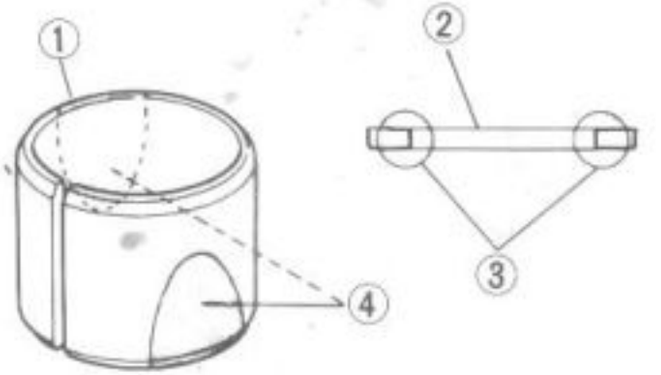


(1) Piston ring
(2) Fork tube
(3) Slider
(4) Piston
(5) Rebound spring

Fork tube/fork slider/piston:
Check the fork tube, fork slider and piston for score marks, scratches, or excessive or abnormal wear. Replace any components which are worn or damage. Check the piston ring for wear or damage. Check the rebound spring for fatigue or damage.

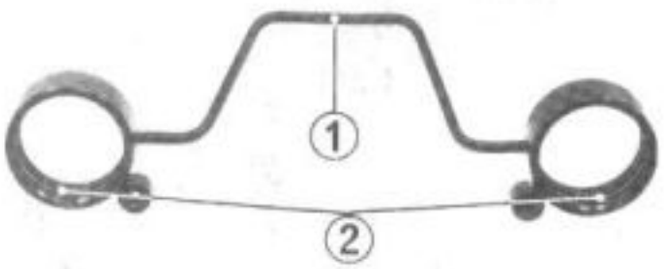


Fork tube:
Set the fork tube in V blocks and check its runout (page 216).



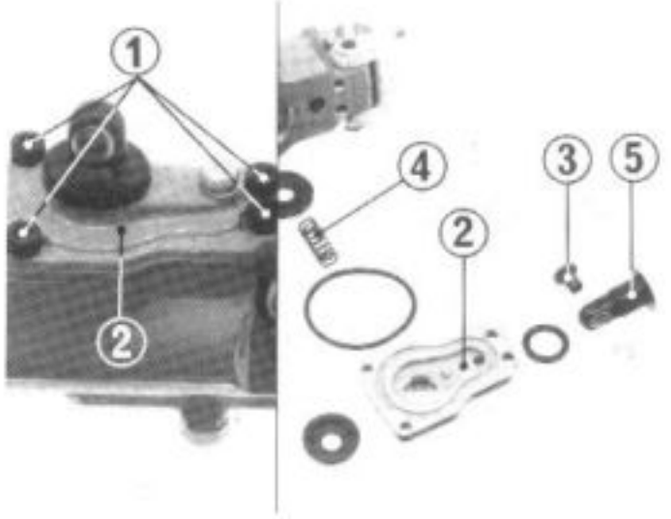
(1) Bushing
(2) Back-up ring
(3) Check points
(4) Copper surfaces

Bushing/back-up ring:
Visually inspect the slider and fork tube bushings. Replace the bushings if there is excessive scoring or scratching, or if the teflon is worn so that 3/4 of the entire surface.
Check the back-up ring and replace it if there is any distortion at the points shown.



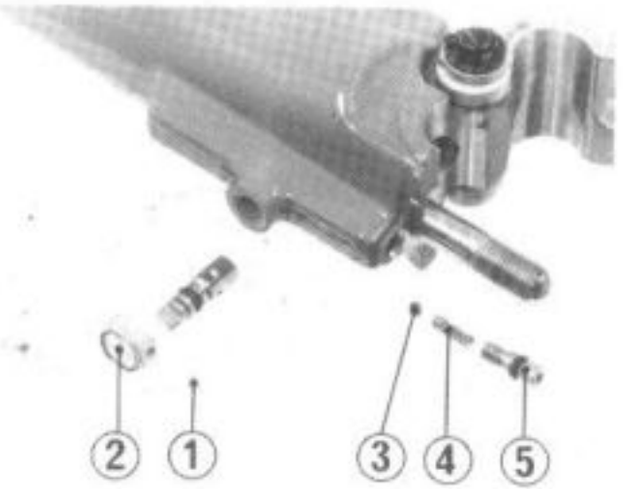
(1) Air joint
(2) O-rings

Air joint:
Check the O-rings for damage.



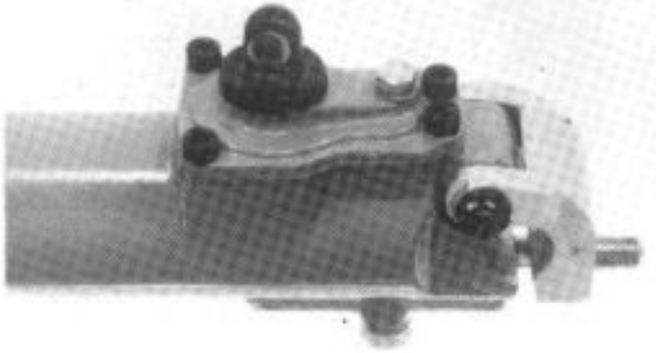
(1) Socket bolts
(2) Anti-dive case
(3) Pivot collar
(4) Piston spring
(5) Piston

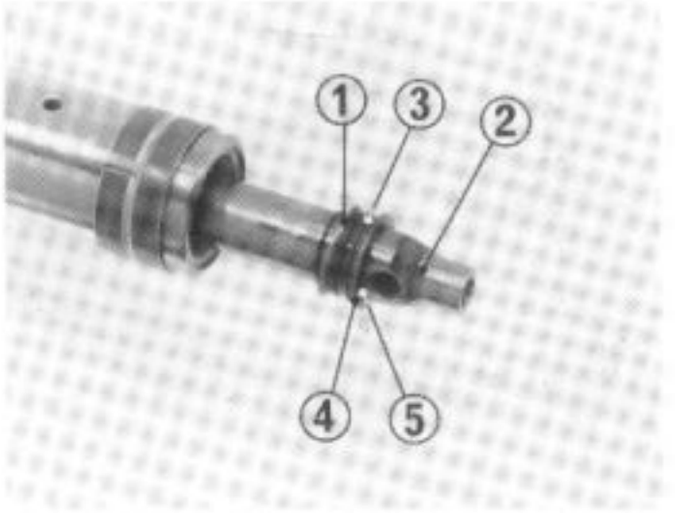
Anti-Dive Case
Remove the four socket bolts and remove the anti-dive case from the left fork. Remove the pivot collar from the piston and disassemble the anti-dive case as shown.
Check the each part for wear or damage.

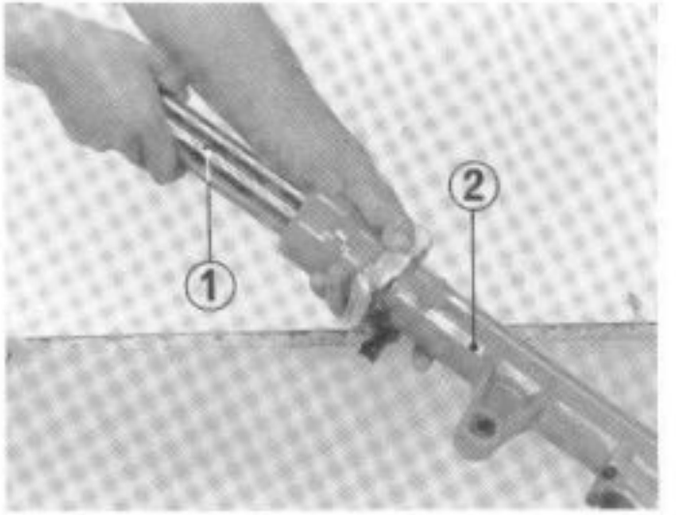


(1) Socket bolt
(2) Anti-dive adjuster knob
(3) Check ball
(4) Valve spring
(5) Orifice

Remove the socket bolt and remove the anti-dive adjuster knob. Remove the socket bolt and remove the valve spring and check ball. Remove the orifice from the fork slider. Check the orifice for clogging by applying compressor air. Also check the orifice for damage. Check the valve spring and check ball for wear or damage.







Assembly

Install the orifice into the left fork slider. Install the check ball and valve spring and tighten the socket bolt. Install the adjuster knob and secure it with the socket bolt. Assemble the anti-dive case and tighten the socket bolts.

TORQUE: 6–9 N·m
(0.6–0.9 kg-m, 4–7 ft-lb)

NOTE:

* *Apply a locking agent to the socket bolt threads before assembly.*
* *Apply ATF or equivalent oil to the piston and piston O-rings.*

(1) Spring seat
(2) Piston
(3) Spring
(4) Oil lock valve
(5) Circlip

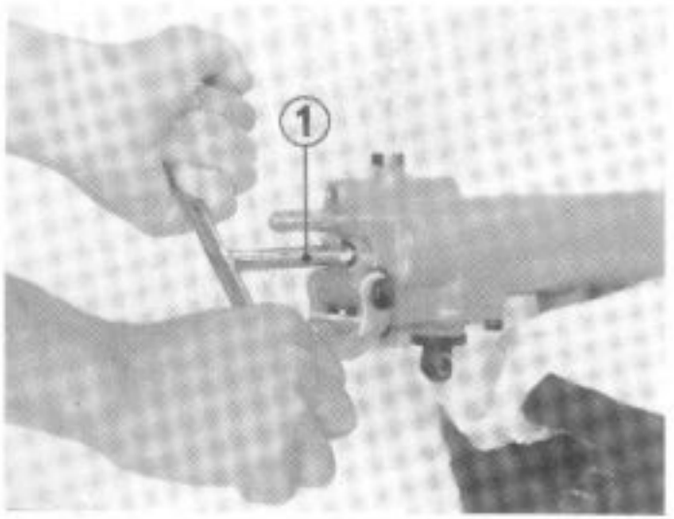
Insert the rebound spring and piston into the fork tube.

Left fork: Install the spring seat, valve spring, oil lock valve and circlip on the piston.

Right fork: Place the oil lock piece on the end of the piston.

(1) Fork tube
(2) Fork slider

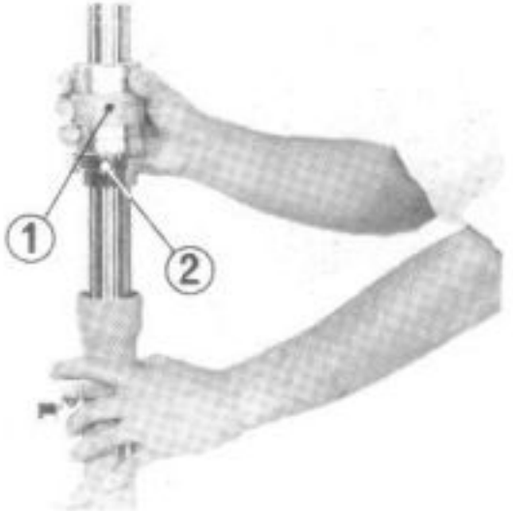
Insert the fork tube into the slider.



(1) 6 mm Hex wrench
(07917–3230000 or equivalent)

Place the fork slider in a vice with soft jaws or shop towel.
Apply locking agent to the socket bolt and thread into the piston.
Tighten the socket bolt with 6 mm hex wrench.

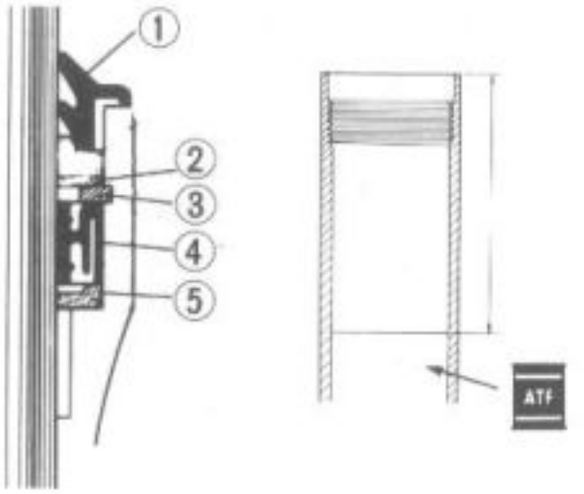
TORQUE: 15–25 N·m
(1.5–2.5 kg-m, 11–18 ft-lb)



(1) Fork seal driver (07947–KA50100)
(2) Fork seal driver attachment
(07947–KF00100)

Place the slider bushing over the fork tube and rest it on the slider. Put the back-up ring and an old bushing or equivalent tool on top. Drive the bushing into place with the seal driver and remove the old bushing or equivalent tool. Coat a new oil seal with ATF or equivalent oil and install it with the seal markings face up. Drive the seal in with the seal driver.

Install the snap ring with its radiused facing down and install the washer and dust cover. Pour the specified amount of ATF or equivalent oil into the fork tube.



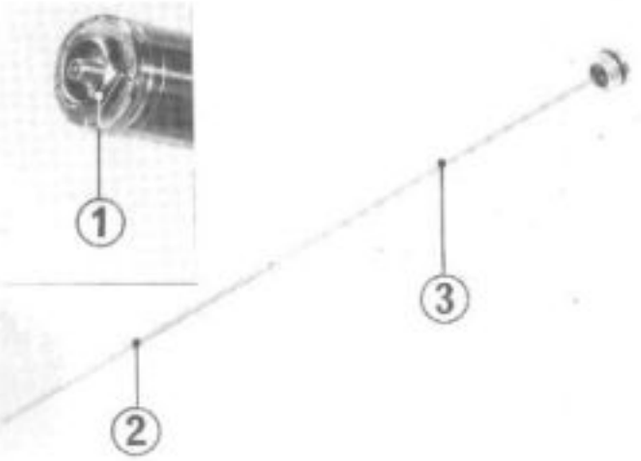
(1) Dust seal
(2) Washer
(3) Snap ring
(4) Oil seal
(5) Back-up ring

Oil Capacity:

Right fork: 440 cm³ (15.4 Imp. oz)
Left fork: 460 cm³ (16.1 Imp. oz)

Compress the front fork and measure the oil level from the top of the tube.
Specified level: 170 mm (6.69 in)
Install the fork spring, spring seat and spacer in the fork tube.

NOTE:
Note the spring direction; the small diameter end must face toward the bottom.



(1) Fork tube cap
(2) Cavity
(3) Damping adjuster rod

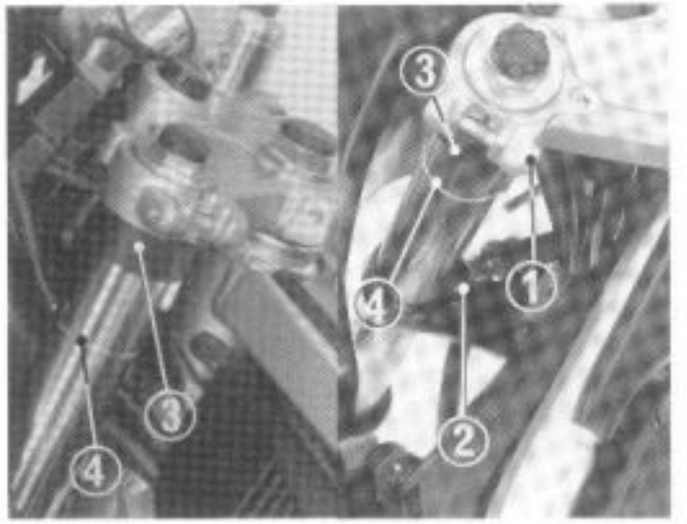
Hold the fork tube in a vice with soft jaws or shop towel, and install and tighten the fork tube cap.

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

NOTE:
On the right fork, align the cavity on the damping adjuster rod with a flat side in the piston.

Installation

Install the fork and temporarily tighten the bottom pinch bolt. Install the fork stop ring in the groove in the fork tube.



(1) Top pinch bolt
(2) Bottom pinch bolt
(3) Air joint
(4) Stop ring

Push the fork tube up until the stop ring contacts the air joint.
Tighten the bottom pinch bolts.

TORQUE: 32–38 N·m
(3.2–3.8 kg-m, 23–27 ft-lb)

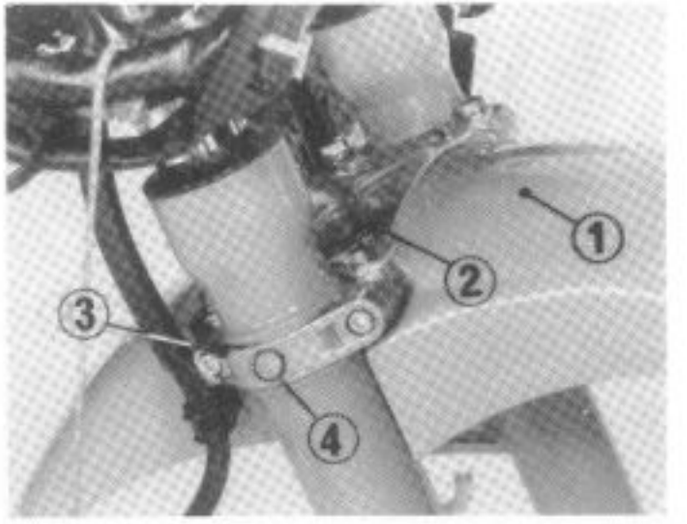
Tighten the top pinch bolts.

TORQUE: 9–13 N·m
(0.9–1.3 kg-m, 7–9 ft-lb)

Install the both handlebars.
Tighten the handlebar mounting bolt.

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

Install the right and left retainer rings.



(1) Front fender
(2) Fork brace
(3) Brace holder
(4) Arrow

Loosely install the brace holders, front fender and fork brace.

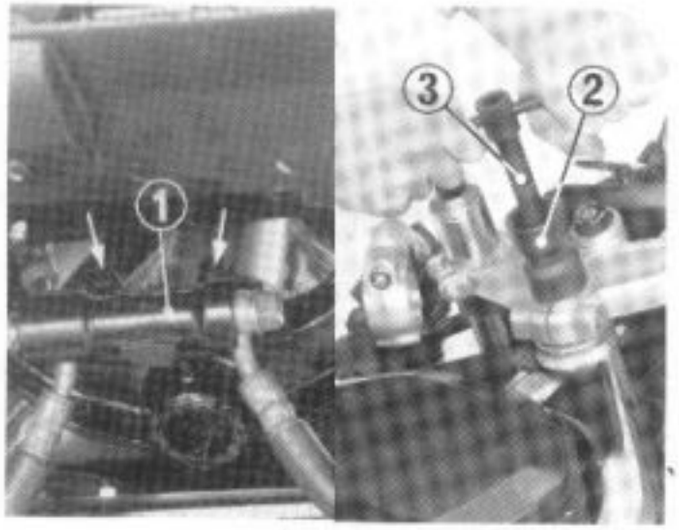
NOTE:
Face the arrows on the brace holders toward the front.

Install the front wheel and brake calipers.
Fill the fork tubes with air (page 20).
Tighten the forward brace holder bolts to the specified torque, then tighten the rear bolts to the same torque.

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

With the front brake applied, pump the forks up and down several times.
Tighten the fork brace bolts.

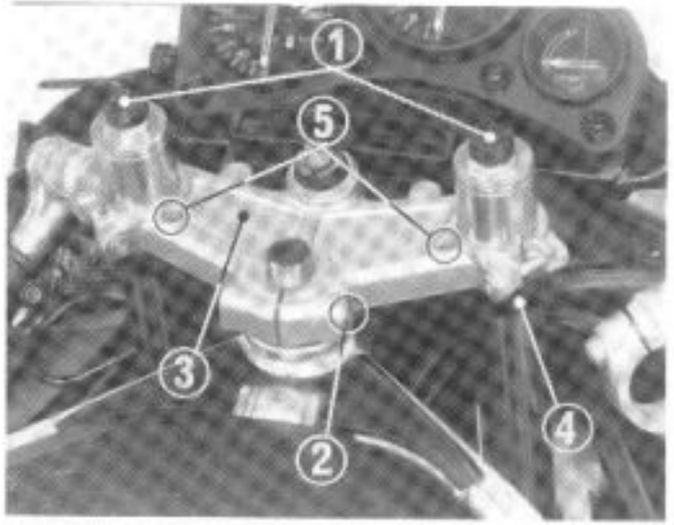
TORQUE: 24–30 N·m
(2.4–3.0 kg-m, 17–22 ft-lb)



(1) Brake hose 3-way joint
(2) Lock nut wrench, 30 x 32 mm (07716–0020400) or equivalent tool)
(3) Extension

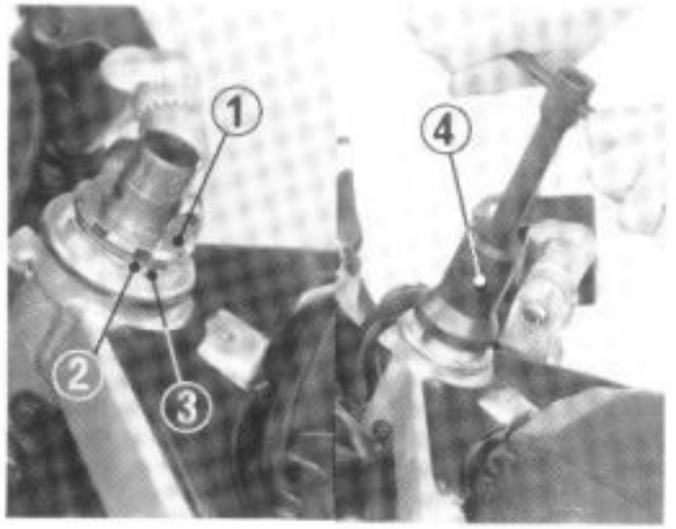
Removal

Remove the fairing, both handlebars, and front wheel (pages 139, 142, 147).
Remove the brake hose 3-way joint.
Remove the steering stem nut using a lock nut wrench.



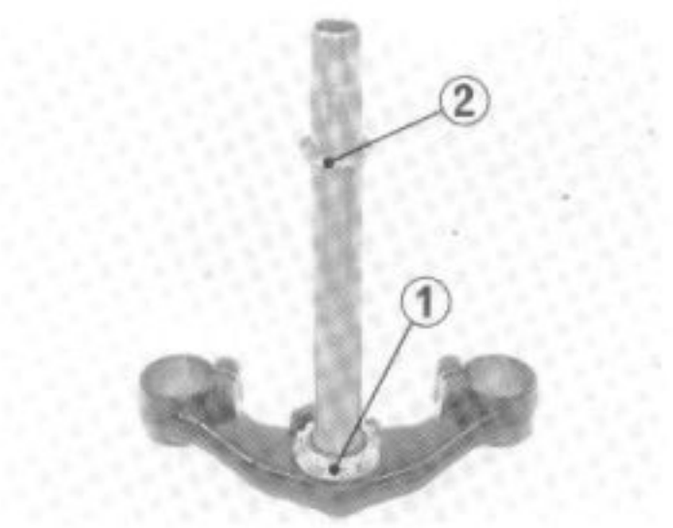
(1) Front forks
(2) Stem pipe pinch bolt
(3) Top bridge
(4) Air joint
(5) Air joint pipe bolts

Remove the front forks (page 147).
Remove the air joint pipe bolts and loosen the stem pipe pinch bolt.
Remove the top bridge from the steering stem.



(1) Lock nut
(2) Lock washer
(3) Adjustment nut
(4) Steering stem socket (07916–3710100)

Straighten the lock washer tabs and remove the lock nut and lock washer.
Remove the bearing adjustment nut and remove the steering stem with grease retainer.



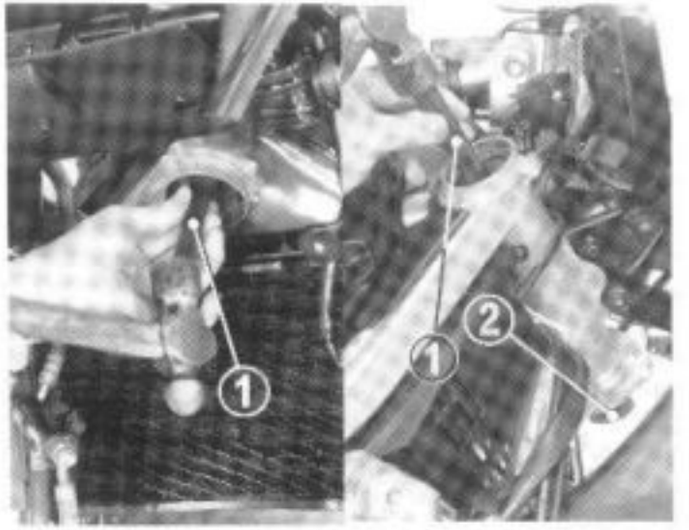
(1) Bearing
(2) Grease retainer

Check the steering bearings for damage or wear.

Bearing Replacement

NOTE:
Replace the bearing and bearing race as a set.

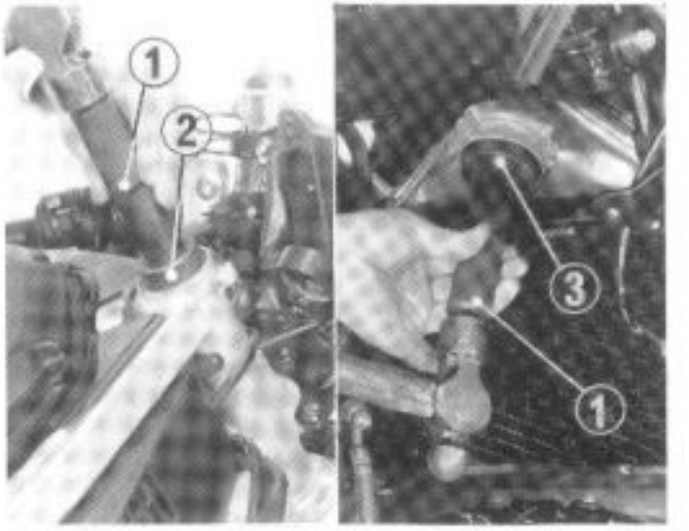
Remove the grease retainer.
Remove the bearing from the steering stem.



(1) Ball race remover (07953–4250001)
(2) Bearing race remover (07946–3710500)

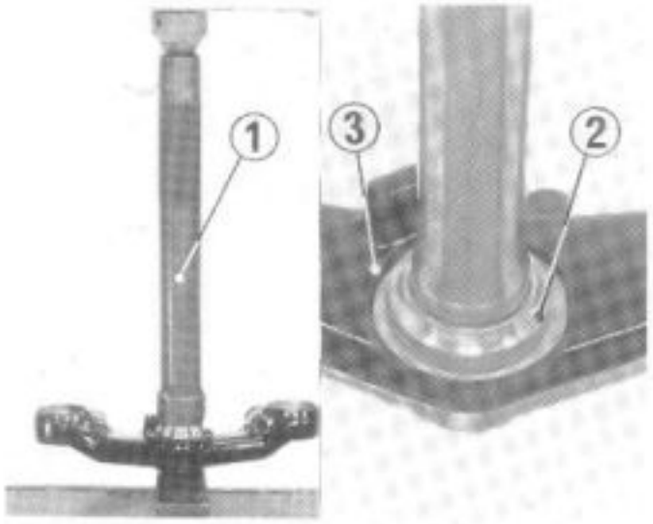
Remove the upper and lower bearing race with the special tool.

NOTE:
If the motorcycle has been involved in an accident, examine the area around the steering head for cracks.



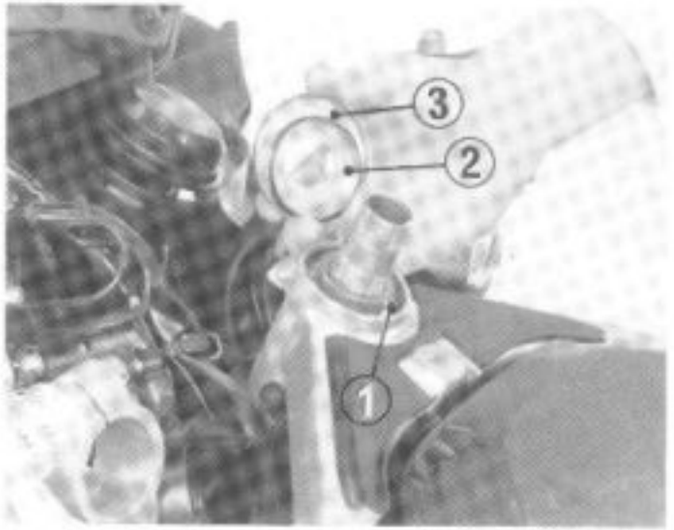
(1) Driver (07749–0010000)
(2) Attachment, 42 x 47 mm (07746–0010300)
(3) Attachment, 52 x 55 mm (07746–0010400)

Drive the upper and lower bearing outer race into the steering head.



(1) Steering stem driver (07946–MB00000)
(2) Lower inner race
(3) Dust seal

Install a dust seal onto the steering stem and press the lower bearing inner race over the steering stem with the special tool.



(1) Upper bearing/Inner race
(2) Dust seal
(3) Adjustment nut

Installation

Pack the bearing cavities with bearing grease.

Instal the grease retainer on the steering stem, then insert the steering stem into the steering head.

Install the upper bearing, inner race and dust seal.

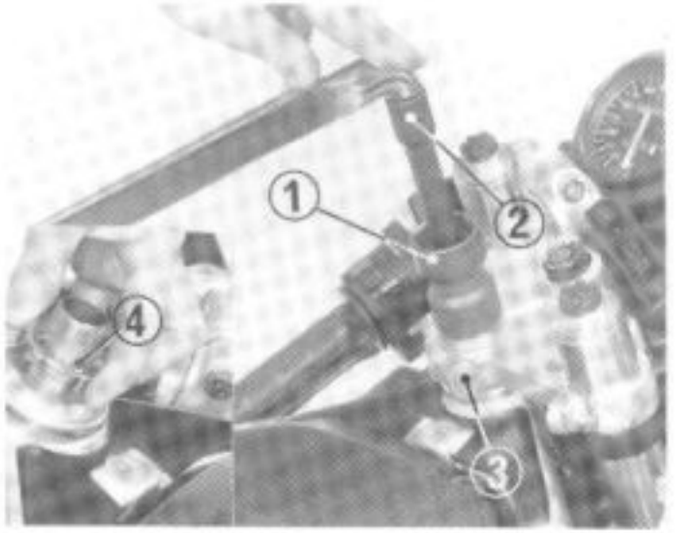
(1) Steering stem socket (07916–3710100)

Install and tighten the adjustment nut.

TORQUE: 23–27 N·m (2.3–2.7 kg-m, 17–20 ft-lb)

Turn the steering stem lock to lock 4–5 times to seat the bearing, then tighten the adjustment nut.

TORQUE: 23–27 N·m (2.3–2.7 kg-m, 17–20 ft-lb)



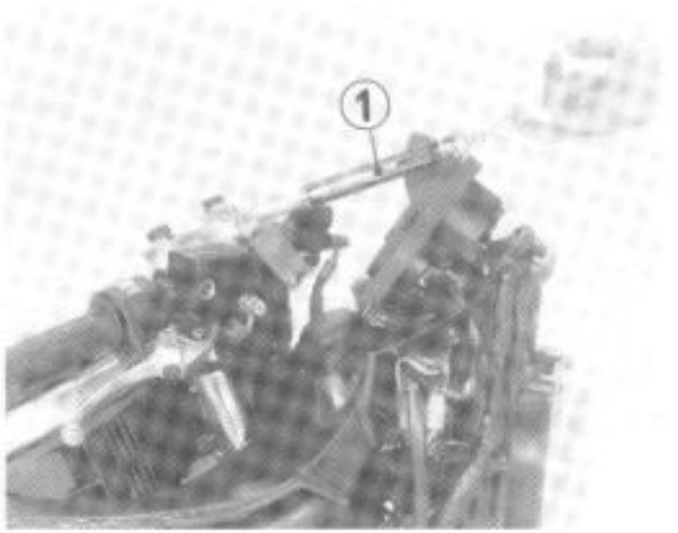
(1) Lock nut wrench, 30 x 32 mm (07716–0020400)
(2) Extension (3) Stem pipe pinch bolt
(4) Lock washer

Install a new lock washer aligning the tabs with the grooves in the nut. Bend two opposite tabs down into the grooves.

NOTE:
Do not install a used lock washer.

Tighten the lock nut by hand until it contacts the lock washer. Hold the adjustment nut and further tighten the lock nut to align its grooves with the lock washer tabs within 90 degrees.

NOTE:
If the lock nut grooves cannot be easily aligned with the lock nut washer tabs, remove the nut, and turn it over and reinstall it.



(1) Spring scale

Bend two lock washer tabs up into the lock nut grooves.

Temporarily install the fork top bridge with the air joint.
Tighten the air joint bolts and temporarily install the front forks.
Tighten the steering stem nut.

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

Tighten the stem pipe pinch bolt.

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

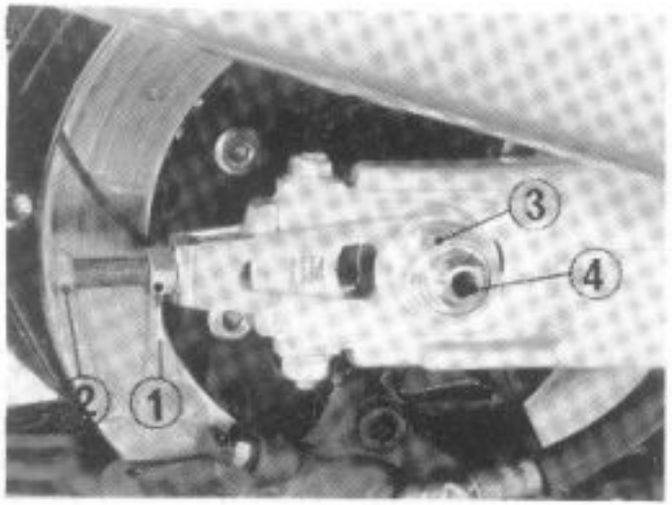
Steering Head Bearing Preload

Install the front forks (page 155). Install the front wheel (page 146). Place a stand under the engine and raise the front wheel off the ground.

Position the steering stem to the straight ahead position.
Hook a spring scale to the fork tube and measure the steering head bearing preload.

NOTE:
Make sure that there is no cable and wire harness interference.

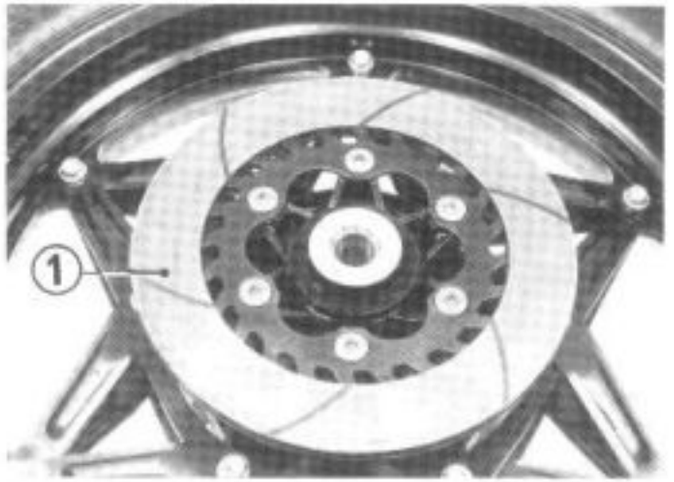
The preload should be within 1.0–1.6 kg (2.21–3.53 lb) for right and left turns. If the readings do not fall within the limits, lower the front wheel on the ground and adjust the bearing adjustment nut.
After making sure the bearing preload, install the removed parts in the reverse order of removal.



(1) Lock nut
(2) Drive chain adjusting bolt
(3) Axle nut
(4) Axle

Removal
Place the motorcycle on the center stand (Special tool). Loosen the drive chain adjusting bolts lock nuts and the adjusting bolts. Remove the axle nut and axle. Push the wheel forward and remove the drive chain from the driven sprocket and remove the rear wheel.

NOTE:
If you depress the brake pedal after the rear wheel is removed, the caliper piston will move out and make reassembly difficult.



(1) Rear brake disc

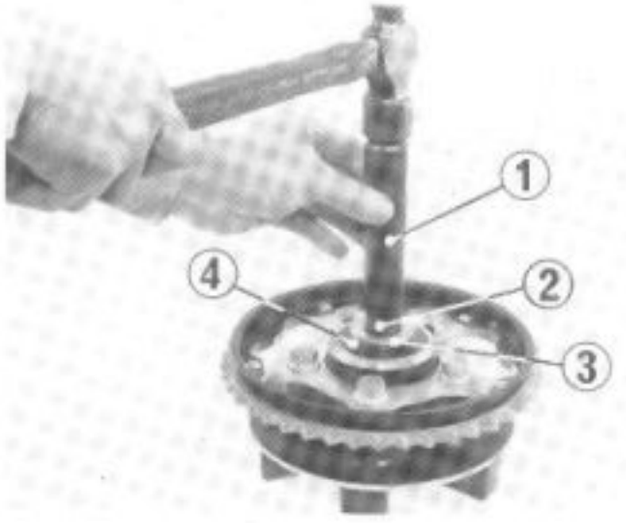
Disassembly
Remove the rear brake disc.

