11. CRANKSHAFT AND CONNECTING RODS

Disassembly
1. Remove the cylinder head, cylinder and pistons. (See pages 12–14)
2. Pull out the A-C generator rotor using rotor remover. (Tool No. 07011-33301)
3. Separate the lower crankcase from the upper one. (See pages 23–24)

4. Remove the cam chain tensioner arm. (See page 30)
5. Remove the crankshaft.

Fig. 3-63
① Connecting rods (four)
② Connecting rod bolts (eight)
③ Crankshaft bearings (ten)
④ Oil seal, 30×42×8
⑤ Crankshaft
⑥ Connecting rod bearings (eight)
⑦ Oil seal, 30×45×8

Fig. 3-64 ① A-C generator rotor
② Rotor remover

Fig. 3-65 ① Crankshaft
Inspection
1. Check the crankshaft center journal for runout.
2. Check the crankshaft-to-crankshaft bearing clearance as follows:
   1) Place a piece of plastigauge on the bearing as shown, and install the crankshaft on it.
   2) Assemble the upper and lower crankcases by torquing the securing bolts to the specification.
   3) Remove the upper crankcase and measure the clearance by the plastigauge. If beyond specified limit, replace crankshaft bearing with a new one.
3. Select the crankshaft bearings in a selective set as follow:
   1) Remove the crankshaft bearings and tighten the upper and lower crankcases to the specified torque. Check the inside diameter of each bearing seat as shown.

2) Measure the outside diameter of the crankshaft journals.
3) Select out bearings on the basis of the readings taken in the steps 1) and 2) above.
The bearings may be identified by a daub of color print on the side or the mark (alphabet) stamped on the rear side.

<table>
<thead>
<tr>
<th>Crankcase bearing I.D.</th>
<th>Crankshaft journal O.D.</th>
<th>31.99-32.00 (1.2594-1.2598)</th>
<th>31.98-31.99 (1.2590-1.2594)</th>
<th>31.97-31.98 (1.2586-1.2590)</th>
</tr>
</thead>
<tbody>
<tr>
<td>35.000-35.008 (1.3780-1.3783)</td>
<td>D (yellow)</td>
<td>C (green)</td>
<td>B (brown)</td>
<td></td>
</tr>
<tr>
<td>35.008-35.016 (1.3783-1.3786)</td>
<td>C (green)</td>
<td>B (brown)</td>
<td>A (black)</td>
<td></td>
</tr>
<tr>
<td>35.016-35.024 (1.3786-1.3789)</td>
<td>B (brown)</td>
<td>A (black)</td>
<td>AA (blue)</td>
<td></td>
</tr>
</tbody>
</table>

4. Measure the inside diameter of the connecting rod small end.
5. Check the side clearance of the connecting rod big end.
6. Check the connecting rod big end-to-crankshaft journal clearance as follows:
   1) Remove the connecting rod bearing cap and place a piece of a plastigauge on the bearing surface. Torque the bearing cap bolts to specification.
   2) Remove the cap and measure the clearance by the plastigauge. If beyond the specified limit, replace bearing with a new one.
7. Select the connecting rod bearings in a selective set as follows:
   1) Measure the outside diameter of the crankshaft pin.
   2) Check to make sure the code number (1, 2 and 3) stamped on the connecting rod big end side is properly matched as shown.
   3) After following the steps 1) and 2) above, select out the bearings referring to the identification table below.

<table>
<thead>
<tr>
<th>Connecting rod code no.</th>
<th>Crankshaft pin O.D.</th>
<th>31.99-32.00 (1.594-1.2598)</th>
<th>31.98-31.99 (1.2590-1.2594)</th>
<th>31.97-31.98 (1.2586-1.2590)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>E (red)</td>
<td>D (yellow)</td>
<td>C (green)</td>
<td>B (brown)</td>
</tr>
<tr>
<td>2</td>
<td>D (yellow)</td>
<td>C (green)</td>
<td>B (brown)</td>
<td>A (black)</td>
</tr>
<tr>
<td>3</td>
<td>C (green)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**NOTE:**
The bearings must be installed with the tang facing toward the front (exhaust side).

