

1 General information

The frames used on the Yamaha ATVs are constructed of metal tubes with a double cradle or semi-double cradle design.

The front suspension consists of telescopic, oil-damped forks, non-damped forks, or solid forks, depending on the model. On YTZ 250 models the forks are air-adjustable to compensate for varying loads and riding conditions.

The rear suspension (not used on all models) consists of a swingarm and a large mono-shock. The shock absorber is nitrogen-charged and hydraulically damped, and is adjusted for varying conditions by altering the spring preload and, on some models, the rebound and compression damping. **Caution:** *The rear shock absorber cannot be rebuilt. If it wears out or is damaged, it should be replaced with a new one. Never tamper with the nitrogen reservoir or attempt to remove the hose from the shock or reservoir. If a shock absorber is replaced, have your dealer dispose of the defective unit.*

The large balloon tires, though not technically a part of the suspension, are responsible for a large amount of shock absorption.

2 Frame — inspection and repair

1 The frame is unlikely to require attention unless accident damage has occurred. In most cases, frame replacement is the only satisfactory remedy for such damage. A few frame specialists have the jigs and other equipment necessary for frame straightening, but even then there is no easy means of determining to what extent the frame may have been overstressed.

2 After the machine has accumulated a lot of miles it is recommended that the frame be examined closely for cracking or splitting at the welded joints. Rust corrosion can also cause weakness at these joints. Loose engine mount bolts can cause ovaling or fracturing of the mounting tabs. Minor damage can often be repaired by welding, depending on the extent and nature of the damage.

3 Remember that a frame which is out of alignment will cause handling problems and accelerated wear on other components. If misalignment is suspected as the result of an accident, it will be necessary to strip the machine completely so that the frame can be thoroughly checked.

3 Handlebars — removal and installation

Removal

1 Look closely at how the cables and wiring harnesses are routed before removing the handlebars.

2 Disconnect or cut any plastic cable ties which attach the wiring harnesses and control cables to the bars.

3 On YTZ 250 models remove the front brake master cylinder and lever by removing the two bolts. Separate the clamp from the master cylinder and detach the master cylinder assembly. On models with cable-operated front brakes remove the mounting screws and detach the lever assembly from the handlebars.

4 Detach the throttle lever assembly by removing the mounting screw(s) (photo). On some models the hand grip will have to be removed to slide off the throttle assembly.

5 Some models have a rear brake lever attached to the left side of the handlebars, while others are equipped with a clutch lever assembly. Detach the lever and cable by removing the lever pivot bolt.

6 Detach the handlebar-mounted switches by removing the mounting screws.

7 Remove the handlebar mounting bolts (photo) and detach the bars and clamps. On YT 60 models remove the nuts from the clamps on the underside of the triple clamp.

Installation

8 Place the handlebars in position in the mounts and install the handlebar upper clamps.

9 Tighten the front bolts to the specified torque first, then tighten the rear bolts to the same torque.

10 Position the throttle lever housing on the handlebars and install the mounting screw(s).

11 Install the brake master cylinder clamp with the mark *Up* on top and the arrow pointing up. Tighten the upper bolt first, then the lower bolt.

12 Install the handlebar switch assemblies and tighten the screws securely.

13 Install the clutch/rear brake and front brake levers and cables.

14 After the handlebars and components have been installed, perform the following inspections with the steering in various positions:

- Check the front brake lever free play and function.
- Check the clutch lever free play.
- Check the throttle free play and return action.
- Check the operation of the electrical components.
- Check the operation of the parking brake.

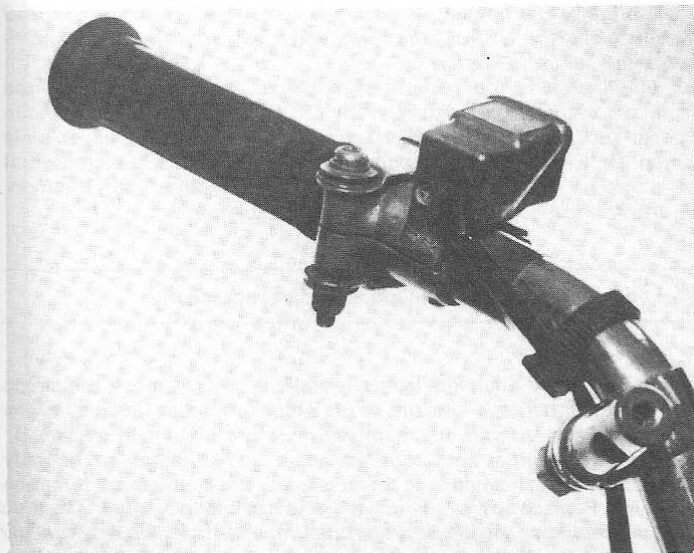
4 Forks — removal and installation

YT 60/125 models

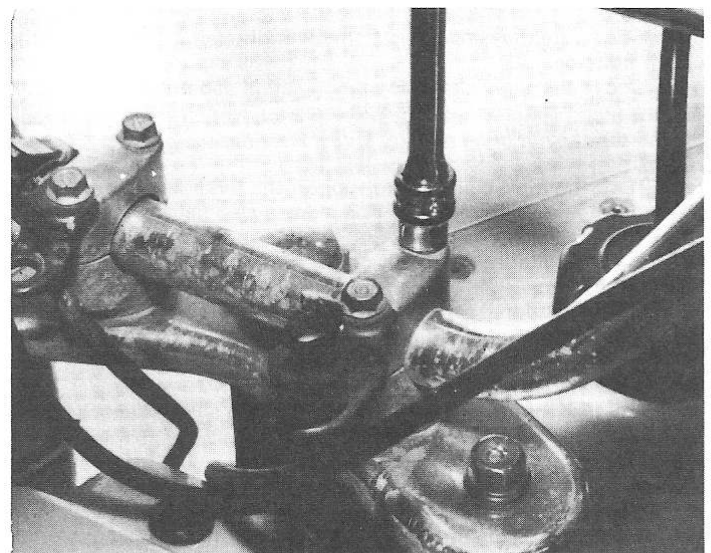
1 Remove the headlight assembly (if so equipped).

2 Raise the front of the machine and place a jackstand or blocks of wood under each footrest to support it in a stable position. Refer to Chapter 6 and remove the front wheel and fender.

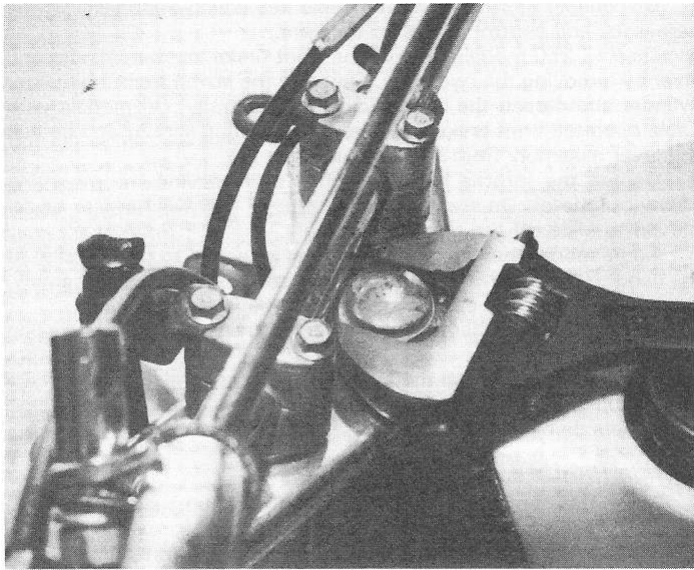
3 On YT 60 models detach the starter (choke) lever from the triple



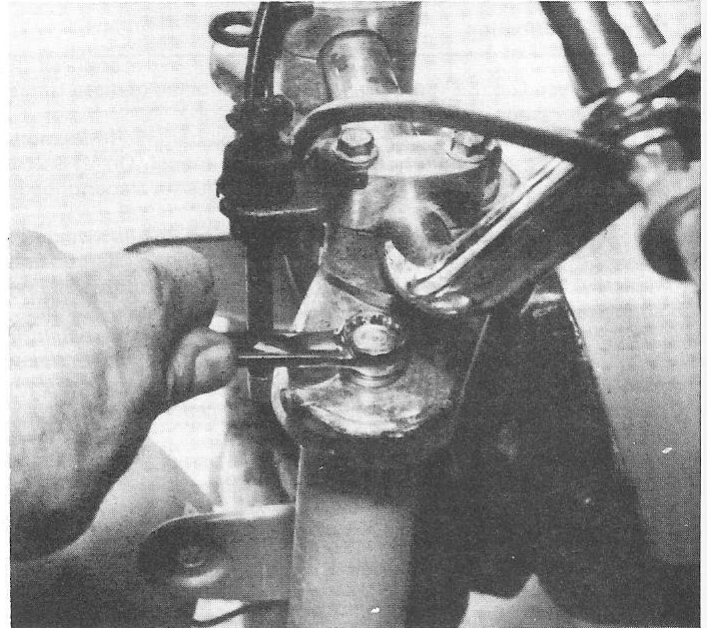
3.4 The throttle is held in place with screws or a screw and nut (YT 125 shown)



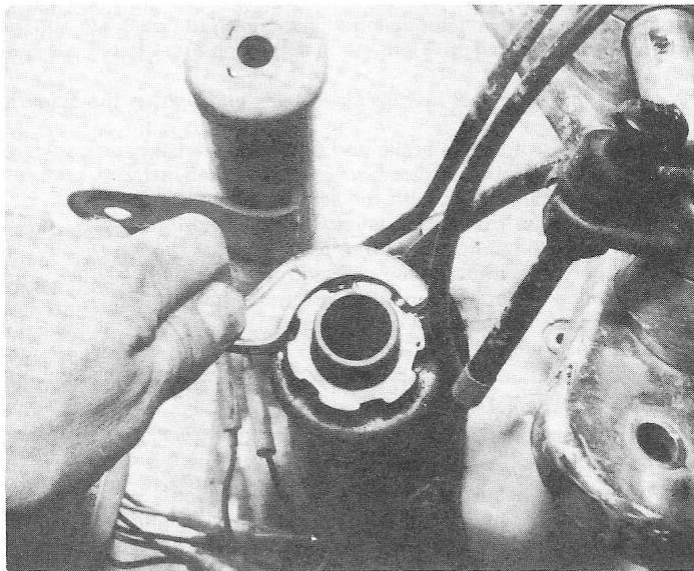
3.7 Removing the handlebar mounting bolts



4.4a Loosening the steering stem cap nut (YT 125 shown)



4.4b Removing the triple clamp-to-fork tube bolts (YT 125 shown)



4.5 Loosening the ring nut with a pin-type spanner wrench (some ring nuts can be loosened by hand)

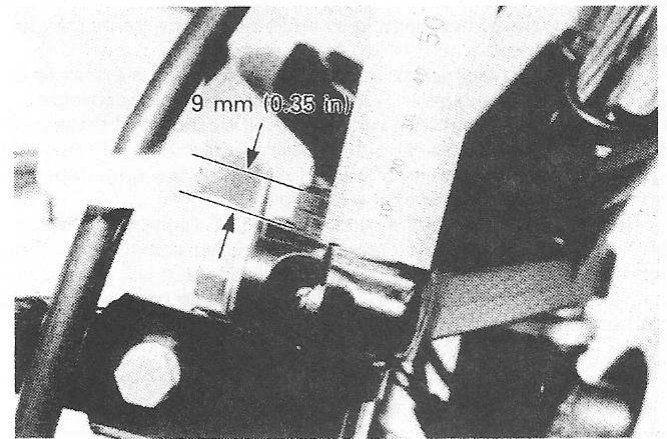


Fig. 5.1 Make sure the end of the fork tube is the specified distance from the top of the triple clamp before tightening the clamp bolts (YT 200 shown) (Sec 4)

clamp. Separate the handlebars from the triple clamp by removing the clamp bolts or nuts.

4 Remove the triple clamp-to-steering stem cap nut (photo) or bolt and the triple clamp-to-fork tube bolts (photo). **Note:** On YT 125 models loosen the cap nut only, then remove it after the triple clamp has been raised.

5 Lift off the triple clamp, then support the forks, unthread the ring nut (photo) and remove it. YT 125 models also have a bearing race cover installed under the ring nut.

6 Carefully slide the forks out of the frame head. Be careful not to lose the bearings — they may be dislodged as the forks are removed.

7 Refer to Section 6 for the installation procedure. The forks are installed as part of the steering head bearing maintenance procedure.

All other models

8 Raise the front of the machine and position a jackstand or blocks of wood under each footrest to support it in a stable position. Some models may require support under the engine — just make sure the machine can't tip forward.

9 Refer to Chapter 6 and remove the front wheel.

10 Remove the clamp bolts and separate the brake cable/brake hose from the fork slider.

11 Support each fork leg as the pinch bolts are loosened, then withdraw the forks from the triple clamps. Where a front carrier is in-

stalled, the carrier bolts must be loosened as well. **Note:** On YTZ 250 models bleed the air from the forks and loosen the fork caps before loosening the pinch bolts.

12 Installation is the reverse of removal. Be sure to tighten the fasteners to the specified torque. On YT 200K models position the top of each fork tube 0.400-inch (10 mm) from the top of the upper triple clamp. On all other YT 200 models position them 0.350-inch (9 mm) from the top of the triple clamp. On YTZ 250 models align the mark on the fork tube with the top of the triple clamp.

5 Forks — disassembly, inspection and reassembly

YT 60 models

1 Separate the dust seal from the fork leg, then remove the circlip and pull the inner fork tube out of the outer fork tube. Clean all of the parts with solvent and dry them with compressed air (if available).

2 Check the inner fork tube for wear and damage, particularly scratched areas and evidence that it is bent. Check the outer fork tube for dents. Replace any worn or damaged parts with new ones. **Caution:** Do not attempt to straighten a bent fork tube, as it will be dangerously weakened.