(1) Final driven flange
(2) Final driven sprocket

Remove the final driven sprocket and driven flange together.

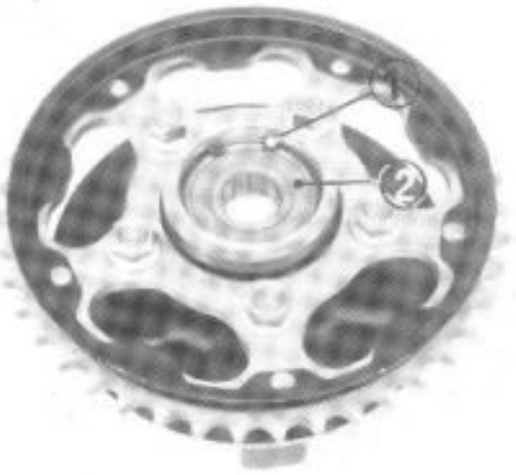
NOTE:
Do not separate the final driven sprocket from the flange, unless replacement of the driven sprocket or flange is necessary.

Remove the driven flange damper rubbers.



(1) Driver (07749–0010000)
(2) Attachment, 24 x 26 mm (07746–0010700)
(3) Rear wheel side collar
(4) Dust seal

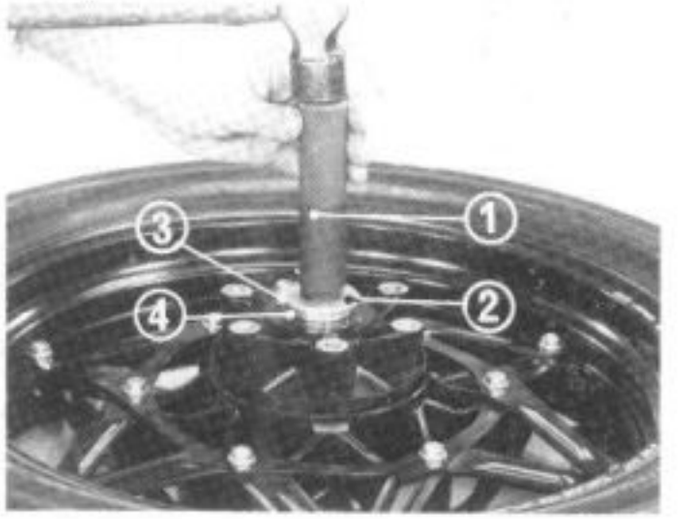
Drive the rear axle sleeve out and remove the rear wheel side collar and dust seal.



(1) Snap ring
(2) Bearing

Remove the snap ring and drive the driven flange side bearing out from the inside.

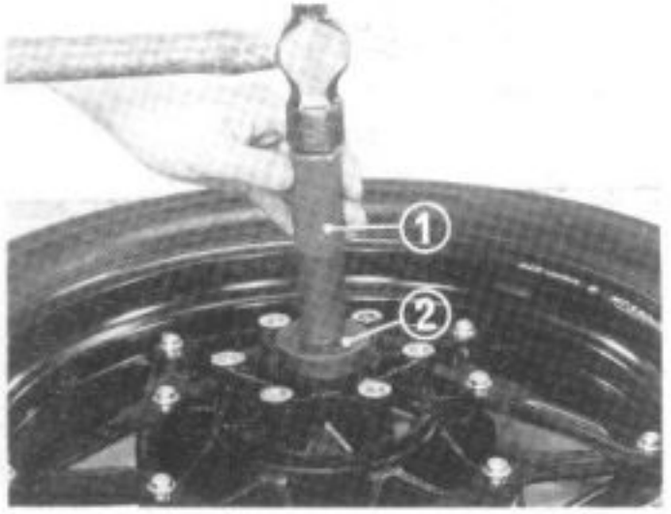
NOTE:
Never reinstall old bearing; once the bearing is removed, it must be replaced with a new one.



(1) Driver (07749–0010000)
(2) Attachment, 24 x 26 mm (07746–0010700)
(3) Wheel side collar
(4) Dust seal

Drive the left wheel bearing and distance collar out together. Remove the wheel side collar and dust seal. Drive the right wheel bearing out.

NOTE:
Never reinstall old bearings; once the bearings are removed, they must be replaced with new ones.



(1) Driver (07749–0010000)
(2) Attachment, 52 x 55 mm (07746–0010400) and Pilot, 25 mm (07746–0040600)

Inspection

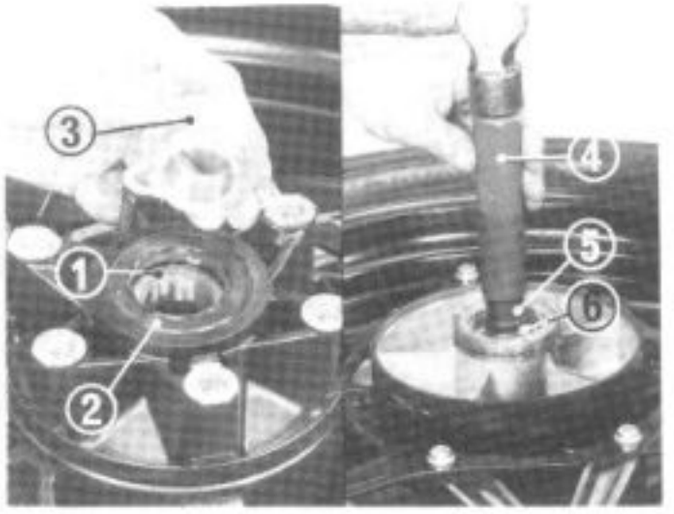
Check the following items:

- Axle shaft bent (page 143).
- Wheel bearing play or rattle.
- Wheel rim runout (page 143).
- Final driven sprocket wear or damage.
- Wear, damage or deteriorated damper rubbers.

Assembly

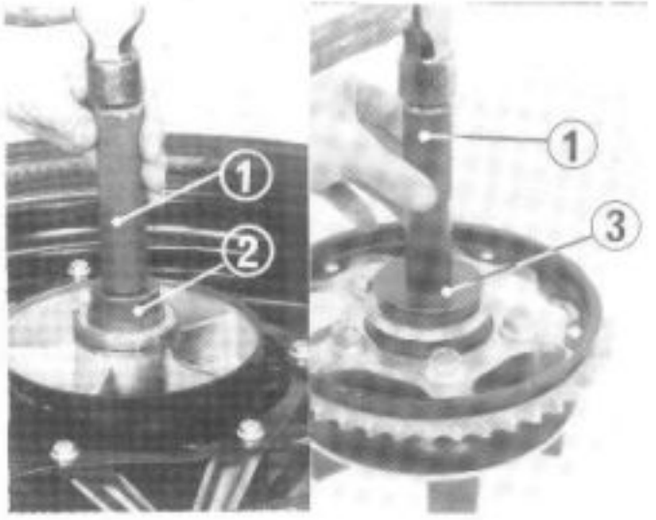
Drive a new right wheel bearing into the wheel hub.

NOTE:
Drive the bearings squarely.



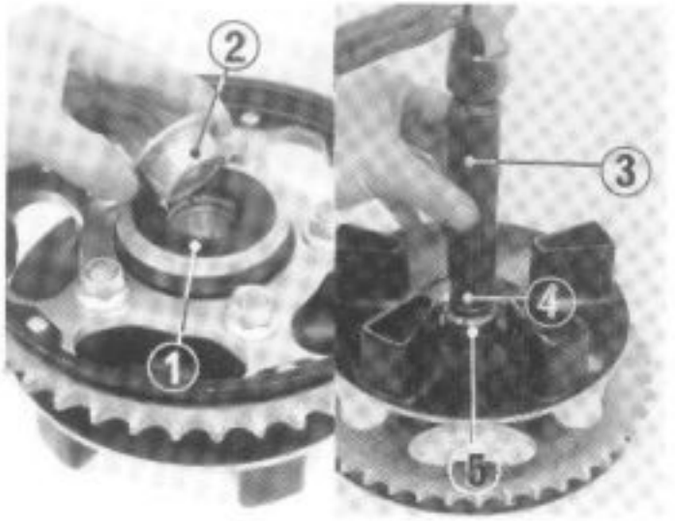
(1) Right wheel bearing
(2) Dust seal
(3) Wheel side collar
(4) Driver (07749–0010000)
(5) Attachment, 24 x 26 mm (07746–0010700)
(6) Distance collar

Install a new dust seal.
Apply grease to the dust seal lip and install the right wheel side collar.
Drive the distance collar into the wheel side collar through the right wheel bearing with its stepped end facing the right side.



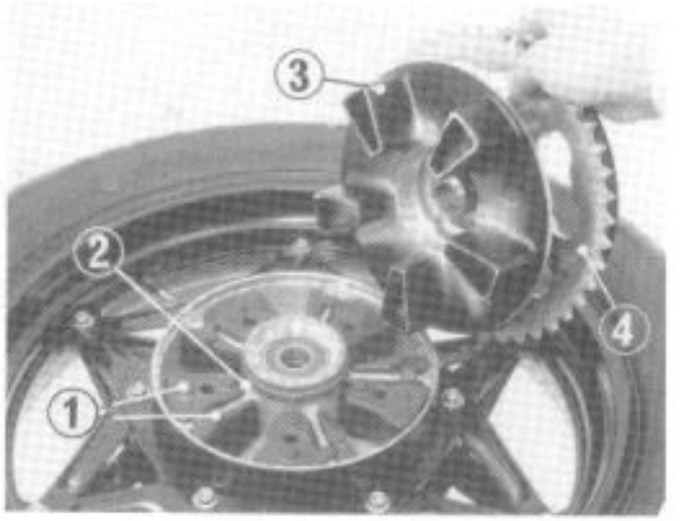
(1) Driver (07749–0010000)
(2) Attachment, 42 x 47 mm (07746–0010300) and Pilot, 20 mm (07746–0040500)
(3) Attachment, 62 x 68 mm (07746–0010500) and Pilot, 25 mm (07746–0040600)

Drive a new left wheel bearing into the wheel hub.
Pack new final driven flange bearing cavities with grease.
Drive the bearing into the final driven flange with its sealed end facing out.



(1) Left dust seal
(2) Wheel side collar
(3) Driver (07749–0010000)
(4) Attachment, 24 x 26 mm (07746–0010700)
(5) Rear axle sleeve

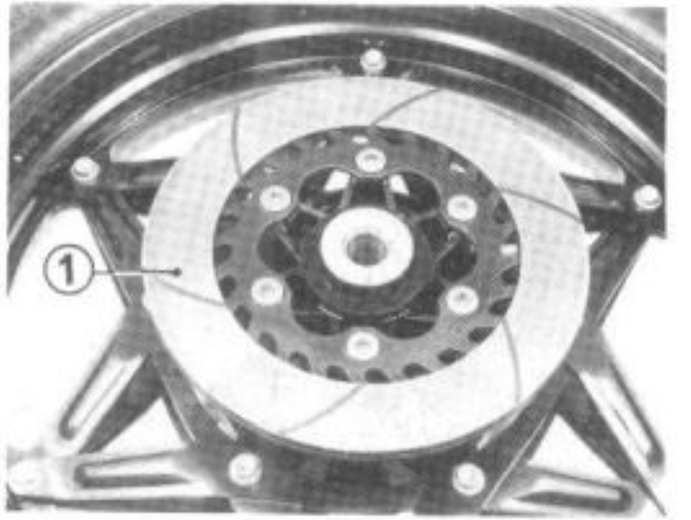
Install the left dust seal into the final driven flange.
Apply grease to the lip of the dust seal and install the wheel side collar.
Drive the rear axle sleeve into the wheel side collar through the left wheel bearing.



(1) Damper rubbers
(2) O-ring
(3) Final driven flange
(4) Driven sprocket

Install the damper rubbers into the wheel hub. Install a new O-ring in the groove of the wheel hub. Install the final driven flange. If the driven sprocket is removed from the flange, tighten the driven sprocket nuts to the specified torque.

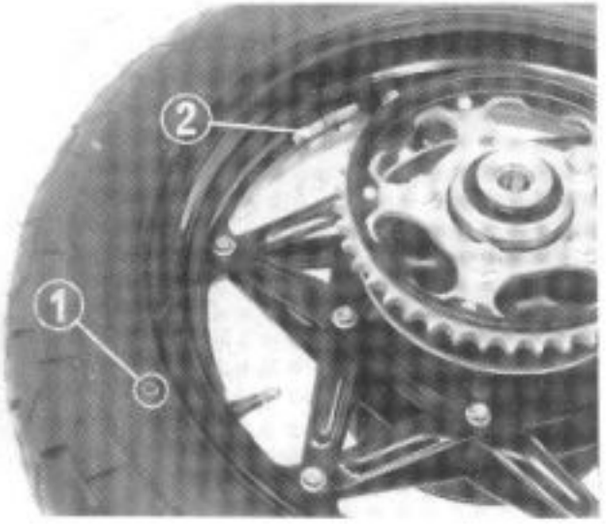
TORQUE: 80–100 N·m (8.0–10.0 kg-m, 58–72 ft-lb)



(1) Brake disc

Apply oil to the disc bolts.
Install the brake disc and tighten the bolts.

TORQUE: 37–43 N·m (3.7–4.3 kg-m, 27–31 ft-lb)



(1) Tire balance mark
(2) Wheel weight

Tire Balance

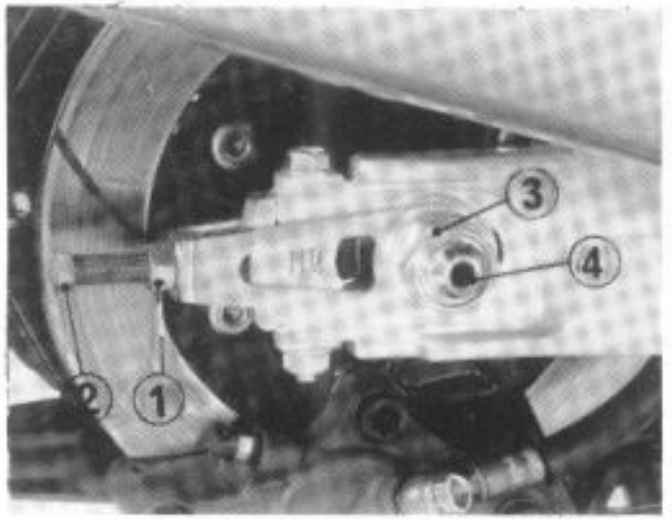
CAUTION:
Wheel balance directly affects the stability, handling and overall safety of the motorcycle. Always check balance when the tire has been removed from the rim.

NOTE:
For optimum balance, the tire balance mark (a paint dot on the side wall) must be located next to the valve stem. Remount the tire if necessary.

On the front wheel, remove the dust seals and speedometer gearbox from the wheel.

(1) Inspection stand

Mount the wheel, tire and brake disc assembly in an inspection stand. Spin the wheel, allow it to stop, and mark the lowest (heaviest) part of the wheel with chalk. Do this two or three times to verify the heaviest area. If the wheel is balanced, it will not stop consistently in the same position. To balance the wheel, install wheel weights on the highest side of the rim, the side opposite the chalk marks. Add just enough weight so the wheel will no longer stop in the same position when it's spun. Do not add more than 60 grams for front wheel and 70 grams for rear wheel.



(1) Lock nut
(2) Drive chain adjusting bolt
(3) Axle nut
(4) Axle

Installation

Install the rear wheel in the reverse order of removal.

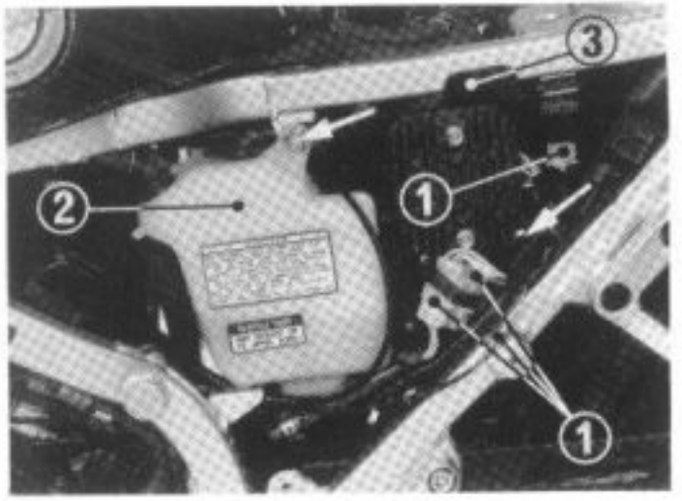
NOTE:

* *When installing the wheel, carefully fit the brake disc between the brake pads.*
* *After installing the wheel, apply the brake several times. Then check that the wheel rotates freely. Recheck wheel installation if the brake drags or if the wheel does not rotate freely.*

Tighten the rear axle nut.

TORQUE: 85–105 N·m
(8.5–10.5 kg-m, 61–76 ft-lb)

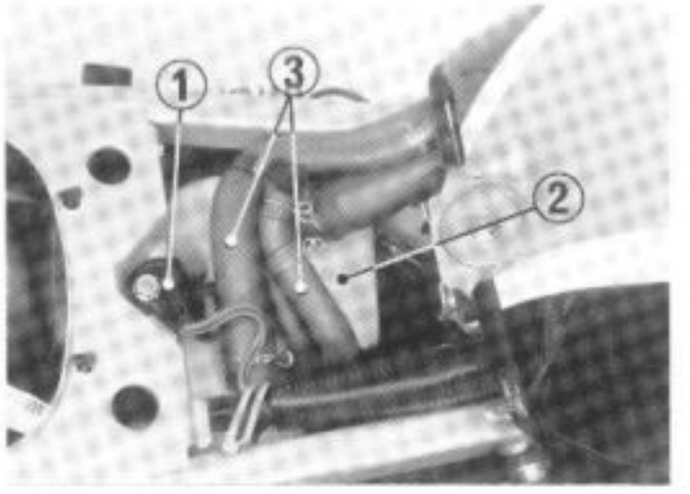
Adjust the drive chain slack (page 40).



(1) Couplers and connector
(2) Reserve tank
(3) Electric panel

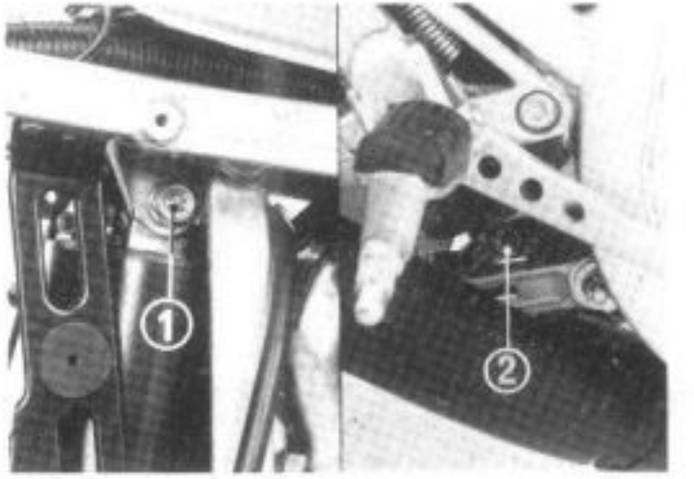
Removal

Remove the frame side covers and seat.
Disconnect the regulator/rectifier, fuel pump relay and neutral switch wire couplers and connector. Remove the bolts attaching the coolant reserve tank and electric panel to the frame.



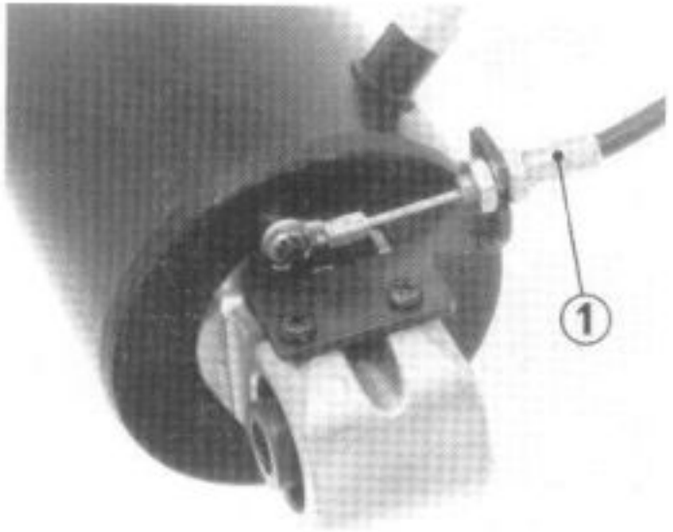
(1) Set plate
(2) Breather separator
(3) Breather tubes

Remove the fuel tank.
Disconnect the crankcase breather tubes from the breather separator.
Remove the breather separator set plate bolt, set plate and separator.
Remove the damping force adjusting knob and air valve hose from the bracket on the frame.



(1) Upper mounting bolt
(2) Lower mounting bolt

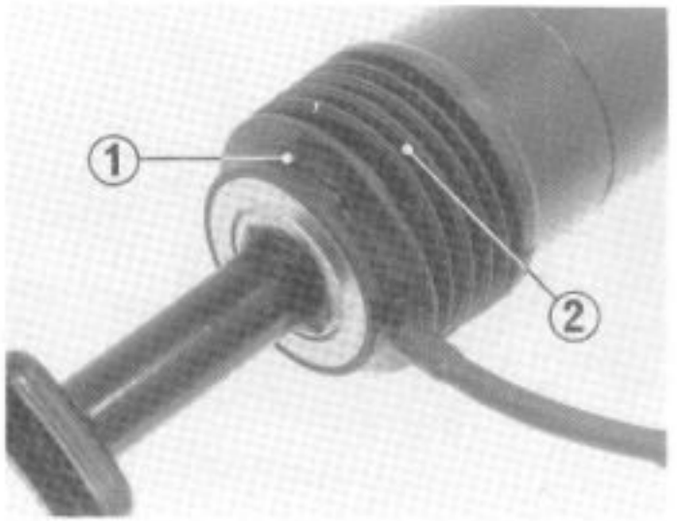
Remove the shock absorber upper and lower mounting bolts, and the boot tube from the swing arm.
Remove the shock absorber.



(1) Damping force adjusting cable

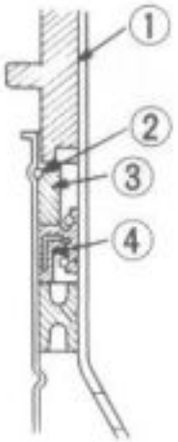
Oil Seal Replacement

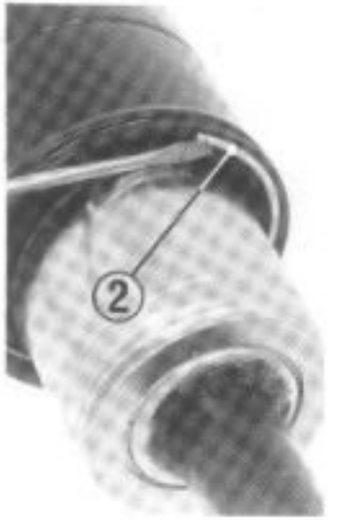
Remove the cotter pin securing the adjusting cable to the adjusting lever and disconnect the cable. Remove the two screw attaching the cable bracket to the shock absorber and remove the cable and bracket.



(1) Boot clip
(2) Boot

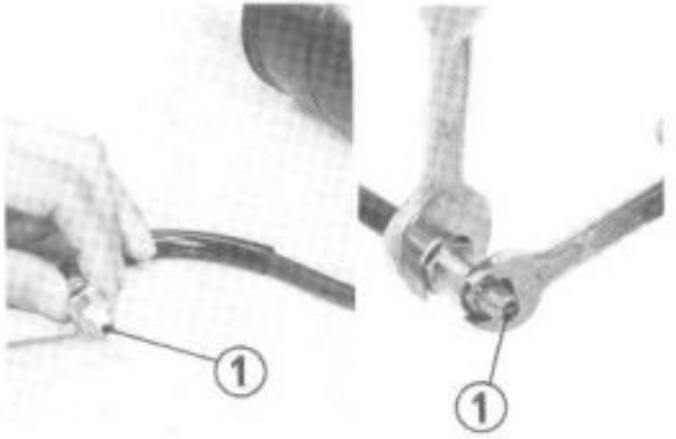
Remove the boot clip and boot.





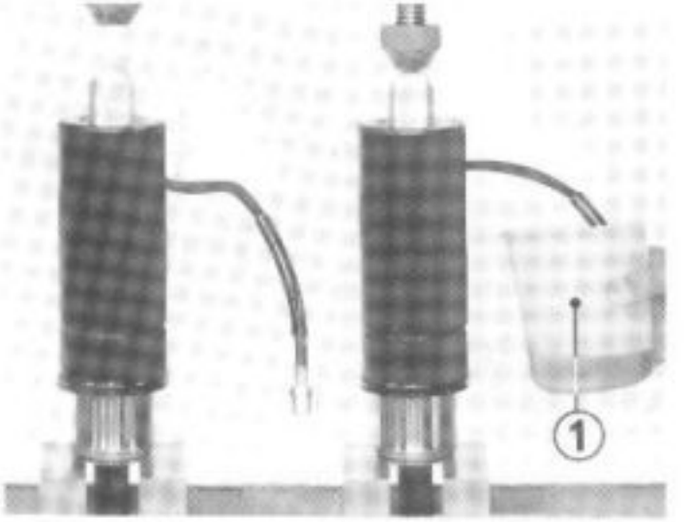
(1) Oil seal driver (07965–MC70100)
(2) Stop ring
(3) Back-up ring
(4) Oil seal

To remove the stopper ring, press down on the back-up plate and oil seal.
Remove the stopper ring and back-up plate.



(1) Air valve

Release air pressure and remove the air valve from the hose.



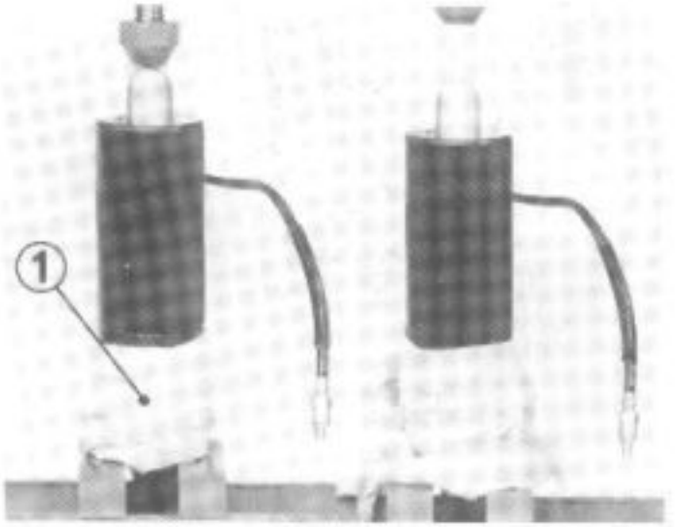
(1) Damper oil (ATF or equivalent)

Place about 300 cm^3 (10.1 oz) of damper oil (ATF or equivalent) in a clean container. Place the shock absorber in a hydraulic press. Place the air hose in the oil and press the shock absorber several times until the damper is filled with the oil.

NOTE:

* *Do not over-press the shock.*
* *This shock absorber's stroke is 4.6 mm (1.81 in).*

Place the shock absorber up right in an oil drain pan. Let the shock stand for 5 minutes to allow air to escape.



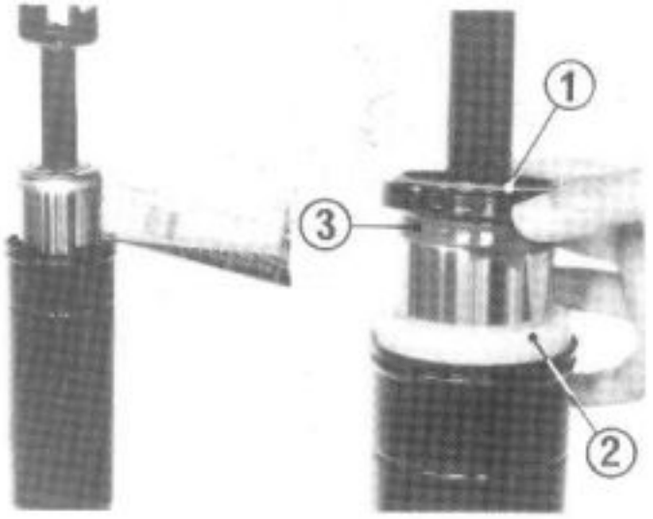
(1) Shop towel

Reinstall the air valve in the air hose. Place the shock absorber in the hydraulic press.

Wrap a shop towel around the shock absorber. Press the oil seal out by compressing the shock absorber. Leave the shock absorber for another 5 minutes to let any remaining ATF drain out.

NOTE:

Do not tilt the shock absorber or ATF will flow out of the damper case.



(1) Oil seal
(2) Guide bushing
(3) Tape

Turn the shock absorber upside down after all the ATF has drained from the outer case. Fill the damper case with the specified amount of ATF.

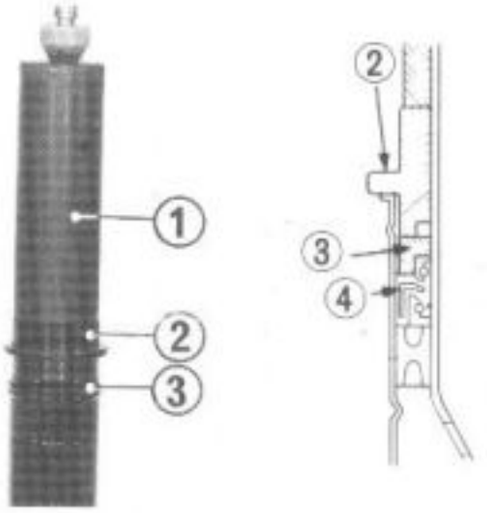
SPECIFIED AMOUNT:

265 cm^3 (7.46 Imp. oz)

Install the guide bushing into the damper case. Wrap a piece of tape around the groove at the end of the shock absorber. Dip the oil seal in damper oil and install it on the damper.

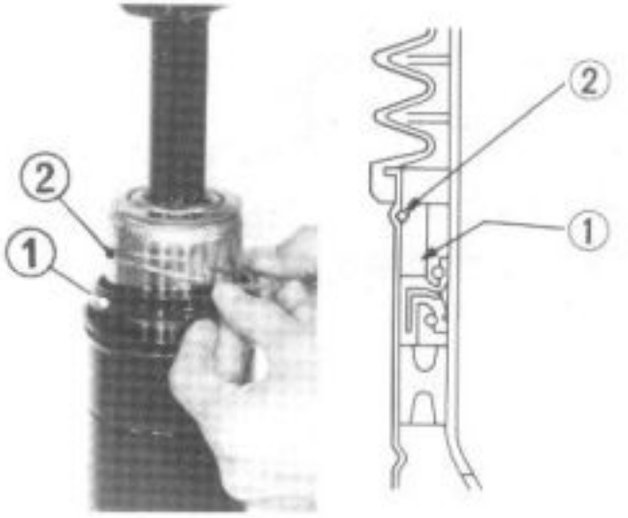
CAUTION:

Be careful not to damage the oil seal during installation.



(1) Oil seal driver attachment (07965–MB00100)
(2) Oil seal driver (07965–MC70100)
(3) Attachment ring (07965–ME70100)
(4) Oil seal

Press the oil seal into the shock absorber with a hydraulic press until the oil seal driver and oil seal driver ring stops at the edge of the outer case.



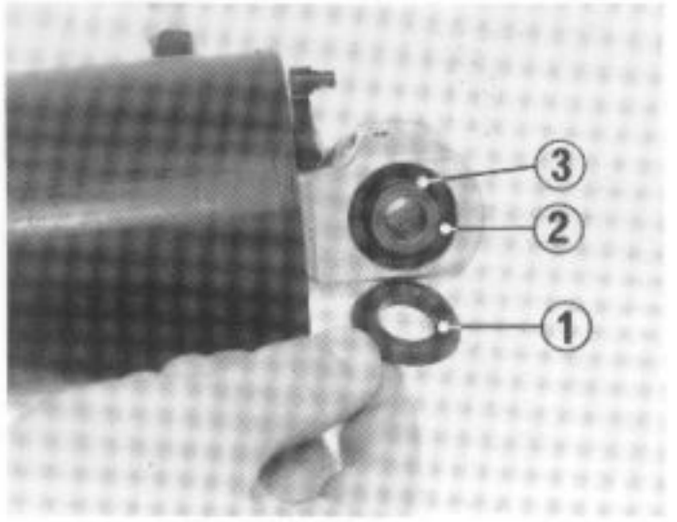
(1) Back-up ring
(2) Stop ring

Install the back-up ring. Install the stop ring, being certain that it is seated in the ring groove in the outer case.

CAUTION:

Be sure stop ring is seated in the ring groove all the way around.

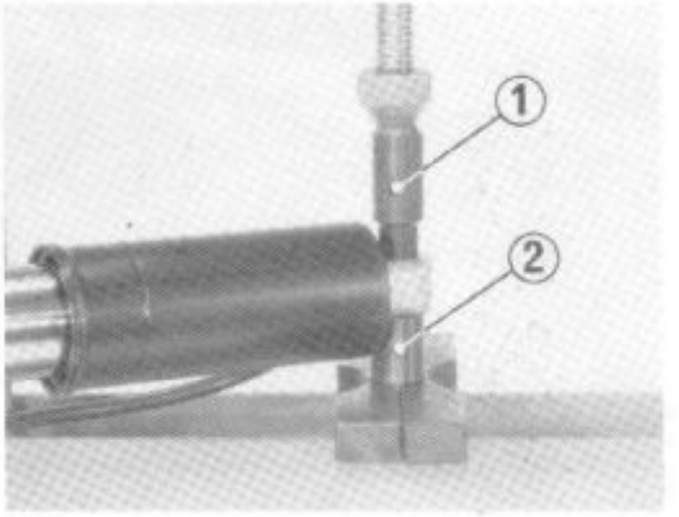
Install the boot and boot clip. Install the damping force adjusting cable using a new cotter pin.



(1) Upper collar
(2) Stopper ring
(3) Spherical bearing

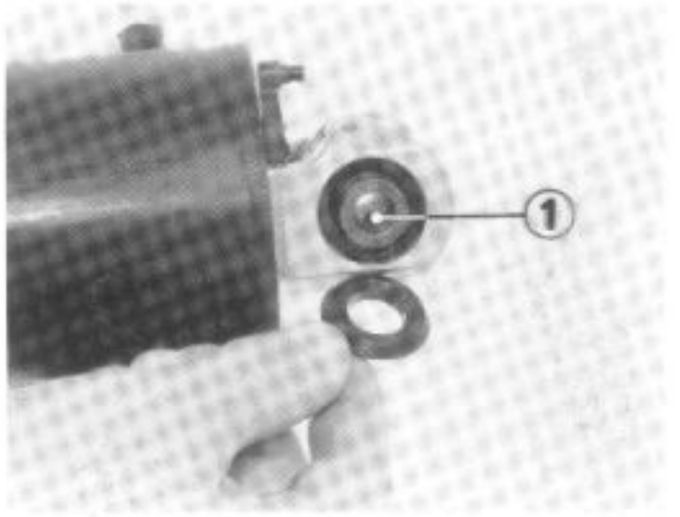
Spherical Bearing Replacement

Remove the upper collars and stopper rings.



(1) Driver (07965–1480100)
(2) Attachment (07946–KA30200)

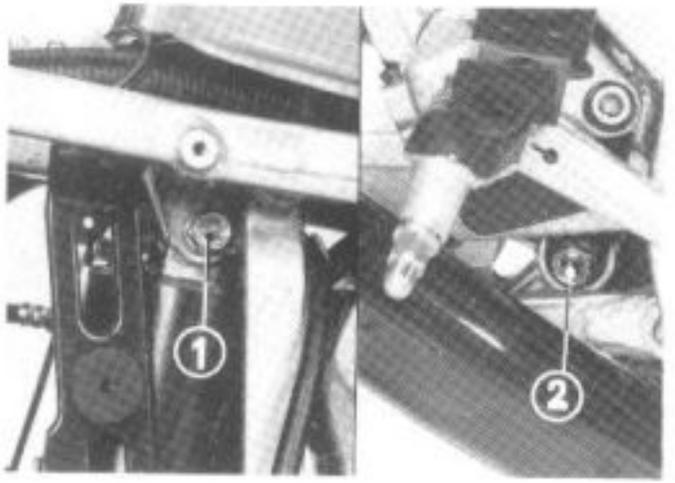
Press out the old spherical bearing from the shock absorber.
Install the stopper ring and press in a new spherical bearing into the shock absorber. Install the outer side stopper ring and upper collars.



(1) Spherical bearing

Apply paste grease (containing more than 40% of molybdenum) to the upper spherical bearing.