8. Select the connecting rods
   When replacing connecting rod with a new one, proceed matching the code mark (alphabet) stamped on the connecting rod big end side as shown.

**NOTE:**
The weight of the connecting rod does not include the weight of the bearings.

**Reassembly**
1. Apply a coat of liquid packing to the mating surfaces of the crankcases and install the bearings after the packing becomes dry.
2. Apply a coat of molybdenum disulfide compound or engine oil to the bearing surfaces.
CRANKCASE

**Disassembly**
1. Separate the upper and lower crankcases from each other. (See pages 23-24)

**Inspection**
1. Check the crankcase oil passage for clogging.
2. Check the primary chain guides for wear.

**Reassembly**
1. Install the primary chain guide with its recessed mark facing the transmission.
2. Apply a uniform coat of liquid packing to the crankcase mating surfaces.
3. Make sure all dowel pins are properly installed in their respective positions.
4. Tighten the ten UBS bolts on the crankcase in the sequence as shown in Fig. 3-76.
5. Use each bolt in its proper position.
Carburetor Component Parts
The carburetor component parts are available in a set as shown in Fig. 3-77. It is recommended that its respective parts be replaced as a set so as to maintain a satisfactory performance of the carburetor.

Disassembly
1. Remove the carburetor assembly from the machine. (See page 11)

Stay plate and carburetor body
2. Remove the throttle return spring from the link lever.

Fig. 3-78 ① Throttle return spring
3. Remove the dust plate B by loosening hex. nuts, and loosen the cap nuts.

4. Remove the link arm from the adjuster holders.
5. Loosen the eight 6 mm flat screws and remove the four carburetors from the stay plate.

Throttle valves and jet needles
6. Remove the carburetor top.
7. Straighten the lugs of the lock washers to remove the 4 mm and 6 mm bolts.

8. Pry out the link arm from the throttle shaft in direction A with a screwdriver.

9. Loosen the two 3 mm screws and remove the valve plate from the throttle valve by turning the plate 90°.
10. Remove the jet needle from the throttle valve.
Adjuster holders
1. Remove the carburetor from the plate. (Refer to the steps 1 through 5.)
2. Remove the adjusting screw from the adjuster holder. Then remove the holder from the lever.

Float, main jet and slow jet
1. Remove the float chamber.
2. Remove the leaf spring, main jet and slow jet.

3. Pull out the float arm pin and remove the float.

4. Remove the clip plate and remove the valve seat.

Inspection
1. Blow the main and slow jets to check them for clogging.
2. Adjusting fuel level
   Move the float so that the float arm comes in a slight contact with the tip of the float valve, and check the height of the float with a float level gauge as shown. If out of specification, adjust by bending the float arm.
Reassembly

1. Put the two 3 mm screws together with spring washers on the valve plate, and press the plate down in the throttle valve by aligning the protrusion of the valve plate with the slot of the throttle valve. Then turn the plate 90° toward the link arm side and tighten with the 3 mm screws.

2. Install the throttle valve to the carburetor body by aligning the carburetor protrusion with the throttle valve slot. Check to make sure the cutaway part of the throttle valve is facing the choke valve side.

3. Install the fuel tubes and fuel joint to the carburetor.

4. Install and route each carburetor tube as shown in Fig. 3-92.

5. Move the throttle lever until it contacts the adjusting screw, and check the throttle valve-to-throttle bore clearance (L). If out of specification (0~1.0 mm/0~0.04 in.), adjust the clearance by means of the adjusting screw.
1. **FRONT WHEEL**

Fig. 4-1

1. Front wheel axle
2. Speedometer gear box
3. Bolts (four) 8x90
4. Gear box retainer cover
5. Gear box retainer
6. Retainer O-ring
7. 6302U radial ball bearing
8. Front axle distance collar
9. Spokes (thirty-six)
10. Front wheel hub
11. Front wheel tube
12. Front wheel tire
13. Front tire flap
14. Wheel balance weight
15. Front wheel rim
16. Front brake disc
17. 8mm lock washer (two)
18. 6302U radial ball bearing
19. Front wheel bearing retainer
20. Dust-seal 22x36x8
21. Wheel side collar
22. Front wheel axle nut

**Disassembly**

1. Using a jack under the engine, raise the front wheel off the ground.
2. Remove the speedometer cable.
3. Loosen the axle holder retaining nuts and remove the front forks wheel from the front forks.