3 Check the free length of the fork spring and compare it to the Specifications. Replace it if it has sagged.

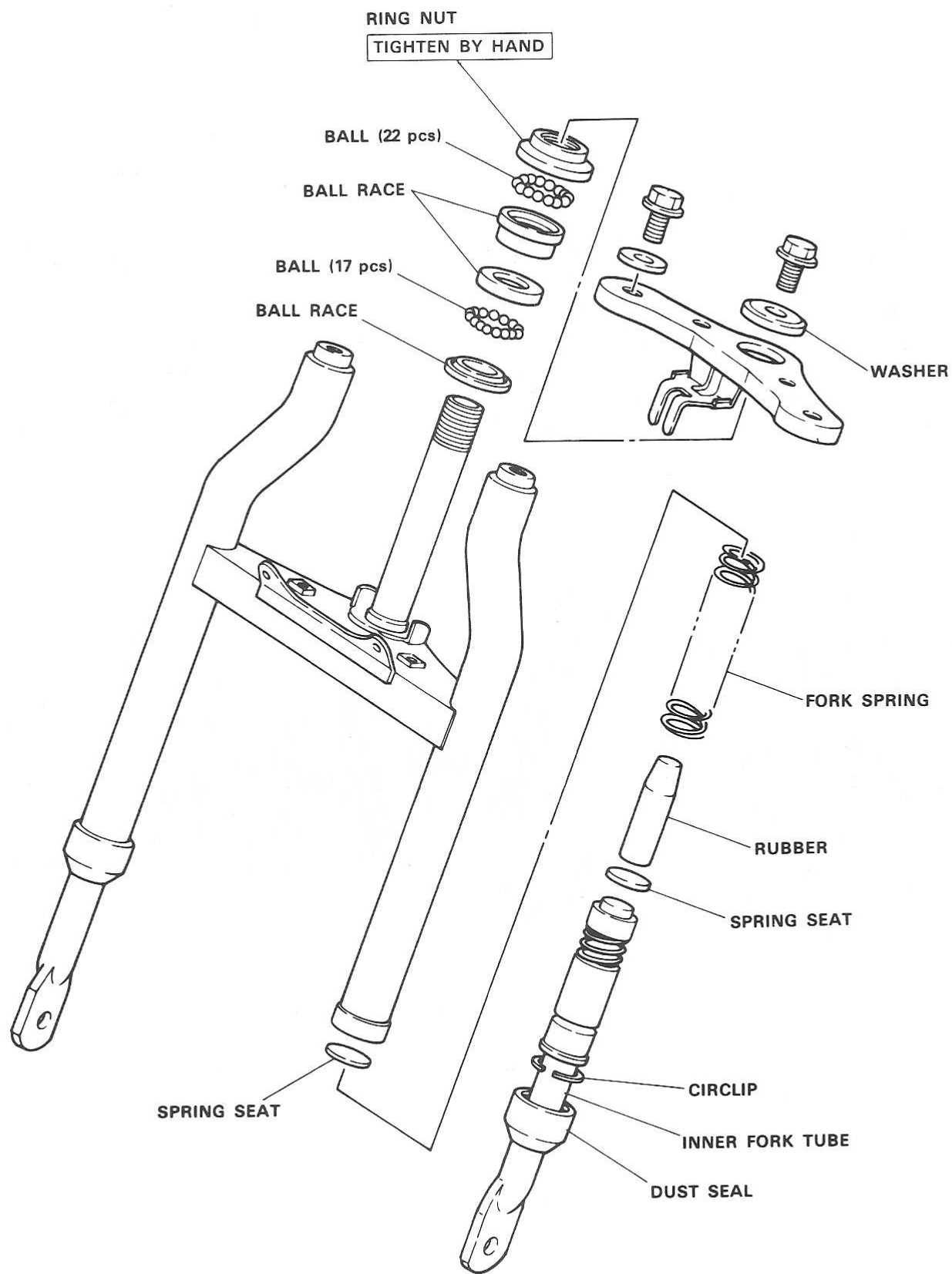


Fig. 5.2 YT 60 fork components — exploded view (YT 125 models similar) (Sec 5)

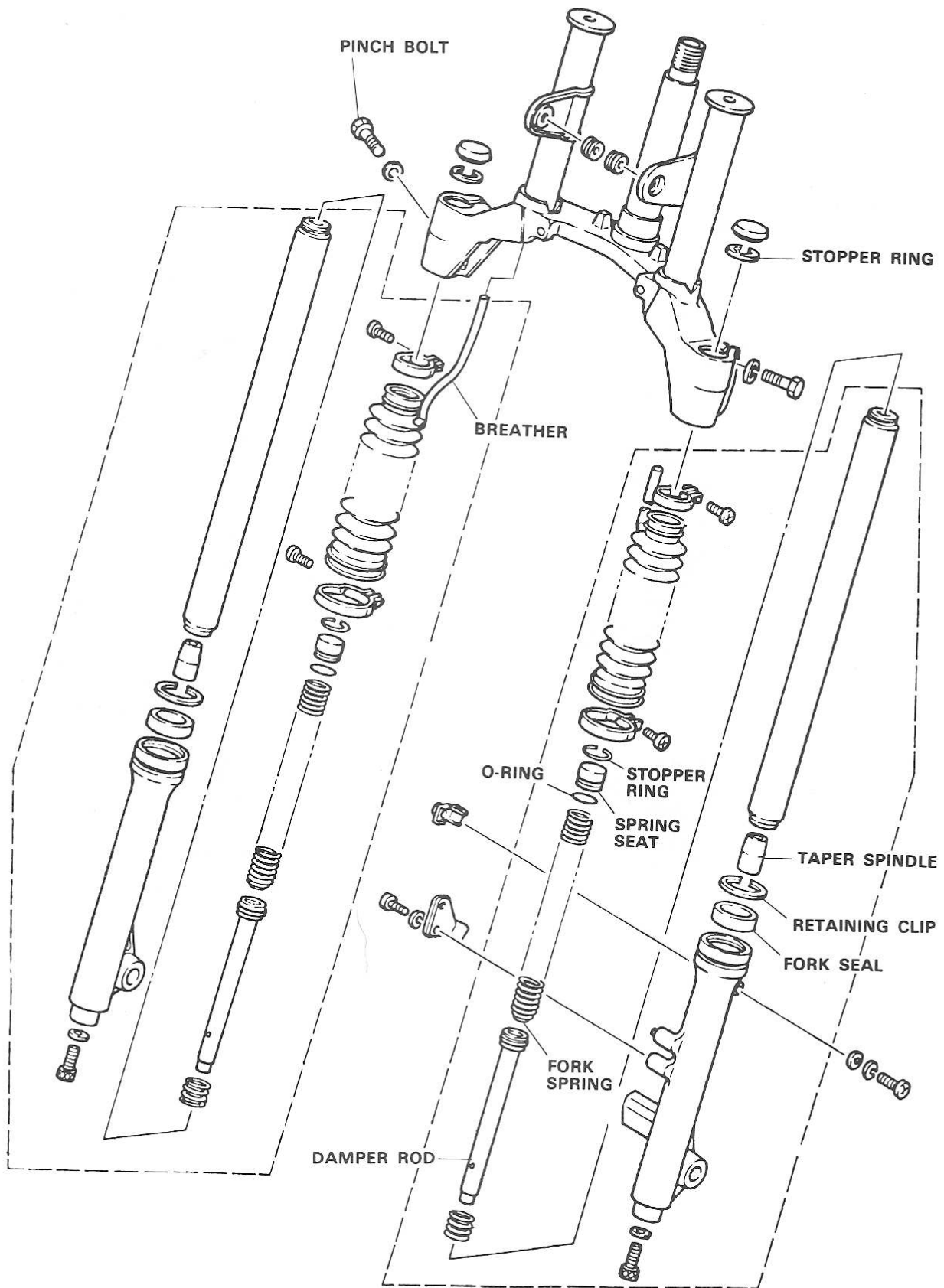


Fig. 5.3 YT 175 fork components — exploded view (YT 225 models similar) (Sec 5)

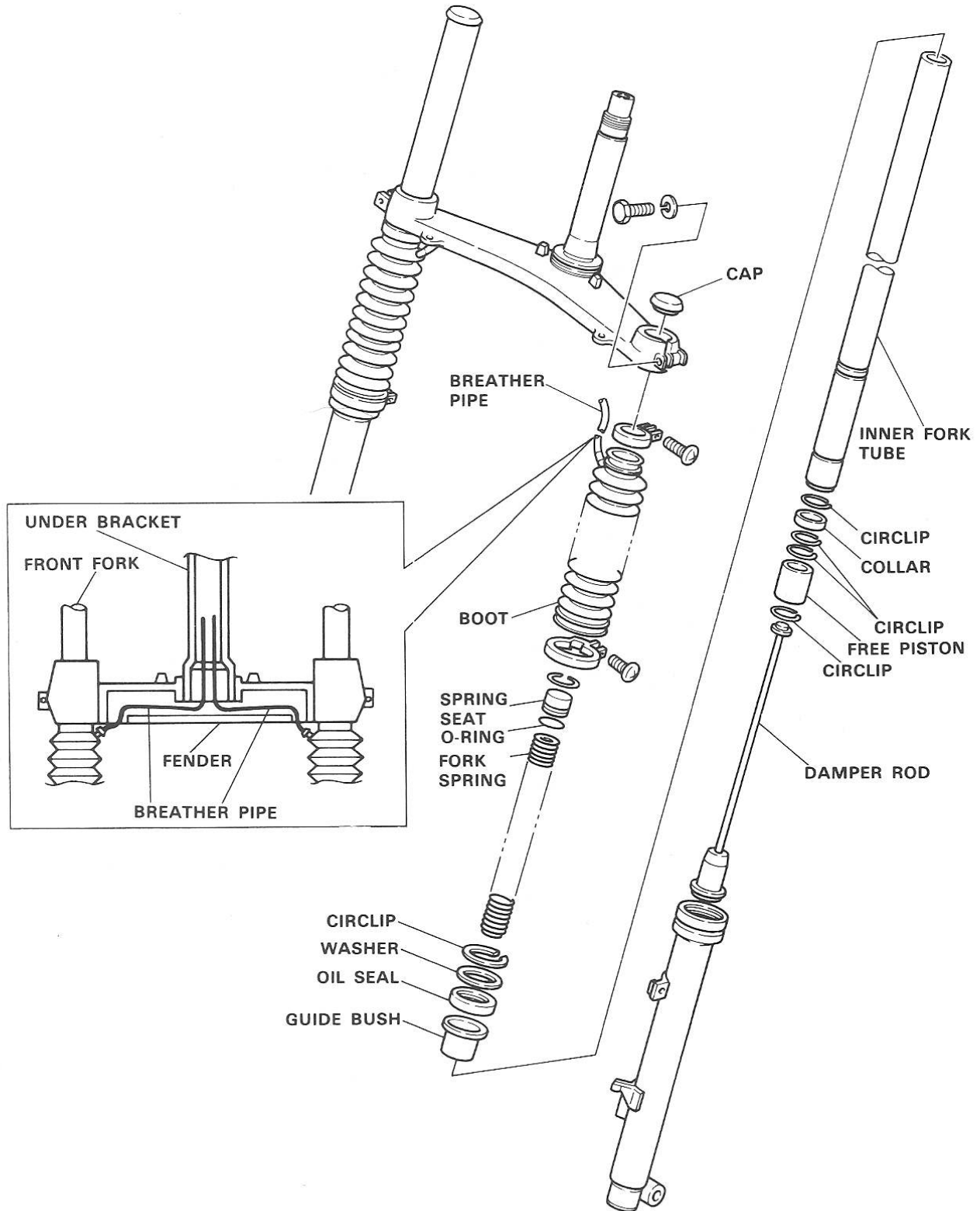


Fig. 5.4 YZ 200 fork components — exploded view (Sec 5)

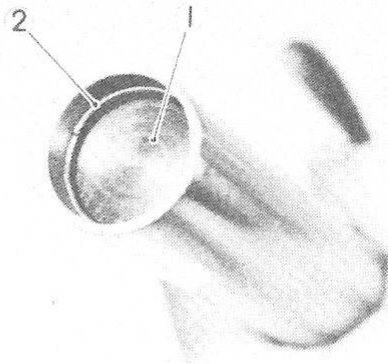


Fig. 5.5 When disassembling the forks on YT 175/225 models, depress the spring seat (1) and remove the stopper ring (2) with a small screwdriver (Sec 5)

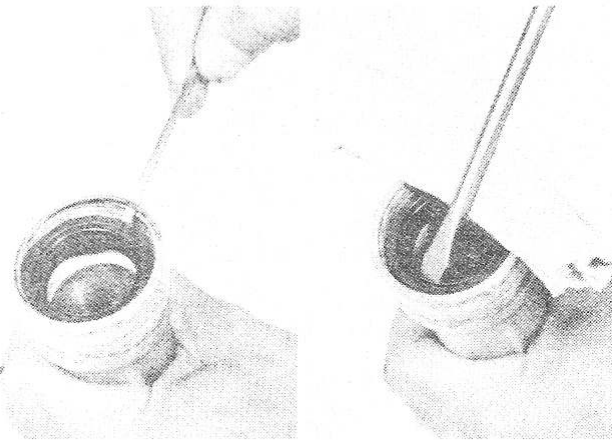


Fig. 5.7 On YT 175/225 models, carefully pry out the seal retaining clip (left), then remove the seal with a large screwdriver (right) (Sec 5)

- 4 Make sure that all of the parts are clean, then apply lithium-base grease to the inner fork tube and install the components in the outer fork tube (refer to the accompanying exploded view illustration).
- 5 Install the circlip (make sure it is seated properly in the outer fork tube groove) and the dust seal.

All other models

- 6 To properly disassemble and repair the forks you will need a bench equipped with a vise, an Allen wrench, some new, clean fork oil of the recommended type and a clean place to work. Snap-ring pliers (internal type) and a fork seal/bushing driver are also required when working on some models. Read through the appropriate procedure before beginning and obtain any special tools needed. Always disassemble one fork leg at a time to avoid mixing up parts.

Disassembly — YT 175/225 models

- 7 Remove the fork boot and the rubber cap, then depress the spring seat and carefully remove the stopper ring (wire circlip) from the groove on the inside of the fork tube.
- 8 Invert the fork tube over a clean drain pan and remove the spring seat and fork spring while draining the oil into the pan. Pump the fork tube and slider a few times to ensure complete draining.
- 9 Carefully clamp the slider in the vise (cushion it with a rag) and remove the Allen head bolt from the bottom of the fork leg. Don't apply any more pressure to the slider than is absolutely necessary as it can be easily damaged. If the bolt is difficult to remove, a special tool that engages with the upper end of the damper rod or an air impact tool may be required to loosen the bolt. Use a wire brush to remove any traces of thread locking compound from the bolt threads.