NOTE:
Use paste grease (containing more than 40% of molybdenum) as follows:
* *MOLYKOTE G-n PASTE manufactured by Dow Corning, U.S.A.*
* *Locol Paste manufactured by Sumico Lubricant, Japan.*
* *Other lubricants of equivalent quality.*

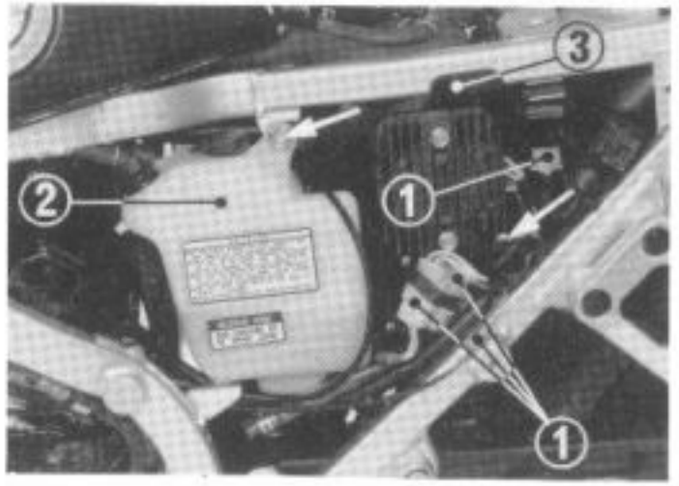


(1) Upper mounting bolt
(2) Lower mounting bolt

Installation

Install the shock absorber in the frame and tighten the upper and lower mounting bolts.

TORQUE: 40–50 N·m (4.0–5.0 kg-m, 29–36 ft-lb)

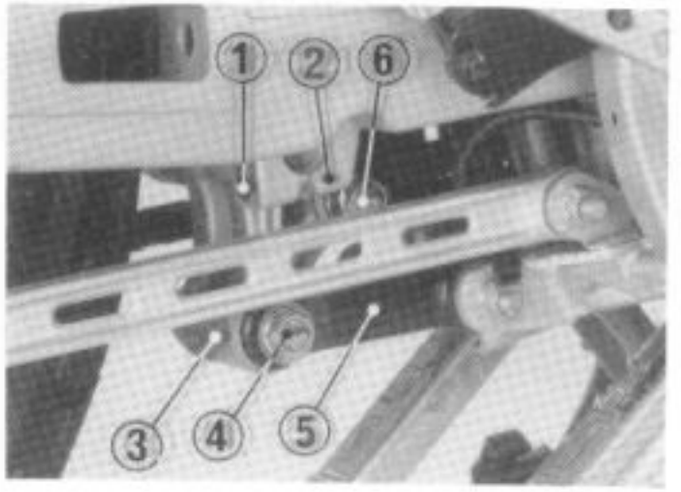


(1) Couplers and connector
(2) Reserve tank
(3) Electric panel

Install the crankcase separator, electric panel and reserve tank. Connect all wire couplers, connectors and breather tubes.

NOTE:
Route the wires, tubes and hoses properly (page 222).

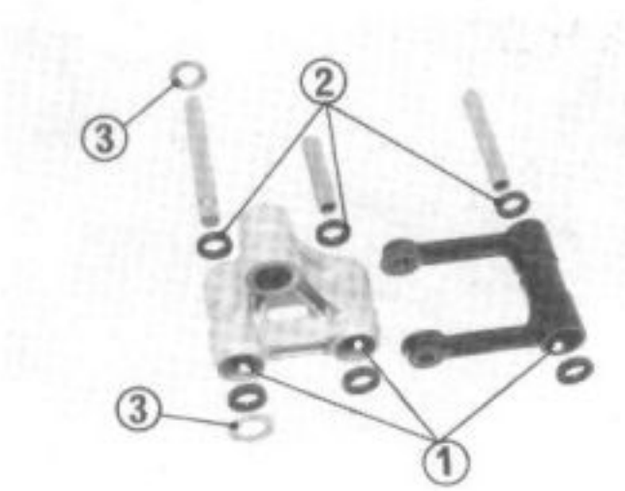
Install the frame side covers and seat. Adjust the shock absorber air pressure (page 20).



(1) Pinch bolt
(2) Shock arm shaft
(3) Shock arm
(4) Arm-to-link bolt
(5) Shock link
(6) Shock lower mounting bolt

Removal

Remove the mufflers and exhaust pipes. Support the frame under the engine to raise the rear wheel off the ground. Remove the shock arm by removing the shock absorber lower mounting bolt, shock arm-to-link bolt, shock arm shaft pinch bolt and shock arm shaft. Remove the shock link by removing the shock link-to-frame bolt.



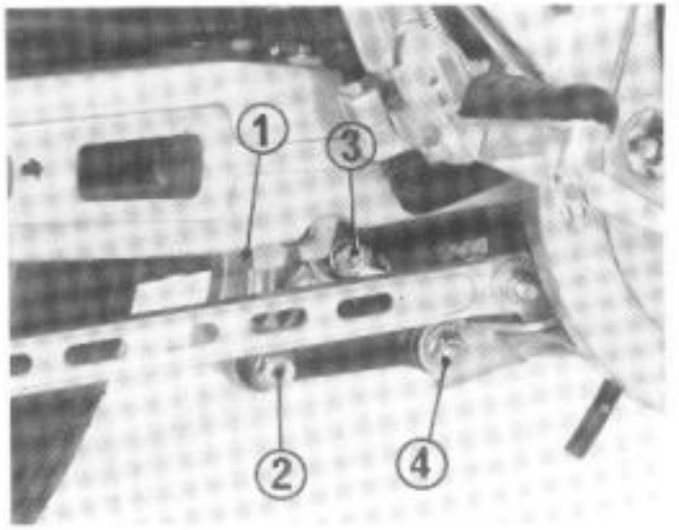
(1) Needle bearings
(2) Dust seals
(3) Thrust washer

Inspection

Check the linkage needle bearings for wear or damage.
Check the dust seals for damage.
Replace the parts as necessary.

Installation

Apply molybdenum disulfide grease to the needle bearings and dust seals.



(1) Pinch bolt
(2) Shock arm-to-link bolt
(3) Shock lower mounting bolt
(4) Shock link-to-frame bolt

Install the shock arm and link and tighten each bolt in the order listed.

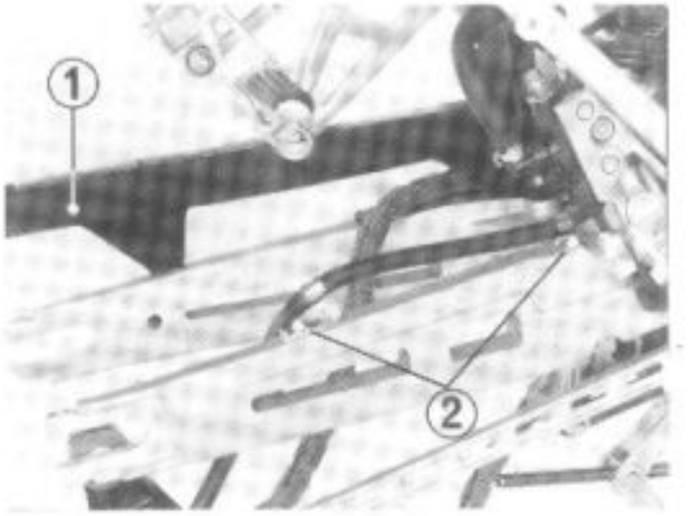
NOTE:

Install the thrust washer on the left side between the swing arm and the shock arm.

TORQUE:

Shock link-to-frame: 40–50 N·m (4.0–5.0 kg-m, 29–36 ft-lb)
Shock arm-to-shock link: 40–50 N·m (4.0–5.0 kg-m, 29–36 ft-lb)
Shock arm shaft pinch bolt: 20–30 N·m (2.0–3.0 kg-m, 14–22 ft-lb)

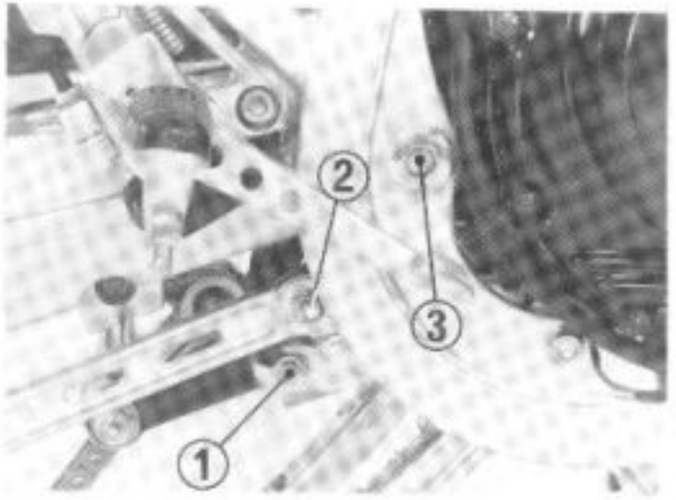
Install the mufflers and exhaust pipes.



(1) Chain cover
(2) Brake hose clamp

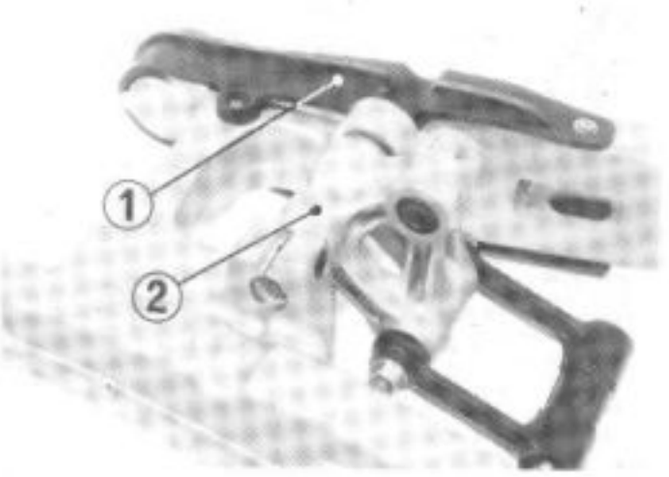
Removal

Remove the rear wheel (page 160).
Remove the chain cover.
Remove the two bolts attaching the brake hose clamp to the frame.
Remove the rear shock absorber lower mounting bolt.



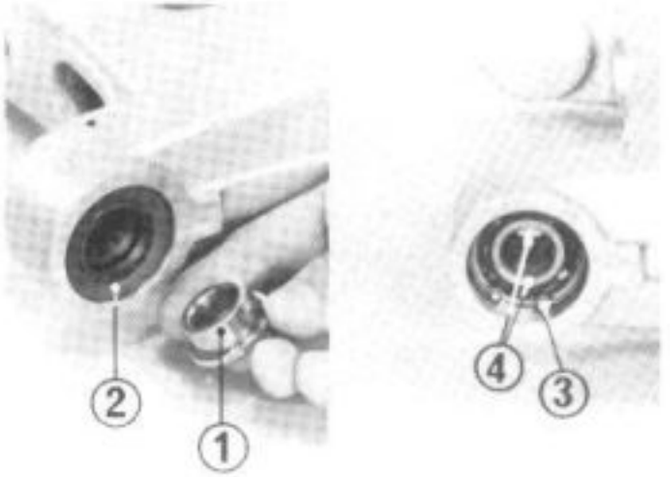
(1) Shock link-to-frame bolt
(2) Rear brake torque rod bolt
(3) Right pivot bolt

Remove the shock link-to-frame bolt and rear brake torque rod bolt.
Remove the right and left swing arm pivot bolts.



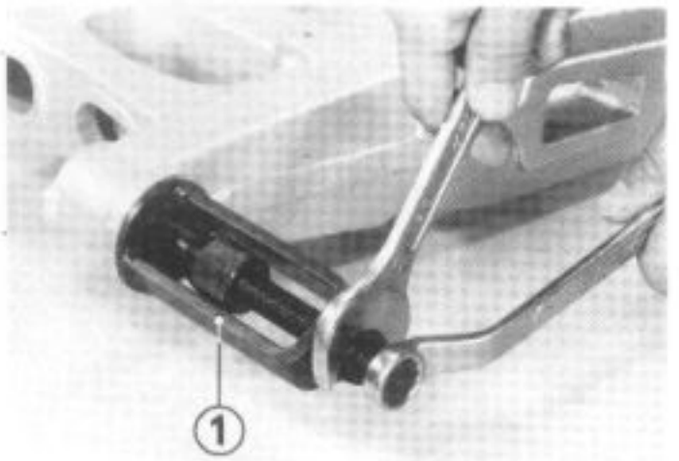
(1) Drive chain slider
(2) Shock arm

Remove the swing arm from the frame.
Remove the shock arm by removing pinch bolt and shock arm shaft and the drive chain slider from the swing arm.



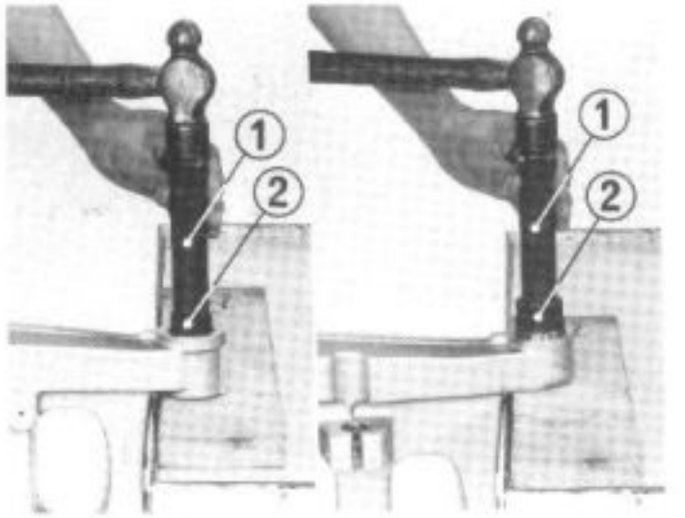
(1) Pivot collar
(2) Dust seal
(3) Snap ring
(4) Bearings

Bearing Replacement
Remove the pivot collars and dust seals from the swing arm's right pivot.
Remove the snap ring and drive out the pivot bearings.



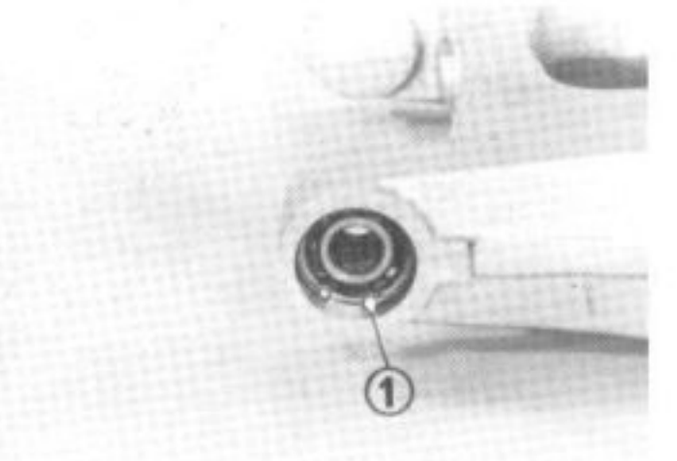
(1) Needle bearing remover (07931–MA70000)

Remove the dust seal from the swing arm's left pivot.
Remove the left pivot needle bearing with the special tool.



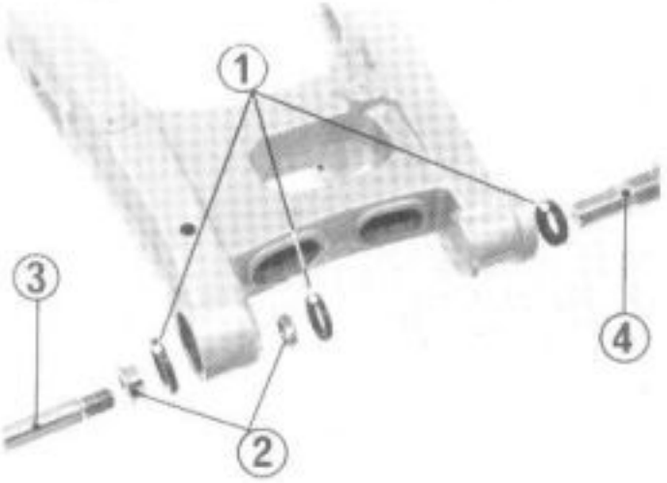
(1) Driver (07749–0010000)
(2) Attachment, 32 x 35 mm (07746–0010100)
Pilot, 20 mm (07746–0040500)
(3) Attachment, 37 x 40 mm (07746–0010200)
Pilot, 17 mm (07746–0040400)

Drive a new needle bearing into the swing arm left pivot.
CAUTION:
To prevent the swing arm from damage, support the swing arm as shown.
Apply grease to new ball bearing cavities.
Drive the ball bearings into the swing arm right pivot.



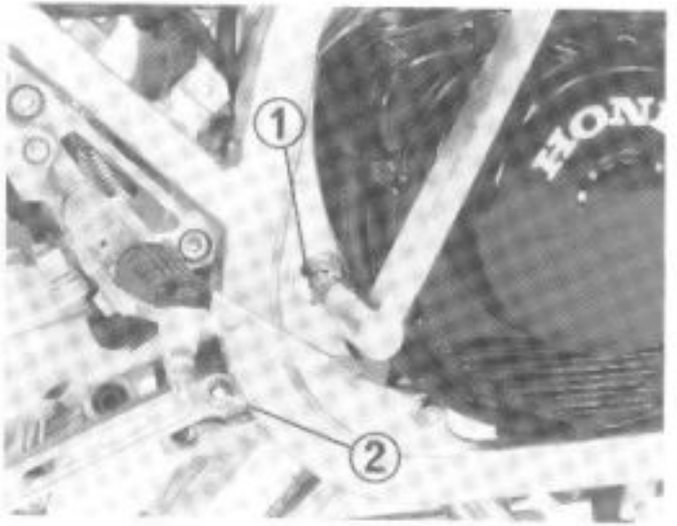
(1) Snap ring

Install the snap ring in the right swing arm pivot.



(1) Dust seals
(2) Right pivot collars
(3) Right pivot bolt
(4) Left pivot bolt

Apply grease to the dust seals and install them into the pivots.
Install the right pivot collars.



(1) Right pivot bolt
(2) Brake torque rod bolt

Installation

Install the shock absorber arm and the drive chain slider onto the swing arm. Install the swing arm onto the frame in the reverse order of removal. Tighten the right swing arm pivot bolt.

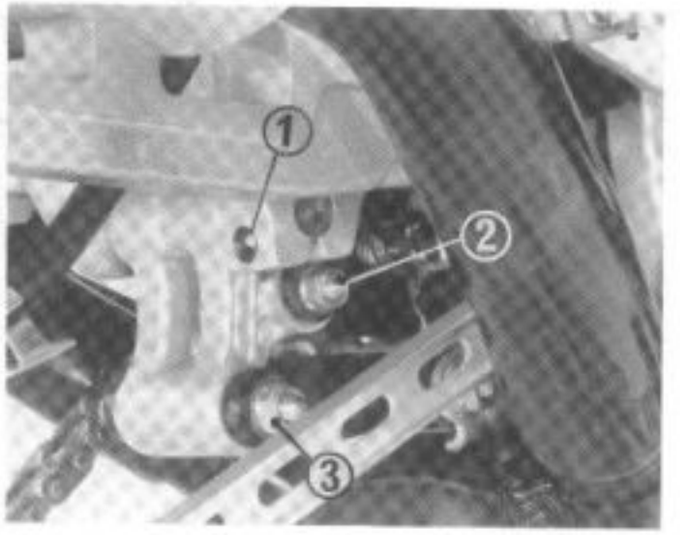
TORQUE: 85–105 N·m
(8.5–10.5 kg-m, 61–76 ft-lb)

Tighten the left pivot bolt.

TORQUE: 85–105 N·m
(8.5–10.5 kg-m, 61–76 ft-lb)

Tighten the brake torque rod bolt.
(For brake torque rod inspection, refer to page 188).

TORQUE: 24–30 N·m
(2.4–3.0 kg-m, 17–22 ft-lb)



(1) Shock arm shaft pinch bolt
(2) Shock lower mounting bolt
(3) Shock arm-to-frame bolt

Tighten the shock arm-to-frame.

TORQUE: 40–50 N·m
(4.0–5.0 kg-m, 29–36 ft-lb)

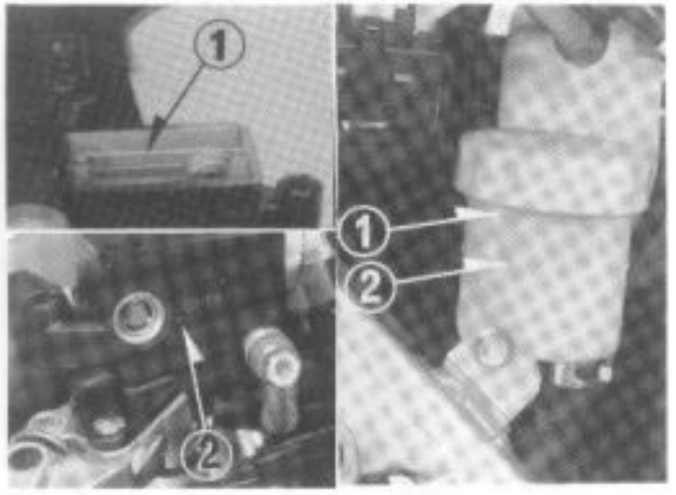
Tighten the shock arm shaft pinch bolt.

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

Tighten the shock lower mounting bolt.

TORQUE: 40–50 N·m
(4.0–5.0 kg-m, 29–36 ft-lb)

Install the rear wheel (page 164).



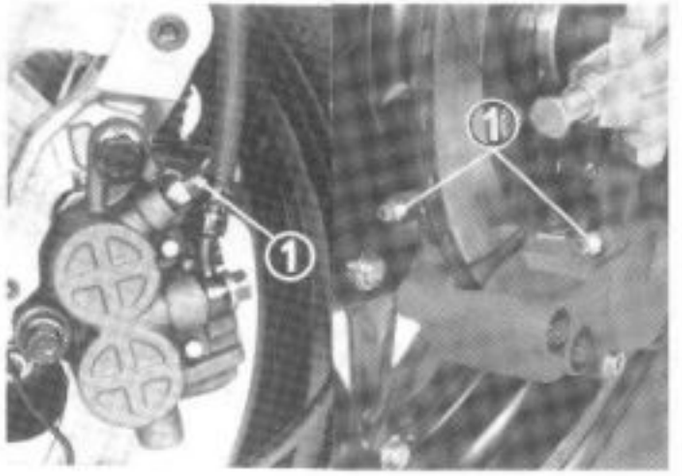
(1) Upper level
(2) Lower level

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.

CAUTION:
* ***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

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



(1) Bleed valves

Brake fluid draining:

Connect a bleed hose to the bleed valve to avoid spilling fluid.

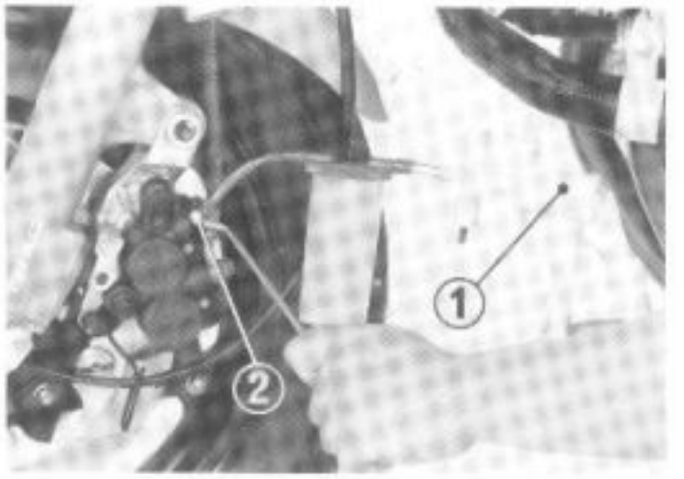
WARNING

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

Loosen the caliper bleed valve and pump the brake lever or pedal. Stop operating the lever or pedal when fluid stops flowing out of the bleed valve.

Brake fluid filling:

Fill the reservoir with DOT 4 brake fluid from a sealed container.



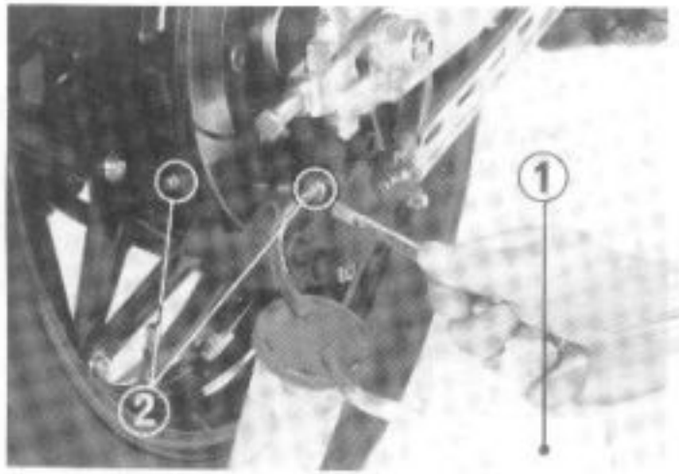
(1) Brake bleeder
(2) Bleed valve

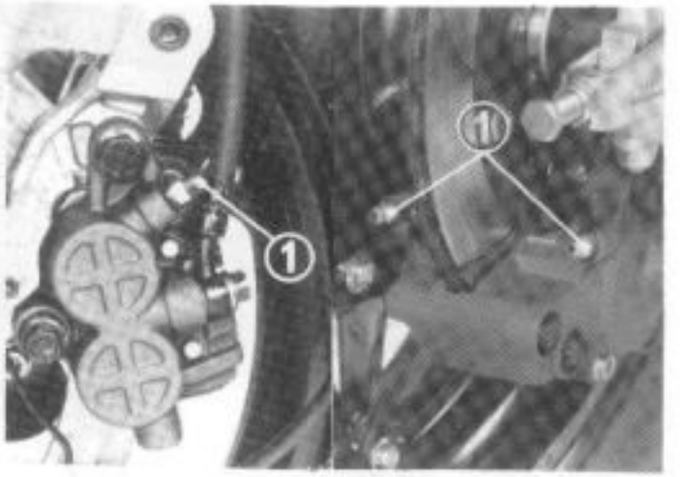
CAUTION:
Do not mix different types of fluid. They are not compatible.

Connect the Brake Bleeder or equivalent to the bleed valve. Pump the brake bleeder and loosen the bleed valve. Add fluid when the fluid level in the master cylinder reservoir is low.

NOTE:
* *Check the fluid level often while bleeding the brakes to prevent air from being pumped into the system.*
* *When using a brake bleeding tool, follow the manufacturer's operating instructions.*

Repeat the above procedures until air bubbles do not appear in the plastic hose.





(1) Brake Bleeder
(2) Bleed valves

NOTE:
If air is entering the bleeder from around the bleed valve threads. Seal the threads with teflon tape.

Close the bleed valve and operate the brake lever or pedal. If it feels spongy, bleed the system by performing the Air Bleeding procedure.

NOTE:
If a brake bleeder is not available, perform the following procedure.

Pump up the system pressure with the lever or pedal until there are no air bubbles in the fluid flowing out of the reservoir hole and lever or pedal resistance is felt.

Air Bleeding

Connect a bleed hose to the bleed valve.

1) Squeeze the brake lever or pedal, open the bleed valve 1/2 turn and then close the valve.

NOTE:
Do not release the brake lever or pedal until the bleed valve has been closed.

2) Release the brake lever or pedal slowly and wait several seconds after it reaches the end of its travel.

Repeat steps 1 and 2 until bubbles cease to appear in the fluid at the end of the hose.

(1) Bleed valves

Tighten the bleed valve.

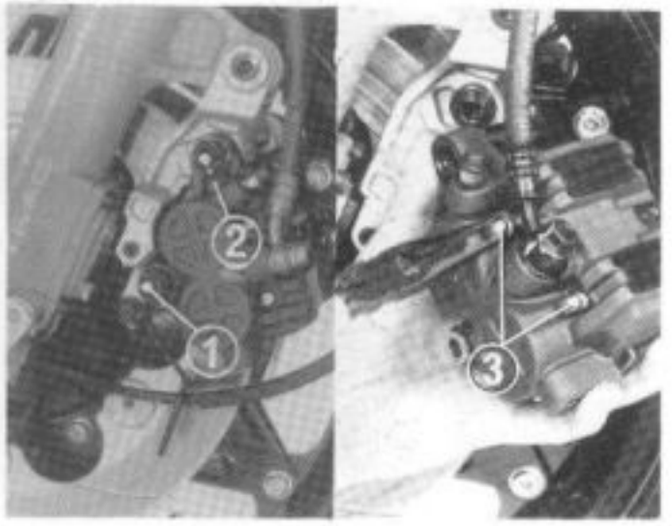
TORQUE: 4–7 N·m
(40–70 kg-cm, 35–61 in-lb)

Fill the fluid reservoir to the upper level mark.

WARNING

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

Reinstall the diaphragm and master cylinder cover.

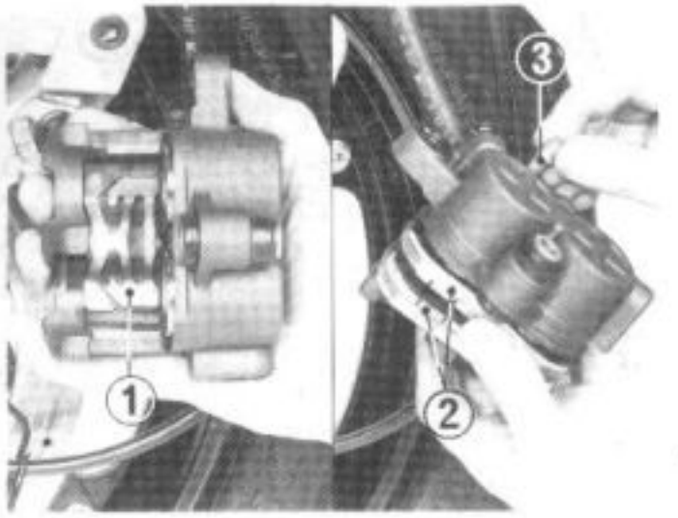


(1) Caliper bolt
(2) Pivot bolt
(3) Pad pin

Front Brake Pad Replacement

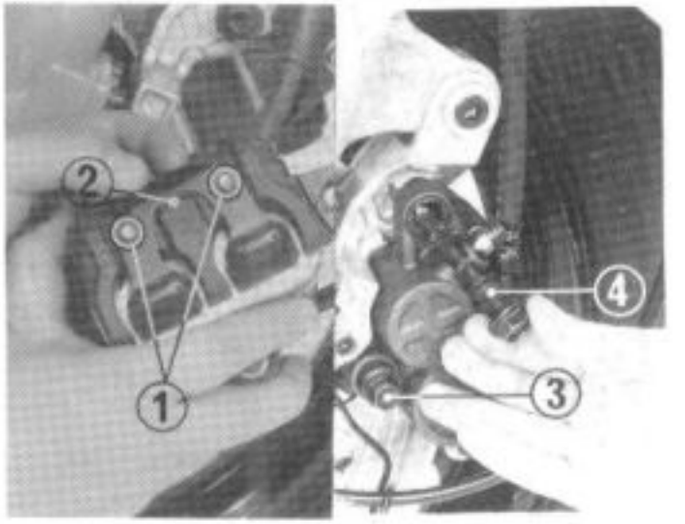
NOTE:
Always replace the brake pads in pairs to assure even disc pressure.

Remove the pad pin retainer bolt. Remove the caliper bolt and pivot bolt. Remove the caliper from the bracket. Remove the pad pin retainer and pull the pad pins out of the caliper. Remove the brake pads.



(1) Pad spring
(2) Pads
(3) Pad pin

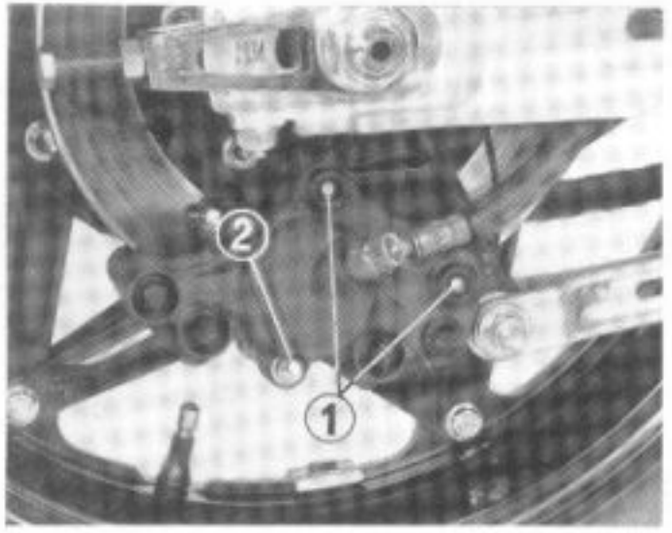
Position the pad spring in the caliper as shown. Push the caliper pistons in all the way. Install the new pads in the caliper. Install the pad pins, one pad pin first, then install the other pin by pushing the pads against the caliper to depress the pad spring.



(1) Pad pins
(2) Pin retainer
(3) Caliper bolt
(4) Pivot bolt

Place the pad pin retainer over the pad pins. Push the retainer down to secure the pins. Install the pad pin retainer bolt. Install the caliper to the bracket so the disc is positioned between the pads, being careful not to damage the pads. Apply silicone grease to the inside of the pivot bolt boot and pivot bolt. Tighten the caliper bolt and pivot bolt.

TORQUE:
Caliper bolt: 20–25 N·m
(2.0–2.5 kg-m, 14–18 ft-lb)
Pivot bolt: 25–30 N·m
(2.5–3.0 kg-m, 18–22 ft-lb)

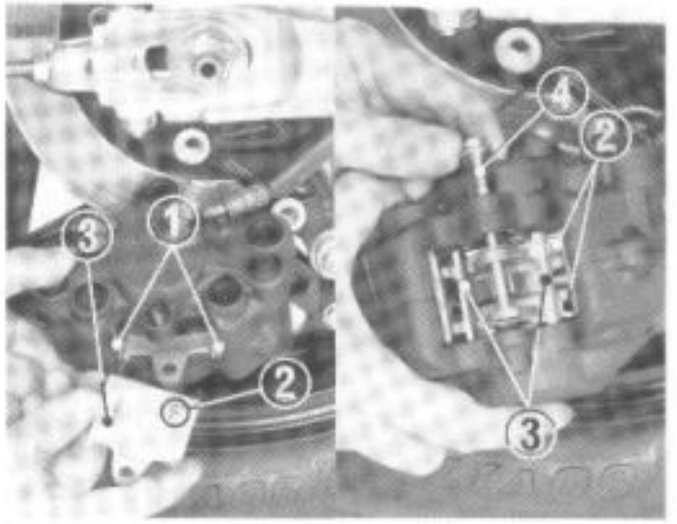


(1) Caliper bolts
(2) Pad pin

Rear Brake Pad Replacement

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

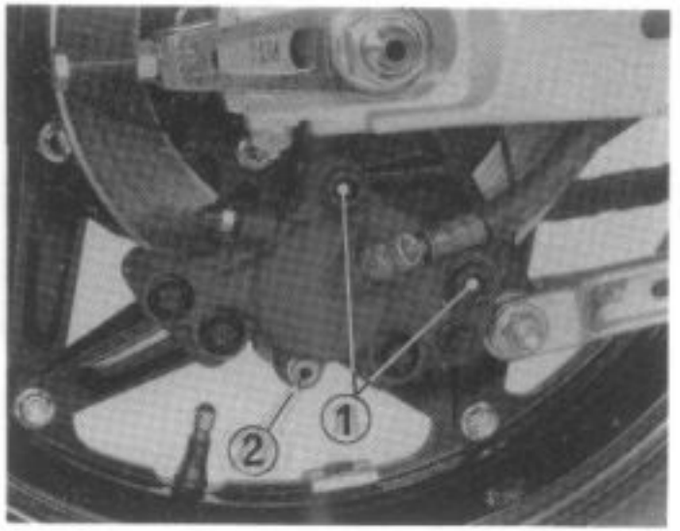
Remove the two caliper bolts and the caliper from the bracket.
Remove the pad pin, pad spring and pads from the caliper.



(1) Pad retainers
(2) "F" arrow mark
(3) Pads
(4) Pad spring
(5) Pad pin

Position the pad retainers.
Push the caliper pistons in all the way.
Install new pads, pad shims, pad spring and pad pin.

NOTE:
Install the pad shims to the pads with their "F" arrow mark pointing forward.