**NOTE:**
Do not operate the front brake lever with the front wheel removed.
4. Loosen the front wheel axle nut and remove the front wheel axle.
5. Straighten the lugs of the lock washers and remove the front brake disc.

1) When the brake disc has been removed, the gear box retainer cover can be removed as an assembly.

Fig. 4-2

1. Jack
2. Speedometer cable

Fig. 4-3

1. Lock washer
2. Brake disc
6. Remove the dust seal and remove the bearing retainer with bearing retainer wrench (Tool No. 07088-32301).

**Inspection**
1. Check the front axle for bend.
2. Check the front wheel rim for face runout.
3. Check the spokes for looseness, bend or any other damage.
   Spoke torque specifications: \(25 \sim 30 \text{ kg/cm}(1.9 \sim 2.2 \text{ lbs-ft})\).
4. Check the tire for cracks, excessive wear or any other damage.
5. Check the tube valve for air leaks.
6. Check the tire pressure.
   Tire pressure specification: \(1.8 \text{ kg/cm}^2\) (26 psi)

**Reassembly**
1. Fill the ball bearings and the front wheel hub with grease. Drive the bearings in the hub.
   1) Use the outer bearing driver attachment (Tool No. 07048-33301) and ball bearing driver handle (Tool No. 07048-61101) for the bearing installation.
   2) Be sure to install the distance collar.
   2. Stake the bearing retainer at two places as shown.
3. Check the retainer O-ring is properly installed. Install the gear box retainer and retainer cover with the 8 mm bolts. Then put the brake disc on the opposite side of the wheel hub.
4. Install the brake disc to the wheel hub with the nuts.

**NOTE:**
Be sure to renew the lock washers. Bend the lugs of the washers properly after tightening the nuts.
5. Install the speedometer gear box in place to the gear box retainer.

6. Install the front wheel to the front forks.
   Tighten the axle holder at the left side (brake disc side) first and then the one at the right side.
   To prevent misalignment, tighten the front axle holder nut first, then tighten the rear nut until axle is clamped securely in place.

**Wheel balancing**

1. Jack up the machine to clear the wheel of the ground.
   Mark the side off the tire and lightly spin the wheel several times.
2. If the mark comes to rest at the same point each time, it is an indication that wheel is out of balance.

3. Install a balance weight to the nipple end of the spoke at the top of the wheel directly opposite the heaviest point (the bottom of the wheel).
   The balance weights are available in four different weights 5, 10, 15 and 20 gr.
4. Repeat the testing several times. If the wheel no longer stops at one place each time, it is completely balanced.
5. The wheel balancing should be made with the brake disc installed.
FRONT DISC BRAKE

Disassembly

Front brake disc
1. Drain the brake fluid.
2. Disconnect the front brake pipe from the caliper.
3. Remove the front fender.
4. Loosen the caliper adjusting bolt and 8 mm nut to remove the disc cover and caliper assembly.

5. Loosen the two caliper securing bolts to separate the calipers A and B.
6. Pull out the cotter pin or remove the pad B from the caliper B.

7. Remove the pad A from the caliper A by lightly tapping the head of the caliper.

**Master cylinder**

1. Remove the master cylinder.
   1) Remove the master cylinder boots and loosen the oil bolt.
   2) Loosen the hex. bolts to remove the master cylinder holder.
   3) Loosen the brake lever pivot bolt to remove the brake lever.

2. Remove the boot from the cylinder, taking care not to damage it. Remove the circlip using snap ring pliers (Tool No. 07073-32301).