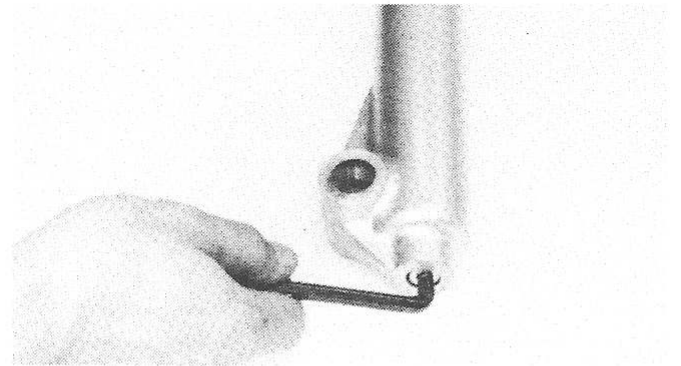


Fig. 5.6 Removing the Allen head damper rod bolt (a special tool or an air wrench may be required to remove the bolt if the damper rod turns) (Sec 5)

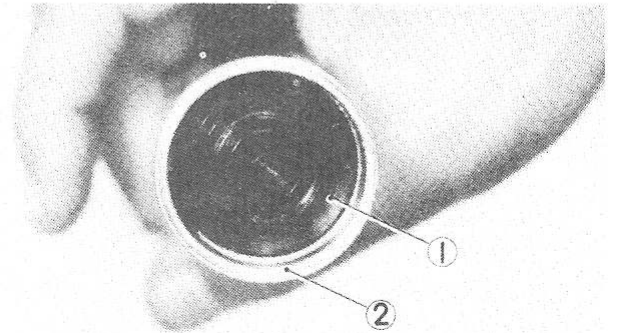


Fig. 5.8 When disassembling the forks on YT 200 models, depress the spring seat (1) and remove the stopper ring (2) with a small screwdriver (Sec 5)

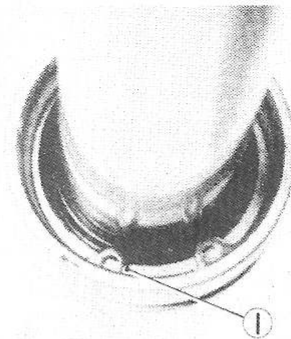


Fig. 5.9 The forks used on YT 200 models are equipped with a snap-ring that must be removed to separate the fork tubes and replace the seal (Sec 5)

- 10 Pull the inner fork tube and damper rod assembly out of the slider, then invert the fork tube and catch the damper rod assembly as it slides out of the fork tube. Use an appropriate size tap to remove any excess thread locking compound from the threaded hole in the bottom of the piston.
 - 11 Using a small screwdriver, carefully remove the seal retaining clip from the slider groove.
 - 12 Use a screwdriver to pry the seal out of the top of the slider. Cushion the slider with a rag so it doesn't get nicked.
- #### Disassembly — YT 200 models
- 13 Remove the fork boot and the rubber cap, then depress the spring seat and carefully remove the stopper ring (wire circlip) from the groove on the inside of the fork tube.
 - 14 Remove the fork spring but *do not drain the oil*.
 - 15 Using snap-ring pliers, remove the oil seal snap-ring from the slider and lift out the washer.
 - 16 Compress the fork tube into the slider until it protrudes about two

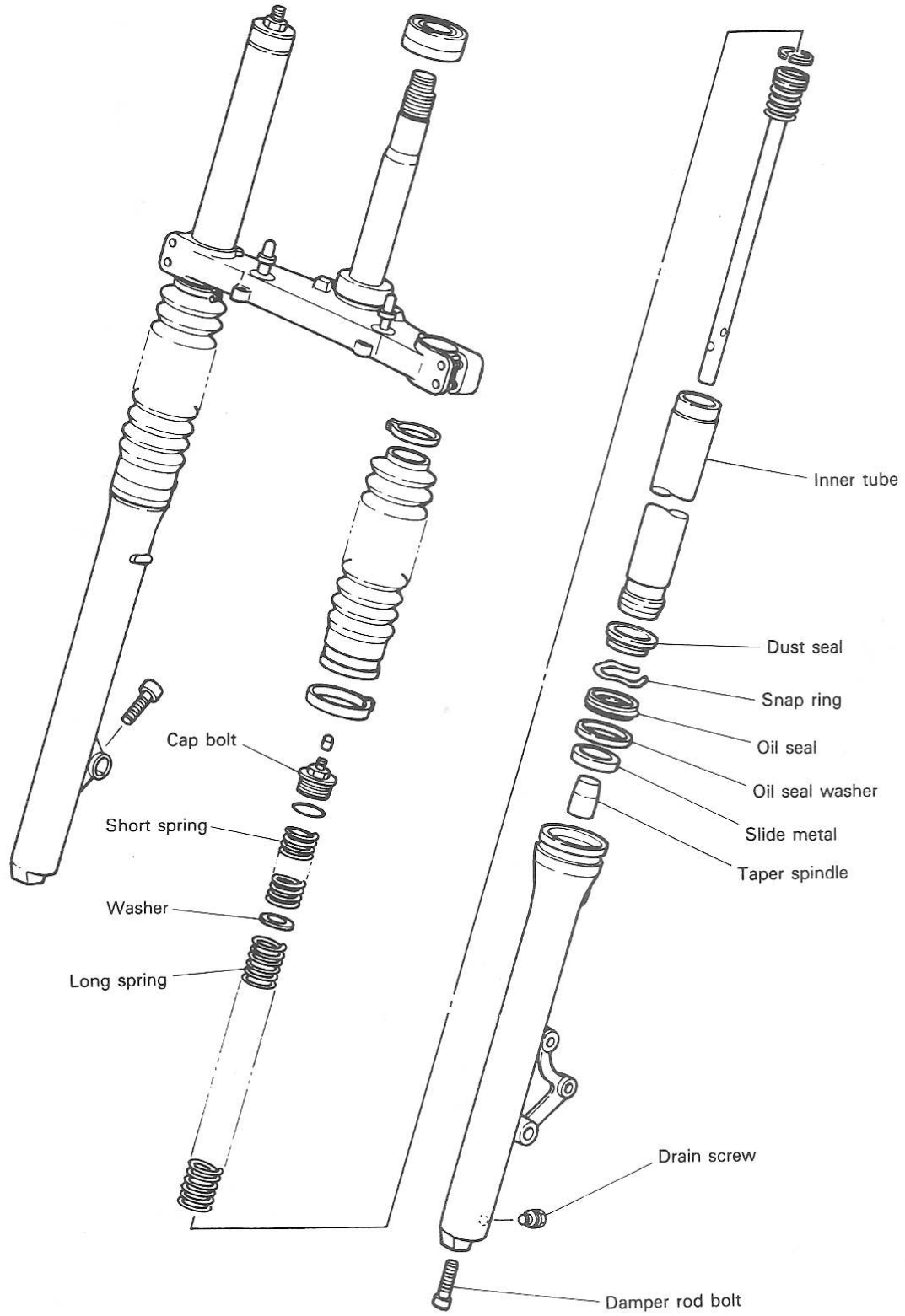


Fig. 5.10 YTZ 250 fork components — exploded view (Sec 5)

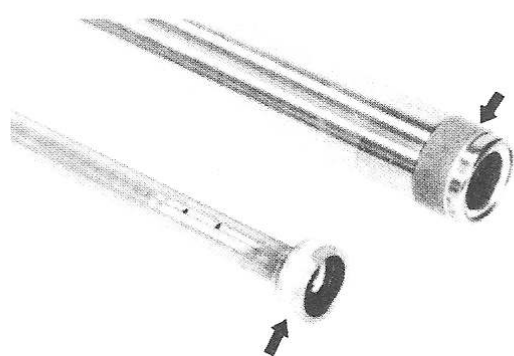


Fig. 5.11 Be sure to check the fork tube and slider bushings (right arrow) and the damper rod seal (left arrow) for wear (Sec 5)

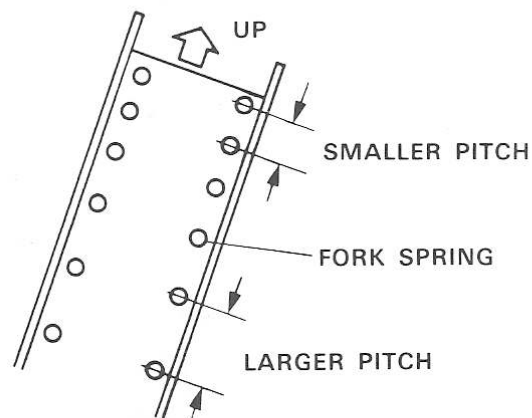


Fig. 5.12 On YT 175/225 models, install the fork spring with the smaller pitch up (Sec 5)

inches, then fill it completely with fork oil and reinstall the spring seat and wire circlip.

17 Slowly compress the inner fork tube until the oil seal pops out of the slider.

18 Remove the seal and guide bushing, then withdraw the fork tube from the slider.

19 Remove the stopper ring and spring seat from the fork tube and drain the oil.

Disassembly — YTZ 250 models

20 Loosen the clamp and remove the rubber fork boot.

21 Remove the fork caps, then slide out the short spring, the washer and the long spring.

22 Remove the dust seal and the snap-ring that retains the oil seal.

23 Fill the fork tube with fork oil, then reinstall the cap and compress the fork lightly while depressing the air valve. When oil runs out of the air valve, release it and slowly compress the fork until the oil seal pops out of the slider.

24 Remove and discard the seal, then mount the slider in a vise. Cushion it with rags to prevent damage. **Note:** *If oil seal replacement is the extent of fork service required, the following steps can be omitted (refer to the reassembly procedure).*

25 Remove the Allen head damper rod bolt from the bottom of the fork leg. If the bolt is difficult to remove, a special tool that engages with the upper end of the damper rod or an air impact tool may be required to loosen the bolt. Use a wire brush to remove any traces of thread locking compound from the bolt threads.

26 Slowly push the inner fork tube into the slider, then pull it out quickly until it tops out. The slider bushing will be dislodged from the slider after doing this several times. **Note:** *Avoid bottoming the inner fork tube in the slider as the taper spindle could be damaged.*

Inspection — all models

27 Clean all components with solvent and dry them with compressed air (if available).

28 Measure the free length of the springs and check them for cracks or other damage. If the springs are sagged, or if defects are noted, replace them with new ones. If the springs in one fork leg must be replaced, always replace the springs in the other fork leg also.

29 Check the fork tube, the slider and the damper rod piston for score marks, scratches, and excessive or abnormal wear.

30 Have the fork tube checked for runout at an automotive machine shop. *If it is bent, it should not be straightened. Replace it with a new one.*

31 Check the slider for dents that could cause the forks to bind during operation.

32 Check the oil seal seat outer surface for damage and evidence of leaks. If it is damaged, replacing the seal will not cure the leak.

33 Check the O-ring on the spring seat or cap. Replace it with a new one if it is damaged or distorted.

34 Examine the fork tube and slider bushings and the damper rod seal (not all models). If they are damaged or worn, replace the parts with new ones.

Reassembly — YT 175/225 models

35 Make sure all components are clean before proceeding with reassembly and be sure to use a new oil seal.

36 Lubricate the outer edge of the new seal and install it in the slider. Use a large socket and hammer to seat it. Apply pressure only on the outer edge of the seal and make sure it enters the slider squarely. Install the retaining clip and make sure it is seated in the groove, then lubricate the seal lip with fork oil.

37 Place the rebound spring over the damper rod, slide the damper rod assembly into the inner fork tube until it protrudes from the end, then slip the taper spindle into place on the end of the damper rod.

38 Carefully slide the entire fork tube/damper rod assembly into the slider until the Allen head bolt can be threaded into the end of the rod through the slider hole.

39 Mount the slider in the vise, apply red Loctite to the bolt threads, install the bolt and sealing washer through the slider and into the damper rod and tighten it to the specified torque. The special tool that engages with the upper end of the damper rod will probably be needed to keep the rod from turning as the bolt is tightened.

40 Mount the fork tube in the vise with the open end up, then pour the specified amount of oil into the fork tube (see Chapter 1). A plastic baby bottle, calibrated in ounces and cc's, makes an ideal measuring device.

41 Install the fork spring (smaller pitch up), spring seat and a new stopper ring (circlip). Make sure the circlip is seated in the groove securely.

42 Slip the dust boot over the tube but do not tighten the clamp screws until after the fork is installed.

43 Store the completed fork leg in an upright position and repeat the rebuilding procedure for the remaining fork leg.

44 If the steering head bearings require maintenance or replacement, now is a very good time to do it since access to the bearings involves removal of the forks.

Reassembly — YT 200 models

45 Make sure all components are clean before proceeding with reassembly. Be sure to use a new oil seal.

46 Insert the damper rod assembly and inner fork tube into the slider, then position the guide bushing and oil seal over the fork tube. Use the special tools (Yamaha P/N YM-08010 and YM-33281) to drive the oil seal into the slider.

47 Install the washer and oil seal retaining snap-ring.

48 Mount the fork tube in the vise with the open end up, then pour the specified amount of oil into the fork tube (see Chapter 1). A plastic baby bottle, calibrated in ounces and cc's, makes an ideal measuring device.

49 Install the fork spring (larger diameter end up), spring seat and a new stopper ring (circlip). Make sure the circlip is seated in the groove securely.

50 Slip the dust boot over the tube but do not tighten the clamp screws until after the fork is installed.

51 Store the completed fork leg in an upright position and repeat the rebuilding procedure for the remaining fork leg.

52 If the steering head bearings require maintenance or replacement, now is a very good time to do it since access to the bearings involves removal of the forks.