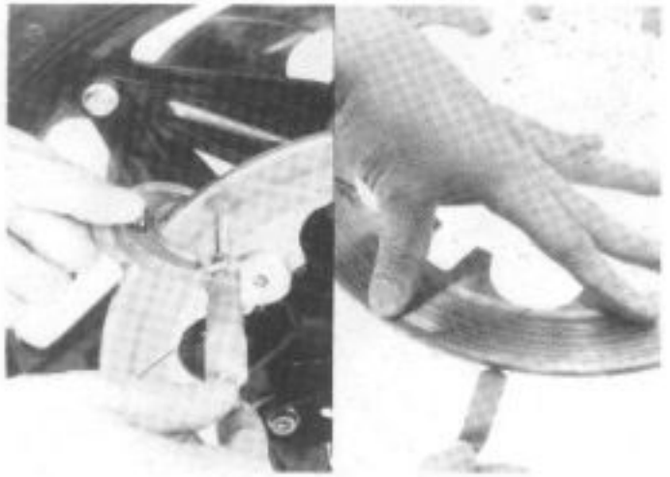


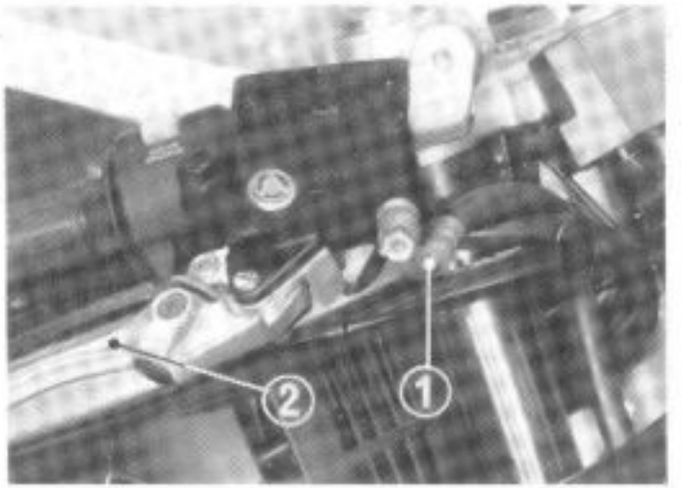
(1) Caliper bolts
(2) Pad pin

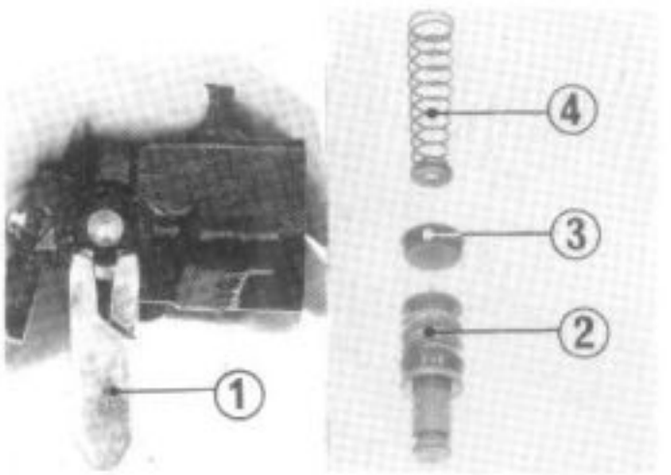
Install the caliper to the bracket so the disc is positioned between the pads, being careful not to damage the pads. Tighten the caliper bolts.

TORQUE: 20–25 N·m
(2.0–2.5 kg-m, 14–18 ft-lb)

Tighten the pad pin.
TORQUE: 15–20 N·m
(1.5–2.0 kg-m, 11–15 ft-lb)







Brake Disc Inspection

Measure the thickness of each disc (page 217).

Remove the brake disc.

Measure the brake disc for warpage (page 217).

(1) Brake hose
(2) Brake lever

Front Master Cylinder Removal

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

CAUTION:

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

NOTE:

When removing the fluid hose bolt, cover the end of the hose to prevent contamination. Secure the hose to prevent fluid from leaking out.

Disconnect the front brake switch wires. Remove the front brake master cylinder.

(1) Snap ring pliers (07914–3230001)
(2) Piston/Secondary cup
(3) Primary cup
(4) Spring

Front Master Cylinder Disassembly

Remove the piston boot and the snap ring from the master cylinder body. Remove the secondary cup and piston. Then remove the primary cup and spring. Remove the brake light switch from the master cylinder body, if necessary. Clean the inside of the master cylinder and reservoir with brake fluid.

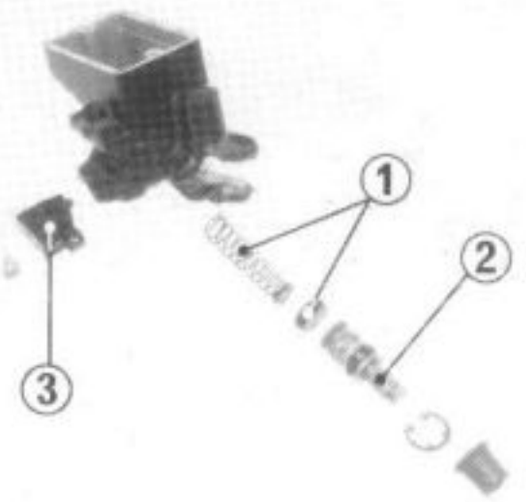
Front Master Cylinder Inspection

Check the master cylinder for scores, scratches or nicks.

Measure the master cylinder I.D. (page 217).

Check the primary and secondary cups for damage.

Measure the master piston O.D. (page 217).



(1) Brake fluid DOT 4
(2) Piston
(3) Front brake light switch

Front Master Cylinder Assembly

CAUTION:

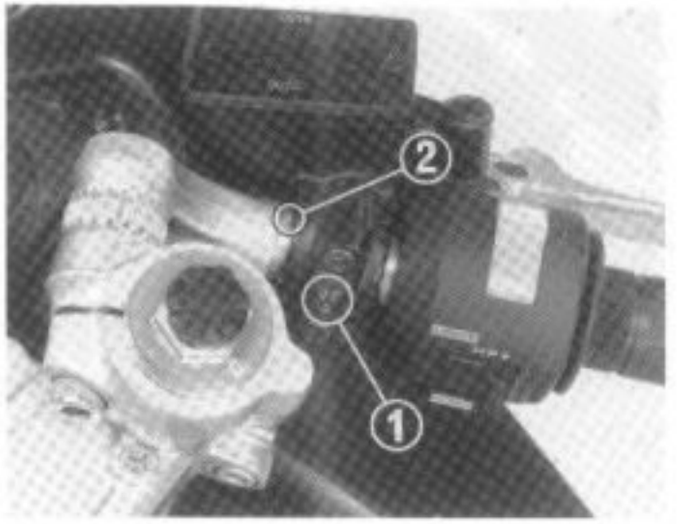
Keep the master cylinder piston, cylinder and spring as a set; don't substitute individual parts.

Assemble the master cylinder. Dip the piston and primary cup in brake fluid before assembly. Install the spring, primary cup and piston.

CAUTION:

When installing the cups, do not allow the lips to turn inside out and be certain the snap ring is firmly seated in the groove.

Install the snap ring. Install the boot.



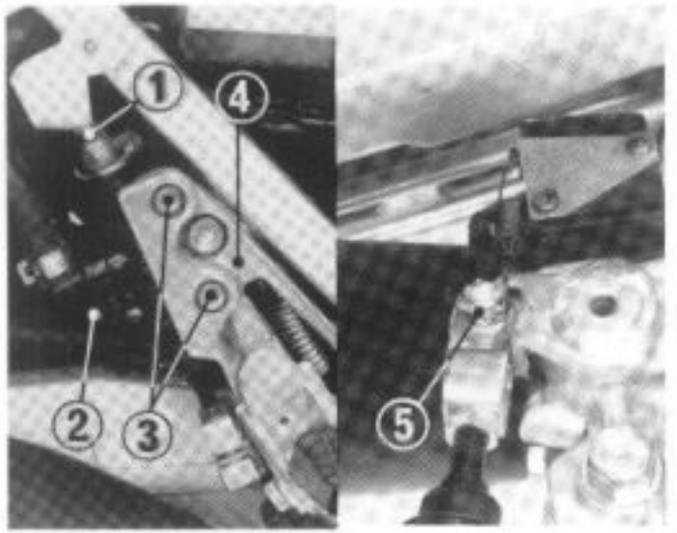
(1) "UP" mark
(2) Punch mark

Front Master Cylinder Installation

Place the front master cylinder on the handlebar and install the holder with its "UP" mark facing up. Install the mounting bolts. Align the end of the holder with the punch mark on the handlebar. Tighten the upper bolt first, then tighten the lower bolt. Install the fluid hose with the bolt and two sealing washers.

TORQUE: 25–35 N·m
(2.5–3.5 kg-m, 18–25 ft-lb)

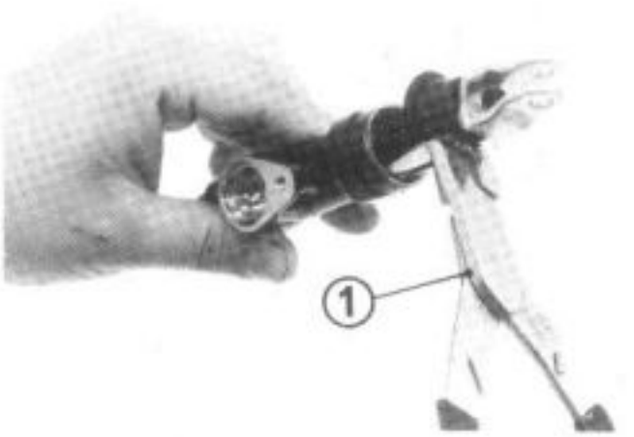
Install the brake lever. Connect the front brake switch wires. Fill the reservoir to the upper level and bleed the brake system according to page 175.



(1) Brake hose bolt
(2) Screw
(3) Mounting bolts
(4) Footpeg bracket
(5) Cotter pin

Rear Master Cylinder Removal

Drain the rear brake hydraulic system. Remove the brake hose bolt and disconnect the brake hose. Remove the reservoir hose connector screw and disconnect the hose from the master cylinder. Remove the master cylinder mounting bolts. Remove the footpeg bracket. Remove the cotter pin and clevis pin and remove the master cylinder from the brake pedal.



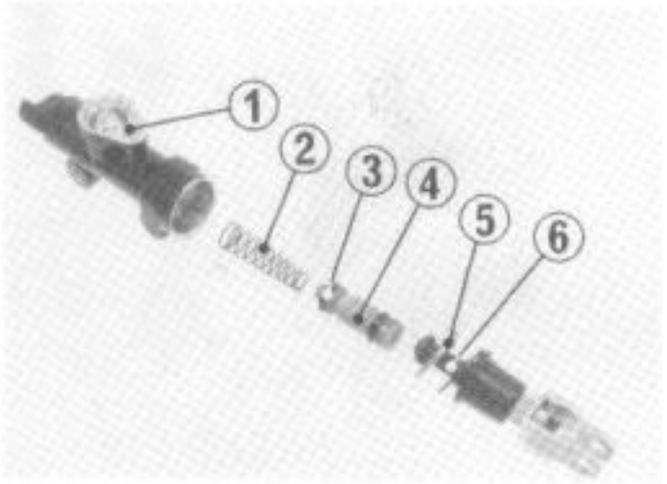
(1) Snap ring pliers (07914–3230001)

Rear Master Cylinder Disassembly

Remove the rubber boot.
Remove the snap ring and push rod from the master cylinder body.
Remove the master piston, primary cup and spring.
It may be necessary to apply a small amount of air pressure to the fluid outlet to remove the master piston and primary cup.
Clean all parts with brake fluid.

Rear Master Cylinder Inspection

Check the master cylinder for scores, scratches or nicks.
Measure the I.D. of the master cylinder (page 217).
Check the primary and secondary cups for damage.
Measure the master piston O.D. (page 217).



(1) Master cylinder body
(2) Spring
(3) Primary cup
(4) Master piston
(5) Snap ring
(6) Push rod

Rear Master Cylinder Assembly

CAUTION:

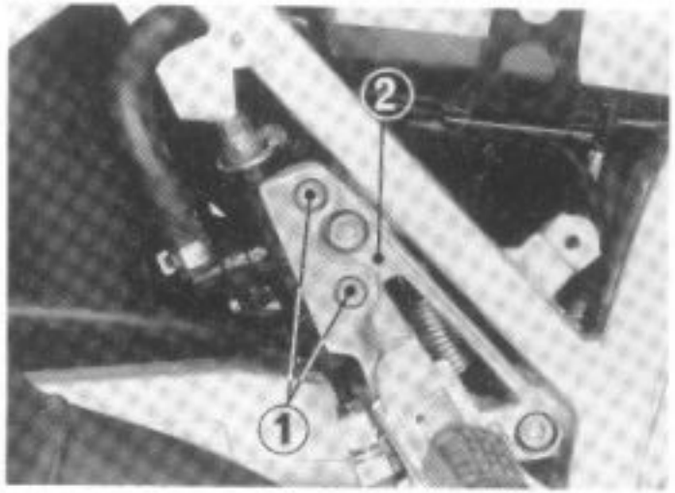
Keep the master cylinder piston, cylinder and spring as a set; do not substitute individual parts.

Assemble the master cylinder. Dip the piston and primary cup in brake fluid before assembly.

CAUTION:

When installing the cups, do not allow the lips to turn inside out and be certain the snap ring is seated firmly in the groove.

Install the spring, primary cup and piston. Install the push rod and snap ring. Install the rubber boot.



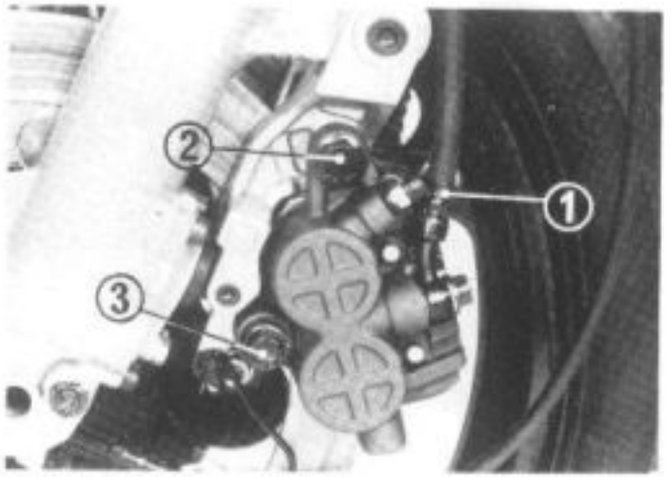
(1) Master cylinder mount bolt
(2) Footpeg bracket

Rear Master Cylinder Installation

Install the master cylinder onto the footpeg bracket with two bolts. Connect the push rod to the brake pedal with the clevis pin and a new cotter pin. Install the footpeg bracket to the frame. Connect the reservoir hose to the master cylinder with a new O-ring and screw. Connect the brake hose with the hose bolt and two sealing washers.

TORQUE: 25–35 N·m
(2.5–3.5 kg-m, 18–25 ft-lb)

Fill and bleed the rear brake system.



(1) Brake hose
(2) Pivot bolt
(3) Caliper bolt

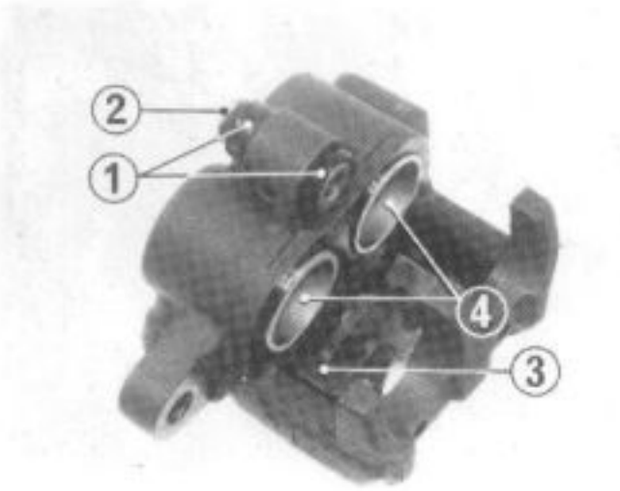
Front Caliper Removal

Drain the front brake system. Place a clean container under the caliper and disconnect the brake hose from the caliper.

CAUTION:

Avoid spilling brake fluid on painted surfaces.

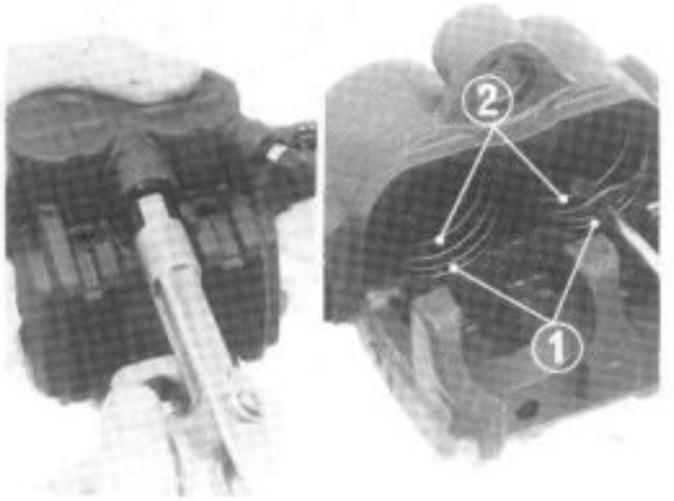
Remove the caliper pivot bolt and caliper bolt, and remove the caliper.



(1) Boot
(2) Pivot collar
(3) Pad spring
(4) Pistons

Front Caliper Disassembly

Remove the brake pads (page 177).
Remove the pad spring.
Remove the caliper pivot collar and boots.
Remove the pistons from the caliper.



(1) Dust seals
(2) Piston seals

If necessary, apply compressed air to the caliper fluid inlet to get the piston out. Place a shop rag under the caliper to cushion the piston when it is forced out. Use the air in short spurts.

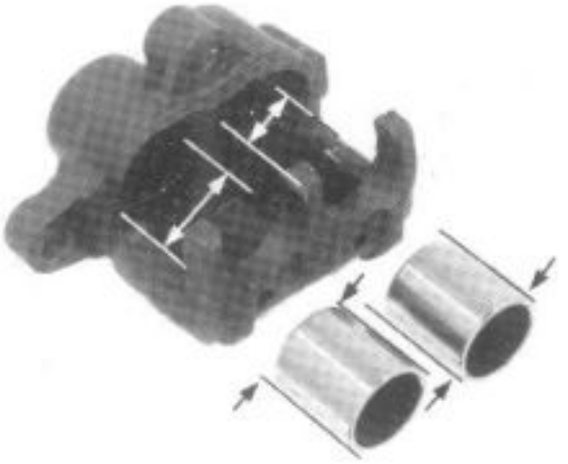
WARNING

Do not bring the nozzle too close to the inlet.

Push the seals in and lift them out, then discard them. Clean the seal grooves with brake fluid.

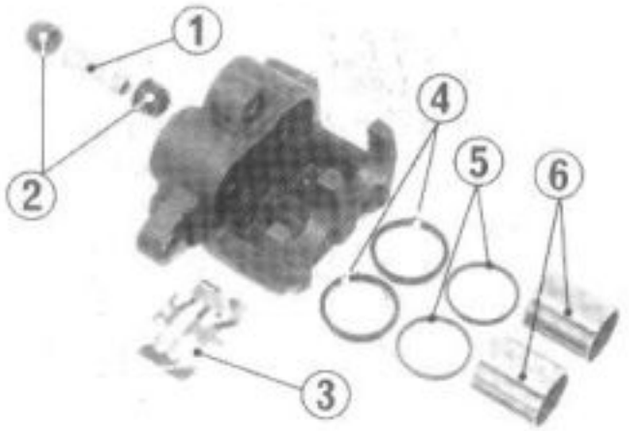
CAUTION:

Be careful not to damage the piston sliding surfaces.



Front Caliper Inspection

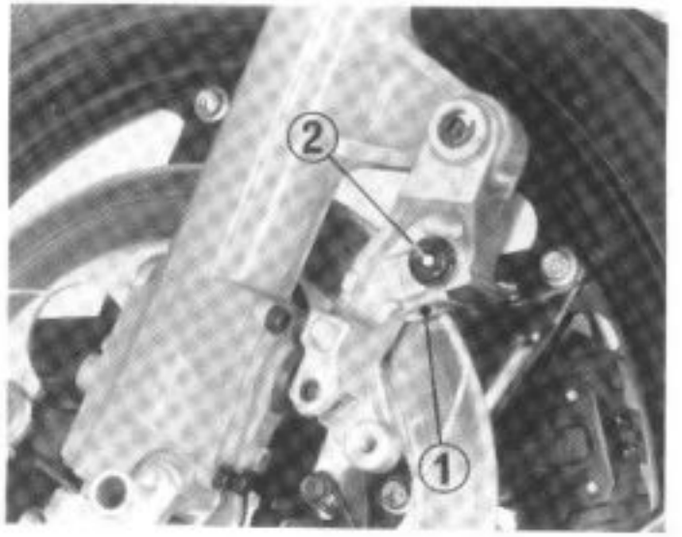
Check the pistons for scoring, scratches or other damage. Measure the piston diameter with a micrometer (page 217).
Check the caliper cylinder for scoring, scratches or other damage. Measure the caliper cylinder bore (page 217).



(1) Collar
(2) Collar boots
(3) Pad spring
(4) Piston seals
(5) Dust seals
(6) Pistons

Front Caliper Assembly

The piston and dust seals must be replaced with new ones whenever they are removed. Coat the seals with brake fluid before assembly. Install the pistons with the dished ends toward the pads. Install the collar boots and collar making sure that the boots are seated in the collar and caliper grooves properly. Install the pad spring. Install the pads (page 177).



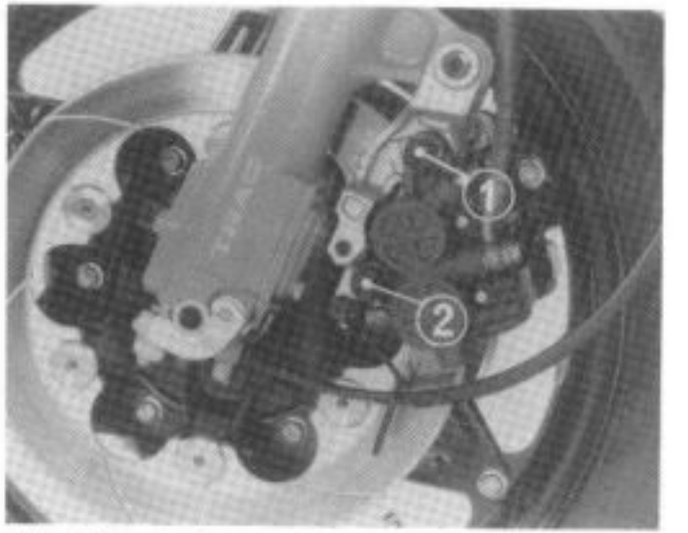
(1) Retainer clip
(2) Pivot boot

Front Caliper Installation

Make sure that the retainer clip is in position on the caliper bracket.

Inspect the condition of the caliper pivot boot.

Apply silicone grease to the caliper pivot bolt.



(1) Pivot bolt
(2) Caliper bolt

Install the caliper assembly over the brake disc so that the disc is positioned between the pads.

CAUTION:

Be careful not to damage the pads.

Install the caliper pivot bolt and caliper bolt, and tighten them securely.

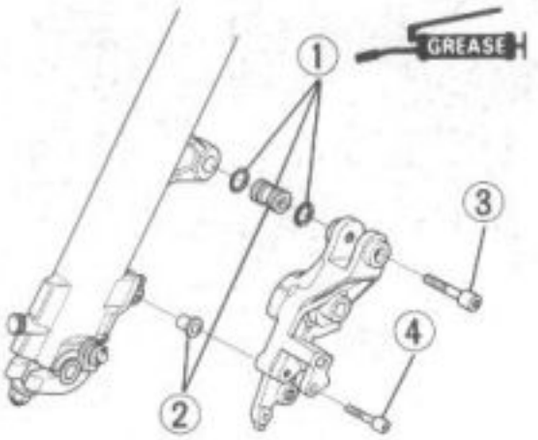
TORQUE:

Pivot bolt: 25–30 N·m
(2.5–3.0 kg-m, 18–22 ft-lb)
Caliper bolt: 20–25 N·m
(2.0–2.5 kg-m, 14–18 ft-lb)

Connect the brake hose to the caliper with the bolt and two sealing washers.

TORQUE: 25–35 N·m
(2.5–3.5 kg-m, 18–25 ft-lb)

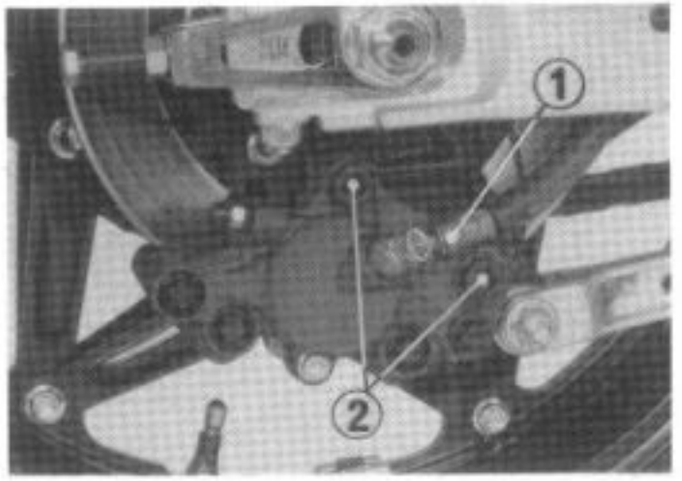
Fill the brake fluid reservoir and bleed the brake system (page 175).



(1) Paste grease
(2) Collar
(3) Bracket bolt
(4) Anti-dive pin bolt

Front Caliper Bracket

Remove the caliper (page 177). Right caliper: Remove the two caliper bracket bolts and the bracket. Left caliper: Remove the caliper bracket bolt and anti-dive pin bolt and the bracket. Then, remove the anti-dive pivot collar and pin bolt collar. Check the pivot collar and bushing for excessive wear or damage, and apply paste grease (page 169) to the collar. Install the bracket in the reverse order of removal.



(1) Brake hose
(2) Caliper bolts

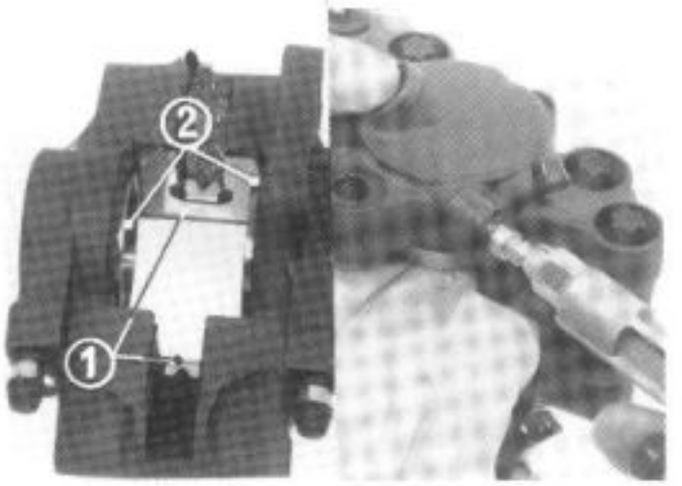
TORQUE:
Bracket bolt: 30–40 N·m (3.0–4.0 kg-m, 22–29 ft-lb)
Anti-dive pin bolt: 10–15 N·m (1.0–1.5 kg-m, 7–11 ft-lb)

Rear Caliper Removal

Drain the rear brake system.
Disconnect the brake hose from the caliper.

CAUTION:
Avoid spilling brake fluid on painted surfaces.

Remove the two caliper bolts and the caliper from the bracket.



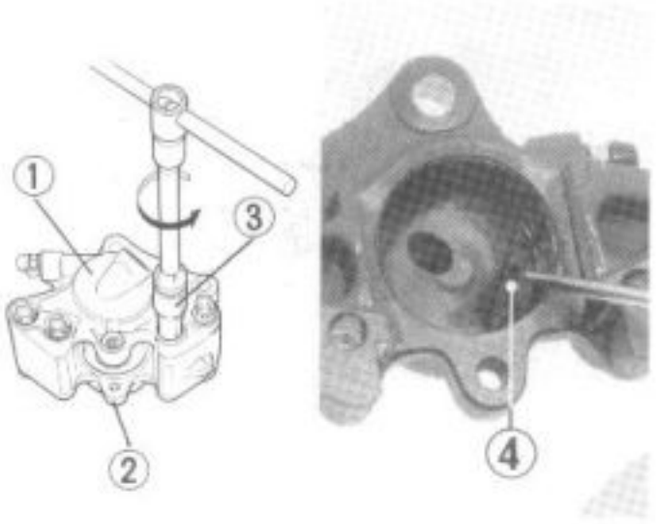
(1) Pad retainers
(2) Pistons

Rear Caliper Disassembly

Remove the brake pads (page 177). Remove the pad retainers and pistons. If necessary, apply compressed air to the caliper fluid inlet to get the pistons out. Place a shop towel under the caliper to cushion the piston when it is forced out. Use the air in short spurts.

WARNING

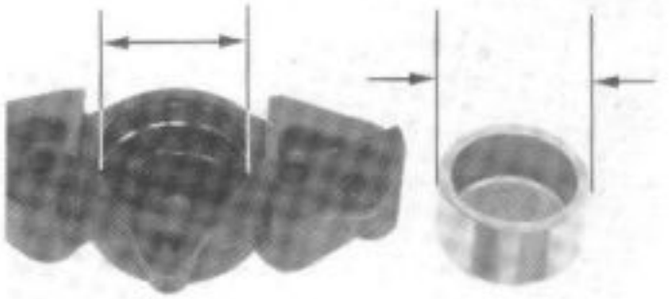
Do not bring the nozzle too close to the inlet.



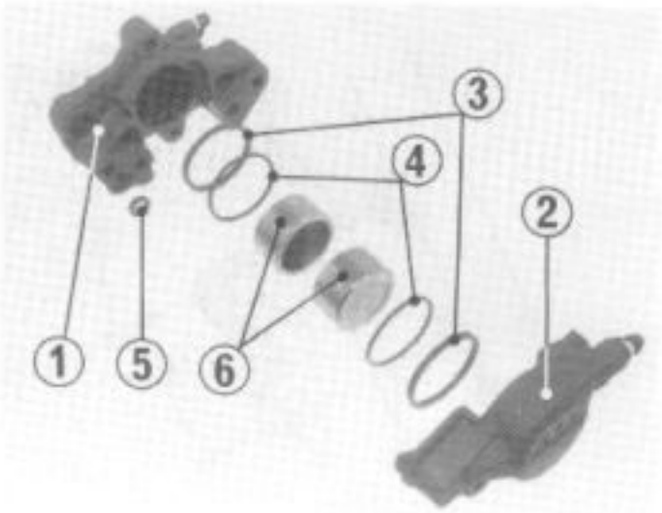
(1) Caliper A (2) Caliper B
(3) Torx driver socket, E-12 (07707–0020500 or equivalent tool)
(4) Seals

Remove the four torx bolts and separate calipers A and B. Remove the O-ring.
Push the seals in and lift them out, then discard them. Clean the seal grooves with brake bluid.

CAUTION:
Be careful not to damage the piston sliding surfaces.

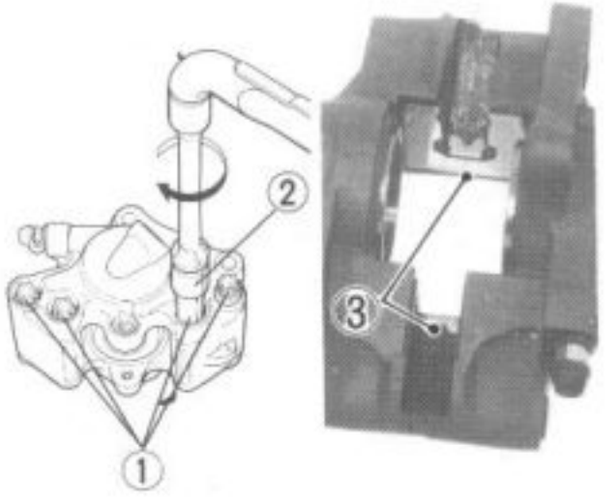


Rear Caliper Inspection
Check the caliper cylinders and pistons for scoring, scratches or other damage.
Measure the caliper piston O.D. (page 217).
Measure the caliper cylinder I.D. (page 217).



(1) Caliper A
(2) Caliper B
(3) Piston seals
(4) Dust seals
(5) O-ring
(6) Pistons

Rear Caliper Assembly
The piston and dust seals must be replaced whenever they are removed. Coat the seals with brake fluid before assembly.
Install the pistons with the dished ends toward the pads.
Install a new O-ring into the fluid passage on caliper A.

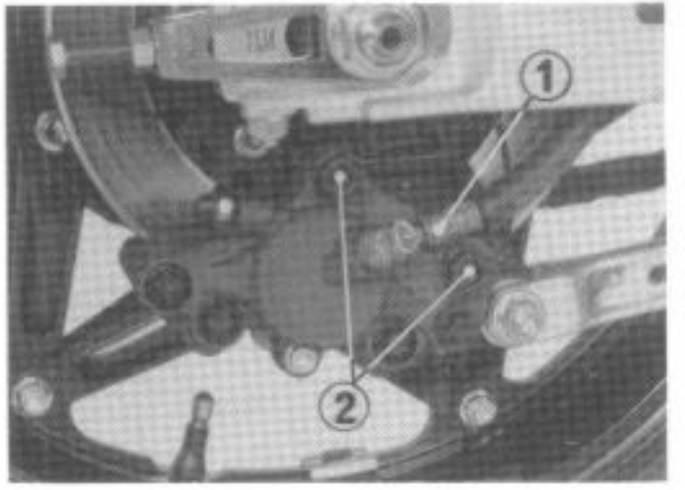


(1) Bolts
(2) Torx driver socket, E-12 (07707–0020500 or equivalent tool)
(3) Pad retainers

Assemble calipers A and B and tighten the four torx bolts.

TORQUE: 20–25 N·m (2.0–2.5 kg-m, 14–18 ft-lb)

Install the pad retainers onto the caliper. Install the brake pads (page 178).



(1) Brake hose
(2) Caliper bolts

Rear Caliper Installation

Install the caliper assembly over the brake disc so that the disc is positioned between the pads.

CAUTION:
Be careful not to damage the pads.

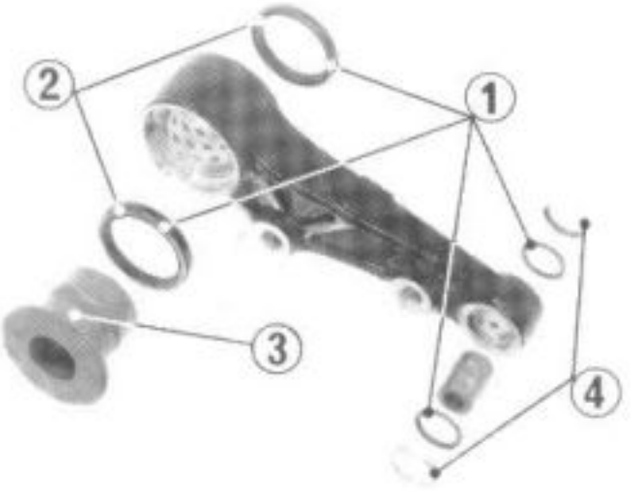
Tighten the caliper bolts.

TORQUE: 20–25 N·m (2.0–2.5 kg-m, 14–18 ft-lb)

Connect the brake hose to the caliper with the bolt and two sealing washers.

TORQUE: 25–35 N·m (2.5–3.5 kg-m, 18–25 ft-lb)

Fill the rear brake system and bleed the brake system (page 175).



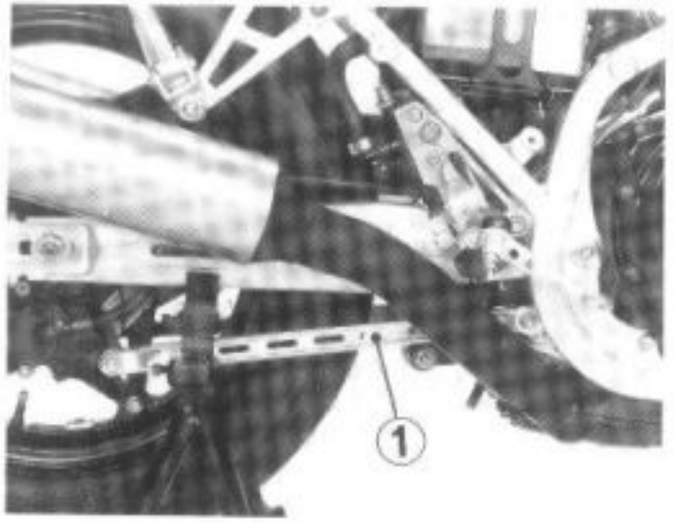
(1) Paste grease
(2) Dust seals
(3) Collars
(4) Dust cap

Rear Caliper Bracket

Remove the rear caliper. Remove the rear wheel (page 160). Disconnect the brake torque rod from the caliper bracket. Remove the collars and dust seals. Check the collars and bushings for excessive wear or damage and replace if necessary. Coat paste grease (page 169) to the bushings and new dust seals. Install the dust seals and collars. Connect the brake torque rod to the bracket.