3. Remove the piston, primary cup, spring and check valve from the master cylinder in this order.

**NOTE:**

1. Apply air pressure of 2~3 kg/cm² (28~43 psi) to the brake hose joint to remove the primary cup.
2. Take care not to damage the check valve when removing it.
IV. FRAME

Inspection
1. Check the pads A and B for excessive wear. Replace the pad if it is worn down to its red-line groove (wear limit line).
2. Measure the inside diameter of the caliper cylinder and the outside diameter of the piston.
3. Measure the inside diameter of the master cylinder and the outside diameter of the piston.

Reassembly
Caliper assembly
1. Apply a coat of silicone sealing grease to the sliding surface of the calipers when installing the pads A and B.

NOTE:
1. Do not grease the friction surfaces of the pads.
2. Take care to prevent foreign material from entering the caliper assembly at reassembly.

Master cylinder
1. Apply a coat of brake fluid to the inside surface of the cylinder.
2. Install the check valve together with the return spring to the cylinder.

NOTE:
Check to see the valve is installed properly in the cylinder.

3. Apply a thin coat of brake fluid to around the primary cup, and install it to the cylinder in proper orientation.

NOTE:
1. Take care not to damage the primary cup during installation.
2. Be sure to renew primary cup when it is disassembled.

4. Install the 18 mm circlip. Check to see the circlip is fitted in place.
5. Bleed the brake line and fill the master cylinder fluid cup with SAE DOT3 brake fluid.
3. REAR WHEEL AND REAR BRAKE

Disassembly
1. Remove the muffler at each side.
2. Remove the rear brake rod and rear brake stopper arm.
3. Loosen the drive chain adjusting bolt and lock nut on each side. Remove the cotter pin and loosen the axle nut.
4. Remove the drive chain from the final driven sprocket. Then take off the rear wheel together with the chain adjuster stopper and rear wheel axle.
5. Remove the 69 mm external circlip and remove the final driven sprocket. The lock washers need not be removed.

NOTE:
1. When replacing the final driven sprocket, replace it together with its fixing bolts.
2. When the lock washer has been removed, replace it with a new one at reassembly.
6. Remove the rear wheel bearing retainer with bearing retainer wrench (Tool No. 07088-32901).

**Inspection**

1. Check the rear wheel axle for bend.
2. Check the ball bearings for excessive play.
3. Check the rim for face runout.
4. Check the spokes for looseness, bend or any other damage.
   Spoke torque specification: $20 \sim 30 \text{ kg}\cdot\text{cm}$ ($1.5 \sim 1.9 \text{ lbs}\cdot\text{ft}$).
5. Check the final driven sprocket for wear or any other damage.
6. Check the drive chain for excessive wear, elongation or any other damage.
7. Check the tire for cracks, excessive wear or any other damage.
8. Check the tire pressure.
   Tire pressure specification: $2.0 \text{ kg/cm}^2$ (28 psi).
9. Check the brake lining for excessive wear.
10. Check the brake panel for cracks or any other damage.
11. Check the brake drum for excessive wear.

**Reassembly**

1. Fill the ball bearings and the wheel hub with grease. Insert the distance collar into the hub and drive in the bearing using bearing driven handle (Tool No. 07048-61101) and driver attachment (Tool No. 07048-33301).
2. Install the bearing retainer using retainer wrench (Tool No. 07088-32901). Stake the bearing retainer at four places as shown in Fig. 4-31.
3. Install the driven sprocket to the pivot bushing of the wheel hub and secure it with the 69 mm circlip.
4. Apply a coat of grease to the anchor pin before installing the brake shoes.

**NOTE:**
The brake shoe lining must be free from any grease or oil.
5. Upon completion of reassembly, check the drive chain tension and adjust properly.
   Also check the rear brake pedal for depressed-height and free play, and adjust properly if necessary.
4. STEERING HANDLEBAR

Fig. 4-34

1. Throttle grip pipe
2. Master cylinder
3. Starter, headlight, emergency switch
4. Upper handle holder
5. Pilot lamp
6. Steering handlebar
7. Turn signal, horn switch
8. Throttle cable A
9. Throttle cable B
10. Fork top bridge
11. Steering stem nut
12. Clutch cable

Disassembly

1. Remove the master cylinder, taking care not to spill brake fluid.
2. Disconnect the clutch cable at the lever.
3. Disconnect the throttle cables A and B from the carburetor throttle cable stay.