Reassembly — YTZ 250 models

53 Make sure all components are clean before proceeding with reassembly and be sure to use a new oil seal.

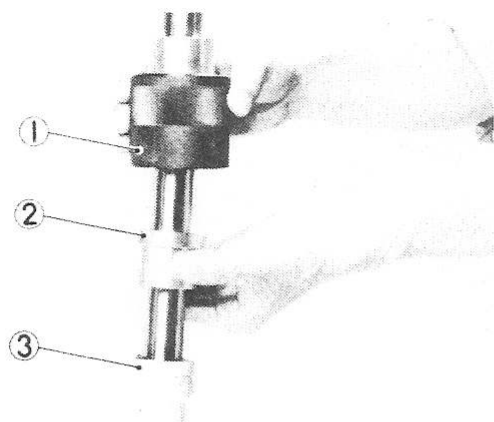


Fig. 5.13 On YT 200 models, Yamaha tools number YM-08010 (1) and YM-33281 (2) are required to install the seal (3) correctly (Sec 5)

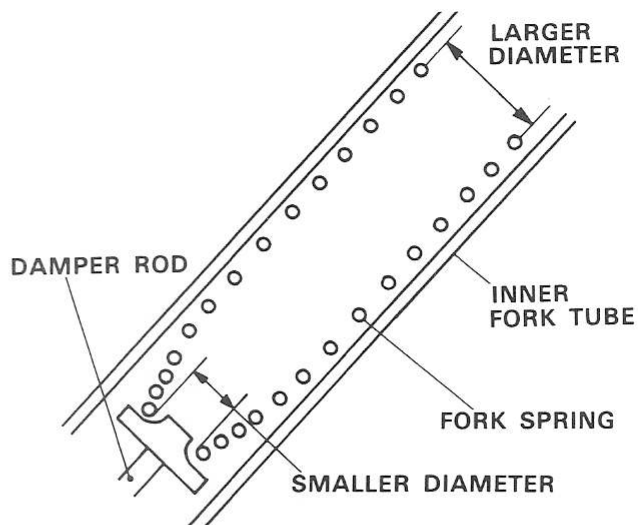


Fig. 5.14 On YT 200 models, install the fork spring with the larger diameter end at the top (Sec 5)

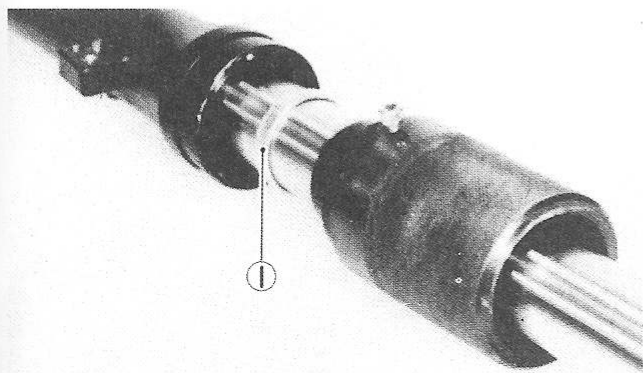


Fig. 5.15 On YTZ 250 models, the slide metal (slider bushing) (1) must be driven into the slider with a special tool (Sec 5)

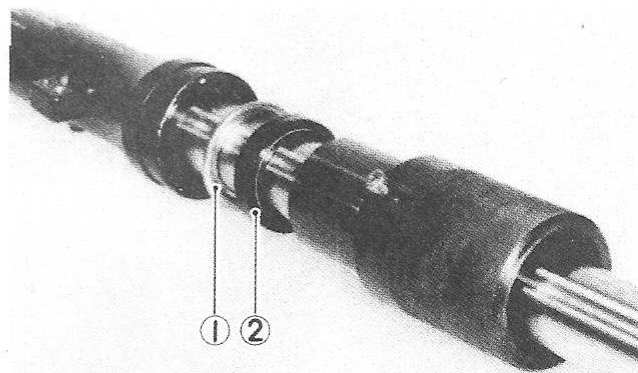


Fig. 5.16 On YTZ 250 models, the seal washer (1) and seal (2) must be seated in the slider with a special tool (Sec 5)

54 Place the rebound spring over the damper rod, slide the damper rod assembly into the inner fork tube until it protrudes from the end, then slip the taper spindle into place on the end of the damper rod.

55 Carefully slide the entire fork tube/damper rod assembly into the slider until the Allen head bolt can be threaded into the end of the rod through the slider hole.

56 Mount the slider in the vise, apply red Loctite to the five bolt threads just under the head, install the bolt and sealing washer through the slider and into the damper rod and tighten it to the specified torque. The special tool that engages with the upper end of the damper rod will probably be needed to keep the rod from turning as the bolt is tightened.

57 Mount the fork tube in the vise with the open end up, then install a new slide bushing with the special tool (Yamaha P/N YM-33963 and YM-1369). When the bushing is seated, install a new seal washer with the beveled edge facing up.

58 Lubricate the outer edge of the new seal and install it in the slider. Drive it in with the special tool until it is seated, then install the snap-ring.

59 Gently tap the dust seal into place with the special tool. Pour the specified amount of oil into the fork tube (see Chapter 1). A plastic baby bottle, calibrated in ounces and cc's, makes an ideal measuring device.

60 Install the long spring, washer, short spring and fork cap. The cap can be tightened after the fork is reinstalled and the pinch bolts will keep the fork leg from turning.

61 Slip the dust boot over the tube but do not tighten the clamp screws until after the fork is installed.

62 Store the completed fork leg in an upright position and repeat the

rebuilding procedure for the remaining fork leg.

63 If the steering head bearings require maintenance or replacement, now is a very good time to do it since access to the bearings involves removal of the forks.

6 Steering head — disassembly, maintenance and reassembly

1 If the steering head bearing check and adjustment in Chapter 1 does not remedy excess play or roughness in the steering head bearings, disassemble the entire front end and replace the bearings and races with new ones. **Note:** YTZ 250 models are equipped with a tapered roller bearing at the lower end of the steering head. It should be extremely reliable and wear resistant, but if it must be replaced with a new one it can be removed by driving it off the steering stem. The new one should be packed with grease and driven onto the stem by applying pressure to the inner race only.

2 On YT 60 and 125 models refer to Section 4 and remove the forks. The steering head bearings will be exposed in the process. On all other models refer to Chapter 6 and remove the front wheel. Remove the fender and, on YTZ 250 models, the brake hose clamp. Remove the handlebars and fork tubes by following the procedures in this Chapter. Remove the headlight assembly.

3 Loosen and remove the upper triple clamp-to-steering stem bolt or cap nut (depending on model) and separate the triple clamp from the steering stem.

4 Using a pin-type spanner wrench, or a pin punch and hammer, remove the ring nut (sometimes called the adjusting nut) while sup-

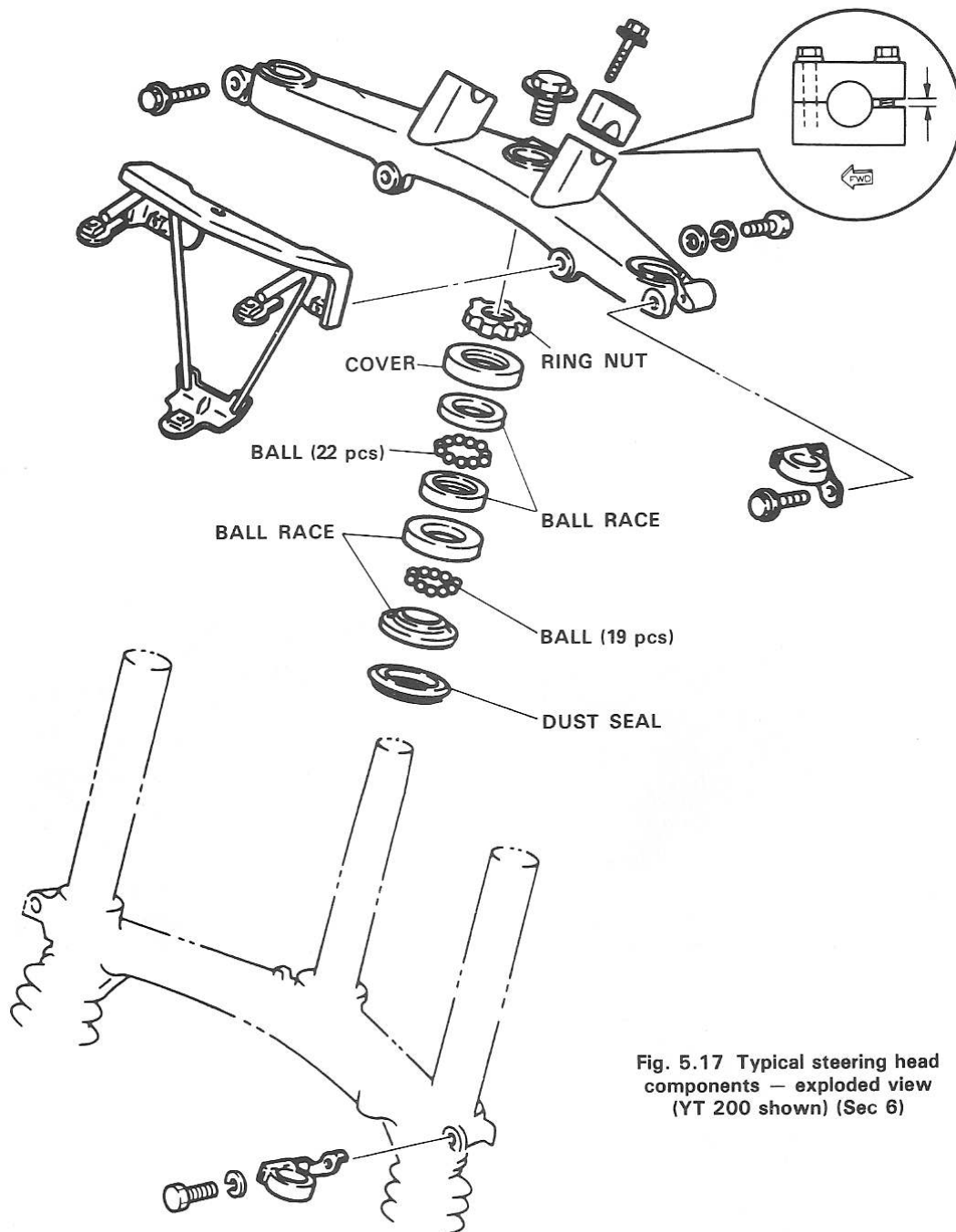


Fig. 5.17 Typical steering head components — exploded view (YT 200 shown) (Sec 6)

porting the steering head from the bottom.

- 5 Place a clean drain pan directly underneath the steering head to catch the ball bearings if they fall out. Lift the top ball race and the steel balls off the steering head. Some models have a cover over the upper ball race. Remove the steering stem and bottom triple clamp.
- 6 Clean all the parts with solvent and dry them thoroughly. Wipe all the old grease out of the frame steering head and bearing races.
- 7 Replace the bearing races if any wear or damage is evident.
- 8 To remove the races, drive them out of the steering head with a large drift punch held against the back side of the race (photo). Since the races are an interference fit in the frame, installation will be easier if the new races are left in a freezer overnight. This will cause them to shrink and slip into place in the frame with less effort. Tap the races gently into place with a hammer and punch or large socket. **Note: Do not strike the bearing surface.**
- 9 Check the ball bearings for cracks, dents, pits or flat spots. Replace any defective bearings or races with new ones. If any bearings or races are required, replace all of the bearings and all of the races with new parts.

10 To remove the race from the steering stem, tap around its outer circumference with a hammer and punch. Some models have a dust seal under the lower race.

- 11 Inspect the steering stem triple clamp and upper triple clamp for cracks or other damage. **Note: Do not attempt to repair any steering components. Replace them with new parts if defects are found.** Pack the steering stem races with grease, then lay the ball bearings in place in the race (photo). The grease will hold them in place during installation.
- 12 Pack the upper race in the frame steering head with grease and lay the bearings in place on the race (photo).
- 13 Pack the lower race in the frame steering head and the top ball race with grease. Carefully slide the steering stem into place in the frame. Slip the top race over the stem and thread the ring/adjusting nut into place. Tighten the ring nut as described in the Specifications. If no torque specifications are given, tighten the ring nut by hand only. Make sure the stem rotates freely with no noticeable vertical play.
- 14 Installation of the upper triple clamp is the reverse of removal. Be sure to tighten the nuts/bolts to the specified torque.
- 15 Check the steering head bearings for play and readjust them if

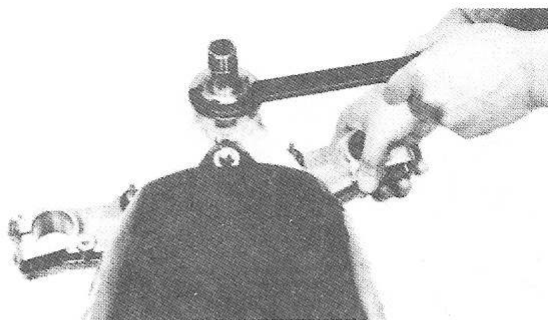
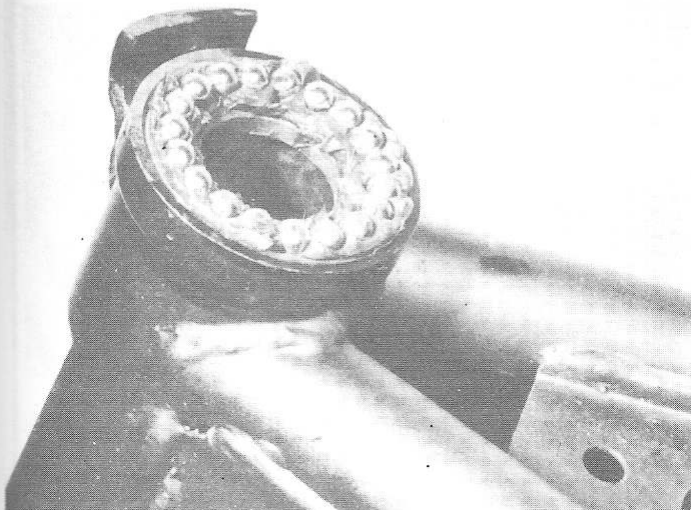


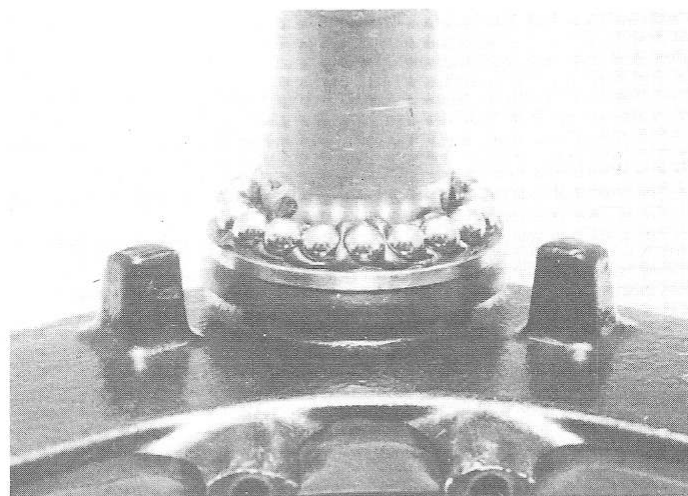
Fig. 5.18 Loosening the steering stem ring nut with a spanner wrench (Sec 6)