TORQUE: 24–30 N·m (2.4–3.0 kg-m, 17–22 ft-lb)

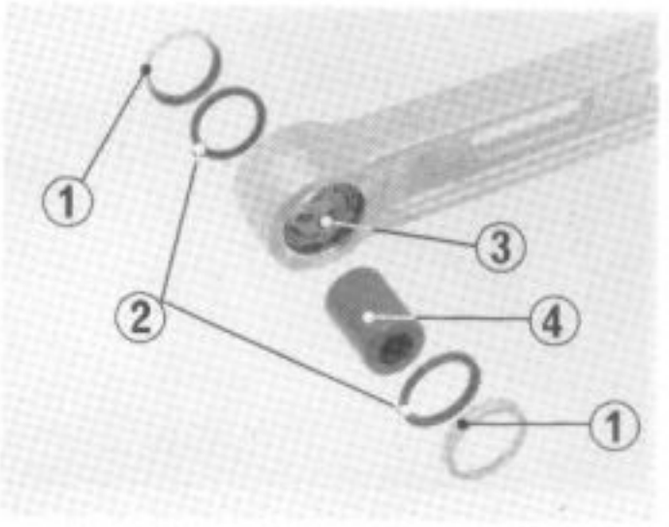
Install the rear wheel and caliper.



(1) Brake torque rod

Brake Torque Rod

Remove the brake torque rod bolts from the frame and rear brake caliper bracket.



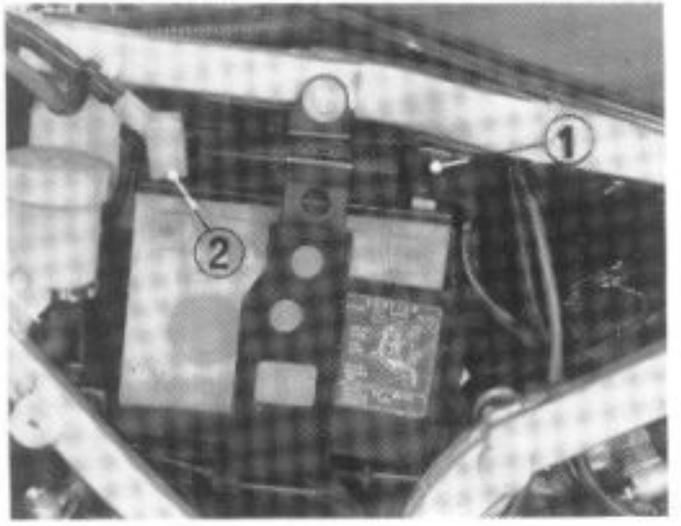
(1) Dust cap
(2) Dust seal
(3) Bushing
(4) Collar

Remove the caps, dust seals and collars from the brake torque rod.

Remove the caps, collar and dust seals from the rear brake bracket (page 187).

Check the collars, bushings and dust seals for excessive wear or damage and replace if necessary.

Coat paste grease (page 169) to the bushings and new dust seal.



(1) Negative terminal
(2) Positive terminal

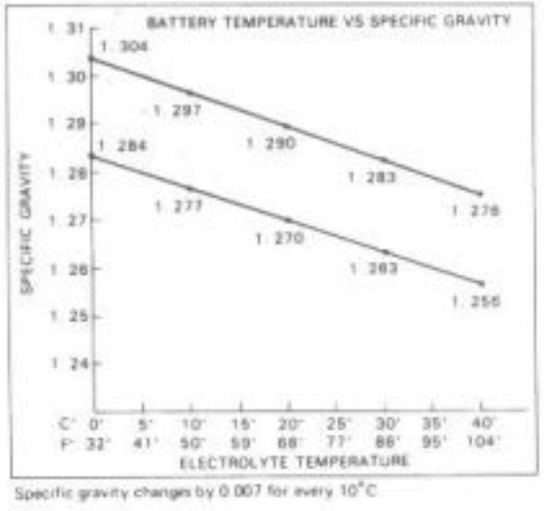
Battery Removal/Inspection

Disconnect the negative cable first, then the positive cable. On installation, reconnect the negative cable last. Remove the battery from the motorcycle for charging whenever possible. If the battery must be charged on the motorcycle, disconnect the battery cables.

CAUTION:

Make sure the positive cable is not forced against any metal parts, otherwise a short may occur.

Check for cracked or broken case or plates. Check the plates for sulphation. Replace the battery if damaged or sulphated. Check electrolyte level in cells. If low, add distilled water to bring the level to the upper mark.



Specific gravity changes by 0.007 for every 10°C

NOTE:

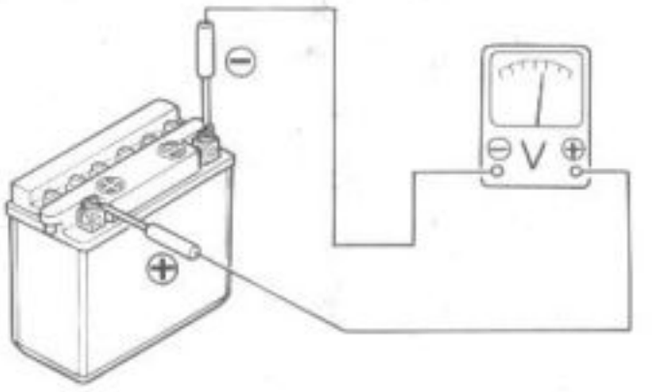
In order to obtain accurate test readings when checking the charging system, the battery must be fully charged and in good condition. Perform the following inspections and tests before attempting to troubleshoot charging system problems.

Specific Gravity Test

The specific gravity must be checked with a hydrometer. Test each cell by drawing electrolyte into the hydrometer.

Fully charged: 1.280 at 20°C (68°F)
Normal reading: 1.260 at 20°C (68°F)
Needs charging: 1.200 at 20°C (68°F)

Make sure the variance between the high and low cells is less than 0.05.



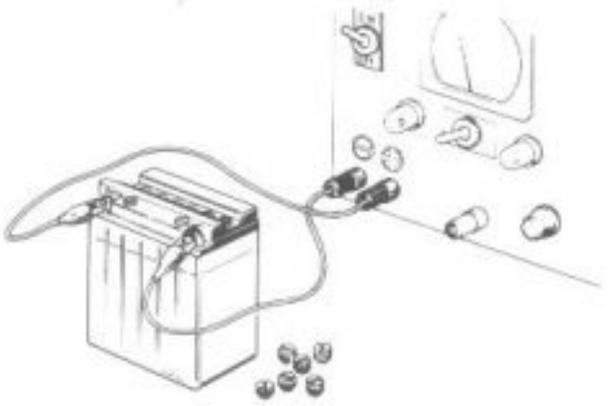
WARNING

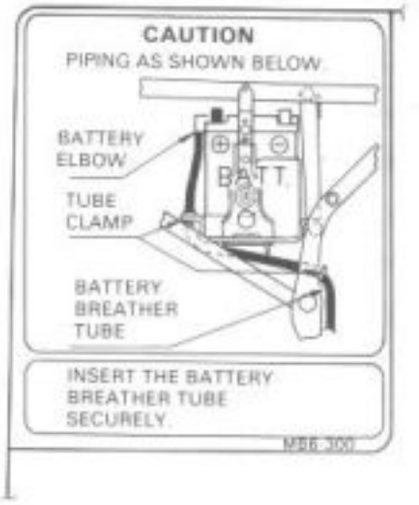
The battery electrolyte contains sulfuric acid. Avoid contact with skin, eyes, or clothing. Antidote: Flush with water and call a doctor if electrolyte gets in your eyes.

Battery Voltage

Set meter to the DCV-Scale. Connect the Red lead to the battery (+) terminal and the Black lead to the (–) terminal.

Fully charged: 12–13 volts
Normal reading: 11–12 volts
Needs charging: Below 11 volts





Battery Charging

When the specific gravity reading is low, the battery must be recharged. Slow-charge the battery; do not quick charge it. Remove the battery cell caps. Charge until specific gravity reaches 1.260–1.280.

MAXIMUM CHARGE RATE:

1.6 amperes

The reading should remain stable for at least one hour after charging. Check electrolyte level periodically. After charging, wash the battery with water. After installation coat the terminals with petroleum jelly.

WARNING

- *Before charging a battery, remove each cell cap.*
- *Batteries produce explosive gases. Keep sparks and flames away.*
- *Ventilate when charging in an enclosed area.*
- *Turn power ON/OFF at the charger, not at the battery terminals.*
- *The battery contains sulphuric acid; avoid contact with skin, eyes, or clothing. Always shield eyes when working with batteries.*

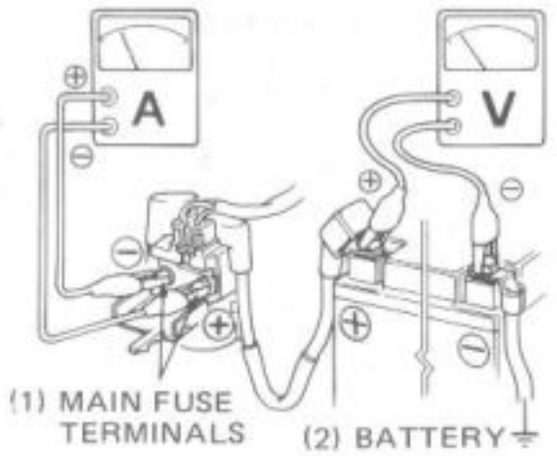
CAUTION:

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

(1) Negative (–) terminal
(2) Ground cable

Leakage Inspection

Inspect the battery voltage leakage before charging output inspection. Turn the ignition switch OFF. Remove the ground cable from the battery. Connect the voltmeter between the ground cable and battery (–) terminal. The voltmeter should indicates 0V with the ignition switch off.



Charging System Inspection

NOTE:
Use a fully charged 12V battery (electrolyte specific gravity above 1.260) to test the charging output. Use of a low battery will result in false readings.

Start the engine and warm it up to operating temperature. Remove the main fuse; connect an ammeter to the positive (+) and negative (–) terminals of the fuse holder as shown.

NOTE:

* *Use an ammeter which can measure the rate of flow of current in both directions.*
* *Do not hook up an ammeter between the battery positive (+) terminal and negative (–) cable of the battery. Failure to do so can lead to a broken ammeter.*

Connect a voltmeter between the positive and negative terminals of the battery. Start the engine and take the readings on the meters:

NOTE:
Measure the current after the fan motor has come to a complete stop.

- Allow the engine to run at 2,500 rpm immediately after starting. The needle of the ammeter should be swung widely toward the positive range of the dial, then returned to ±0A.
- Check the charging outputs at the speeds shown:
- Gradually raise the engine speed from the idling to find the speed at which the output is ±0A.

CHARGING START:
1,000–1,200 min^{-1} (rpm)

- Check the charging output voltage by raising engine speed and gradually dropping it to 3,000 min^{-1} (rpm). The voltage should be maintained within 13.5–15.5 V.

If the ammeter shows discharging even when the engine speed is raised, the probabilities are:

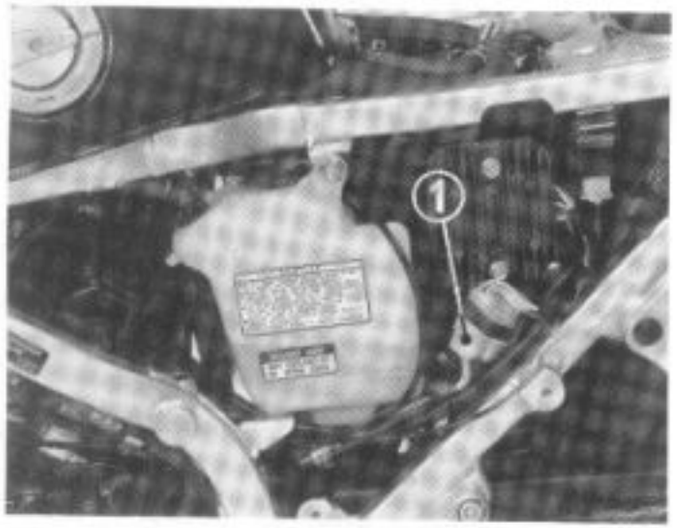
- Short circuit (excessive current draw)
- Overcharged battery
- Faulty alternator
- Loose or poor contact between alternator and voltage regulator

If the ammeter shows charging even when the engine speed is lowered, this is an indication of:

- Faulty voltage regulator/rectifier
- Discharged battery

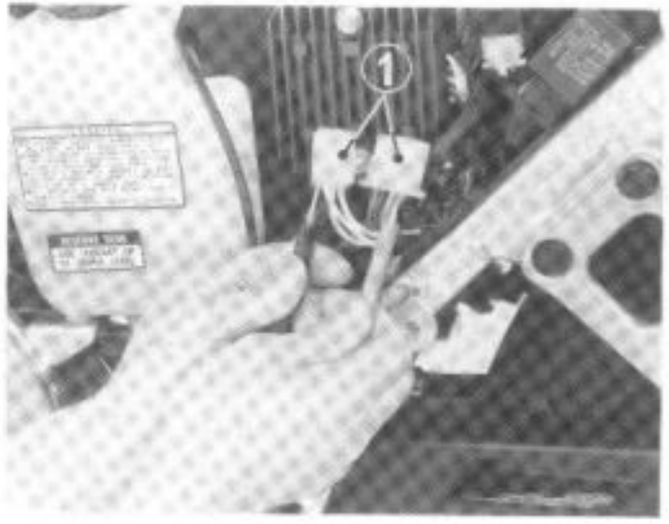
If the output voltage is outside of 13.5–15.5V when the engine speed is increased, the likelihood is:

- Faulty voltage regulator/rectifier



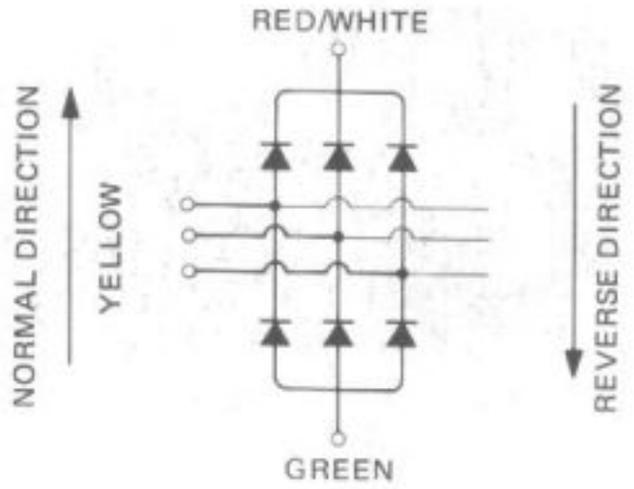
(1) Alternator wire coupler

Alternator Stator Coil Inspection
Remove the seat and left side cover.
Disconnect the alternator and regulator/rectifier coupler.
Check for continuity between the leads, and between the leads and ground.
Replace the stator if there is no continuity between the leads, or if there is continuity between the leads and ground.



(1) Regulator/rectifier wire couplers

Voltage Regulator/Rectifier Inspection
Remove the seat and left side cover.
Disconnect the regulator/rectifier couplers.
Check for continuity between the leads with an ohmmeter.

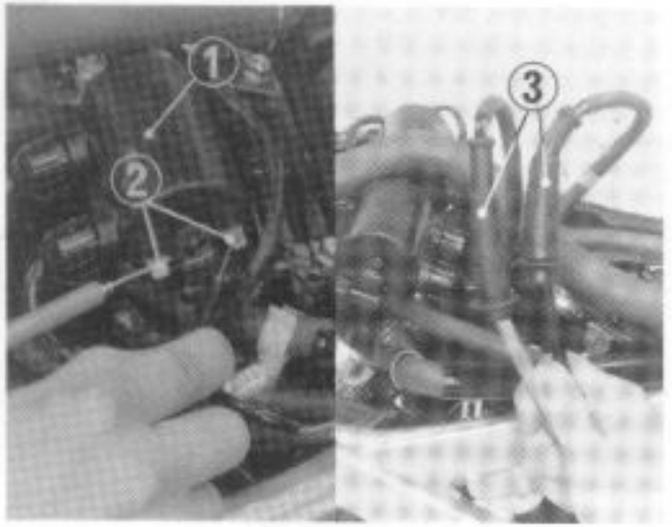


NORMAL DIRECTION: CONTINUITY

	⊕ probe	⊖ probe
I	YELLOW	GREEN
II	RED/WHITE	YELLOW

REVERSE DIRECTION:
NO CONTINUITY

	⊕ probe	⊖ probe
I	GREEN	YELLOW
II	YELLOW	RED/WHITE



(1) Ignition coil
(2) Primary coil terminals
(3) Spark plug caps

Ignition Coil Inspection
Remove the seat and fuel tank.
Disconnect the coil primary leads.
Measure the primary coil resistance.

RESISTANCE: 2.4–3.0 ohms

Measure the secondary coil resistance with the spark plug caps in place.

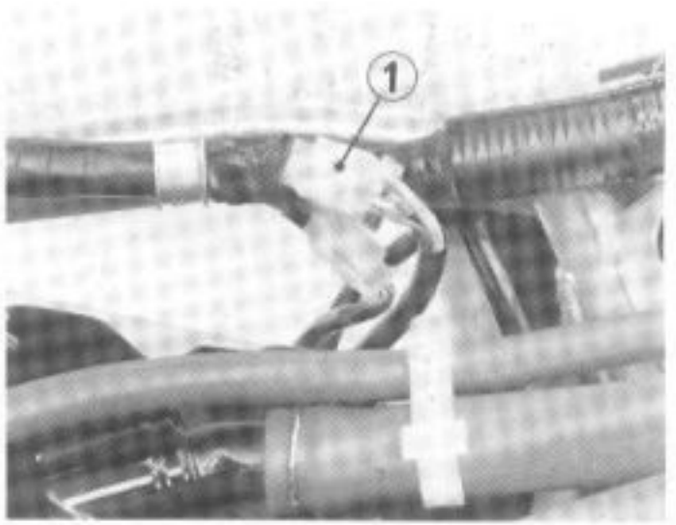
RESISTANCE: 21–28 kohms

(1) Bolts

Remove the high tension cords from the ignition coil.
Measure the secondary coil resistance.

RESISTANCE: 12.6–15.4 kohms

Ignition Coil Replacement
Disconnect the primary leads and high tension cords.
Remove the bolts attaching the ignition coil and replace the coil with a new one.

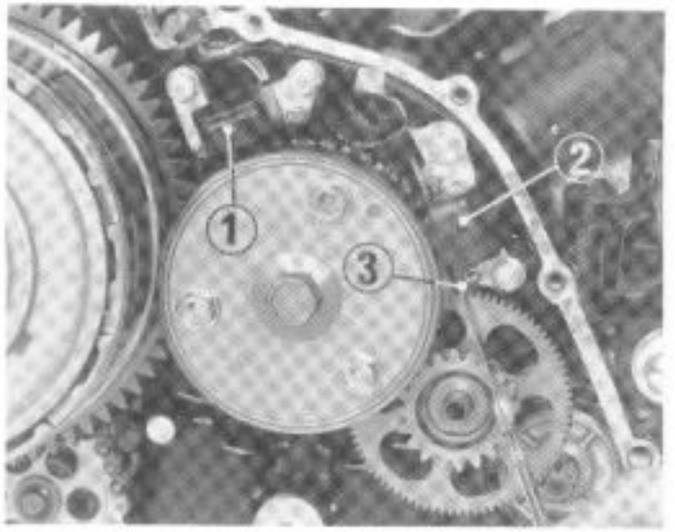


(1) Pulse generator wire coupler

Pulse Generator Inspection
Remove the seat and fuel tank.
Disconnect the pulse generator coupler and measure the coil resistance.

RESISTANCE: Approximately 480 ohms

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



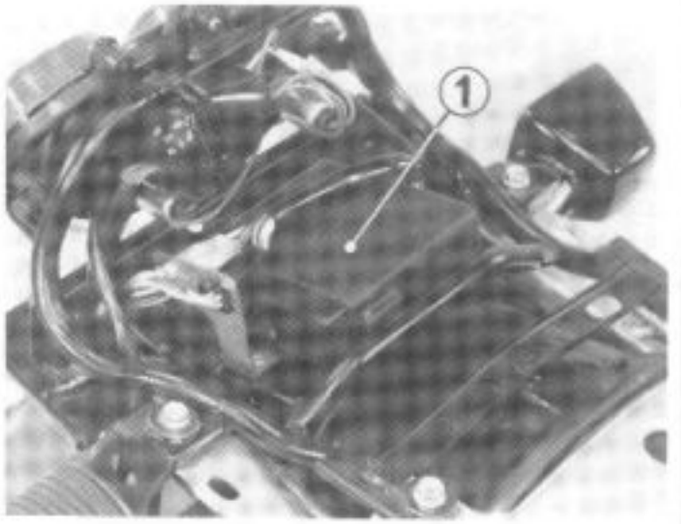
(1) 1-3 cylinder pulse generator
(2) 2-4 cylinder pulse generator
(3) Feeler gauge

Pulse Generator Replacement

Remove the clutch cover (page 66).
Remove the pulse generator mounting bolts, and pulse generators.
Install new pulse generators.
Measure the air gap between the pulse generator and rotor.

AIR GAP: 0.3–0.9 mm (0.012–0.035 in)

Install the clutch cover (page 76).
Recheck the ignition timing (page 194).



(1) Spark unit

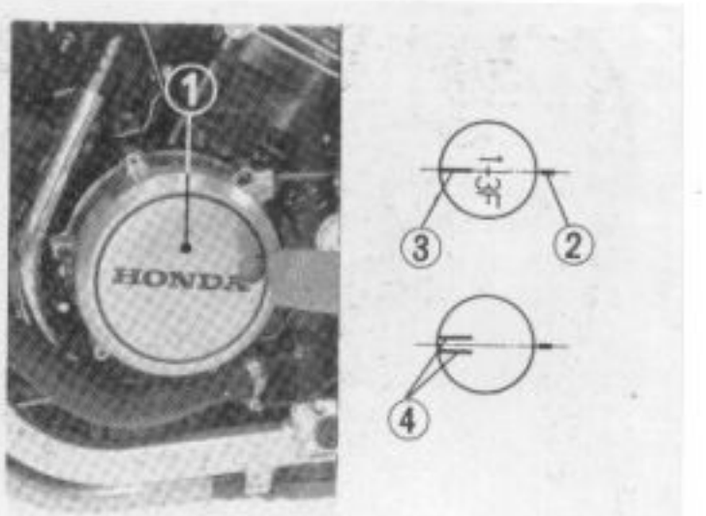
Spark Unit

If the pulse generators, ignition coils and wiring are good, and the ignition timing is not within specification; replace the spark units with new ones and recheck the ignition timing.

Ignition Timing

Warm up the engine and remove the alternator cover. Use a felt pen to mark a dark line and "1-3F" in line with the F mark on the end surface of the flywheel. Install the timing inspection cover. Connect the timing light to the high tension wire of the No. 1 or No. 3 cylinder. Start the engine and check the ignition timing.

AT IDLE SPEED: The dark line (1-3F) should align with the index mark on the timing cover.



(1) Timing inspection cover (07998–MB40000)
(2) Index mark
(3) "F" mark (4) Full advance marks

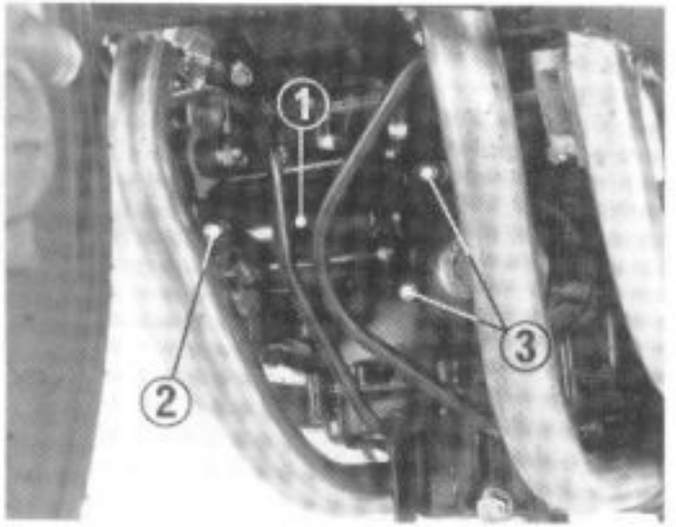
1,800 min^{-1} (rpm): The advance starts.
3,800 min^{-1} (rpm): The advance ends and the index mark should be between the full advance marks.

Connect the timing light to the high tension wire of the No. 2 or No. 4 cylinder and check the ignition timing for No. 2 and No. 4 cylinder.

NOTE:

The ignition system is transistorized and cannot be adjusted. If the ignition timing is incorrect, check the spark units and pulse generators. Replace parts as required.

After timing inspection, check the engine oil level and add if necessary.



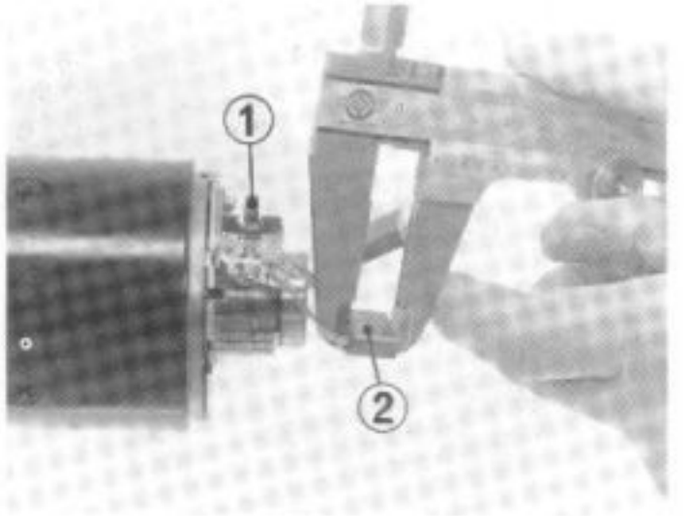
(1) Starter motor
(2) Starter cable
(3) Bolts

Starter Motor Removal

WARNING

With the ignition switch OFF, remove the negative cable at the battery before servicing the starter motor.

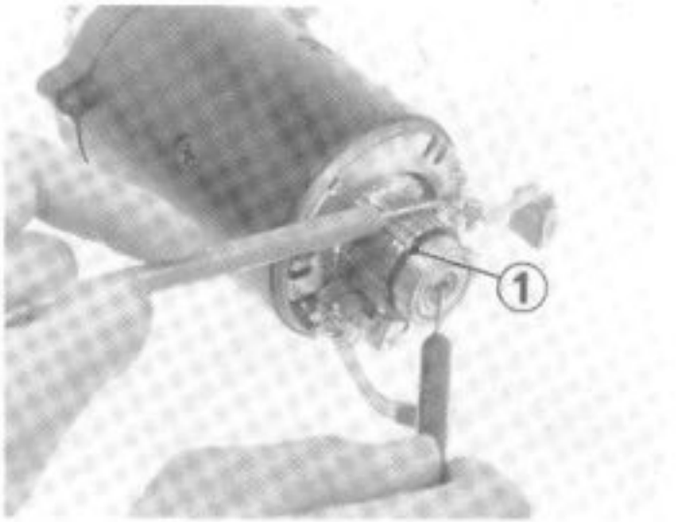
Disconnect the starter motor cable at the motor.
Remove the starter motor mounting bolts, and starter motor.



(1) Brush spring
(2) Brush

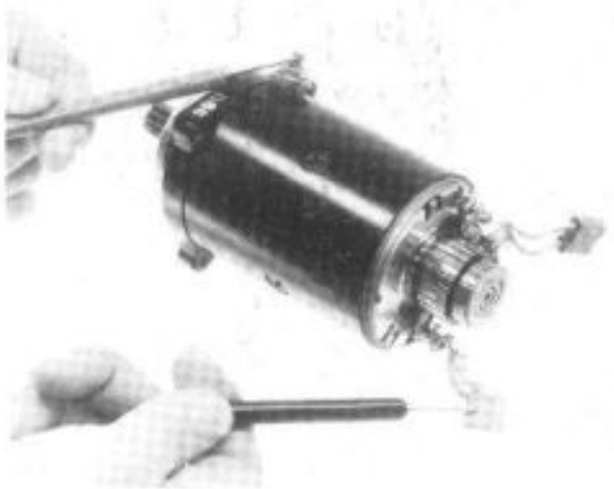
Starter Motor Inspection

Remove the starter motor case screws.
Inspect the brushes and measure the brush length.
Measure brush spring tension with a spring scale (page 218).

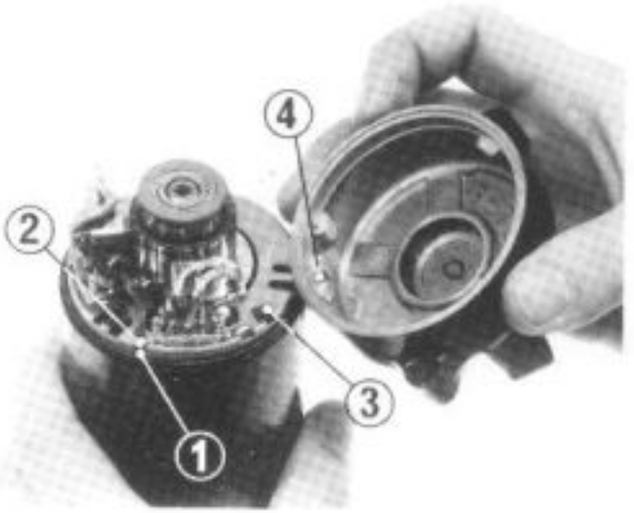


(1) Commutator

NOTE:
Record the location and number of shims.
Inspect the commutator bars for discoloration. Bars discolored in pairs indicate grounded armature coils.
NOTE:
Do not use emery or sand paper on the commutator.
Check for continuity between pairs of commutator bars. There should be continuity. Also, make a continuity check between individual commutator bars and the armature shaft. There should be no continuity.

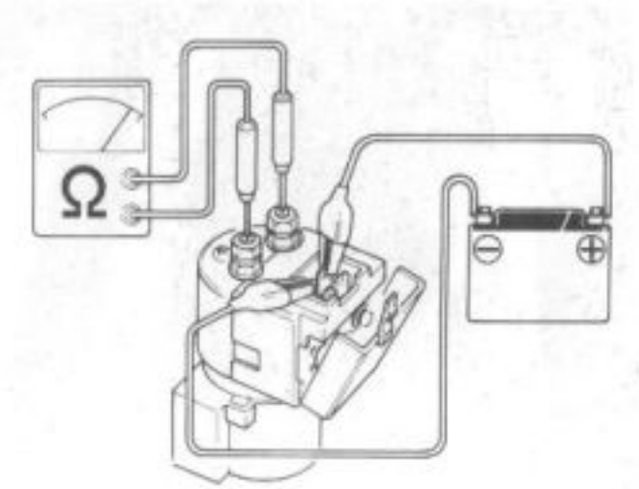


Check for continuity from the cable terminal to the motor case.
There should be continuity.
Then check for continuity from the cable terminal to the brush.
There should be continuity.
Replace the starter motor if the field coil does not have continuity or if it is shorted to the motor case.

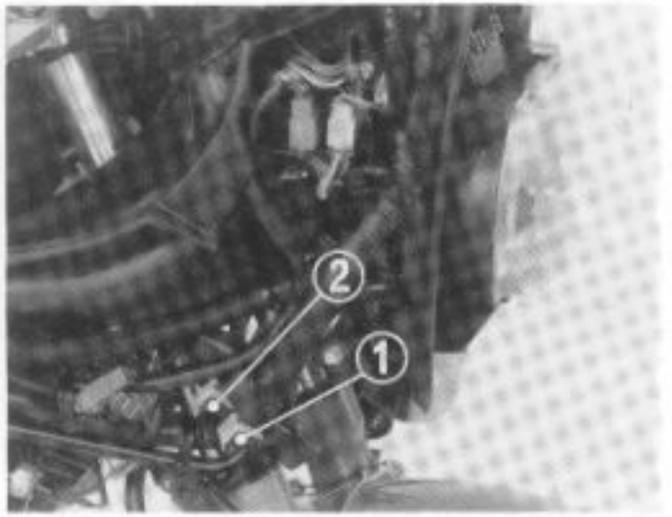


(1) Notch
(2) Pin
(3) Pin
(4) Slot

Starter Motor Assembly/Installation
Assemble the starter motor.
Align the case notch with the brush holder pin.
Install the rear cover aligning its slot with the brush holder pin.
Install the starter motor in the reverse order of removal.



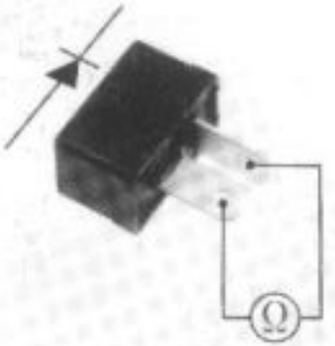
Starter Relay Switch
Depress the starter switch button with the ignition ON.
The coil is normal if the starter relay switch clicks.
Connect an ohmmeter to the starter relay switch terminals.
Connect a 12V battery to the switch cable terminals.
The switch is normal if there is continuity.



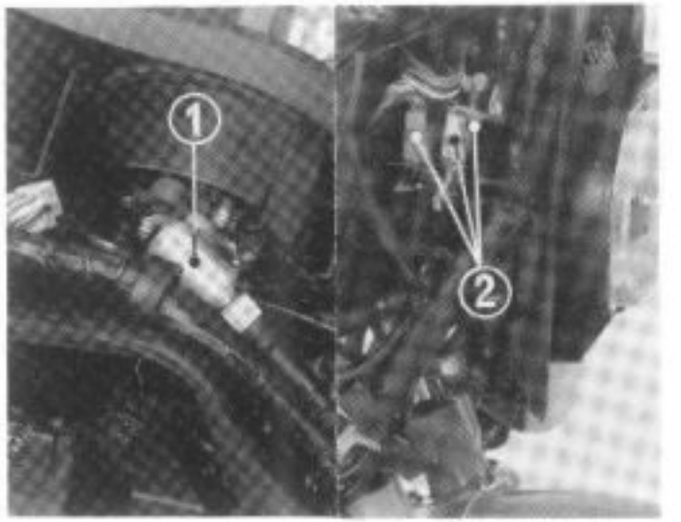
(1) Clutch diode
(2) Lighting diode

Clutch and Lighting Diode
Remove the fairing (page 139).
Remove the clutch and lighting diode from the wire harness.

NOTE:
Blue/White and Blue wire coupler – Lighting Diode
Light blue/Red and Green/Red coupler – Clutch Diode



Check for continuity with an ohmmeter.
Normal direction: Continuity
Reverse direction: No continuity

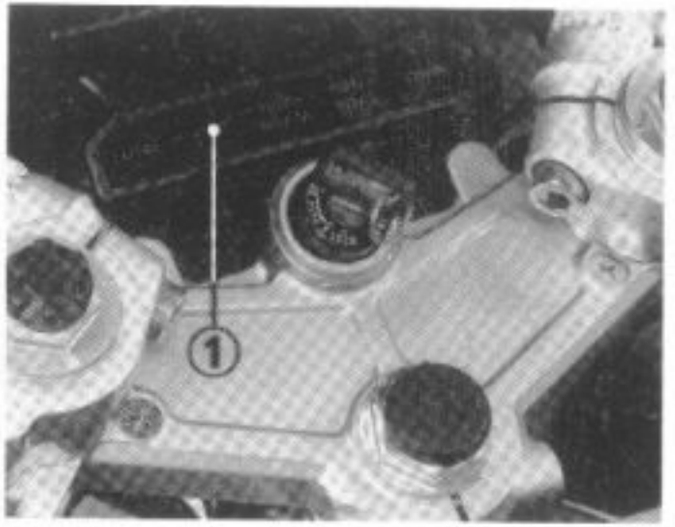


(1) Speedometer cable
(2) Instrument wire couplers

Instrument Removal/Installation
Remove the fairing (page 139).
Disconnect the speedometer cable from the instruments.
Disconnect the instrument wire couplers.

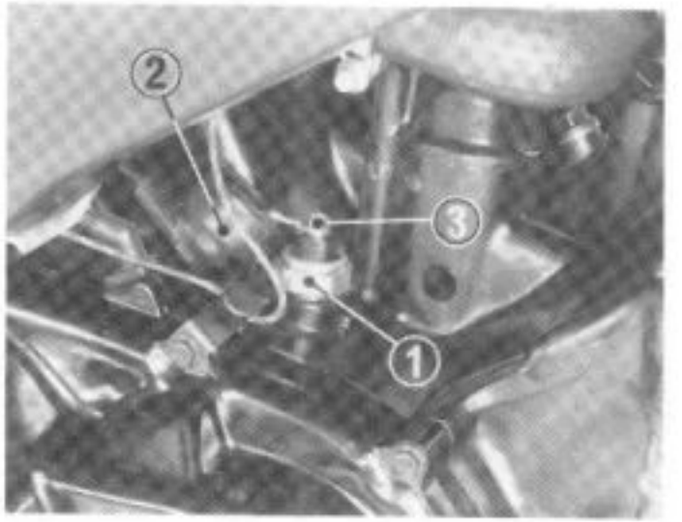
(1) Bolts

Remove the four instrument mounting bolts and the instruments.
Install the instruments in the reverse order of removal.