4. Remove the head light unit from the case and disconnect the wiring at the harness in the case.
5. Remove the upper handle holder and remove the steering handlebar.

Fig. 4-35

1. Master cylinder
2. 6mm hex bolts

Fig. 4-36

1. Upper handle holder
2. Steering handlebar
6. Carefully pull out the lighting switch assembly and turn signal switch assembly from the steering handlebar.

**Inspection**
1. Check the steering handlebar for twist or any other damage.
2. Check each wiring for breakage or any other damage.
3. Check each cable for damage.

**Reassembly**
1. Install the lighting switch assembly and turn signal switch assembly to the steering handlebar. In this case use a wire or the like to tie the ends of the wirings to pass through in the pipe without binding or kinking.

2. Install the steering handlebar, aligning the punch marks on the handlebar with the mating edges of the holder and fork top bridge.

**NOTE:**
1. When tightening the upper holder to the fork top bridge, tighten the hex. bolts at the front first and then the ones at the rear.
2. Take care not to bind or kink the wirings.

3. Check to be sure each wiring and cable is free from binding or kinking when turning the steering handlebar fully to either left or right side.
5. STEERING STEM

Disassembly
1. Remove the front wheel and caliper assembly.
2. Remove the steering handlebar.
3. Remove the head light unit from the head light case and disconnect the wiring at the harness in the case. Then remove the case from the steering stem.
4. Disconnect the brake hose at the 3 way joint at the steering stem.
5. Remove the speedometer and tachometer. Disconnect the meter cables at the engine and front wheel sides.

6. Loosen the front fork bolt at the steering stem bottom bridge, and also loosen the bolts securing the forks at the fork top bridge. Then pull out the front fork assembly.
7. Loosen the steering stem nut on top of the stem, and remove the fork top bridge.

8. Loosen the steering head top thread to remove the steering stem.

NOTE:
Take care not to lose the steel balls (upper: 19 pcs. and lower: 18 pcs.)

Inspection
1. Check the steering stem for bend or any other damage.
2. Check the steering top and bottom cone races for excessive wear or any other damage.
3. Check the steering head dust seal for excessive wear.
Reassembly
1. Install #8 steel balls (upper: 19 pcs. and lower: 18 pcs.) to each race properly. Fully tighten the steering head top thread and turn it off so that the stem rotates easily without rattles when turned to either to left or right side.

NOTE:
Be sure to clean the cone races, ball races and steel balls in cleaning solvent, and apply a coat of grease before reassembly.

2. The fork top bridge should be installed after temporarily tightening the steering stem.

Disassembly
1. Remove the front wheel.
2. Remove the caliper assembly and front fender.
3. Loosen the 8 mm bolts at the steering stem bottom bridge and at the fork top bridge, which secure the front fork assembly. Pull out the assembly from underside.

NOTE:
Before loosening the above bolts, make the front fork bolts loose.

4. Drain the front suspension oil.
5. Remove rust on the front fork pipe, if any, with fine emery cloth.
6. Loosen the 8 mm socket bolt at the bottom of the fork bottom case using hollow wrench (Tool No. 07085-32301).
   The front fork pipe complete with the damper unit can be removed from the bottom case as shown in Fig. 4-50 A.

7. Remove the front fork bolt on top of the fork pipe to remove the front cushion spring and spring seat.
8. To remove the oil seal, take off the bottom case cover and remove the circlip.

**Inspection**
1. Measure the free length of the front cushion spring.
2. Check the front fork pipe and bottom case for looseness or any other damage.
3. Check the oil seal for scratches or any other damage.
4. Check the front fork pipe sliding part for damage.

**Reassembly**
1. Install the front fork pipe complete with the damper unit into the fork bottom case.

**NOTE:**
Apply locking sealant to the 8mm socket bolt.

2. Apply a coat of ATF (automatic transmission fluid) to around and inside the oil seal before installing it to the front fork pipe. Press-fit the seal using front seal driver (Tool No. 07054-33301).