6.8 Position the punch against the back side of the lower race and tap it with a hammer to drive out the race



6.11 After packing the steering stem race with grease, lay the bearings in place



6.12 The remaining bearings are installed in the top frame race (use grease to hold them in place)

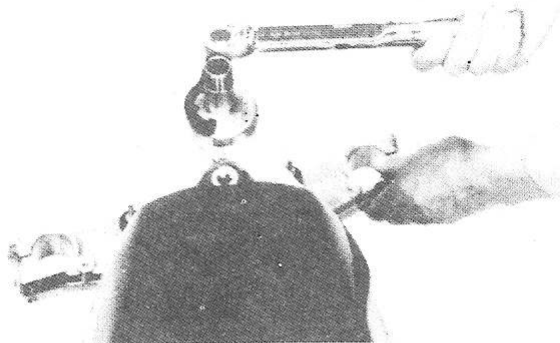


Fig. 5.19 Tightening the ring nut with a torque wrench (note the special spanner wrench designed to be used with a torque wrench) (Sec 6)

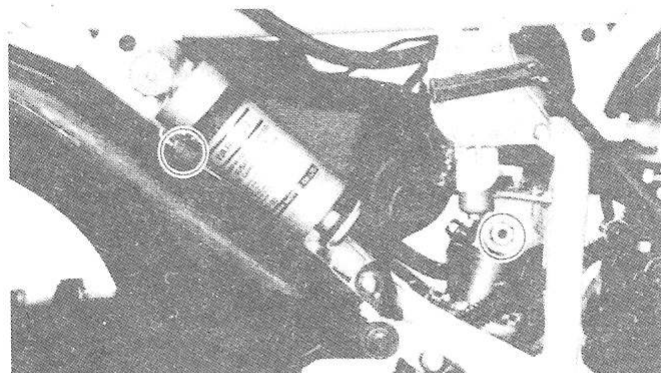


Fig. 5.20 On YTZ 250 models, the shock reservoir is bolted (arrow) to the left frame tube (Sec 7)

necessary. The steering stem should rotate freely without any noticeable vertical play or roughness.

16 Install the handlebars, the headlight assembly, the front fender and the front wheel by reversing the removal procedures.

7 Rear shock absorber — removal and installation

1 The rear shock absorber and nitrogen reservoir can be removed for inspection, spring preload adjustment, or as a part of another procedure.

2 To remove the rear shock absorber, remove the seat and rear fender assembly, then support the machine at the rear of the frame (not under the swingarm).

YZF 250 models

3 Remove the reservoir clamp and slide the reservoir out of the bracket. Let the reservoir hang safely out of the way.

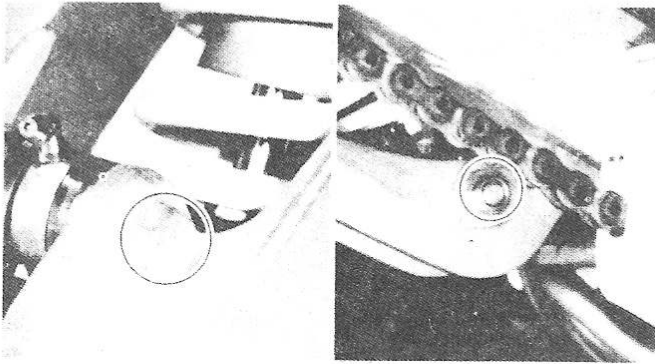


Fig. 5.21 YTZ 250 upper connecting rod bolt (left) and lower shock mount bolt (right) locations (Sec 7)

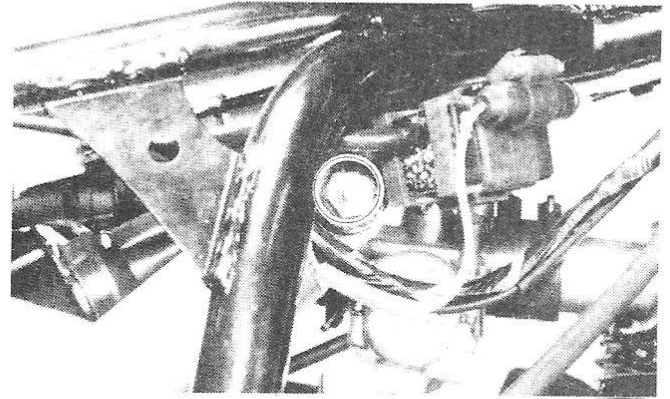


Fig. 5.22 YTM 225 upper shock mount location (Sec 7)

- 4 Remove the upper connecting rod pivot bolt and the lower shock mounting bolt.
- 5 Remove the upper shock mounting bolt and withdraw the shock and reservoir from the frame.
- 6 Before installation, apply grease to the collars, bushings and seals.
- 7 Installation is the reverse of removal. Be sure to tighten the bolts/nuts to the specified torque.

YTM 225 models

- 8 Remove the shock absorber upper mounting bolt. Let the swingarm drop as the bolt is withdrawn.
- 9 Remove the cotter pin from the swingarm, drive out the lower shock pivot shaft and separate the shock from the swingarm.
- 10 Remove the shock from the frame by carefully pulling it toward the rear of the machine.
- 11 Before installation, apply grease to the upper mounting bolt and the lower pivot shaft.
- 12 Installation is the reverse of removal. Be sure to install a new cotter pin in the swingarm and tighten the upper bolt/nut to the specified torque.

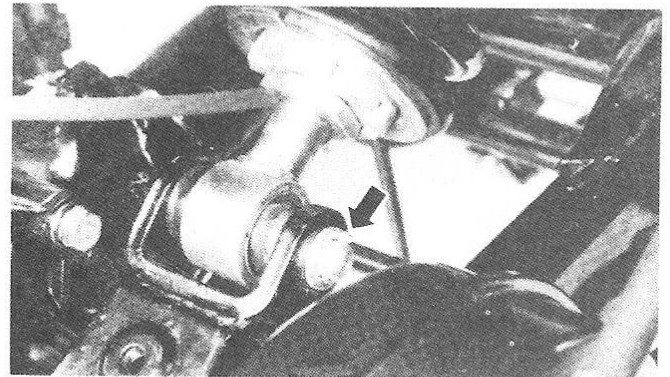


Fig. 5.23 On YTM 225 models, remove the cotter pin (arrow) and drive out the pivot shaft to detach the lower shock mount (Sec 7)

8 Swingarm — removal and installation

YZT 250 models

- 1 Position a jack or blocks of wood under the engine to support the machine so that the rear wheels are off the ground. Refer to Chapter 6 and remove the rear axle.
- 2 Remove the upper connecting rod and lower shock absorber mounting bolt and allow the swingarm to fall free. Replace the bolts in the shock absorber lower mount hole and the connecting rod mount to prevent loss.
- 3 Remove the chain guard assembly from the swingarm.
- 4 Remove the swingarm pivot shaft nut and drive the shaft out with a long aluminum or brass rod.
- 5 Carefully withdraw the swingarm. If the thrust bearing covers are dislodged, the bearing components will fall out, so be careful. Place the swingarm on a clean workbench and carefully remove the bearing covers, the outer seals, the thrust bearing components and the bushings. **Note:** Lay the parts out in the order of removal so they can be reinstalled in the exact same positions. Check the bushings and the needle bearings in the swingarm tubes for wear and damage. Insert the bushings into the bearings and turn them to check for noise, roughness or excessive radial play.
- 6 If the bearings must be replaced refer to Section 9 for the procedure to follow.
- 7 If replacement or maintenance is required, separate the relay arm and connecting rod from the swingarm.
- 8 Before reassembling the swingarm, check the shock absorber relay arm, connecting rod, thrust covers, collars and bushings for damage and wear. Reassemble the collars and bushings and check for excessive radial play. Replace worn or damaged parts with new ones.
- 9 Reassembly and installation are the reverse of removal and disassembly. Apply grease to the bushings/collars, the seal lips, the dust seals and the swingarm pivot shaft. Fill the inside of the thrust covers with grease. **Note:** Be sure to install the shims in the swingarm

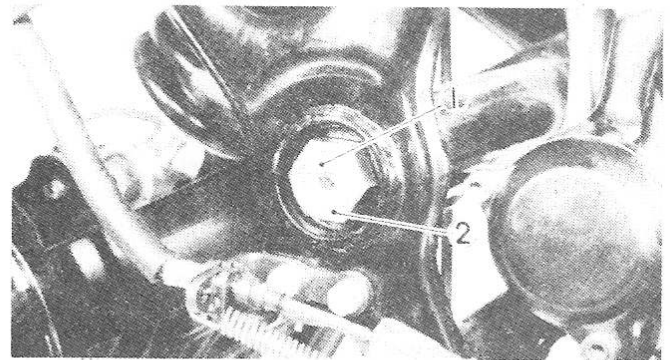


Fig. 5.24 On YTM 225 models, the swingarm is held in the frame by two pivot shafts (1) which are retained by locknuts (2) (Sec 8)

pivot in their original locations. Tighten the nuts/bolts to the specified torque and lubricate the swingarm pivot with a grease gun after the swingarm is installed.

YTM 225 models

- Note:** It is not absolutely necessary to remove the rear wheels, rear brake assembly, rear axle and final gear assembly if the swingarm bearings only are being replaced or serviced. The brake cables, the lower shock mount and the swingarm pivots must, however, be removed.
- 10 Refer to Chapter 6 and remove the rear axle. If the swingarm is being replaced with a new one, separate the final drive assembly and the driveshaft from the swingarm.
 - 11 Separate the driveshaft rubber boot from the engine or swingarm.
 - 12 Detach the lower shock absorber mount (see Section 7).
 - 13 Pry out the swingarm pivot caps, then loosen the pivot shaft locknuts and unthread the shafts. Separate the swingarm from the frame.

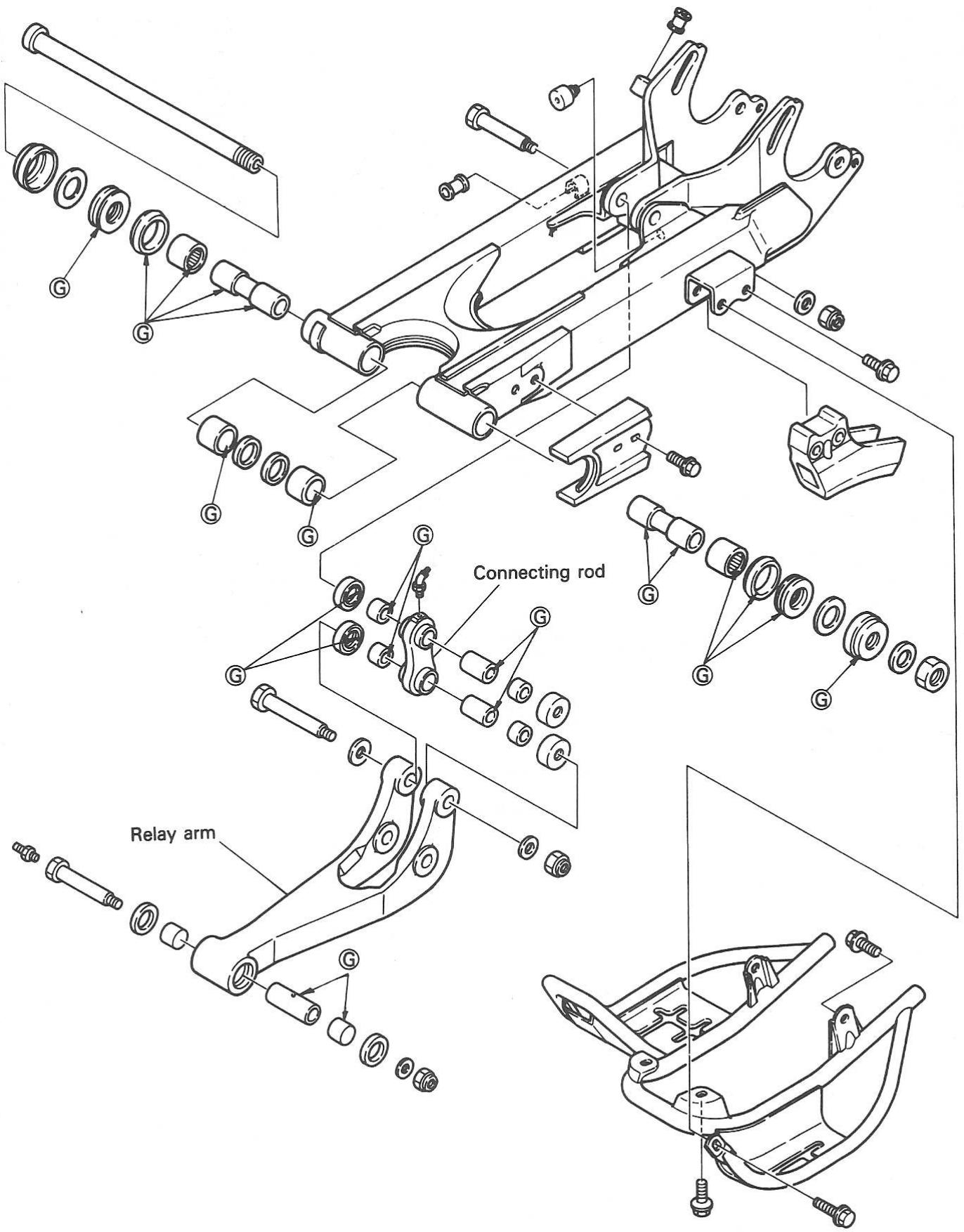


Fig. 5.25 YTZ 250 swingarm components — exploded view (Sec 9)

14 Refer to Section 9 for all bearing inspection and replacement procedures.

15 Check the engine-to-swingarm rubber driveshaft boot for damage. Replace it with a new one if it is torn or cracked.

16 Clean the pivot shafts and collars, then apply grease to the seal lips and collars and insert the collars.

17 Clean the frame mounts, then position the swingarm and install the pivot shafts finger-tight. If the driveshaft/final drive are in place in the swingarm, align the U-joint splines with the splines on the driveshaft as the swingarm is positioned in the frame. Tighten the *left* pivot shaft to the specified torque, followed by the *left* pivot shaft locknut. **Note:** Do not allow the pivot shaft to turn while tightening the locknut.