(1) Oil pressure warning light

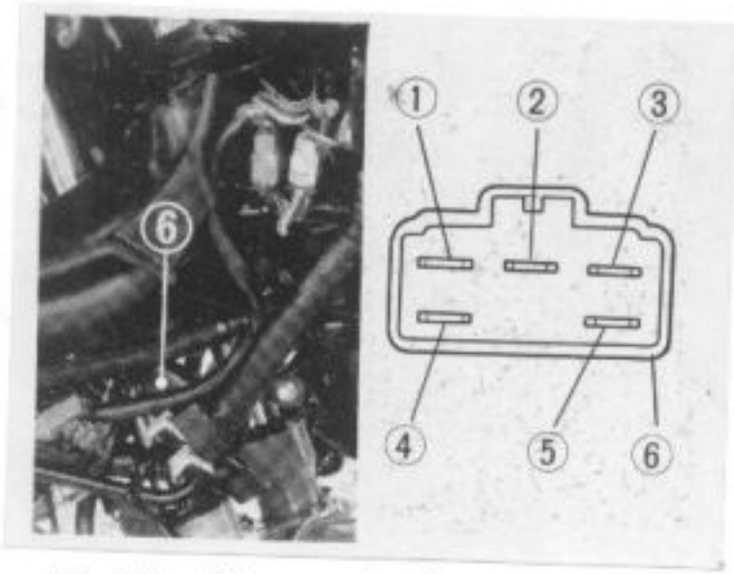
Oil Pressure Warning System
Remove the lower fairing (page 139) and tool box. Disconnect the oil pressure switch wire from the switch by removing the terminal screw. Turn the ignition switch ON. Ground the oil pressure switch wire to the engine. The oil pressure warning light should come on. If the light does not come on, check the wires for loose connection or open circuit and bulb for burnt out and replace or repair if necessary. If the oil pressure and warning system are normal and the warning light comes on, replace the oil pressure switch with a new one.



(1) Oil pressure switch
(2) Switch wire
(3) Screw

Apply sealing agent to a new switch threads when replacing the switch.

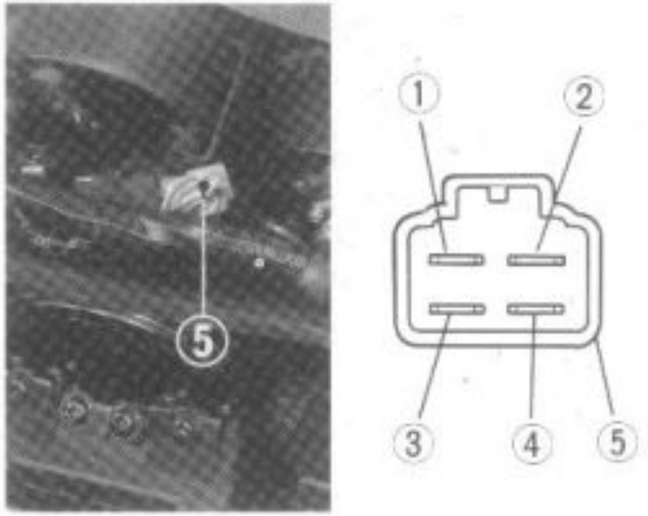
TORQUE: 10–14 N·m
(1.0–1.4 kg-m, 7–10 ft-lb)



(1) White/Blue terminal
(2) White/Red terminal
(3) Blue terminal
(4) White terminal
(5) Green terminal
(6) Dimmer relay

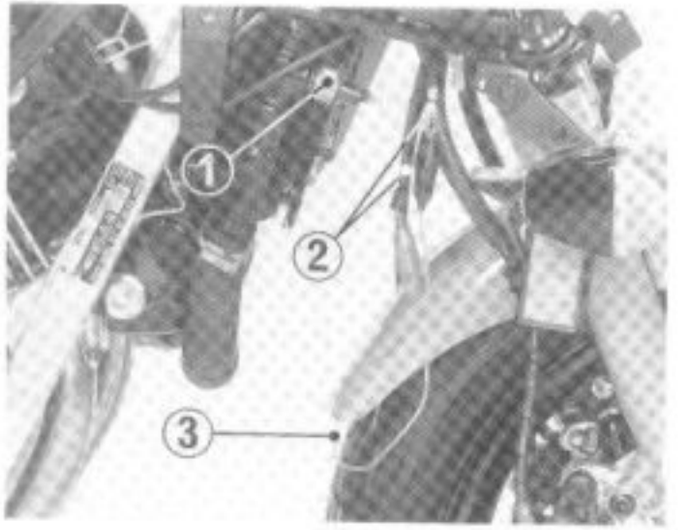
Dimmer and Lighting Relay
Remove the fairing (page 139).

Dimmer Relay:
Disconnect the dimmer relay from the 6P coupler.
Check continuity between (2) and the (4). There should be continuity.
Connect the 12V to the (3) and the (5) to the ground, then check continuity between (2) and the (1).
There should be continuity.



(1) Black/Red terminal
(2) Blue/White terminal
(3) White/Red terminal
(4) Green terminal
(5) Lighting relay

Lighting Relay:
Disconnect the lighting relay from the 4P coupler.
Check the continuity between (1) and the (3).
There should be no continuity.
Connect the 12V to the (2) and the (4) to the ground, then check continuity between (1) and (3).
There should be continuity.

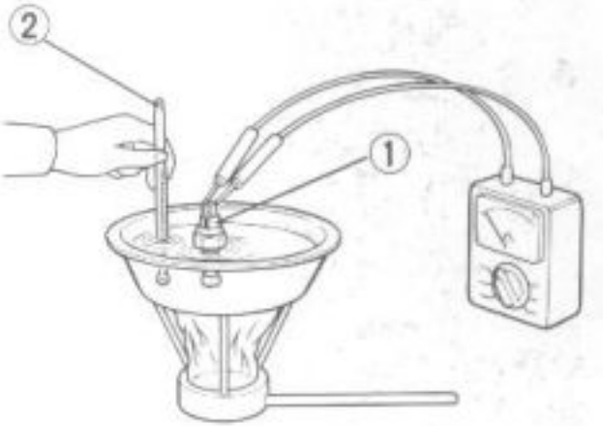


(1) Thermostatic switch
(2) Thermostatic wires
(3) Jamper wire

Thermostatic Switch

If the fan motors do not start, inspect the coolant level (page 38) before switch inspection. Fill the cooling system with recommended coolant and recheck the fan motors operation if coolant level is low. Remove the fairing and disconnect the wire coupler from the thermostatic switch. Short the coupler terminals together with a jumper wire as shown. The cooling fan motor should start running. If it does not start, check for a blown or faulty fuse, loose terminals or connectors, or an open circuit. If it starts, inspect the fan thermostatic switch as follows:

Suspend the switch in a pan of coolant (40% water + 60% coolant) and check the

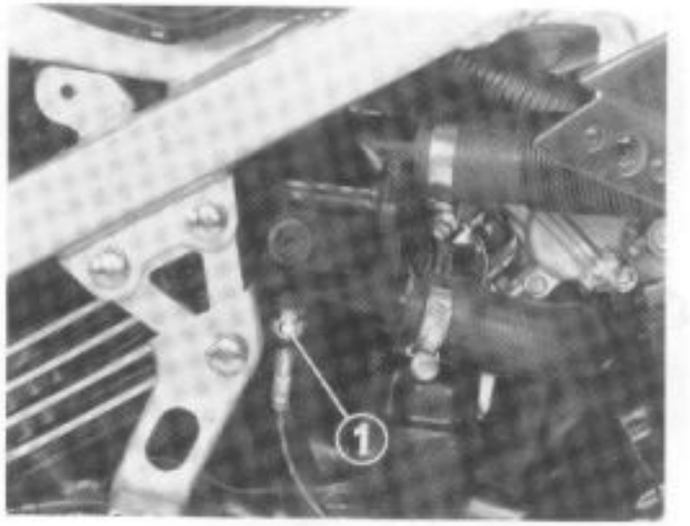


(1) Thermostatic switch
(2) Thermometer

temperatures at which the switch opens and closes. Make sure that there is no switch continuity with room temperature and gradually raise the coolant temperature. The switch should be continuity (close) at 98–102°C (208–216°F).

NOTE:

* *Keep temperature for 3 minutes before testing continuity. A sudden change of temperature will cause error of temperature reading between the thermometer and the switch.*
* *Do not let the thermometer or switch touch the pan as it will give a false reading.*
* *Soak the switch in coolant up to its threads.*

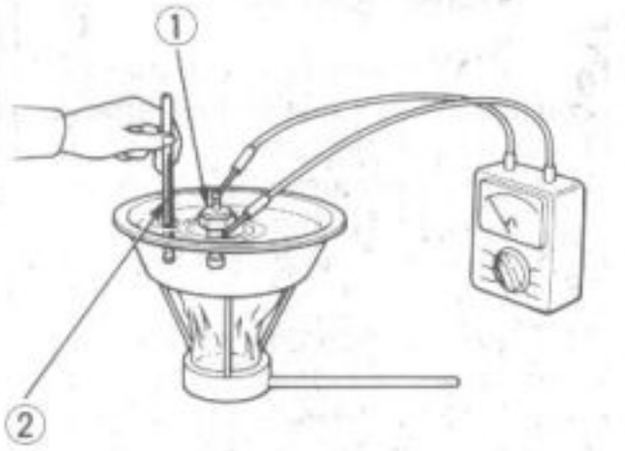


(1) Temperature sensor

Temperature Sensor

Disconnect the green/blue wire from the temperature sensor.

Drain the coolant and remove the temperature sensor from the thermostat case.



(1) Temperature sensor
(2) Thermometer

Suspend the unit in oil over a burner and measure the resistance through the unit as the oil heats up.

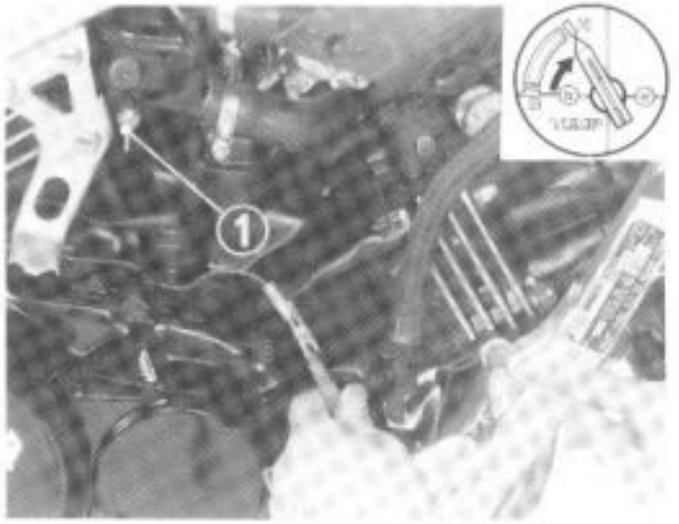
Temperature	60°C	85°C	110°C	120°C
	140°F	185°F	230°F	248°F
Resistance	104.0Ω	43.9Ω	20.3Ω	16.1Ω

WARNING

Wear gloves and eye protection.

NOTE:

* *Oil must be used as the heated liquid to check operation above 100°C (212°F).*
* *You'll get false readings if either the thermometer or temperature unit touches the pan.*



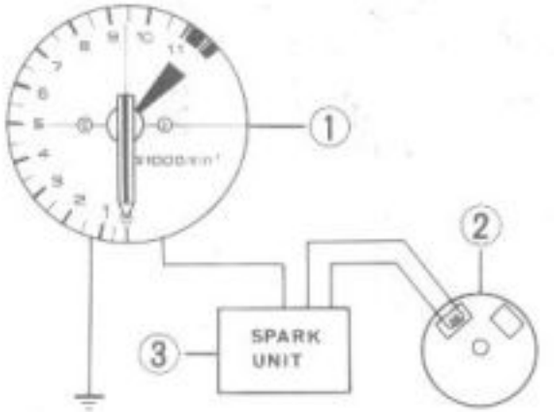
(1) Temperature sensor

Temperature Gauge

Disconnect the wire from the temperature sensor and short it to ground.
Turn the ignition switch to ON.
The temperature gauge needle should move all the way to the H.

CAUTION:

Do not leave the temperature sensor wire grounded for longer than a few seconds or the temperature gauge will be damaged.



(1) Tachometer
(2) Pulse generator
(3) Spark unit

Tachometer

If the tachometer does not work properly, replace the spark unit with a new one and recheck the operation.
If the problem still appears, replace the spark unit with the original one and tachometer with a new one.

TROUBLESHOOTING

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 line or fuel filter (3) Sticking float valve (4) Faulty fuel pump (5) Faulty fuel pump relay (6) Clogged fuel tank vent hole
REACHING CARBURETOR ↓		
2. Perform a 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 spark unit (6) Broken or shorted ignition coil (7) Faulty ignition or engine stop switches (8) Faulty pulse generator
GOOD SPARK ↓		
3. Test cylinder compression	LOW COMPRESSION →	(1) Low battery charge (2) Improper valve clearance (too small) (3) Valve stuck open (4) Worn cylinder and piston rings (5) Damaged cylinder head gasket (6) Seized valve (7) Improper valve timing
COMPRESSION NORMAL ↓		

		POSSIBLE CAUSE
4. Start by following normal procedure ENGINE DOES NOT FIRE	ENGINE STARTS BUT STOPS →	(1) Improper choke operation (2) Carburetor incorrectly adjusted (3) Intake pipe leaking (4) Improper ignition timing (Spark unit or pulse generator) (5) Fuel contaminated
5. Remove and inspect spark plug	WET PLUG →	(1) Carburetor flooded (2) Carburetor choke excessively opened (3) Cylinder flooded (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 (4) Drive chain too tight (5) Rear axle nut excessively tight
2. Check tire pressure PRESSURE NORMAL	PRESSURE LOW →	(1) Punctured tire (2) Faulty tire valve
3. Check clutch slipping CLUTCH ENGAGED PROPERLY	CLUTCH SLIPS →	(1) Clutch spring weak (2) Worn clutch disc/plate (3) Warped clutch disc/plate (4) Hydraulic system sticking

		POSSIBLE CAUSE
4. Accelerate lightly ENGINE SPEED INCREASES	ENGINE SPEED DOES NOT INCREASE →	(1) Carburetor choke opened (2) Clogged air cleaner (3) Restricted fuel flow (4) Clogged muffler (5) Clogged fuel tank vent hole
5. Check ignition timing CORRECT	INCORRECT →	(1) Faulty spark unit (2) Faulty pulse generator
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 ahead gasket (4) Improper valve timing
8. Check carburetor for clogging NOT CLOGGED	CLOGGED →	(1) Carburetor not serviced frequently enough
9. Check spark plugs NOT FOULED OR DISCOLORED	FOULED OR DISCOLORED →	(1) Plugs not serviced frequently enough (2) Spark plug with incorrect heat range

		POSSIBLE CAUSE
10. Check engine 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) Coolant level too low (2) Fan motor not working (3) Thermostat stuck closed (4) Excessive carbon build-up in combustion chamber (5) Use of poor quality fuel (6) Clutch slipping
NOT OVERHEATING ↓		
13. Accelerate or run at high speed	ENGINE KNOCKS →	(1) Worn piston and cylinder (2) Wrong type of fuel (3) Excessive carbon build-up in combustion chamber (4) Ignition timing too advanced (Faulty spark unit)
ENGINE DOES NOT KNOCK		

POOR PERFORMANCE AT LOW AND IDLE SPEEDS

		POSSIBLE CAUSE
1. Check ignition timing and valve clearance	INCORRECT →	(1) Improper valve clearance (2) Improper ignition timing (Faulty spark unit)
CORRECT ↓		

		POSSIBLE CAUSE
2. Check carburetor pilot screw adjustment	INCORRECT →	See Fuel System Section
CORRECT ↓		
3. Check for leaking intake pipe	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) Faulty ignition coil
GOOD SPARK		

POOR PERFORMANCE AT HIGH SPEED

NOTE: Ignition to the No. 2 and No.4 cylinders is cut-off at above 10,900–11,250 min^{-1} (rpm) to prevent engine damage.

		POSSIBLE CAUSE
1. Check ignition timing and valve clearance	INCORRECT →	(1) Improper valve clearance (2) Faulty spark unit (3) Faulty pulse generator
CORRECT ↓		
2. Disconnect fuel line at carburetor	FUEL FLOW RESTRICTED →	(1) Fuel tank empty (2) Clogged fuel line (3) Clogged fuel tank breather hole (4) Clogged fuel valve (5) Faulty fuel pump (6) Faulty fuel pump relay
FUEL FLOWS FREELY ↓		

		POSSIBLE CAUSE
3. Remove carburetors and check for clogged jets	CLOGGED →	Clean
NO CLOGGED JETS ↓		
4. Check valve timing	INCORRECT →	Cam gears not installed properly
CORRECT ↓		
5. Check valve spring tension	WEAK →	Faulty spring
NOT WEAKENED		

POOR HANDLING → Check tire and suspensions pressures	POSSIBLE CAUSE
1. If steering is heavy →	(1) Steering stem adjuster nut too tight (2) Damaged steering head bearings
2. If either wheel is wobbling →	(1) Excessive wheel bearing play (2) Bent rim (3) Improperly installed wheel (4) Swing arm pivot bearing excessively worn (5) Bent frame
3. If the motorcycle pulls to one side →	(1) Bent frame (2) Front and rear wheels not aligned (3) Bent front fork (4) Bent swing arm

TORQUE VALUES

Engine

Item	Q'ty	Thread Dia. (mm)	Torque N·m (kg-m, ft-lb)	Remarks
Cylinder head cover bolt	8	6	8–12 (0.8–1.2, 6–9)	
Camshaft holder bolt	24	6	10–14 (1.0–1.4, 7–10)	
Cylinder head bolt	8	8	21–25 (2.1–2.5, 15–18)	
	16	9	43–47 (4.3–4.7, 31–34)	
Flywheel rotor bolt	1	12	85–105 (8.5–10.5, 61–76)	
Primary drive gear bolt	1	12	85–105 (8.5–10.5, 61–76)	
Clutch lock nut	1	25	80–90 (8.0–9.0, 58–65)	Apply locking agent to the threads.
Crankcase bolt	14	9	38–42 (3.8–4.2, 27–30)	
	2	8	21–25 (2.1–2.5, 15–18)	
	15	6	10–14 (1.0–1.4, 7–10)	
Rocker arm shaft	8	20	45–50 (4.5–5.0, 33–36)	Apply locking agent to the threads.
Starter clutch cover bolt	3	8	26–30 (2.6–3.0, 19–22)	
Shift fork center lock bolt	1	7	16–20 (1.6–2.0, 12–14)	
Oil filter center bolt	1	20	15–20 (1.5–2.0, 11–14)	
Countershaft bearing holder bolt	3	8	21–25 (2.0–2.5, 15–18)	
Drive sprocket bolt	1	10	50–54 (5.0–5.4, 36–39)	
Valve adjustment nuts	16	7	21–25 (2.1–2.5, 15–18)	
Drain plug	1	12	35–40 (3.5–4.0, 25–29)	
Connecting rod nuts	8	8	36–40 (3.6–4.0, 26–29)	
Drum stopper pivot nut	1	6	8–12 (0.8–1.2, 6–9)	
Oil pressure switch	1	–	10–14 (1.0–1.4, 7–10)	Apply 3-Bond Sealant, or its equivalent, to the threads.
Spark plugs	4	12	12–16 (1.2–1.6, 9–12)	
Exterior oil pipe bolt	2	8	20–25 (2.0–2.5, 14–18)	
	1	10	20–25 (2.0–2.5, 14–18)	
Mainshaft bearing holder bolt/screw	3	6	7–11 (0.7–1.1, 5–8)	• Tighten the screw first, then tighten the bolt. • Apply locking agent to the threads.
Shift drum set plate bolt/screw	3	6	7–11 (0.7–1.1, 5–8)	
Clutch slave cylinder bleed valve	1	8	4–7 (0.4–0.7, 3–8)	
Cam gear bolt	8	6	10–14 (1.0–1.4, 7–10)	
	2	8	21–25 (2.1–2.5, 15–18)	
Oil pump driven sprocket bolt	1	6	15–20 (1.5–2.0, 11–14)	

Chassis

Item	Q'ty	Thread Dia. (mm)	Torque N·m (kg-m, ft-lb)	Remarks
Sub-frame bolt	4	10	60–70 (6.0–7.0, 43–51)	
Engine rear hanger upper bolt	1	10	60–70 (6.0–7.0, 43–51)	
Engine rear hanger lower bolt	1	10	35–45 (3.5–4.5, 25–33)	
Engine center hanger bolt	6	8	24–30 (2.4–3.0, 17–22)	
Engine front hanger bolt (10 mm)	2	10	35–45 (3.5–4.5, 25–33)	
Engine front hanger bolt (8 mm)	2	8	24–30 (2.4–3.0, 17–22)	
Front brake disc bolt	12	8	35–40 (3.5–4.0, 25–29)	U nut
Front axle nut	1	14	55–65 (5.5–6.5, 40–47)	
Right brake caliper bracket bolt	2	10	30–40 (3.0–4.0, 22–29)	
Left caliper bracket pivot bolt	1	10	30–40 (3.0–4.0, 22–29)	
Anti-dive pin bolt	1	6	10–15 (1.0–1.5, 7–11)	
Front axle holder nut	2	10	35–45 (3.5–4.5, 25–33)	U nut
Anti-dive case socket bolt	4	6	6–9 (0.6–0.9, 4–7)	Apply locking agent to the threads
Front fork bottom socket bolt	2	8	15–25 (1.5–2.5, 11–18)	Apply locking agent to the threads
Fork tube cap	2	–	15–30 (1.5–3.0, 11–22)	
Front fork brace bolt	4	8	24–30 (2.4–3.0, 17–22)	
Steering adjustment nut	1	26	23–27 (2.3–2.7, 17–20)	See page 158.
Steering stem nut	1	24	90–120 (9.0–12.0, 65–87)	
Stem pipe pinch bolt (top bridge)	1	8	20–30 (2.0–3.0, 14–22)	
Driven sprocket nut	5	12	80–100 (8.0–10.0, 58–72)	UBS nut
Rear brake disc bolt	6	8	37–43 (3.7–4.3, 27–31)	Apply oil to the threads.
Rear axle nut	1	18	85–105 (8.5–10.5, 61–76)	U nut
Rear shock absorber mount bolt	2	10	40–50 (4.0–5.0, 29–36)	U nut
Shock link-to-frame bolt	1	10	40–50 (4.0–5.0, 29–36)	U nut
Shock arm-to-link bolt	1	10	40–50 (4.0–5.0, 29–36)	U nut
Shock arm shaft pinch bolt	1	8	20–30 (2.0–3.0, 14–22)	
Swing arm right pivot bolt	1	25	85–105 (8.5–10.5, 61–76)	
Swing arm left pivot bolt	1	16	85–105 (8.5–10.5, 61–76)	

Item	Q'ty	Thread Dia. (mm)	Torque N·m (kg-m, ft-lb)	Remarks
Front brake caliper bolt	2	8	20–25 (2.0–2.5, 14–18)	
Front brake caliper pivot bolt	2	8	25–30 (2.5–3.0, 18–22)	
Rear brake caliper bolt	2	10	30–40 (3.0–4.0, 22–29)	
Rear brake pad pin	1	8	15–20 (1.5–2.0, 11–15)	
Brake hose oil bolt	7	10	25–35 (2.5–3.5, 18–25)	
Brake caliper bleed valve	4	7	4–7 (0.4–0.7, 3–5)	
Front fork bottom pinch bolt	2	8	32–38 (3.2–3.8, 23–27)	
Front fork top pinch bolt	2	7	9–13 (0.9–1.3, 7–9)	
Rear brake caliper torx bolt	4	8	20–25 (2.0–2.5, 14–18)	
Rear brake torque rod bolt	2	8	24–30 (2.4–3.0, 17–22)	
Handlebar mounting bolts	2	10	30–40 (3.0–4.0, 22–29)	
Exhaust muffler mounting bolts	2	10	30–40 (3.0–4.0, 22–29)	
Rear brake pedal bolt	1	8	20–30 (2.0–3.0, 14–22)	
Thermostatic switch	1	16	20–25 (2.0–2.5, 14–18)	
Clutch and front brake master cylinder holder bolt	4	6	10–14 (1.0–1.4, 7–10)	
Clutch and front brake master cylinder cap bolt	4	4	1–2 (0.1–0.2, 0.7–1.4)	

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

Standard Torque Values

Item	Torque Values N·m (kg-m, ft-lb)	Item	Torque Values N·m (kg-m, ft-lb)
5 mm bolt and nut	4–6 (0.4–0.6, 3–4)	5 mm screw	3–5 (0.3–0.5, 2–4)
6 mm bolt and nut	8–12 (0.8–1.2, 6–9)	6 mm screw and 6 mm flange bolt with 8 mm head	7–11 (0.7–1.1, 5–8)
8 mm bolt and nut	18–25 (1.8–2.5, 13–18)	6 mm flange bolt and nut	10–14 (1.0–1.4, 7–10)
10 mm bolt and nut	30–40 (3.0–4.0, 22–29)	8 mm flange bolt and nut	24–30 (2.4–3.0, 17–22)
12 mm bolt and nut	50–60 (5.0–6.0, 36–43)	10 mm flange bolt and nut	35–45 (3.5–4.5, 25–29)

Special Tool

TOOL NAME	TOOL NUMBER	REMARKS	REF. PAGE
Oil pressure gauge	07506–3000000	or equivalent tool	77
Oil pressure gauge attachment	07510–4220100		77
Compression gauge attachment	07510–MB00101		39
Pilot screw wrench	07908–4220201		37
Valve adjusting wrench	07908–MB00100		35
Oil filter wrench	07912–6110001		36
Snap ring pliers	07914–3230001	or equivalent tool	62, 149, 179, 181
Steering stem socket	07916–3710100		156, 158
Lock nut wrench	07916–4220000		69, 74
Hex wrench, 6 mm	07917–3230000	or equivalent tool	149, 154
Needle bearing remover	07931–MA70000		173
Bearing race remover	07946–3710500		157
Steering stem driver	07946–MB00000		158
Fork seal driver	07947–KA50100		154
Fork seal driver attachment	07947–KF00100		154
Driver	07949–3710001		105
Ball race remover	07953–4250001		157
Oil seal driver attachment	07965–MB00100		168
Oil seal driver	07965–MC70100		166, 168
Attachment ring	07965–ME70100		168
Center stand	07965–MA30001		49
Valve guide reamer	07984–2000000		89, 90
Timing inspection cover	07998–MB40000		194
Primary gear holder	07924–ME90000		67, 76

Common Tool

TOOL NAME	TOOL NUMBER	REMARKS	REF. PAGE
Float level gauge	07401–0010000		128
Torx driver socket, E-12	07707–0020500	or equivalent tool	186, 187
Lock nut wrench, 30 x 32 mm	07716–0020400	or equivalent tool	156, 159
Flywheel holder	07725–0040000		81, 82
Rotor puller	07733–0020001		81
Valve guide remover, 5.5 mm	07742–0010100		89
Valve guide driver	07743–0020000		90
Attachment, 24 x 26 mm	07746–0010700		161, 162, 163
Attachment, 32 x 35 mm	07746–0010100		173
Attachment, 37 x 40 mm	07746–0010200		173
Attachment, 42 x 47 mm	07746–0010300		139, 157, 162
Attachment, 52 x 55 mm	07746–0010400		105, 157, 162
Attachment, 62 x 68 mm	07746–0010500		110, 162
Pilot, 15 mm	07746–0040300		145
Pilot, 17 mm	07746–0040400		173
Pilot, 20 mm	07746–0040500		99, 105, 162, 173
Pilot, 25 mm	07746–0040600		162
Pilot, 40 mm	07746–0040900		110
Driver	07746–0030100		107
Attachment, 30 mm I.D.	07746–0030300		107
Bearing remover shaft	07746–0050100		144
Bearing remover head, 15 mm	07746–0050400		144
Driver	07749–0010000		110, 139, 157, 162 156, 163, 173
Valve spring compressor	07757–0010000		87, 93
Valve seat cutter, 45°	07780–0010800	Intake, 33 mm	91
Valve seat cutter, 45°	07780–0010300	Exhaust, 29 mm	91
Valve seat cutter, 60°	07780–0014000	In/Ex, 30 mm	91
Valve seat cutter, 32°	07780–0012900	Intake, 33 mm	91
	07780–0012100	Exhaust, 28 mm	91
Cutter holder	07781–0010101		91
Vacuum gauge set	07404–0030000		37

SERVICE DATA

Engine

Unit: mm (in)

ITEM			STANDARD	SERVICE LIMIT	
				FOR NORMAL USE	FOR RACE USE
COOLING SYSTEM	Coolant capacity	Radiator and engine	2.97 ℓ (2.61 Imp. qt)	———	←
		Reserve tank	0.28 ℓ (0.26 Imp. qt)	———	←
		Total system	3.25 ℓ (2.86 Imp. qt)	———	←
	Coolant freezing point (Distilled water/ ethylene glycol)	55 : 45	−32°C (−25°F)	———	←
		50 : 50	−37°C (−34°F)	———	←
		45 : 55	−44.5°C (−48°F)	———	←
	Radiator cap relief pressure		95–125 kPa (0.95–1.25 kPa, 13.5–17.8 psi)	———	←
	Thermostat	Begins to open	80°–84°C (176°–183°F)	———	←
		Valve lift	Minimum of 8 mm at 95°C (0.31 in at 203°F)	———	←
CLUTCH SYSTEM	Master cylinder	Cylinder I.D.	14.000–14.043 (0.5512–0.5529)	14.06 (0.554)	←
		Piston O.D.	13.957–13.984 (0.5495–0.5506)	13.94 (0.549)	←
	Slave cylinder	Cylinder I.D.	33.600–33.662 (1.3228–1.3253)	33.68 (1.326)	←
		Piston O.D.	33.550–33.575 (1.3209–1.3218)	33.53 (1.320)	←
	Clutch fluid		DOT 4 brake fluid	———	←
	Outer guide I.D.		29.995–30.012 (1.1809–1.1816)	30.08 (1.184)	←
	Clutch spring free height		4.4 (0.17)	4.2 (0.165)	←
	Clutch center (B) I.D.		74.414–74.440 (2.9297–2.9307)	74.47 (2.932)	←
	One way clutch inner O.D.		57.755–57.768 (2.2738–2.2743)	57.72 (2.272)	←
	Clutch disc thickness		3.72–3.88 (0.146–0.153)	3.1 (0.12)	←
	Clutch plate warpage		———	0.30 (0.012)	←
	Starter driven gear O.D.		47.175–47.200 (1.8573–1.8583)	47.16 (1.857)	←
LUBRICATION SYSTEM	Engine oil capacity	After draining	3.0 ℓ (2.64 Imp. qt)	———	←
		After disassembly	3.7 ℓ (3.26 Imp. qt)	———	←
	Oil pressure (at oil pressure switch)		600–700 kPa (6.0–7.0 kg/cm², 85–100 psi)/ 5,000 min⁻¹ (rpm) at 80°C (176°F)	———	←
	Oil pump delivery (at 5,000 min⁻¹ <rpm>)		54.8 ℓ (12.05 Imp. gal)/min.	———	←
	Oil pump rotor tip clearance	Main pump	0.15 (0.006)	0.20 (0.008)	←
		Cooler pump	0.15 (0.006)	0.20 (0.008)	←

Unit: mm (in)

ITEM				STANDARD	SERVICE LIMIT	
					FOR NORMAL USE	FOR RACE USE
LUBRICATION SYSTEM	Oil pump body clearance	Main pump		0.15–0.23 (0.006–0.009)	0.35 (0.014)	←
		Cooler pump		0.15–0.23 (0.006–0.009)	0.35 (0.014)	←
	Oil pump end clearance	Main pump		0.02–0.07 (0.001–0.003)	0.10 (0.004)	←
		Cooler pump		0.02–0.07 (0.001–0.003)	0.10 (0.004)	←
CYLINDER HEAD	Cylinder compression pressure			1,100–1,500 kPa (11–15 kg/cm², 156–213 psi)	———	←
	Valve clearance		(IN/EX)	0.14 (0.006)	———	←
	Cam-shaft	Cam lobe height	IN	35.459–35.619 (1.3960–1.4023)	35.40 (1.394)	←
			EX	35.459–35.619 (1.3960–1.4023)	35.40 (1.394)	←
		Runout		———	0.03 (0.001)	←
		Camshaft journal O.D.	Center	23.861–23.882 (0.9394–0.9402)	23.69 (0.933)	←
			Both ends	23.949–23.970 (0.9429–0.9437)	23.87 (0.940)	←
		Camshaft holder I.D.		24.000–24.021 (0.9449–0.9457)	24.07 (0.948)	←
		Journal oil clearance	Center	0.118–0.160 (0.0046–0.0063)	0.20 (0.0079)	←
			Both ends	0.030–0.072 (0.0012–0.0028)	0.10 (0.0039)	←
	Rocker arm	Arm I.D.		12.000–12.018 (0.4724–0.4731)	12.05 (0.474)	←
		Shaft O.D.		11.966–11.984 (0.4711–0.4718)	11.93 (0.470)	←
		Arm-to-shaft clearance		0.016–0.052 (0.0006–0.0021)	0.07 (0.003)	←
	Valve	Valve stem O.D.	IN	5.475–5.490 (0.2156–0.2161)	5.47 (0.2154)	←
			EX	5.455–5.470 (0.2148–0.2154)	5.45 (0.2146)	←
		Valve guide I.D. (IN/EX)		5.500–5.515 (0.2165–0.2171)	5.55 (0.219)	←
		Stem-to-guide clearance	IN	0.010–0.040 (0.0004–0.0016)	0.08 (0.003)	←
			EX	0.030–0.060 (0.0012–0.0024)	0.10 (0.004)	←
		Valve length	IN	87.15–87.75 (3.431–3.455)	86.95 (3.423)	←
			EX	86.55–87.15 (3.408–3.431)	86.35 (3.400)	←
		Valve seat width		1.0 (0.04)	1.3 (0.05)	←
	Valve spring	Free length	Outer	39.01 (1.536)	37.66 (1.483)	←
			Inner	44.94 (1.769)	43.47 (1.711)	←
		Preload/length	Outer	5.74–6.94 kg (12.65–15.30 lbs)/ 34.2 mm (1.35 in)	5.38 kg (11.86 lbs)/ 34.2 mm (1.35 in)	←
			Inner	14.75–16.97 kg (32.52–37.41 lbs)/ 37.7 mm (1.48 in)	14.15 kg (31.20 lbs)/ 37.7 mm (1.48 in)	←
	Cylinder head warpage			———	0.10 (0.004)	←

Unit: mm (in)

ITEM				STANDARD	SERVICE LIMIT	
					FOR NORMAL USE	FOR RACE USE
CYLINDER HEAD	Valve timing (At 1 mm lift)	IN	Opens	10° BTDC	—	←
			Closes	40° ABDC	—	←
		EX	Opens	45° BBDC	—	←
			Closes	10° ATDC	—	←
	Valve timing (At 0 lift)	IN	Opens	59° BTDC	—	←
			Closes	105° ABDC	—	←
		EX	Opens	103° BBDC	—	←
			Closes	57° ATDC	—	←
TRANSMISSION	Gear I.D.		M4, M5	31.000–31.016 (1.2205–1.2211)	31.04 (1.222)	←
			C2, C3	33.000–33.016 (1.2992–1.2998)	33.04 (1.301)	←
	Gear bushing O.D.		M4, M5	30.950–30.975 (1.2185–1.2195)	30.94 (1.218)	←
			C2, C3	32.950–32.975 (1.2972–1.2982)	32.93 (1.297)	←
	Gear bushing I.D.		M4	27.995–28.016 (1.1022–1.1030)	28.04 (1.104)	←
	Mainshaft O.D. (At M4)			27.977–27.990 (1.1015–1.1020)	27.92 (1.099)	←
	Gear-to-bushing clearance		M4	0.025–0.066 (0.0010–0.0026)	0.10 (0.004)	←
			C2, C3	0.025–0.066 (0.0010–0.0026)	0.11 (0.004)	←
	Bushing-to-shaft clearance (M4)			0.005–0.039 (0.0002–0.0015)	0.06 (0.002)	←
	Shift fork	Claw thickness		6.43–6.50 (0.253–0.256)	6.10 (0.240)	←
		Left and right fork I.D.		14.000–14.021 (0.5512–0.5520)	14.04 (0.553)	←
	Fork shaft O.D.			13.966–13.984 (0.5498–0.5506)	13.90 (0.547)	←
CRANKSHAFT, PISTON	Connecting rod big end side clearance			0.10–0.30 (0.004–0.012)	0.40 (0.016)	0.35 (0.014)
	Crankshaft	Runout		—	0.03 (0.001)	0.02 (0.001)
		Crankpin oil clearance		0.028–0.052 (0.001–0.002)	0.08 (0.003)	0.028–0.052 (0.001–0.002)
		Main journal oil clearance		0.020–0.044 (0.0008–0.0017)	0.08 (0.003)	0.020–0.044 (0.008–0.0017)