**NOTE:**
1. Be sure to install the circlip in place.
2. Replace the oil seal with a new one at reassembly.
3. Fill each front fork bottom case with good quality ATF of 125 cc (4.2 ozs).

**NOTE:**
When changing oil, add 105 cc (3.6 ozs).
Disassembly

Rear suspension

1. Remove the rear bumper by loosening the 8 mm bolts and rear cushion upper nuts.
2. Remove the rear suspension by removing 10 mm bolts.

3. Compress the rear suspension using service tool (Tool No. 07035-32901) and remove the spring seat stoppers to remove the rear cushion spring.

Rear fork

4. Remove the rear wheel.
5. Loosen the self lock nut to pull out the rear fork pivot bolt. Then remove the rear fork from the frame.
**Inspection**
1. Measure the free length of rear cushion spring.
2. Check the rear cushion damper for deformation or oil leakage.
3. Check the rear cushion stopper rubber for damage.
4. Measure the rear fork center collar-to-bushing clearance.
5. Check the rear fork swing arm for bend.

**Reassembly**
1. Apply a coat of grease to the rear fork center collar before installing it to the rear fork.
2. Install the rear fork.
   Insert the rear fork pivot bolt from the left side.
3. Assemble the rear suspension.
   1) Compress the rear suspension with the service tool (Tool No. 07035-32901) and pull up the upper joint to install the spring seat stoppers in place.
   2) Apply locking sealant to upper joint before tightening.
4. Install the rear suspension to the frame.

8. **FRAME BODY**

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Fig. 4-57  
1. Upper case
2. Rear cushion spring
3. Upper joint
4. Lock nut
5. Stopper rubber
6. Rear damper unit

Fig. 4-58  
1. Spring seat stoppers

Fig. 4-59  Frame body
**Removal**

1. Remove the fuel tank.
2. Remove the seat.
3. Remove the battery.
   - Disconnect the ground cable at the negative terminal first and then the starter cable at the positive terminal of the battery.
4. Dismount the engine from the frame.
5. Remove the steering stem.
   - Before removing the stem, remove the front wheel, front forks and steering handlebar.
6. Remove the rear fender.
   - Disconnect the wire leads of the rear turn signals and tail/stop light.
   - Loosen the 6 and 8 mm hex bolts which secure the rear fender.
7. Remove the air cleaner case and battery box.
   - Disconnect each wiring at the connector and coupler.
   - Remove the silicon rectifier, regulator and starter magnetic switch.
   - Loosen the three hex bolts which secure the air cleaner case.
8. Disconnect the wire harness.
9. Remove the main and side stands.
10. Remove the top and bottom ball races from the steering head pipe using ball race remover (Tool No. 07046-33315).

**Inspection**

1. Check the hole in the fuel filler cap for clogging.
2. Check the frame body for bend, cracks, deformation or any other damage.
3. Check the steering head pipe for misalignment or deformation.
4. Check wire harness, coupler and connector for proper connection or any other damage.

5. Check the O-ring of the fuel cock drain and strainer cup for fatigue or any other damage.
6. Check the fuel pipe for any damage.

**Installation**

1. Drive the top and bottom ball races into the steering head pipe properly and evenly using ball race driver attachment (Tool No. 07048-33310) and driver handle (Tool No. 07048-61101).

2. Connect the wire harness.
   Route the wirings and secure them with the clips.

3. Install the air cleaner case and battery box.
   Remove any dust from the cleaner case and check the water drain hole for clogging before installation.

4. Install the battery box.
   Connect the starter cable to the positive terminal and then the ground cable to the negative terminal of the battery.
   Route the battery overflow tube in accordance with the battery caution mark.
5. Install the main stand and side stand.

NOTE:
1. Do not overtighten the main stand mounting bolts. Be sure to install the battery over flow tube guide to the left side of the bolt.
2. Install the side stand spring with its longer hook part upward.

6. Clean the air cleaner.
   Lightly tap the cleaner element and apply a blast of compressed air from inside to remove dust out.

7. Install the mufflers.
   Join the upper and lower mufflers securely with the connecting tube and tighten the connecting pipe. Install the mufflers to the frame with the brackets and tighten the 8 mm nuts.
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