18 Tighten the *right* pivot shaft to the specified torque, followed by the *right* pivot shaft locknut. Install the pivot shaft caps in the frame holes.

19 The remaining installation steps are the reverse of removal. Be sure to tighten the nuts/bolts to the specified torque.

9 Swingarm bearings — replacement

YZF 250 models

1 The swingarm needle bearings are press fit in the swingarm tubes and must be driven out with a hammer and punch. Make sure the punch has sharp, square edges on the end that contacts the bearings. Insert the punch into the tube and drive the bearings out from the back side. Work carefully and do not gouge the inside of the tube.

2 Clean the swingarm tubes, bushings, thrust washers, thrust bearings, thrust bearing covers and seals with solvent and dry them with compressed air (if available).

3 Check all of the components for wear and damage. Replace any defective parts with new ones. If the thrust washers are replaced, be sure to use washers of the exact same thickness.

4 The new bearings can be driven into the tube if it is done with extreme care, but the possibility of damaging the new bearings in the process is great. The inside of the swingarm tubes must be clean and free of burrs before the new bearings are installed. Lubricate the outside of the bearings and carefully drive them into place with a block of hardwood and a hammer until they are recessed in the ends of the tubes. A seal must be installed after the inner bearing in each tube, so allow room for it.

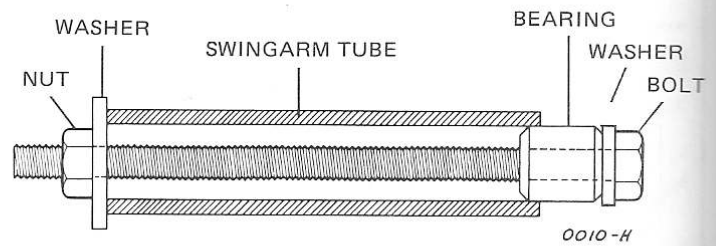


Fig. 5.26 Homemade swingarm bearing press details (Sec 9)

5 A preferred method would be to draw the bearings into place with a length of threaded rod, two nuts (or a long bolt and nut) and a couple of thick washers, one with a diameter slightly smaller than the outside diameter of the bearings and one that will bear against the end of the tube. A socket of the correct diameter could be substituted for the washer that must push against the end of the bearing. Slide the smaller washer or socket over the bolt or threaded rod with one nut installed, then slip a bearing over the bolt or rod. Insert the bolt or rod through the swingarm tube, slip the larger washer over the end and install the remaining nut. Position the bearing in the tube opening and snug up the nut. Hold the bolt head (or nut) with a wrench and slowly tighten the nut until the bearing is drawn squarely into the tube. Disassemble the tool, then repeat the procedure to install the remaining bearing. Remember to lubricate the outside of the bearings and work carefully to avoid distorting them.

6 Install the seals in the inner ends of the tubes using the same procedure. The outer face of the seals should be flush with the ends of the tubes. Apply grease to the seal lips.

7 Apply grease to the bushings and slip them into place in the bearings, then lubricate and install the thrust bearings and washers over the outer ends of the bushings. Make sure the thrust washers are installed correctly.

8 Slip the outer seals over the outside of the swingarm tubes (the lips must point in), then install the thrust bearing covers over the ends of the bushings and the outer seals. Fill the insides of the covers with grease before installing them.

9 The swingarm is now ready to be installed in the frame. Be careful not to dislodge the thrust bearing covers, as the bearing components will fall out.

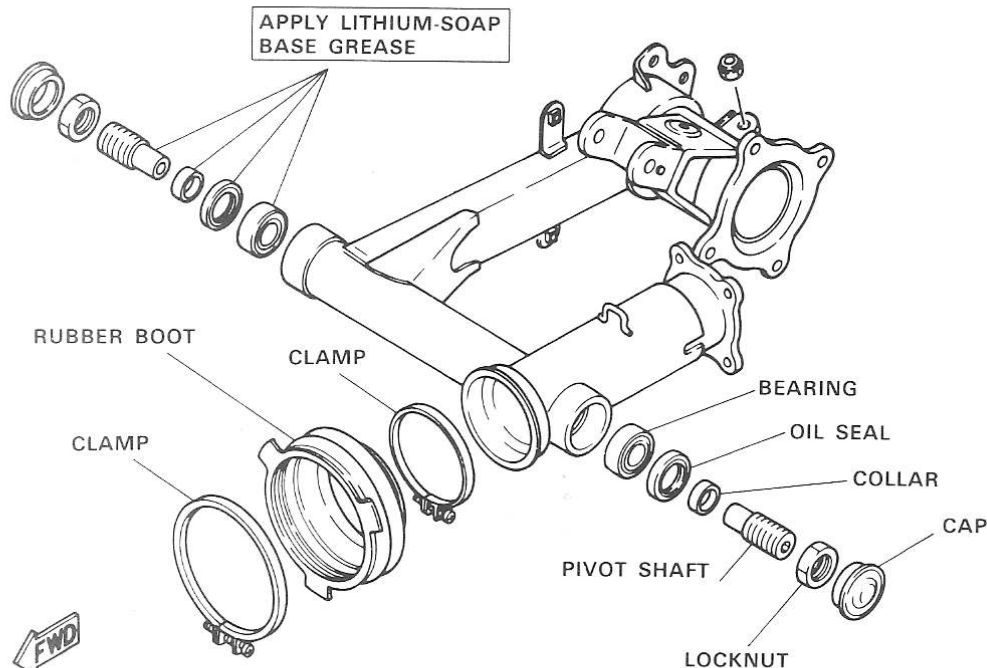


Fig. 5.27 YZF 225 swingarm components — exploded view (Sec 9)

YTM 225 models

10 Apply pressure to the collar in each bearing seal and rotate the bearings. Check for roughness and noise. If there is evidence of damage, remove the collars, pry out the seals and remove the bearings. Check the rollers for pitting and corrosion. If damage is found, replace both bearings and races with new ones.

11 To remove the races, drive them out of the swingarm with a large punch (held against the back side of the race) and a hammer. Since the races are an interference fit in the swingarm, installation will be easier if the new races are left overnight in a freezer. This will cause them to shrink and slip into place in the swingarm with less effort. When installing the races, tap them gently into place with a hammer and punch or a large socket. **Note: Do not strike the bearing surface or the race will be damaged.**

12 Pack the new bearings with grease and position them in the races, then install new seals in the swingarm. Drive the seals into place with a large socket and hammer until the outer face on each seal is flush with the end of the swingarm tube.

13 Apply grease to the seal lips and slip the collars into place. The swingarm can now be reinstalled.

10 Steering shaft (YFM 200N only) — removal, inspection and installation

- 1 Remove the seat, the front carrier, the fuel tank cover and the front fender.
- 2 Pry off the handlebar mount cover and remove the headlight body bracket mounting bolts.
- 3 Withdraw the clips and remove the handlebar holder nuts, then separate the bars from the steering shaft.
- 4 Flatten the lock tab and remove the guide holder mounting bolts.
- 5 Remove the steering shaft guides and O-rings.
- 6 Remove the bolts and detach the skidplate. Don't lose the washers between the skidplate and frame.
- 7 Withdraw the cotter pins and remove the tie-rod-to-steering shaft nuts. Separate the tie-rod ends from the shaft bracket and withdraw the shaft. Note how the cables are routed and make sure they are correct during installation.
- 8 Check the shaft for wear and distortion. *If it is bent, replace it with a new one. Do not try to straighten it.*

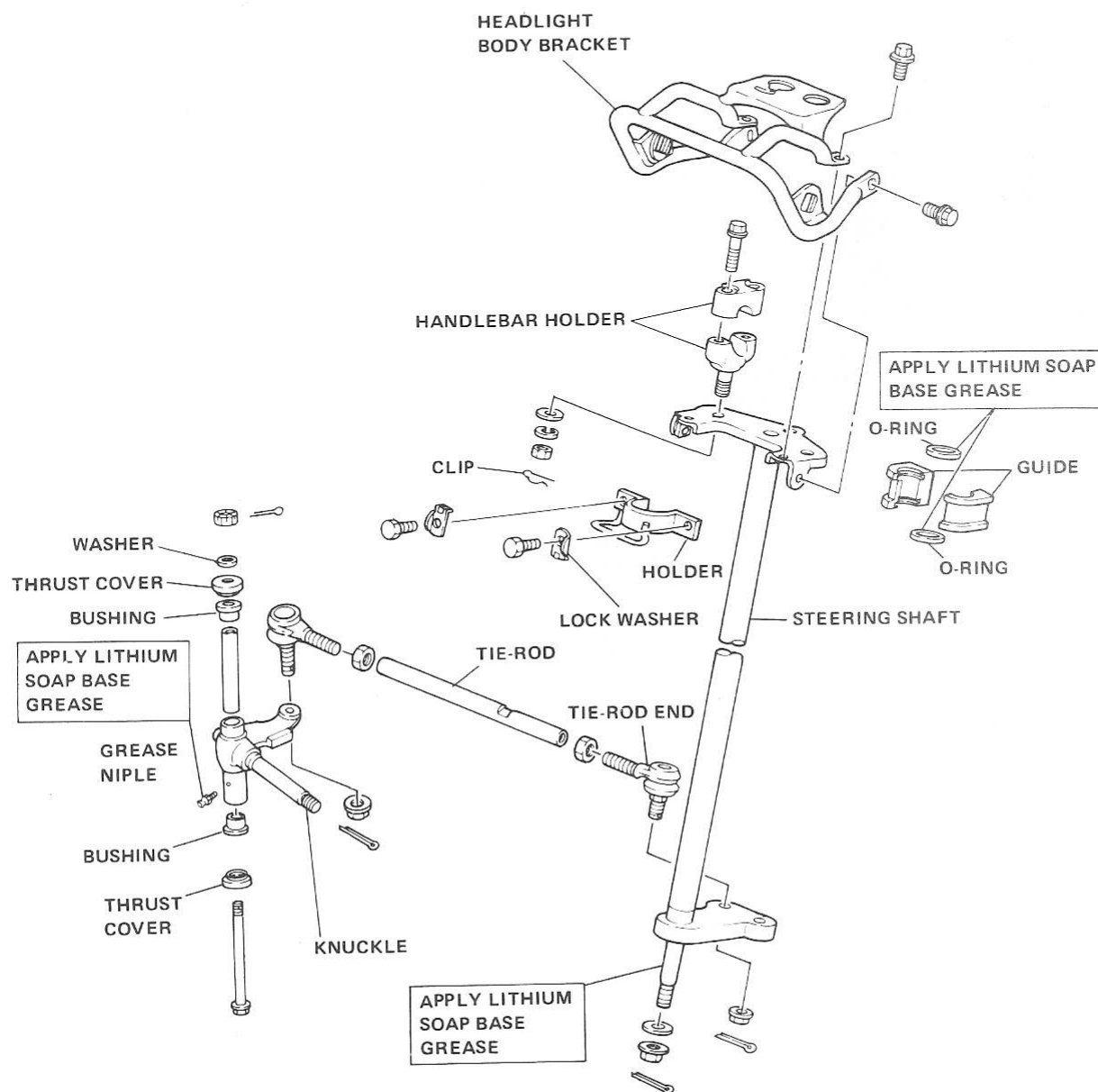


Fig. 5.28 YFM 200N steering system components — exploded view (Sec 10)

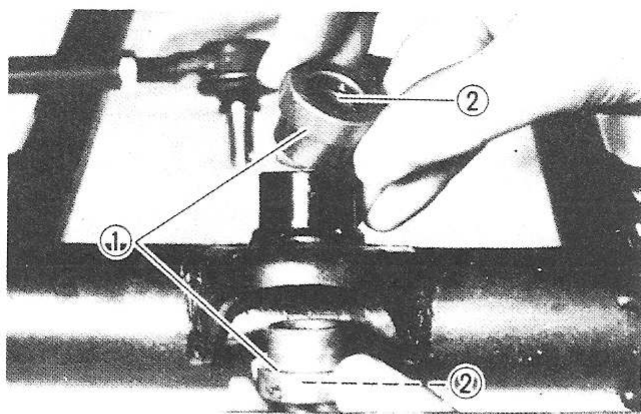


Fig. 5.29 Check the steering shaft bushings in the lower frame mount (1) and the O-rings (2) for wear and damage (Sec 10)

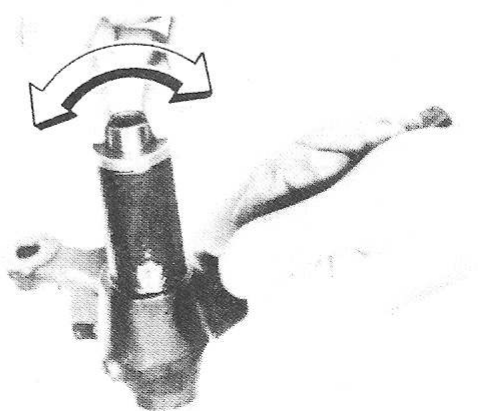


Fig. 5.31 Check the steering knuckle collar and bushings for wear by moving the collar as shown and feeling for play (Sec 11)

9 Check the steering shaft guides and O-rings for wear and damage. Insert the steering shaft into the frame bushings and check for free play. There should be no noticeable free play — if there is, replace the bushings and O-rings with new ones.

10 Installation is the reverse of removal. Be sure to lubricate the bushings and O-rings with grease. Make sure the brake cables and wires are routed properly to avoid damage. Replace all lock washers, cotter pins and clips with new parts and tighten all bolts/nuts to the specified torque. Bend the lock tabs up to keep the guide holder mounting bolts from loosening.

11 Steering knuckles and tie-rods (YFM 200N only) — removal, inspection and installation

1 Raise the front of the machine and support it with the wheels off the ground (use jackstands if available). Remove the front wheels/hubs.

2 Withdraw the cotter pin and remove the outer tie-rod end mounting nut. Use a 14-mm wrench to keep the balljoint stud from turning as the nut is loosened. Separate the tie-rod from the knuckle arm. If the tie-rod is being removed, repeat the procedure at the inner end to separate it from the steering shaft bracket.

3 Remove the cotter pin and the nut from the end of the knuckle shaft. Hold the end of the shaft with a wrench to keep it from turning as the nut is removed. Withdraw the knuckle shaft and separate the knuckle from the frame, then detach the brake backing plate from the knuckle assembly.

4 Remove the thrust covers and shaft from the knuckle, then check the collar for excessive play. If play is noticed, replace the collar and the bushings in the knuckle with new parts. If the thrust covers are worn or damaged, replace them with new ones.