Unit: mm (in)

ITEM			STANDARD	SERVICE LIMIT	
				FOR NORMAL USE	FOR RACE USE
CRANKSHAFT, PISTON	Cylinder	I.D.	77.000–77.015 (3.0315–3.0321)	77.10 (3.035)	←
		Taper	—	0.05 (0.002)	←
		Out of round	—	0.05 (0.002)	←
		Warpage across top	—	0.10 (0.004)	←
	Piston ring end gap	Top	0.32–0.47 (0.013–0.019)	0.65 (0.026)	0.55 (0.022)
		Second	0.32–0.47 (0.013–0.019)	0.65 (0.026)	0.55 (0.022)
		Oil (Side rail)	0.30–0.90 (0.012–0.035)	1.10 (0.043)	1.00 (0.039)
	Ring-to-groove clearance (Top/second)		0.015–0.045 (0.0006–0.0018)	0.10 (0.004)	0.08 (0.003)
	Piston	O.D.	76.955–76.970 (3.0297–3.0303)	76.85 (3.026)	76.90 (3.028)
		Pin bore I.D.	20.002–20.008 (0.7875–0.7877)	20.06 (0.790)	20.015 (0.7880)
	Piston-to-cylinder clearance		0.030–0.060 (0.0012–0.0024)	0.10 (0.004)	←
	Piston pin O.D.		19.994–20.000 (0.7872–0.7874)	19.98 (0.7866)	←
	Piston-to-pin clearance		0.002–0.014 (0.0001–0.0006)	0.040 (0.0016)	0.03 (0.001)
	Connecting rod small end I.D.		20.016–20.034 (0.7880–0.7887)	20.08 (0.791)	20.045 (0.7892)
	Piston pin-to-connecting rod clearance		0.016–0.040 (0.0006–0.0016)	0.060 (0.0024)	0.03 (0.001)

Frame

Unit: mm (in)

ITEM			STANDARD	SERVICE LIMIT	
				FOR NORMAL USE	FOR RACE USE
FRONT WHEEL	Axle shaft runout		—	0.2 (0.01)	←
	Wheel rim runout	Radial	—	2.0 (0.08)	←
		Axial	—	2.0 (0.08)	←
FRONT FORK	Fork spring free length		414 (16.3)	406.0 (15.98)	←
	Fork tube runout		—	0.2 (0.01)	←
	Fork fluid capacity	Right	440 cm^3 (15.4 Imp. oz)	—	←
		Left	460 cm^3 (16.1 Imp. oz)	—	←
	Fork fluid level	Right	170.0 (6.69)	—	←
		Left	170.0 (6.69)	—	←
	Air pressure		0–40 kPa (0–0.4 kg/cm^2, 0–6 psi)	—	←

Unit: mm (in)

ITEM				STANDARD	SERVICE LIMIT	
					FOR NORMAL USE	FOR RACE USE
REAR WHEEL	Axle shaft runout			———	0.2 (0.01)	←
	Wheel rim runout		Radial	———	2.0 (0.08)	←
			Axial	———	2.0 (0.08)	←
REAR SHOCK ABSORBER	Fluid refill capacity			265 cm^3 (7.46 Imp. oz)	———	←
	Air pressure			0–300 kPa (0–3.0 kg/cm^2, 0–43 psi)	———	←
HYDRAULIC BRAKES	Brake disc	Thickness	Front	4.8–5.2 (0.19–0.20)	4.0 (0.16)	←
			Rear	9.8–10.2 (0.39–0.40)	9.0 (0.35)	←
		Runout		———	0.3 (0.01)	←
	Master cylinder I.D.		Front	15.870–15.913 (0.6248–0.6265)	15.925 (0.6270)	←
			Rear	12.700–12.743 (0.5000–0.5017)	12.755 (0.5022)	←
	Master piston O.D.		Front	15.827–15.854 (0.6231–0.6242)	15.815 (0.6226)	←
			Rear	12.657–12.684 (0.4983–0.4994)	12.645 (0.4978)	←
	Caliper cylinder I.D.		Front	32.030–32.080 (1.2610–1.2630)	32.090 (1.2634)	←
			Rear	42.850–42.926 (1.6870–1.6900)	42.940 (1.6905)	←
	Caliper piston O.D.		Front	31.948–31.998 (1.2578–1.2598)	31.940 (1.2575)	←
			Rear	42.815–42.820 (1.6856–1.6858)	42.800 (1.6850)	←
	Brake fluid			DOT 4	———	←

Electrical

Unit: mm (in)

ITEM			STANDARD	SERVICE LIMIT	
				FOR NORMAL USE	FOR RACE USE
BATTERY/ CHARGING SYSTEM	Battery capacity		12V–16 AH	———	←
	Battery specific gravity	Fully charged	1,280 at 20°C (68°F)	———	←
		Normal reading	1,260 at 20°C (68°F)	———	←
		Need charging	1,200 at 20°C (68°F)	———	←
	Battery charging rate		1.6A max.	———	←
	Charging start rpm		1,000–1,200 min^{-1} (rpm)	———	←
	Regulate voltage		13.5–15.5V	———	←

Unit: mm (in)

ITEM				STANDARD	SERVICE LIMIT	
					FOR NORMAL USE	FOR RACE USE
IGNITION SYSTEM	Ignition timing	Initial "F" mark		10° BTDC at idle speed	—	←
		Advance start		1,800 min^{-1} (rpm)	—	←
		Full advance		37° BTDC	—	←
	Ignition coil resistance	Primary coil		2.4–3.0 ohms	—	←
		Secondary coil	With plug cap	21–28 Kohms	—	←
			Without plug cap	12.6–15.4 Kohms	—	←
	Pulse generator coil resistance			480 ohms	—	←
	Pulse generator air gap			0.3–0.9 (0.012–0.035)	—	←
STARTER MOTOR	Brush spring tension			560–680 g (19.8–24.0 oz)	560 g (19.8 oz)	←
	Brush length			12.0–13.0 (0.47–0.51)	6.5 (0.26)	←
SENSORS	Coolant temperature sensor resistance	60° (140° F)		104.0 ohms	—	←
		85° (185° F)		43.9 ohms	—	←
		110° (230° F)		20.3 ohms	—	←
		120° (248° F)		16.1 ohms	—	←
	Thermostatic switch operating temperature		At ON	107–113° C	—	←
			At OFF	102–108° C	—	←

Carburetor Specifications

Identification number	VD85A VD85B <G> VD85C <SW>
Throttle bore	36 mm (1.42 in)
Venturi bore	34 mm (1.34 in) 29.8 mm (1.17 in) <G> 27.3 mm (1.07 in) <SW>
Float level	8.5 mm (0.33 in)

Main jet (front/rear)	#125/#125 #98/#95 <SW>
Slow jet	#38
Pilot screw opening	2
Idle speed	1,000 ± 100 min^{-1} (rpm)

SPECIFICATIONS

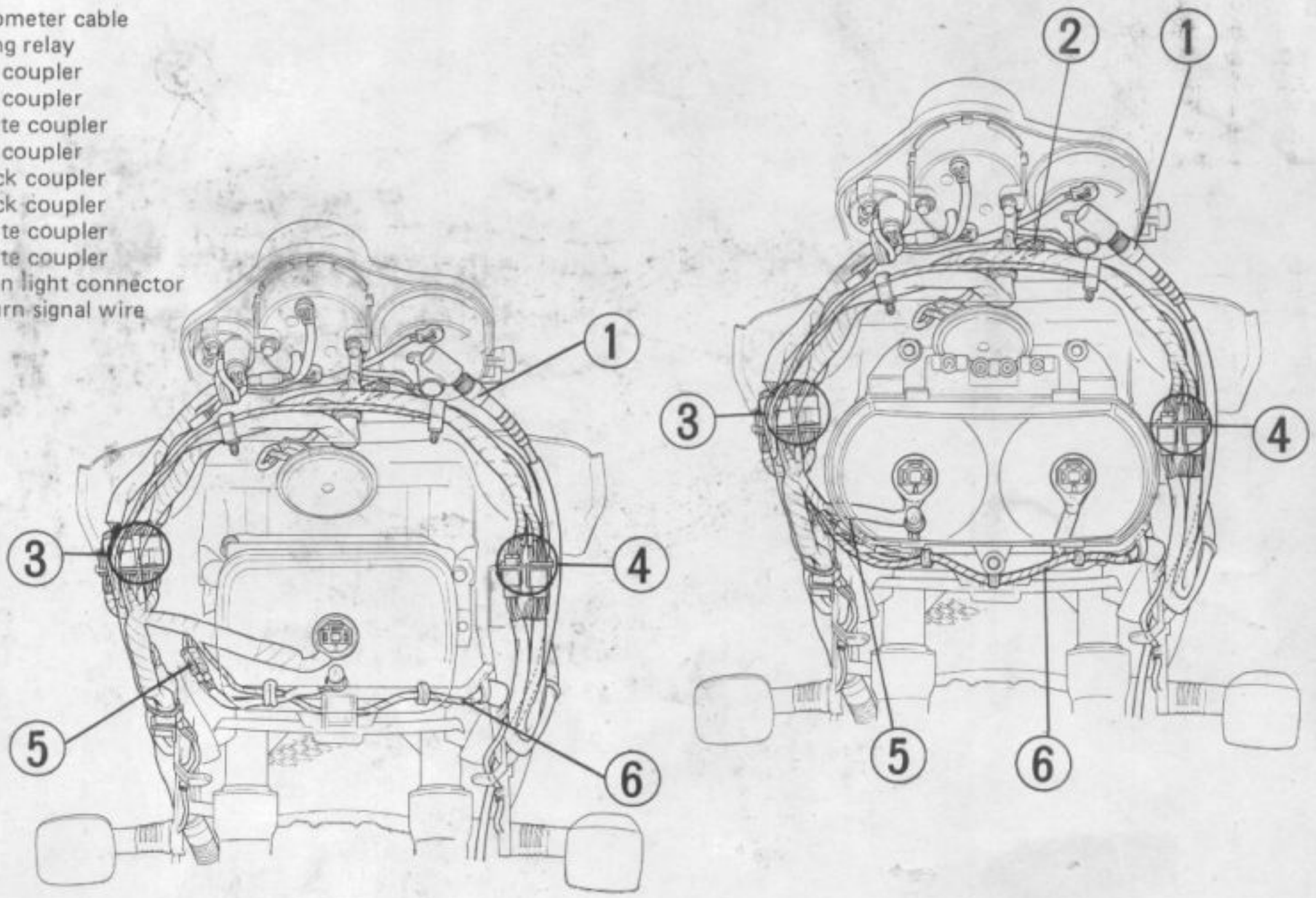
AREA CODE:
E: U.K. G: Germany SW: Switzerland H: Netherland IT: Italy
SP: Spain ED: Europe

ITEM			
DIMENSIONS	Overall length		2,170 mm (85.4 in) 2,180 mm (85.8 in) <G> 2,250 mm (88.6 in) <SW>
	Overall width		730 mm (28.7 in)
	Overall height		1,200 mm (47.2 in)
	Wheel base		1,505 mm (59.3 in)
	Seat height		810 mm (31.9 in)
	Ground clearance		135 mm (5.3 in)
	Dry weight		249 kg (549 lbs)
FRAME	Type		Double cradle
	Front suspension, travel		Telescopic fork, 155 mm (6.1 in)
	Rear suspension, travel		Swing arm, 120 mm (4.7 in)
	Front tire size		120/80V16–V250
	Rear tire size		140/80VR17–V250 <Except SW> or 140/80V17–V250
	Cold tire pressure		
	Driver only	Front	250 kPa (2.5 kg/cm^2, 36 psi)
		Rear	290 kPa (2.9 kg/cm^2, 42 psi)
	Driver and passenger	Front	250 kPa (2.5 kg/cm^2, 36 psi)
		Rear	290 kPa (2.9 kg/cm^2, 42 psi)
	Front brake		Double disc brake
	Rear brake		Single disc brake
	Fuel capacity		25 liters (6.6 U.S. gal., 5.5 Imp. gal)
	Fuel reserve capacity		4.5 liters (1.2 U.S. gal., 1.0 Imp. gal)
	Caster angle		28°
	Trail		98 mm (3.9 in)

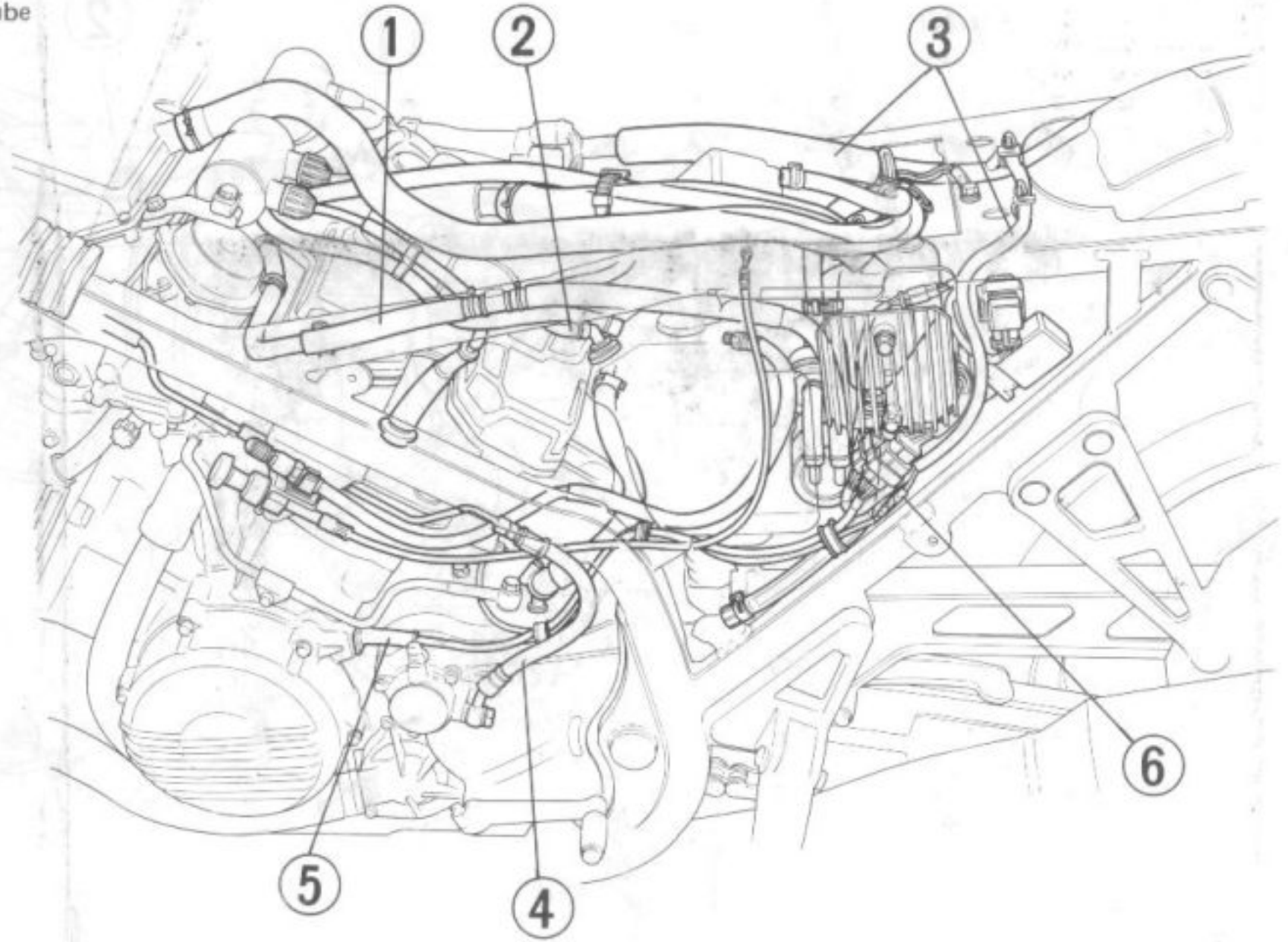
ITEM		
ENGINE	Type	Water cooled 4-stroke
	Cylinder arrangement	4 cylinders 90° -V
	Bore and stroke	77.0 x 53.6 mm (3.03 x 2.11 in)
	Displacement	998 cm^3
	Compression ratio	11.0
	Valve train	Gear drive and DOHC with rocker arm
	Valve clearance (IN/EX)	0.14 mm (0.006 in)
	Lubrication system	Forced pressure and wet sump
	Oil capacity	3.7 liters (3.91 U.S. qt., 3.26 Imp. qt) after disassembly
	Coolant capacity	3.25 liters (3.43 U.S. qt., 2.86 Imp. qt) after disassembly
	Air filtration	Paper filter
	Engine weight	96 kg (212 lbs)
CARBURETION	Carburetor manufacturer/type	Keihin VD
	Throttle bore	36 mm (1.42 in)
	Venturi bore	34 mm (1.34 in)
		29.8 mm (1.2 in) <G>
	Identification number	27.3 mm (1.07 in) <SW>
		VD85A
		VD85B <G>
		VD85C <SW>
	Fuel required	Low lead gasoline with 94 octane number or higher
	Idle speed	1,000 ± 100 min^{-1} (rpm)
DRIVE TRAIN	Clutch	Wet, multi-plate
	Transmission	5-speed constant-mesh
	Primary reduction ratio	1.971 (69/35)
	Gear ratio 1st	2.733 (41/15)
	2nd	1.882 (32/17)
	3rd	1.500 (30/20)
	4th	1.240 (31/25)
	5th	1.037 (28/27)
	Final reduction ratio	2.529 (43/17)

ITEM			
ELECTRICAL	Ignition		Transistorized
	Ignition timing (Initial)		10° BTDC
	(Full advance)		37° BTDC
	Spark plug		
	Standard	NGK	DPR9EA-9
		ND	X27EPR-U9
	For cold climate	NGK	DPR8EA-9
	(below 5°C, 41°F)	ND	X24EPR-U9
	Spark plug gap		0.8–0.9 mm (0.031–0.035 in)
	Firing order		1–4–3–2
	Starting system		Starting motor
	Alternator		0.36 kW 5,000 min^{-1} (rpm)
	Battery capacity		12V–16 Ah
	Fuse		30A (Main) 15A x 2, 10A x 5
LIGHTS	Headlight		12V–60/55W x 2
			12V–60/55W <IT, SW>
	Tail/stop light		12V–5/21W x 2
	Turn signal light		12V–21W x 4
	Meter light		12V–3.4W x 5
	Indicator light		12V–3W x 6
	Position light		12V–4W

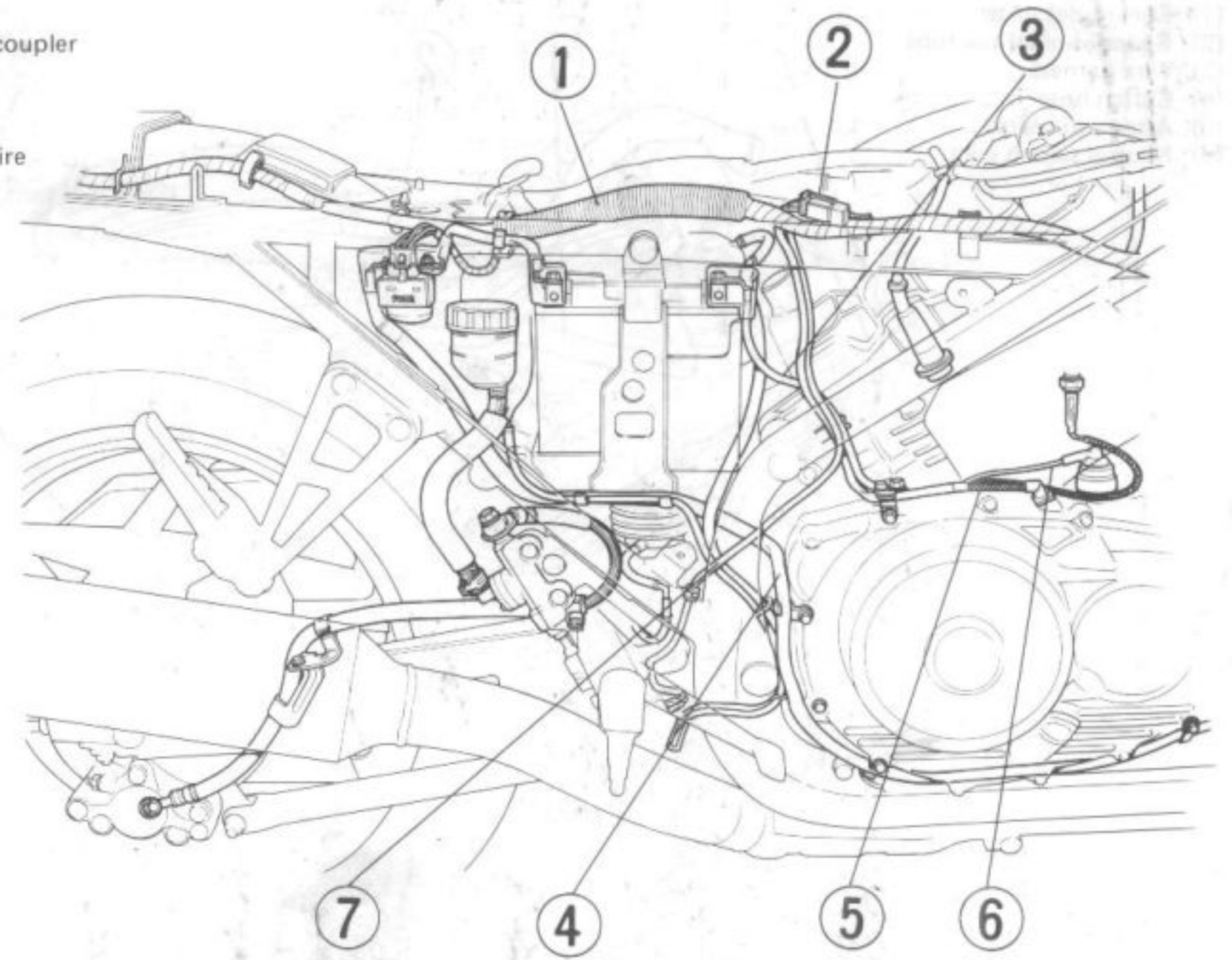
(1) Speedometer cable
(2) Lighting relay
(3) 6P red coupler
    9P red coupler
    6P white coupler
    4P red coupler
(4) 6P black coupler
    9P black coupler
    9P white coupler
    2P white coupler
(5) Position light connector
(6) Left turn signal wire



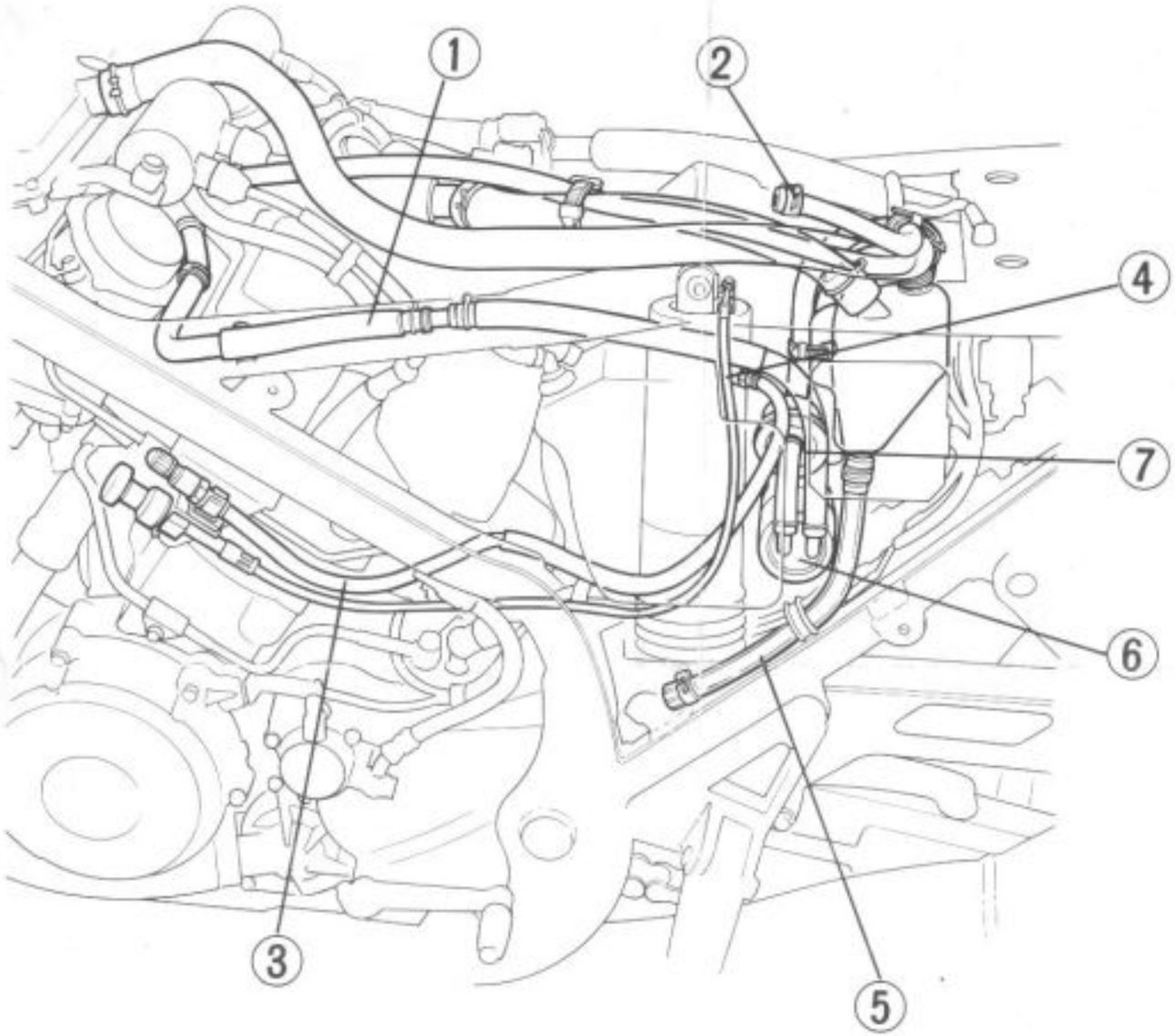
(1) Fuel outlet hose
(2) Radiator overflow tube
(3) Wire harness
(4) Clutch hose
(5) Alternator wire
(6) Neutral switch wire



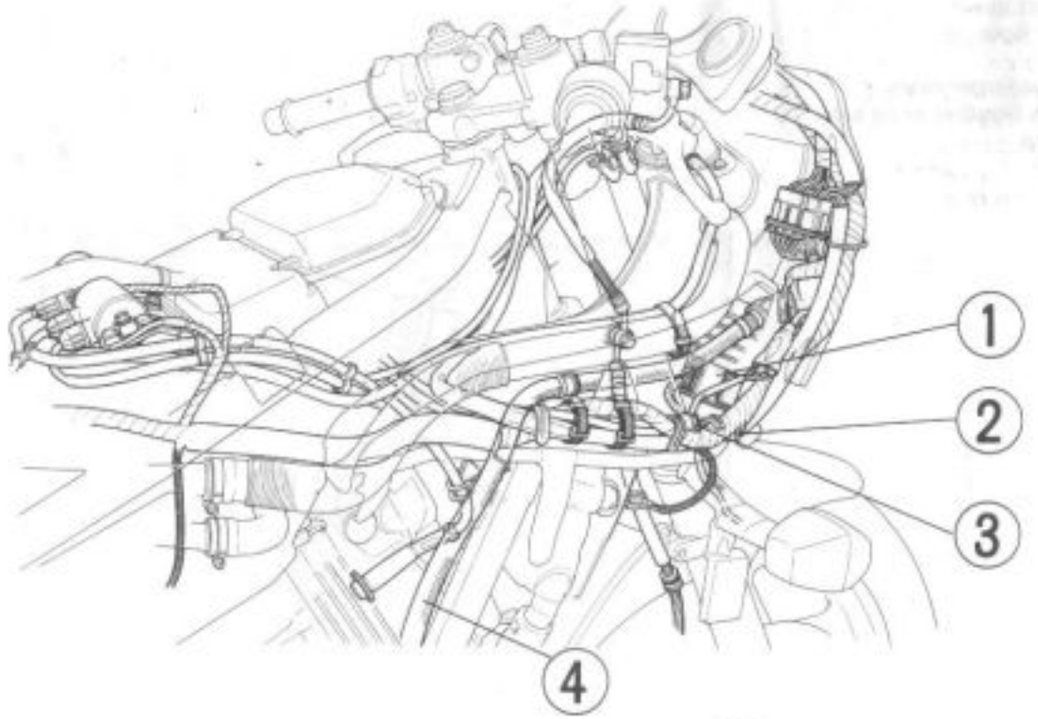
(1) Wire harness
(2) Pulse generator wire coupler
(3) Battery ground cable
(4) Starter motor cable
(5) Pulse generator wire
(6) Oil pressure switch wire
(7) Rear brake light switch wire

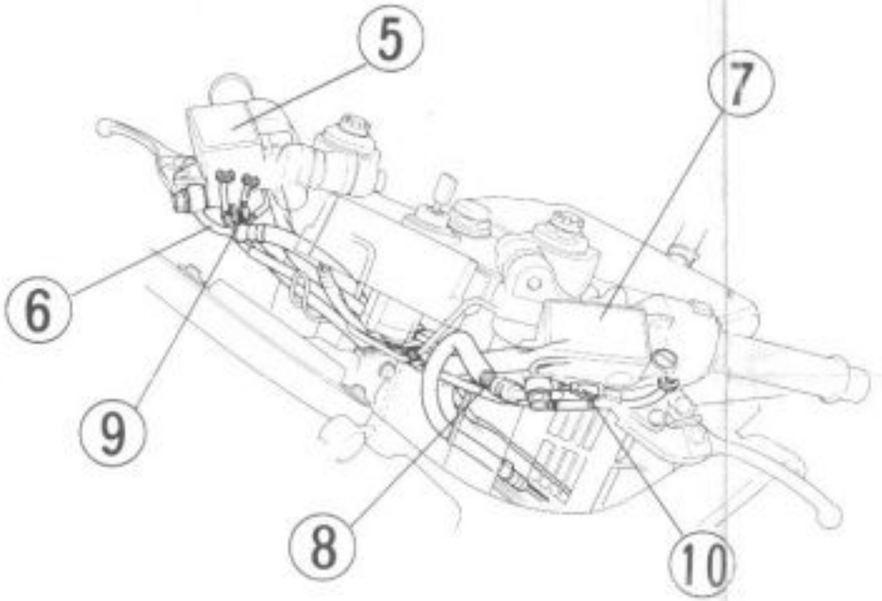


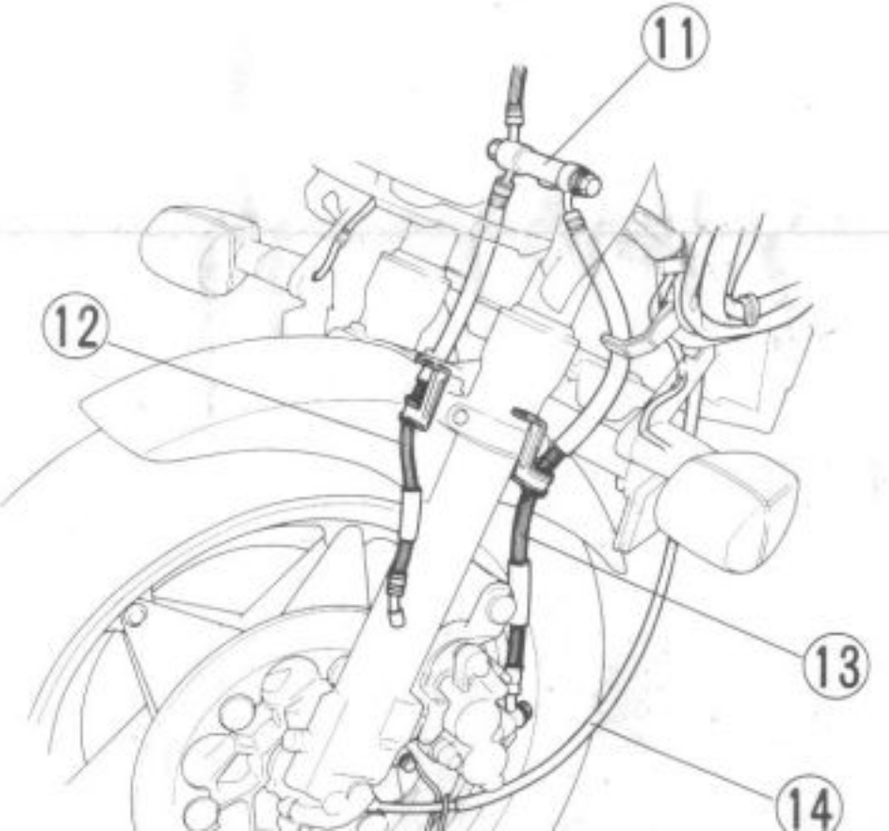
(1) Fuel outlet hose
(2) Fuel inlet hose
(3) Air hose
(4) Damping adjuster cable
(5) Crankcase breather drain tube
(6) Fuel pump
(7) Fuel filter



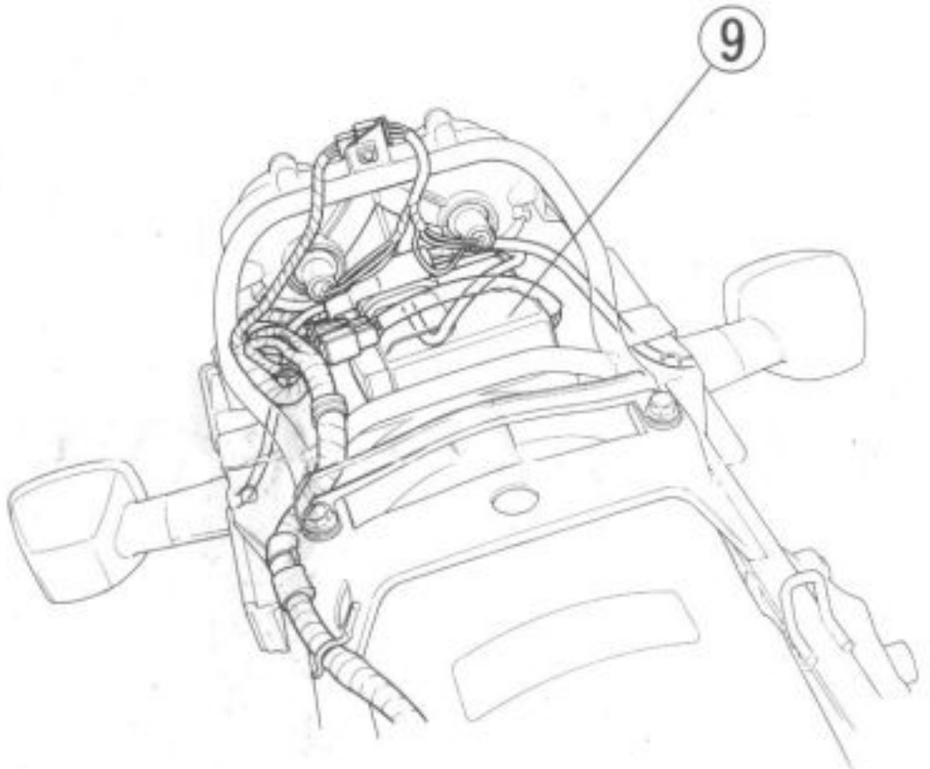
(1) Dimmer relay
(2) Lighting diode
(3) Clutch diode
(4) Oil cooler hose
(5) Brake master cylinder
(6) Brake hose
(7) Clutch master cylinder
(8) Clutch hose
(9) Brake switch wire
(10) Clutch switch
(11) Brake hose 3-way joint
(12) Right brake hose
(13) Left brake hose
(14) Speedometer cable

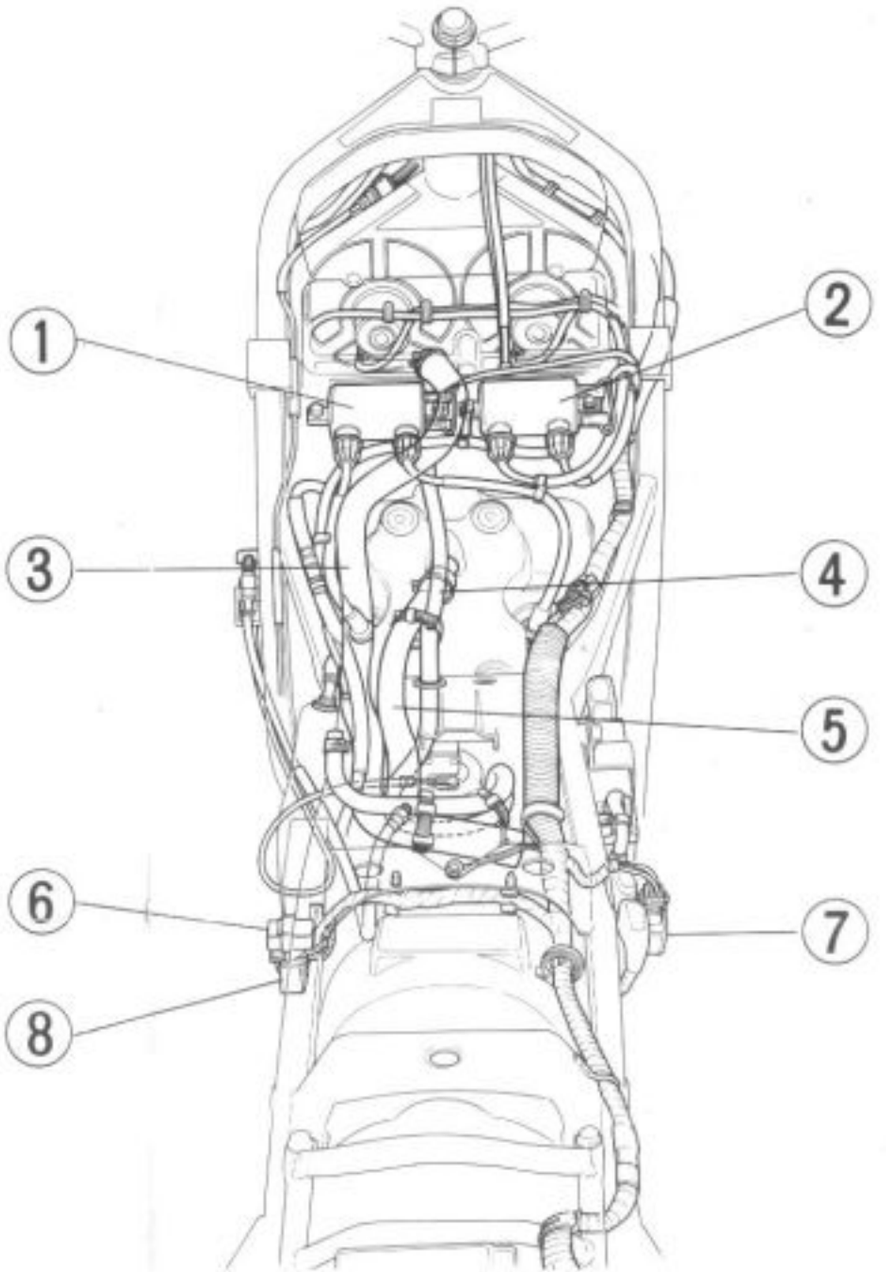




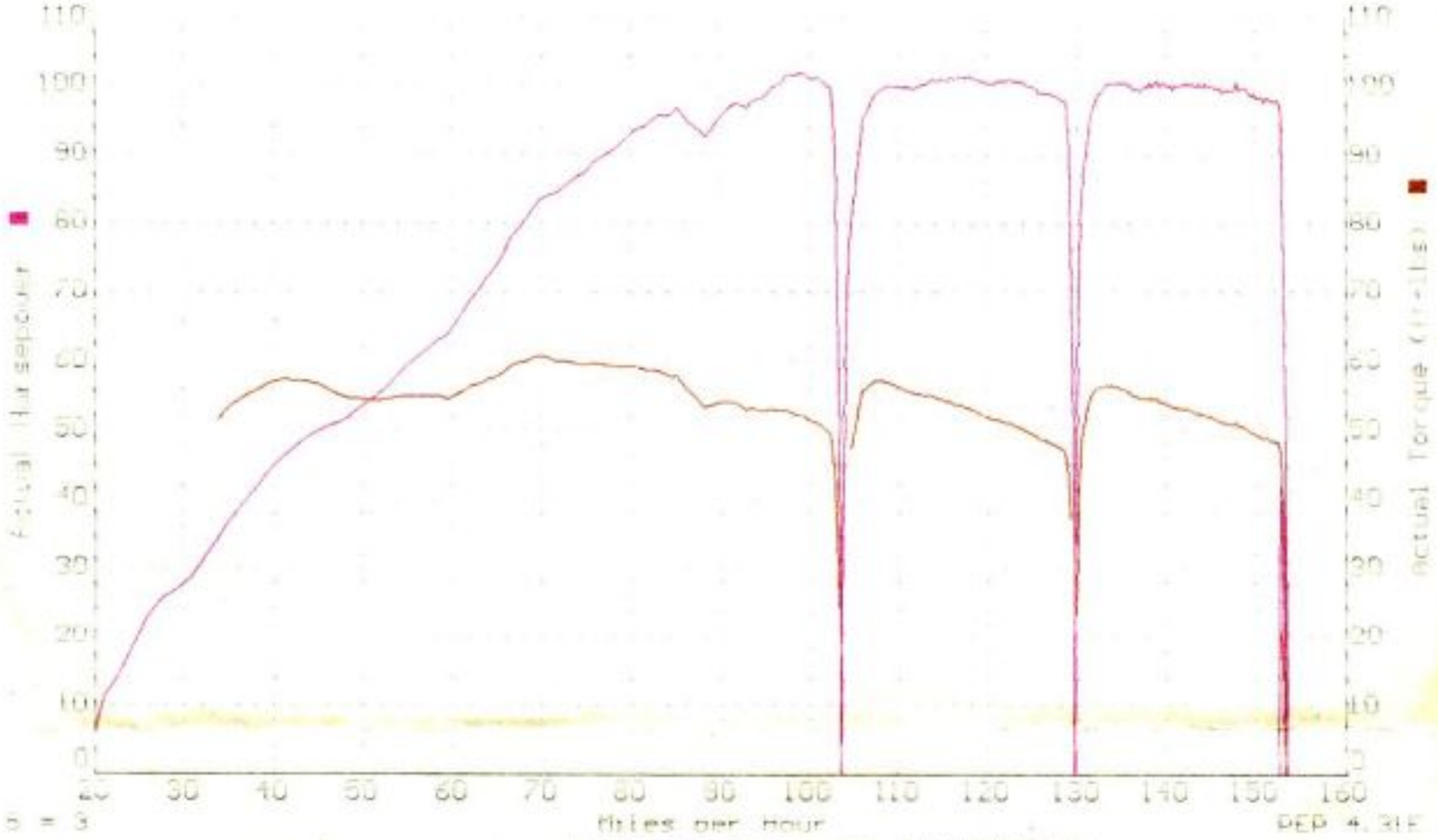


(1) 1-3 ignition coil
(2) 2-4 ignition coil
(3) Breather hose
(4) Carburetor air vent tube
(5) Breather tube
(6) Fuel pump relay
(7) Starter relay switch
(8) Turn signal relay
(9) Spark unit





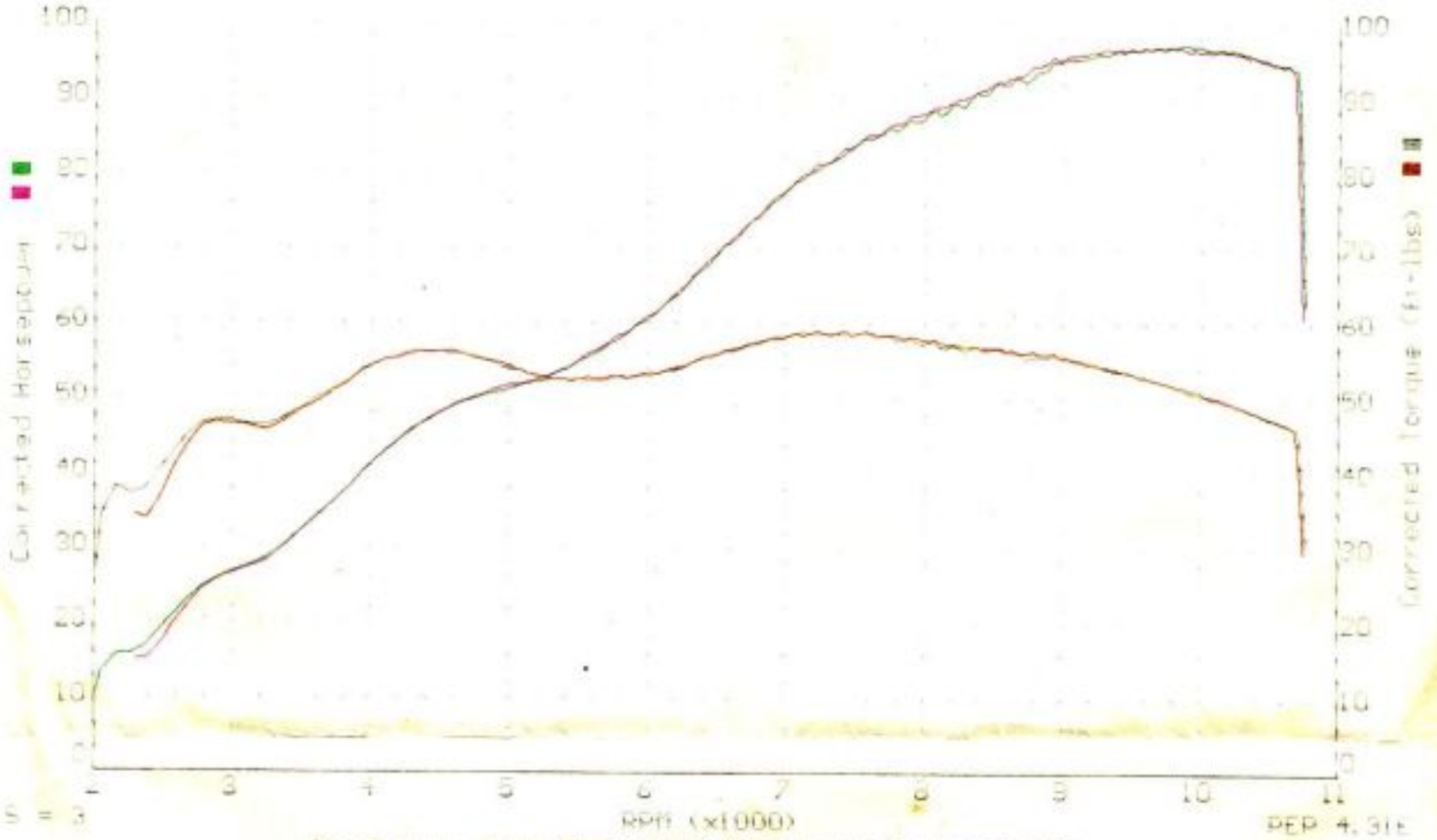
GAVIN.005 - HONDA VFIDOOR BASE 345th



As measured on DYNOJET'S MODEL 100 DYNAMOMETER

GAVIN.005 67.5 °F 30.46-0.26 in.Hg. 400 ft.
STANDARD BIKE WITH 77000kms.

GAUIN.003 - HONDA VF1000R BASE 4th
GAUIN.004 - HONDA VF1000R BASE 4th



As measured on DYNOJET'S MODEL 100 DYNAMOMETER

GAUIN.003 67.5 °F 30.46-0.26 in.Hg. 400 ft. CF=0.95 RPM/MPH=85
STANDARD BIKE WITH 77000kms.

GAUIN.004 67.5 °F 30.46-0.26 in.Hg. 400 ft. CF=0.95 RPM/MPH=0
STANDARD BIKE WITH 77000kms.

DYNO TECH Ltd. TYERS RD, NGAURANGA GORGE, WELLINGTON, PH (04) 499-0072.

1ST	183
2ND	127
3RD	102
4TH	85
5TH	71

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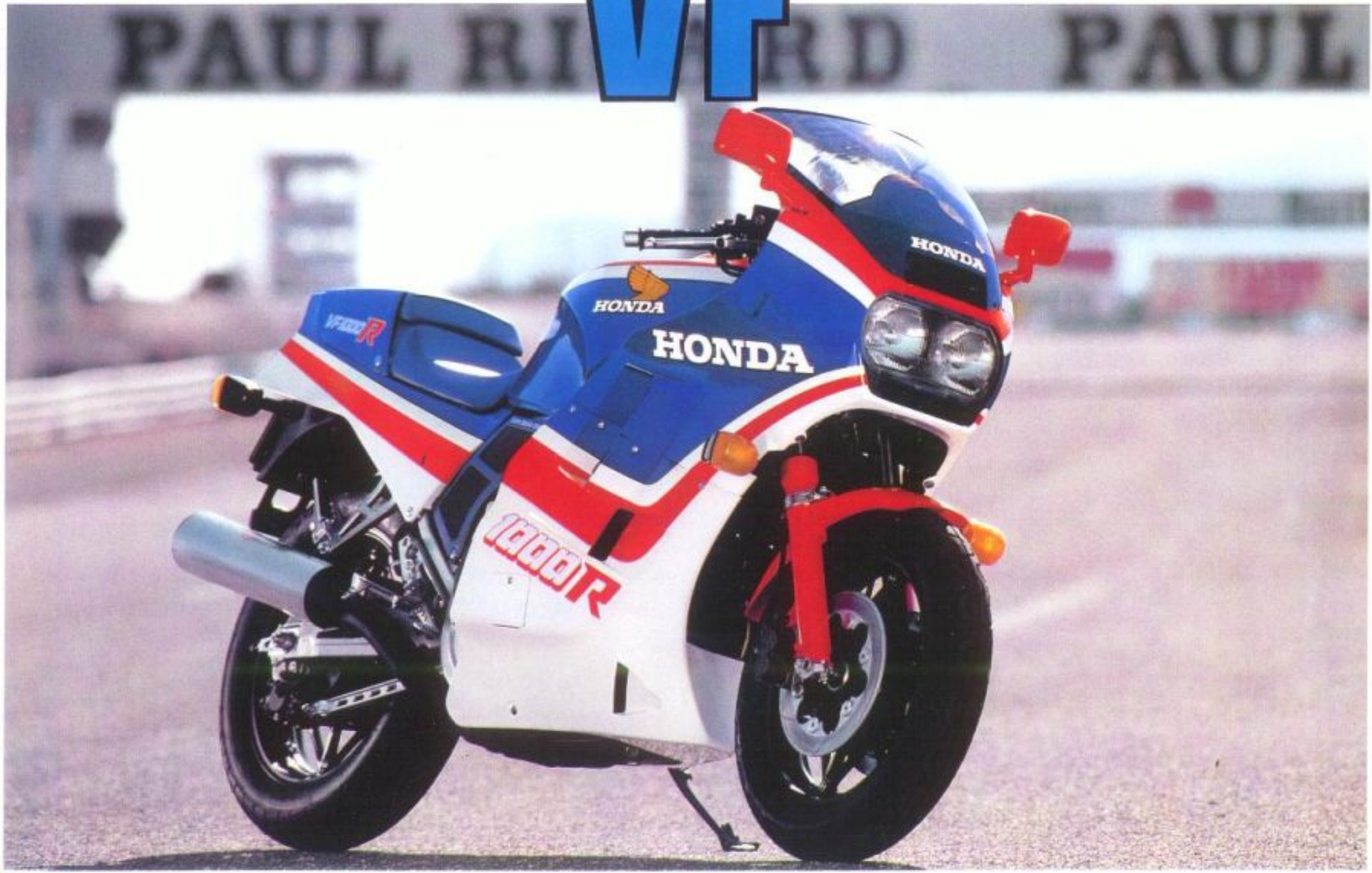
VF1000R



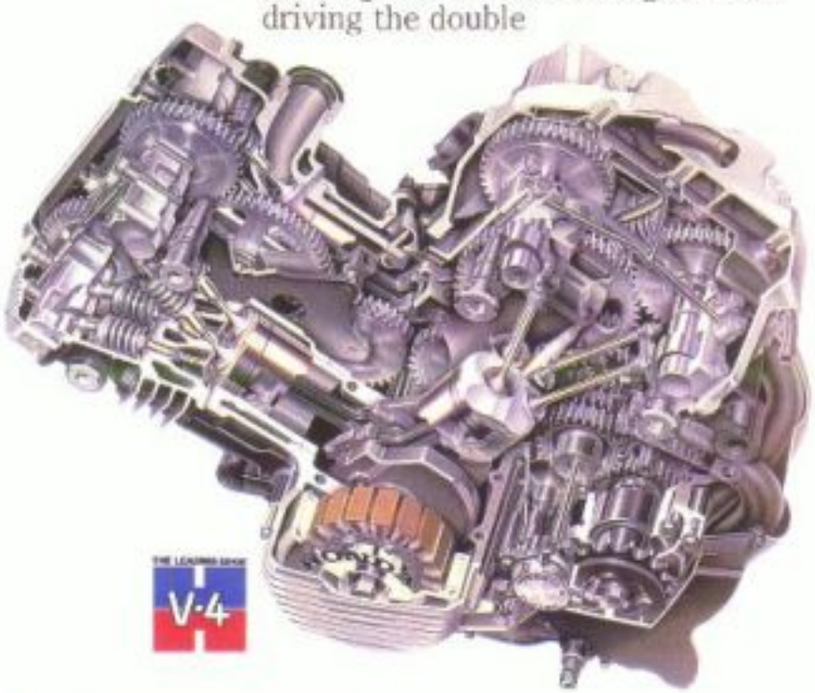
THE PINNACLE OF STREET-GOING V-4 EXPERTISE

Race-bred, street going motorcycles are often packed with compromises. Not so the VF1000R. The power, the performance and the razor-sharp handling that let the FWS racers dominate remains untouched. But the comfort, rideability and practical features you demand in a road motorcycle are there as well.

It's the best of both worlds. At the price of one.

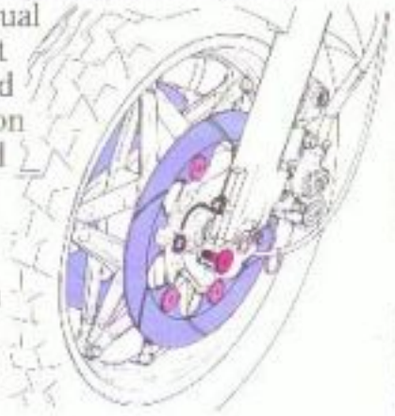
WINNING ENGINE TECHNOLOGY

The engine is a showcase of Honda's V-4 engineering expertise. Starting with the accurate gear train driving the double overhead camshafts. The idler gear and camshaft gears are of the split type with coil springs to maintain constant gear-to-gear contact and ensure quiet running. The engine runs a phenomenal 10.7:1 compression ratio boosting power output. A special combustion chamber and squish band design makes this possible without detonation even on unleaded gas while an efficient oil cooler keeps it running cool. Power is delivered by a hydraulically actuated clutch with a ride-smoothing one-way mechanism.



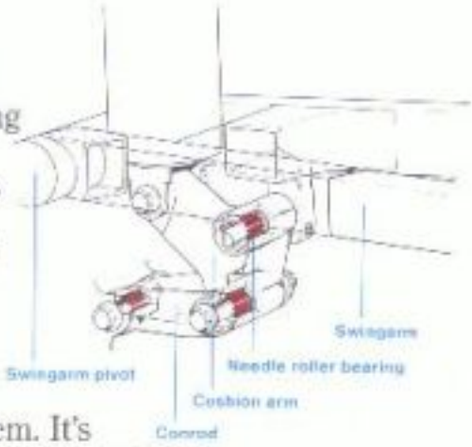
ENDURANCE RACE PROVEN BRAKES

The VF stops as precisely as it goes. With dual floating front discs stopped by dual-piston calipers. And a ventilated rear disc with an opposed piston caliper. All get sintered metal pads.



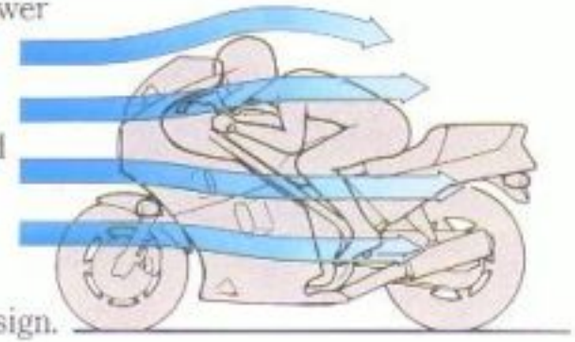
SUPERB HANDLING

The VF1000Rs racing heritage is visible in every component of its unique running gear. Up front there's a rigid air-assist fork with adjustable rebound damping and TRAC, Honda's mechanically actuated anti-dive system. It's balanced at the rear with a massive truss type cast aluminium swingarm pivoted on needle roller bearings. The Pro-Link rear suspension, too, gets long-wearing ball and needle pivots as well as remote-adjustable rebound damping.



WIND-CHEATING AERODYNAMICS

Wind tunnel designed and tested, the VFs full fairing is equal to around 5 extra horsepower at the speeds attainable. It's constructed of durable FRP and has a fan-equipped radiator integrated into the overall aerodynamic design.



The VF1000R. Competition bred. Cat quick. In fact the closest you'll ever get to a street-legal endurance racer.

Compact, lightweight V-4 engine packs gear-driven double overhead camshafts, a low-maintenance transistorized ignition and 122 thunderous horsepower.

Dual floating mount front discs with dual-piston calipers and sintered metal pads. Brake lever positioning can be easily adjusted to match rider preferences.

Road-taming TRAC-equipped 41mm air-assist fork with 3-way adjustable rebound damping and a rigid aluminium plate fork brace.

Penetrating dual halogen headlights and dual round taillights styled after Honda's FWS endurance racers.

Lightweight, forged duralumin separate handlebars, brake pedal, gearshift and footpegs.

Low-maintenance hydraulically actuated clutch with innovative one-way clutch mechanism and adjustable lever freeplay.

Rigid bold side pipe frame constructed of box-section tubing.

Massive cast aluminium truss type swingarm with ball and needle roller bearing pivots.

3-way remote rebound damping adjustable Pro-Link with long-wearing needle roller bearing pivots.

NS500 type aluminium ComStar wheels wear a 16" front and a 17" radial rear tire. The quick-release front wheel speeds changes.

Ergonomic control center with rubber mounted instruments and racer-type large dial electronic tachometer. Compact switch design puts everything at your fingertips.

4-stroke liquid cooled 90° V-4 engine packs a thunderous 122PS and sports many low-maintenance innovations.

Dual floating mount front discs with dual-piston calipers and sintered metal pads.

Rear seat cover removes for pillion use.

Ventilated rear disc with an opposed piston caliper and sintered metal pads.

VF1000R Specifications (G type)		
Engine		DOHC 4-stroke 16-valve liquid cooled 90° V-4
Bore & Stroke		77.0 × 53.6mm (3.03 × 2.11 in.)
Displacement		998cm³ (60.90 in.³)
Compression Ratio		10.7:1
Carburetors		4 × 36mm (1.42 in.) CV type
Max. Horsepower		122PS/10,000rpm (DIN)
Max. Torque		9.4kg-m/8,000rpm (DIN)
Ignition		Transistorized pointless with electronic advance
Starter		Electric
Transmission		5-speed
Final Drive		'O'-ring sealed chain
Dimensions		2,180 × 730 × 1,200mm
(L × W × H)		(85.8 × 28.7 × 47.2 in.)
Wheelbase		1,505mm (59.3 in.)
Seat Height		810mm (31.9 in.)
Ground Clearance		135mm (5.3 in.)
Fuel Capacity		25 liters (6.60 US, 5.50 Imp. gal.)
Wheels		NS type aluminium ComStar
Tires	Front	120/80-V16-V250
	Rear	140/80-VR17-V250
Suspension	Front	Air-assist 41mm (1.6 in.) fork with 3-way adjustable rebound damping, TRAC, fork brace & equalizer, 150mm (5.9 in.) axle travel
	Rear	Pro-Link with 3-way remote adjustable rebound damping, 120mm (4.7 in.) axle travel
Brakes	Front	Dual floating mount discs with dual-piston calipers & sintered metal pads
	Rear	Ventilated disc with opposed-piston caliper
Dry Weight		244kg (538 lb)

Honda machines sold in your area are those most suited to local conditions. Specifications and appearance may differ slightly depending on markets and are subject to change without notice. For details, please consult your nearest Honda dealer.

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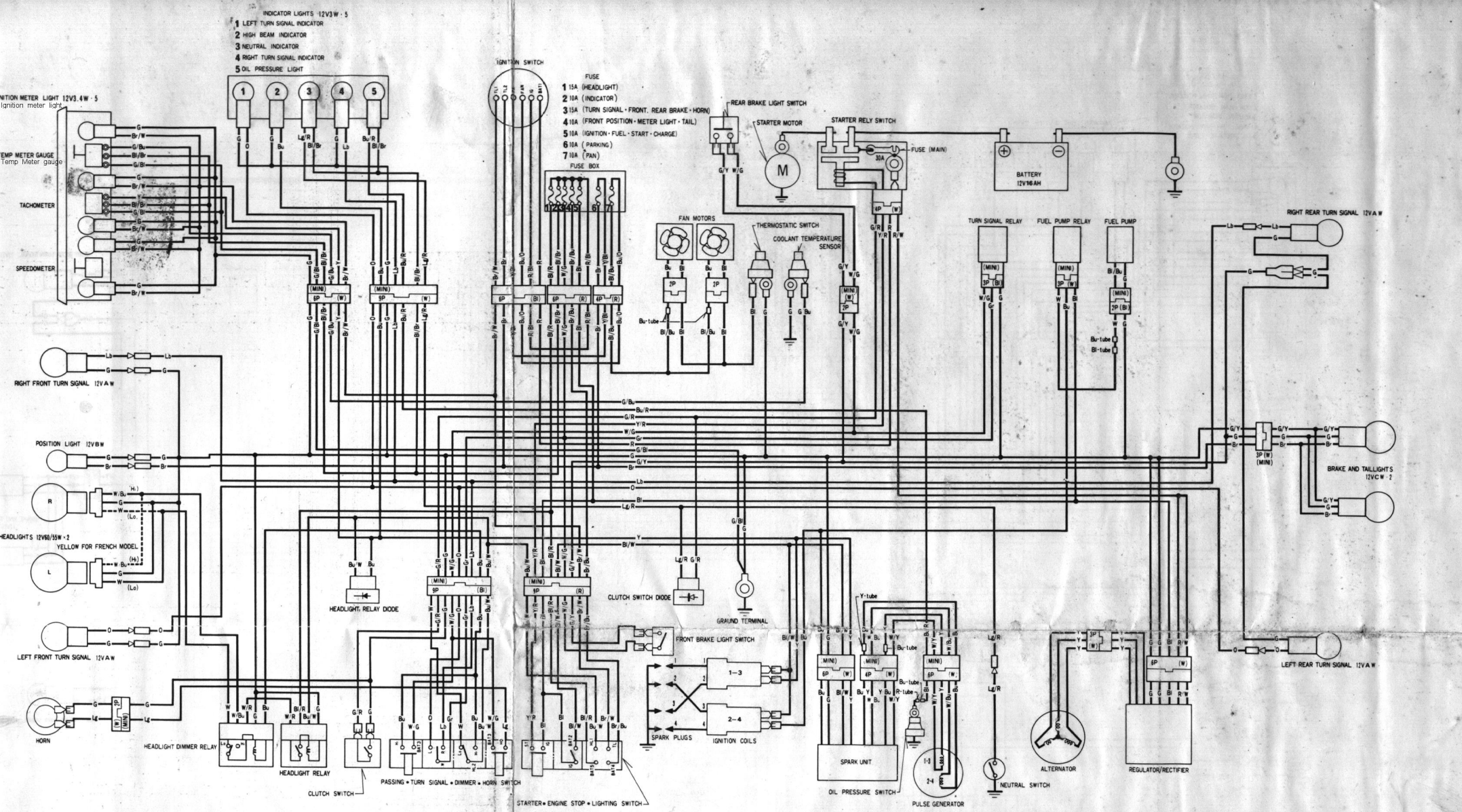
Ride alert. Dress right. Always wear a helmet and eye protection. Enjoy safe motorcycling.



SWITCH CONTINUITY

IGNITION SWITCH

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

STARTER SWITCH / ENGINE STOP SWITCH

	IG	ST		IG	BAT2
FREE			OFF		
PUSH	○	○	RUN	○	○

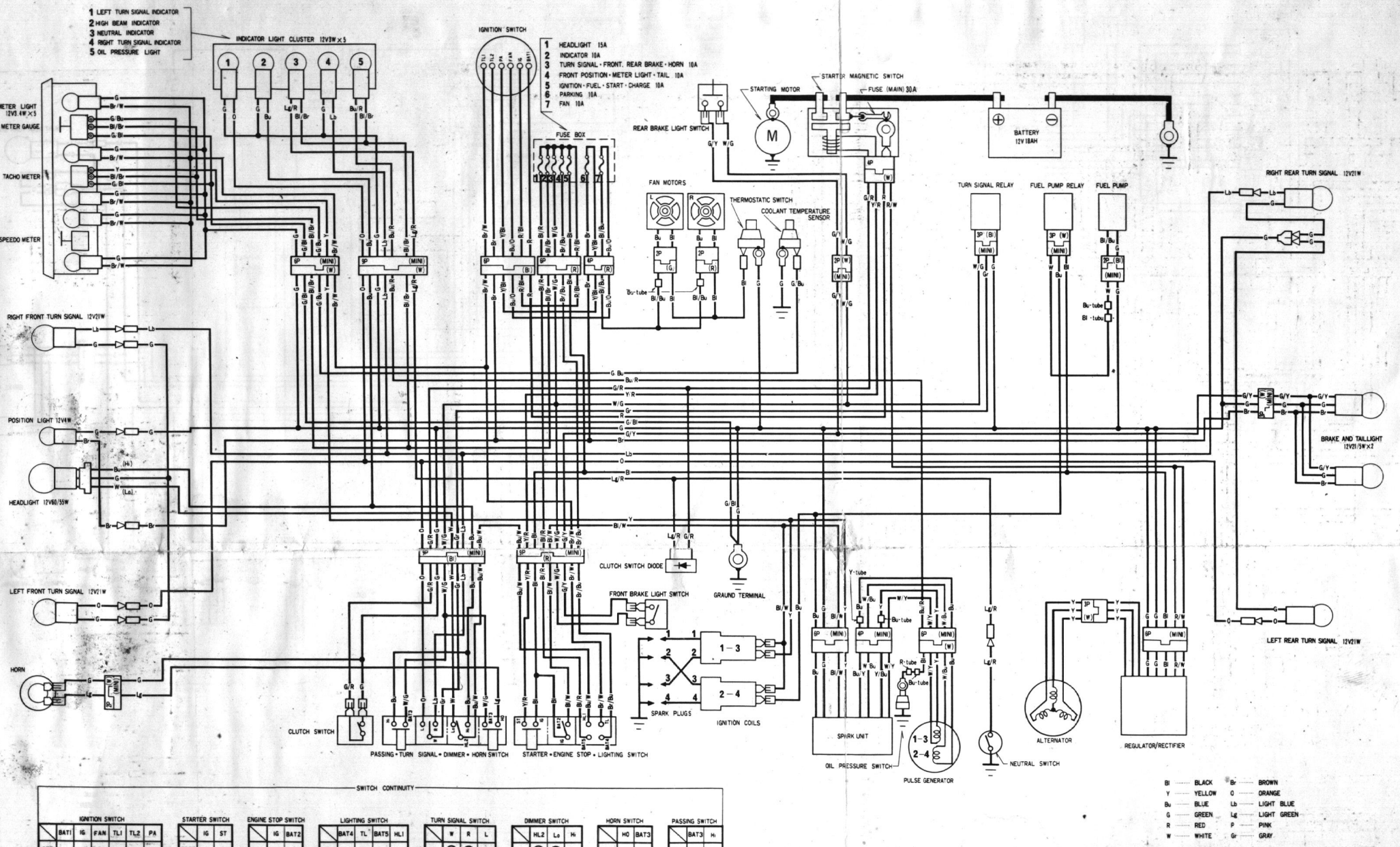
LIGHTING SWITCH / TURN SIGNAL SWITCH / DIMMER SWITCH / HORN SWITCH / PASSING SWITCH

	BAT4	TL	BAT5	HL1		W	R	L		HL2	Lo	Hi		HO	BAT3		BAT3	Hi
●					R	○	○		Lo	○	○		FREE			FREE		
P	○	○	○	○	N				N	○	○	○	PUSH	○	○	PUSH	○	○
H	○	○	○	○	L				Hi	○		○						

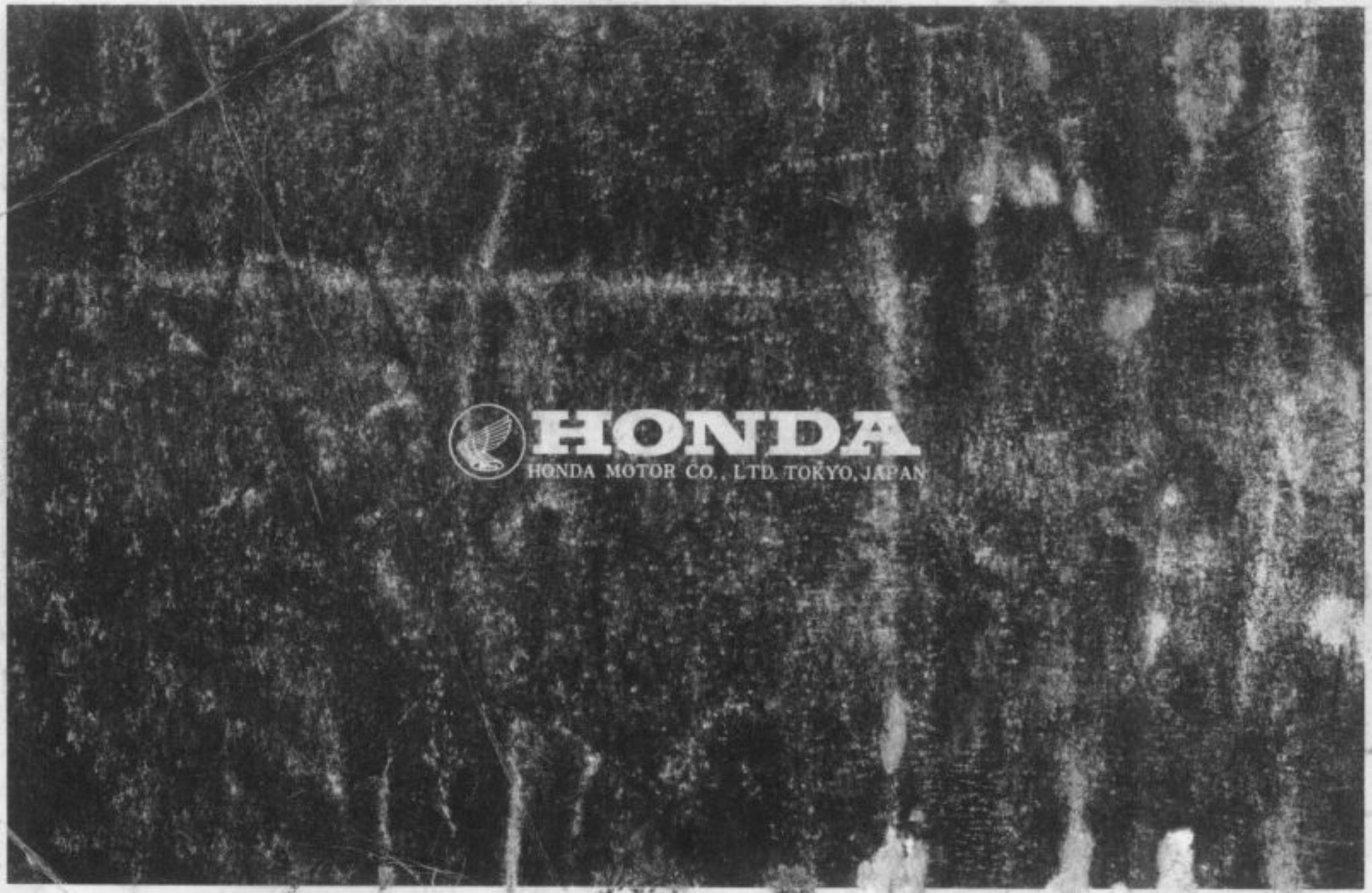
DWG NO.	AREA(TYPE)	TURN SIGNAL LIGHT (A)	POSITION (B) LIGHT	BRAKE AND TAILLIGHT (C)	HEADLIGHT RH	HEADLIGHT RL	HEADLIGHT LH	HEADLIGHT LL
0030Z-MJ4-7000	E. ED	12V21W	12V4W	12V21/5W	○	○	○	○
0030Z-MJ4-6800	G. SP. H	12V21W	12V4W	12V21/5W	○	×	○	○

Bl	BLACK	Br	BROWN
Y	YELLOW	O	ORANGE
Bu	BLUE	Lb	LIGHT BLUE
G	GREEN	Lg	LIGHT GREEN
R	RED	P	PINK
W	WHITE	Gr	GRAY

DIAGRAM



SW, IT 0030Z—MJ4—6900



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