5 Check the tie-rod balljoints for wear. The studs should move freely

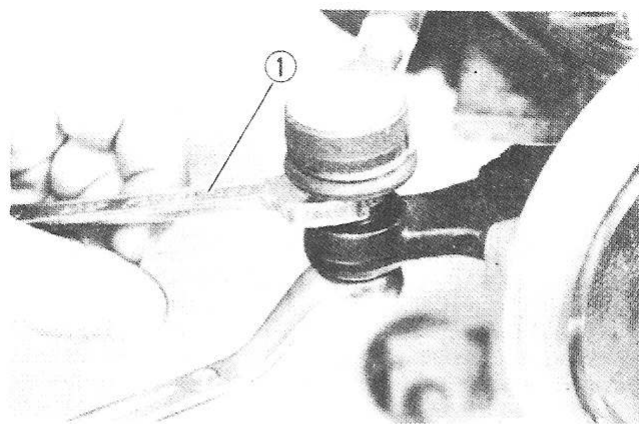


Fig. 5.30 When removing the balljoint retaining nut, hold the stud with a 14 mm wrench (1) as shown (Sec 11)

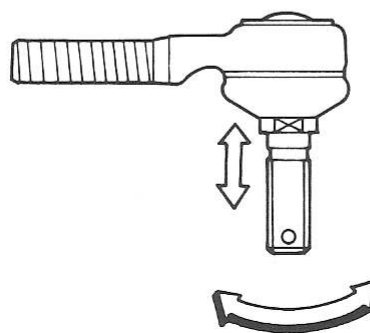


Fig. 5.32 The balljoint stud should move freely back-and-forth or in a circular motion, but there should be no vertical play (Sec 11)

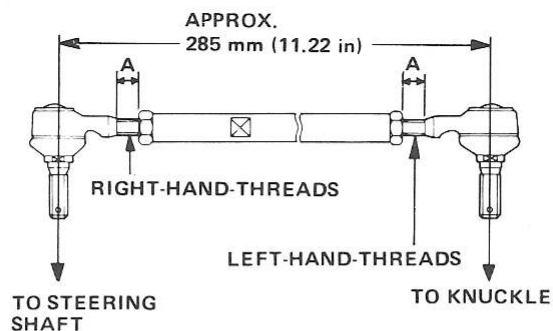


Fig. 5.33 Tie-rod installation details (note the length dimensions and thread type indicated) (Sec 11)

in a circle, but should not have any vertical free play.

6 If the balljoints are worn or damaged, loosen the locknuts and unthread them from the tie-rods. Note that the balljoint threads may be either right-hand or left-hand — examine them carefully before loosening the locknuts.

7 Refer to the accompanying illustration for balljoint installation details. Be sure to adjust the tie-rods to the correct length before tightening the balljoint locknuts.

8 Installation is the reverse of removal. Be sure to apply grease to the bushings, collar and thrust covers in each knuckle assembly. Tighten all nuts/bolts to the specified torque and install new cotter pins.

9 With the machine flat and level, check the toe-in by measuring between the inside edges of the tires. It should be 0-to-0.200-inch (0-to-5-mm). If adjustment is required turn the left and right tie-rods an equal amount to change it. **Caution:** After changing the toe-in, run the machine slowly with light pressure on the handlebars to determine if it steers correctly. If it pulls to one side or the other, make sure the tie-rods are adjusted equally.

Chapter 6 Wheels, brakes and tires

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Specifications

Wheels

Wheel rim runout limit	
YT 60/200/225/YTZ 250	
Radial	0.080 in (2.0 mm)
Axial	0.080 in (2.0 mm)
All others	
Radial	0.040 in (1.0 mm)
Axial	0.040 in (1.0 mm)
Rear axle runout limit	0.060 in (1.5 mm)

Drum brakes

Brake lining thickness limit	See Chapter 1
Brake drum inside diameter limit (all models)	4.37 in (111 mm)

Disc brakes

Brake fluid type	See Chapter 1
Pad lining thickness limit	See Chapter 1
Disc thickness limit	
YTZ 250	0.140 in (3.5 mm)
All others	0.120 in (3.0 mm)
Disc runout limit	
YTZ 250	0.006 in (0.15 mm)
All others	0.020 in (0.5 mm)
Master cylinder bore diameter	0.490 in (12.7 mm)
Caliper bore diameter	1.37 in (34.93 mm)

Tire sizes and pressures	See Chapter 1
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Torque specifications

	Ft-lbs	m-Kg
YT 60		
Front axle nut	36	5.0
Rear hub-to-axle nut	47	6.5
Rear axle ring nut	72	10.0
Wheel rim bolts/nuts	20	4.8
Rear brake lever	6.5	0.9

YT 125/175		
Front axle nut	36	5.5
Sprocket bolts		
YT 125	25	3.5
YT 175	32.5	4.5
Rear axle ring nuts (YT 125)		
Left	58	8.0
Right	80	11.0
Rear axle ring nuts (YT 175)	98	13.5
Rear hub-to-axle nut	80	11.0
Wheel rim bolts/nuts	32.5	4.5
Outer caliper section nuts	28	3.9
YTM 200 K/L		
Front axle nut	36	5.0
Sprocket nuts	32	4.5
Rear axle ring nut	100	14.0
Rear hub-to-axle nut	94	13.0
Brake caliper bolts	32	4.5
Brake caliper nuts	6.5	0.9
Wheel rim bolts/nuts	32	4.5
YTM 200 EK/EL/N/ERN		
Front axle nut	36	5.0
Wheel rim bolts/nuts	20	2.8
Brake caliper bolts	36	5.0
Brake caliper nuts	6.5	0.9
Rear axle ring nuts	72	10.0
Rear hub-to-axle nut		
Thick washer and castellated nut	105	14.5
Thin washer and nut with collar	150	21.0
YFM 200 N		
Front axle nut	61	8.5
Front wheel rim bolts/nuts	20	2.8
Rear wheel rim bolts/nuts	32	4.5
Brake caliper bolts	36	5.0
Brake caliper nuts	6.5	0.9
Rear axle ring nuts		
Inner	170	24.0
Outer	140	19.0
Rear hub-to-axle nut	72	10.0
YTM 225		
Front axle nut	36	5.0
Wheel rim nuts/bolts	32	4.5
Brake caliper bolt	36	5.0
Brake caliper nut	6.5	0.9
Rear axle ring nut	72	10.0
Rear hub-to-axle nut	94	13.0
YTZ 250 N		
Front axle shaft	42	5.8
Front axle pinch bolt	14	2.0
Front wheel-to-hub	20	2.8
Rear wheel-to-hub	32	4.5
Brake disc bolts	20	2.8
Brake caliper bolts	25	3.5
Brake hose banjo bolt	19	2.7
Rear axle ring nuts	98	13.3
Rear hub-to-axle nut	72	10.0
Sprocket nuts	22	3.0

1 General information

The Yamaha ATVs come standard with two-piece split rims and tubeless tires.

Some models are equipped with a rear drum brake only, while others are equipped with a drum front brake and a mechanically-operated rear disc brake. YT 125 models are equipped with a mechanically-operated rear disc brake only. YTZ 250 models are equipped with hydraulically-operated front and rear disc brakes. Most models incorporate a parking brake designed into the rear brake system.

2 Wheels — inspection and repair

1 The wheel to be inspected can be raised off the ground by inserting blocks or jackstands underneath the frame just forward of or to the rear of the engine.

2 Visually inspect the wheels for cracks, flat spots on the rim and other damage. Since tubeless tires are involved, look very closely for dents in the area where the tire bead contacts the rim. Dents in this area may prevent complete sealing of the tire against the rim, which leads to deflation of the tire over a period of time and exposes the tire

bead and walls to greater risk of damage.

3 If a dial indicator is available, elevate the wheels and check the radial runout of each wheel by positioning the indicator stem against the inner wall of the rim, near the edge. Check the axial (side-to-side) runout as well. Compare the results to the Specifications. If a dial indicator is not available, a simpler, though slightly less accurate method, is to attach a stiff wire pointer to the fork leg or frame in place of the indicator. Position the end of the wire a fraction of an inch from the wheel and spin the wheel. If the wheel is true, the distance from the wire to the wheel will remain constant.

4 If dents, warpage or other damage is evident, the wheel will have to be replaced with a new one. Usually it will be necessary to replace only one-half of the split rim assembly. *Never attempt to repair a damaged wheel.*

3 Front wheel — removal and installation

YT 60/125

1 Elevate the front wheel by placing blocks or jackstands under each fork leg.

2 Pull out the cotter pin, then loosen and remove the axle nut.

3 Pull out the axle, then separate the wheel and collars from the forks.

4 Remove any corrosion from the axle with emery cloth and check it carefully to see if it is bent or otherwise distorted.

5 Installation is the reverse of removal. Be sure to tighten the nut to the specified torque and install a new cotter pin.

YFM 200

6 Elevate the front wheels by placing blocks or jackstands under the front of the frame.

7 Detach the plastic hub cap. Remove the cotter pin, then loosen and remove the wheel hub-to-axle nut.

8 Pull the wheel/hub assembly off the axle.

9 Installation is the reverse of removal. The tab on the frame must fit into the recess on the brake backing plate or the brake will not function properly. Be sure to tighten the nut to the specified torque and install a new cotter pin.

YTZ 250

10 Elevate the front wheel by placing blocks or jackstands under the frame (in the engine area).

11 Loosen the front axle Allen-head pinch bolt.

12 Loosen and remove the axle, then carefully separate the wheel and collars from the forks and brake caliper. **Caution:** *Do not operate the front brake lever with the wheel removed. Wedge a small piece of wood between the brake pads to keep them from being forced out of the caliper.*

13 Remove any corrosion from the axle with emery cloth and check it carefully to see if it is bent.

14 Installation is the reverse of removal. Be sure to tighten the pinch bolt and axle to the specified torque.

All others

15 Elevate the front wheel by placing blocks or jackstands under the footrests.

16 Loosen all brake cable adjusters and separate the cable from the lever. Unscrew the lower adjuster and separate the cable from the lever on the backing plate.

17 Remove the cotter pin, then loosen and remove the axle nut.

18 Pull out the axle, then separate the wheel, collars and brake assembly from the forks.

19 Remove any corrosion from the axle and check it carefully to see if it is bent.

20 Installation is the reverse of removal. The tab on the fork leg must fit into the recess in the backing plate or the brake will not operate correctly and the cable will be damaged when the brake is applied. Be sure to tighten the axle nut to the specified torque and install a new cotter pin.

4 Rear wheels — removal and installation

1 Using wood blocks, jackstands, a floor jack or a combination of them, raise the rear wheels off the ground.

2 Pull out the cotter pin, then remove the rear axle nut (apply the parking brake to keep the axle from turning).

3 Carefully pull the wheel/hub assembly off the axle.

4 Installation is the reverse of removal. Line up the splines in the hub with the splines on the axle. Be sure to tighten the nut to the specified torque and install a new cotter pin (if the holes do not line up, *tighten* the nut slightly until they do).

5 Front wheel — disassembly and reassembly (YTZ 250 only)

1 The front brake disc is attached to the hub by four bolts. Remove the bolts and separate the disc from the hub.

2 The hub is attached to the wheel by four nuts. Remove the nuts and separate the hub and wheel.

3 Reassemble the wheel by reversing the disassembly procedure. Be sure to tighten the nuts/bolts to the specified torque and use a thread locking compound on the brake disc mounting bolts.

6 Drum brakes — inspection and brake shoe replacement

Caution: *Brake dust contains asbestos, which is harmful to your health. Do not blow it out of brake components with compressed air and do not inhale any of it.*

1 Drum brakes do not usually require frequent maintenance but they should be checked periodically to ensure proper operation. If the linkage is properly adjusted, if the brake shoes are not contaminated or worn out, and if the return springs are in good condition, the brakes should work fine.

2 Check the brake pedal/lever for proper operation. It should not bind when depressed and it should return completely when released. Refer to Chapter 1 and check the free play.

3 If the brake does not operate properly, make sure nothing is interfering with the pedal/lever or the brake cable and lubricate the pedal/lever pivot. If the brakes still do not operate or return properly, the problem is in the shoe actuating mechanism.

4 If the brake shoe wear check indicates that the shoes are near the wear limit, proceed as follows:

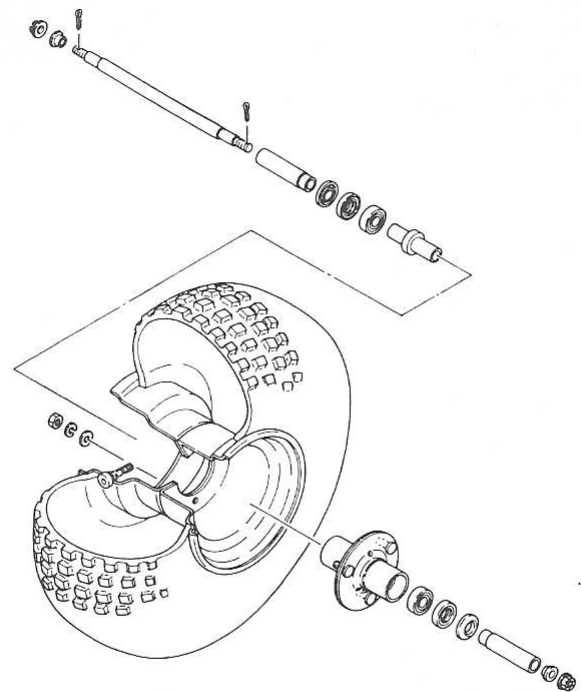


Fig. 6.1 Typical front wheel/axle components — exploded view (YT 125 shown) (Sec 3)

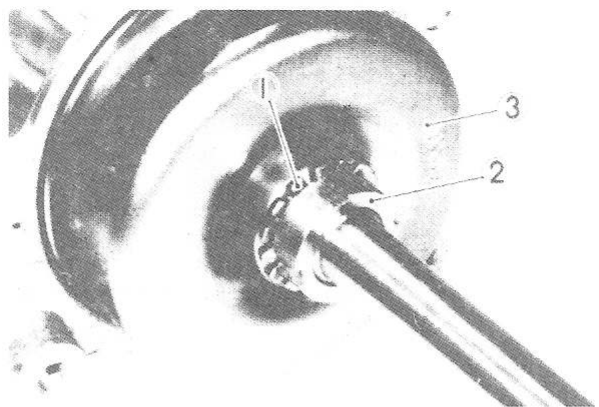


Fig. 6.2 To remove the YT 60 brake drum, flatten the lock washer tab (1), loosen and remove the ring nut (2) and slide off the drum (3) (Sec 6)

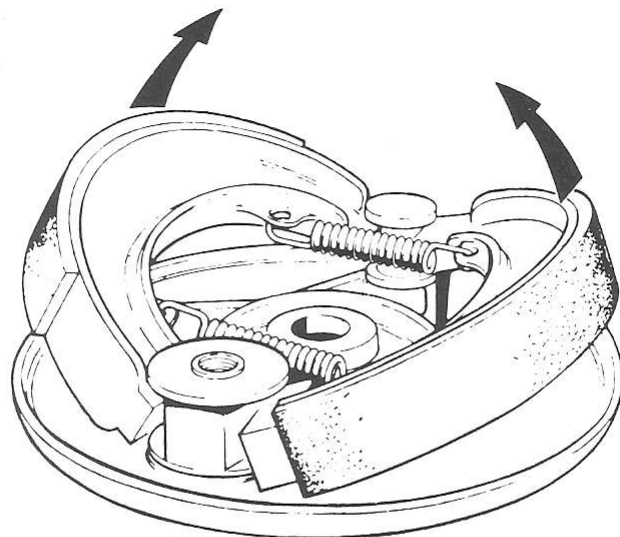


Fig. 6.3 Removing the brake shoes from the backing plate — reverse the procedure to install them (Sec 6)

5 On YT 60 models, block the front tire and raise the rear of the machine. Loosen the cable adjuster at the backing plate, then remove the right rear wheel from the axle. Flatten the lock washer tab with a hammer and punch, then loosen and remove the ring nut with a pin-type spanner wrench or a hammer and punch.

6 Slide off the lock washer and brake drum to expose the brake shoes.

7 On all other drum brake-equipped models, simply remove the front wheel and backing plate assembly to expose the brake shoes (the cable will have to be detached from the lever if the brake assembly is moved to a workbench).

8 If the brake linings are acceptable as far as thickness is concerned, check them for glazing, high spots and hard areas. A light touch-up with a file or emery paper will restore them to usable condition. If the linings are extremely glazed they have probably been dragging. Be sure to properly adjust the pedal/lever free play to prevent further glazing.

9 Occasionally the linings may become contaminated with grease from the wheel bearing or brake cam. If this happens, and it is not too severe, cleaning the shoes with brake system solvent may restore them. Better yet, replace the shoes with new ones.

10 To remove the shoes from the backing plate, pull up on the outer edges of the shoes until they form a 'V', then lift them away from the backing plate. Remove the springs from the shoes and check them for cracks and excessive stretch. Replace them with new ones if defects are noted.

11 Check the drum for rough spots, rust and evidence of excessive wear. If the outer edge of the drum has a pronounced ridge, excessive wear has occurred. To confirm this, measure the drum inside diameter and compare it to the Specifications. Make the measurement in several places to determine if the drum is out-of-round. Excessive wear and out-of-roundness indicate the need for a new drum. Slight roughness and rust spots can be removed with fine emery paper. Use one of the brake shoes as a sanding block so low spots aren't created in the drum.

12 Remove the brake arm from the shaft (it is clamped to the brake camshaft on the outside of the backing plate). Be sure to mark the end of the shaft and the brake arm so they can be reassembled in the same relative positions. Lift off the brake wear indicator and the felt seal (if so equipped). Slip the cam out of the backing plate and clean the backing plate components with solvent to remove brake dust and dirt. If compressed air is available, use it to dry the parts thoroughly.

13 Check the shaft and the hole in the backing plate for signs of excessive wear. Slide the cam back into the backing plate and make sure it turns smoothly without binding. If excessive side play is evident, the backing plate will have to be replaced with a new one. Also, check the shoe contact areas of the cam for wear.

14 Apply a thin coat of high-temperature grease to the camshaft and install it in the backing plate. Slip the felt seal and the wear indicator over the shaft and align the marks on the shaft and the brake arm. Slide the wear indicator and brake arm onto the shaft and install the bolt and nut. Tighten the nut securely.

15 Before installing the new shoes, file a taper on their leading edges. Install the springs, then apply a thin coat of high-temperature grease to the shoe contact areas of the cam and the pivot. Hold the shoes in a 'V' and attach them to the backing plate (make sure the shoe ends

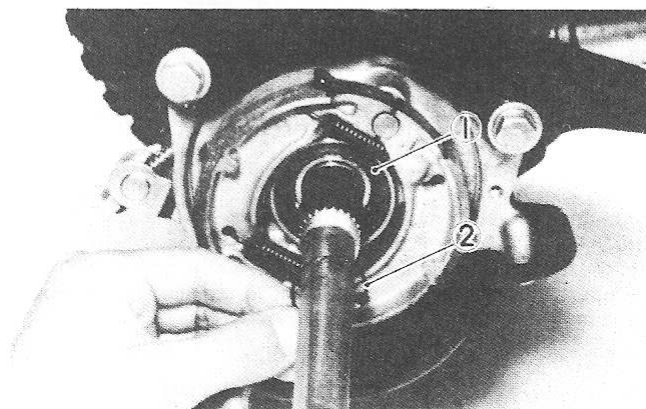


Fig. 6.4 On YT 60 models, check the seal (1) and O-ring (2) before installing the brake drum (Sec 6)

are positioned properly against the cam and pivot).

16 On YT 60 models, check the O-ring and oil seal in the final drive unit before installing the brake drum. Be sure to tighten the ring nut to the specified torque and bend over one of the lock washer tabs to keep it from loosening.

17 On all other drum brake-equipped models, install the front wheel/brake assembly by referring to Section 3.

18 Adjust the brake as described in Chapter 1.

7 Disc brake systems — inspection

Hydraulic disc brakes

1 Carefully examine the master cylinder, the hoses and the caliper units for evidence of brake fluid leakage. Pay particular attention to the hoses. If they are cracked, scraped up or otherwise damaged, replace them with new ones. If leaks are evident at the master cylinder or calipers, they should be rebuilt by referring to the appropriate Sections in this Chapter.

2 Check the front brake lever and the rear brake pedal for proper operation. They should feel firm and should return to their original positions when released. If they feel spongy, or if the pedal or lever travel is excessive, the system may have air trapped in it. Refer to Section 14 and bleed the brakes.

3 Check the brake pads for excessive wear by referring to Chapter 1.

4 Examine the brake discs for cracks and evidence of scoring. Measure the thickness of the discs and compare the measurements to the Specifications. If the discs have worn beyond the allowable limit,

they must be replaced with new ones.

5 If the brake lever or pedal pulsates when the brake is applied during operation, the disc may be warped. Attach a dial indicator set-up to the forks or frame, spin the wheel three times and check the disc runout. If the runout is greater than specified, replace the disc with a new one. If a dial indicator is not available, a dealer service department or motor-cycle repair shop can make this check for you.

Mechanical disc brakes

6 Follow the hydraulic brake inspection procedure, but note that instead of a hydraulic system, the brake cable and housing must be checked for damage and proper operation. Since the brake disc is free to slide on the splines of the axle, the runout check will be inconclusive.

8 Front disc brake caliper — removal and installation

Caution: Hydraulic brake components rarely require disassembly. Do not disassemble components unless absolutely necessary. If any hydraulic brake line connection is loosened, the entire system should be disassembled, drained, cleaned and then properly filled and bled upon reassembly. If you are only replacing the brake pads, do not detach the brake hose from the caliper.

1 Do not detach the hose from the caliper until reading through the caliper rebuild procedure in Section 11 (caliper disassembly requires the hose to be hooked up so the brake is operable).

2 Remove the two mounting bolts and separate the caliper from the fork slider and disc.

3 Installation is the reverse of removal. Be sure to tighten the mounting bolts and banjo bolt to the specified torque.

9 Rear disc brake caliper — removal and installation

Hydraulic disc brakes

Caution: Hydraulic brake components rarely require disassembly. Do not disassemble components unless absolutely necessary. If any hydraulic brake line connection is loosened, the entire system should be disassembled, drained, cleaned and then properly filled and bled upon reassembly. If you are only replacing the brake pads, do not detach the brake hose from the caliper.

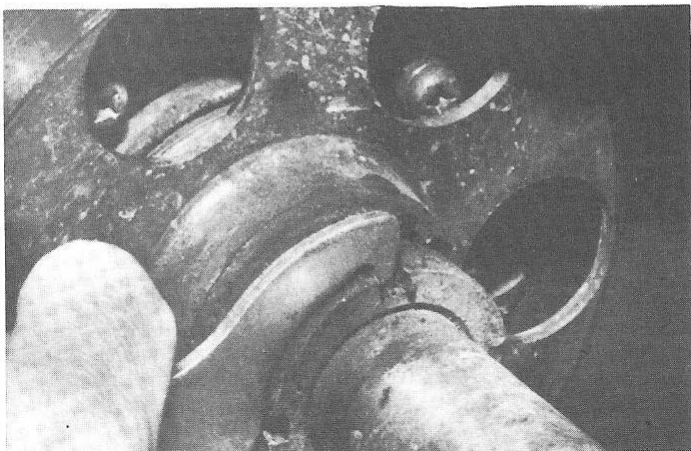
1 Do not detach the hose from the caliper until reading through the caliper rebuild procedure in Section 11 (caliper disassembly requires the hose to be hooked up so the brake is operable).

2 Remove the two mounting bolts and separate the caliper from the swingarm mount.

3 Installation is the reverse of removal. Be sure to tighten the mounting bolts and banjo bolt to the specified torque.

Mechanical disc brakes

4 Refer to Section 10 for the disc brake caliper removal and installation procedure (it is accomplished when removing the pads to replace them with new ones).



10.7b Loosening the ring nut with a pin-type spanner wrench

10 Disc brakes — pad replacement

Caution: Brake dust contains asbestos, which is harmful to your health. Do not blow it out of brake components with compressed air and do not inhale any of it.

1 If the brake pads are worn out (refer to Chapter 1) or contaminated with brake fluid or dirt they must be replaced with new ones. Failure to replace the pads when necessary will result in damage to the disc and severe loss of stopping power.

Hydraulic disc brakes

2 Remove the disc brake caliper assembly (Section 8 or Section 9). Do not disconnect the brake hose when replacing the brake pads.

3 Carefully slide out the pads and spring, noting how they are installed. Replace both pads as a set if either one is worn to the limit.

4 Slowly depress the caliper piston into the bore (keep an eye on the fluid level in the master cylinder as this is done) to provide room for the new thicker pads.

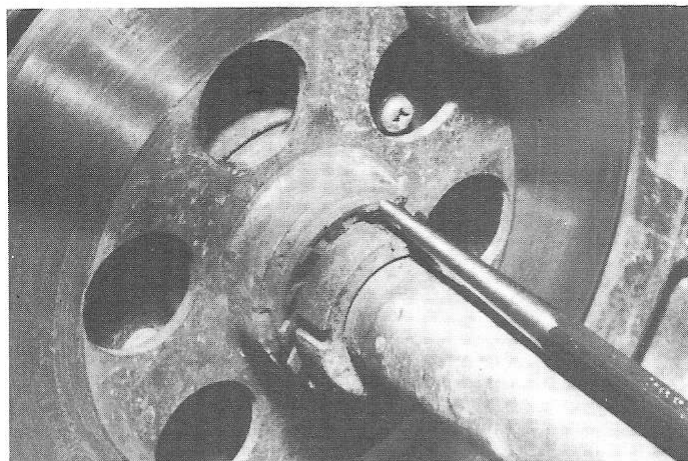
5 Assemble the pads and spring in the caliper, then reinstall the caliper.

Mechanical disc brakes

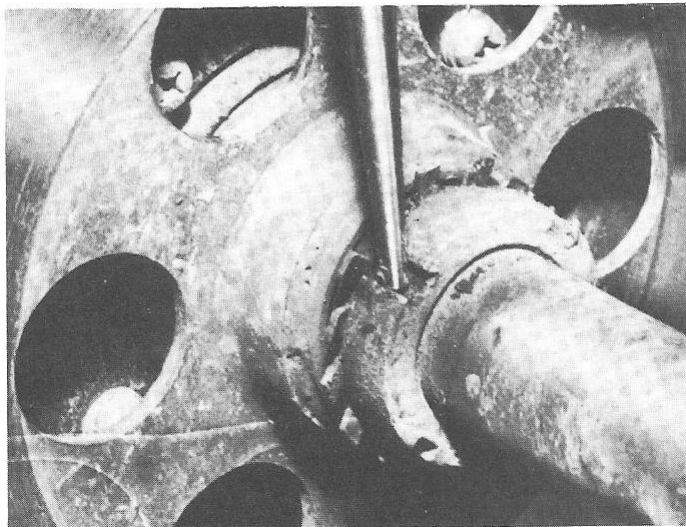
YT 125/175

6 Apply the parking brake to lock the rear wheels, then remove the bolts/nuts and detach the disc cover.

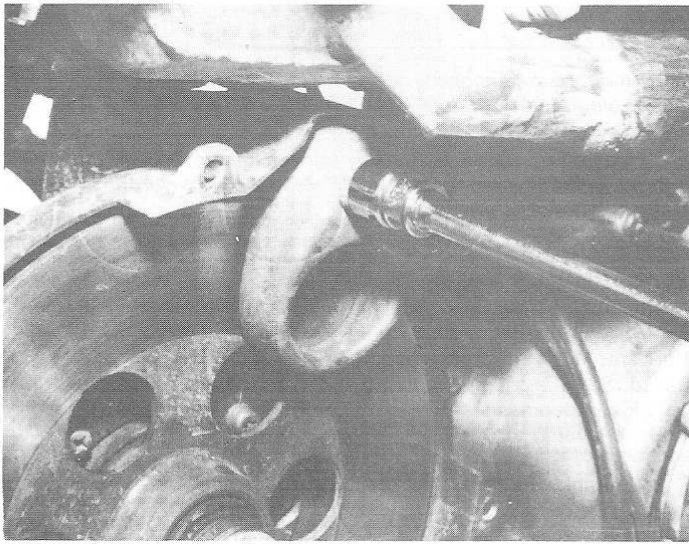
7 Flatten the tab on the lock washer with a hammer and punch (photo), then loosen the large ring nut with a pin-type spanner wrench or a hammer and punch (photos).



10.7a Use a hammer and punch to flatten the lock washer tab before loosening the ring nut



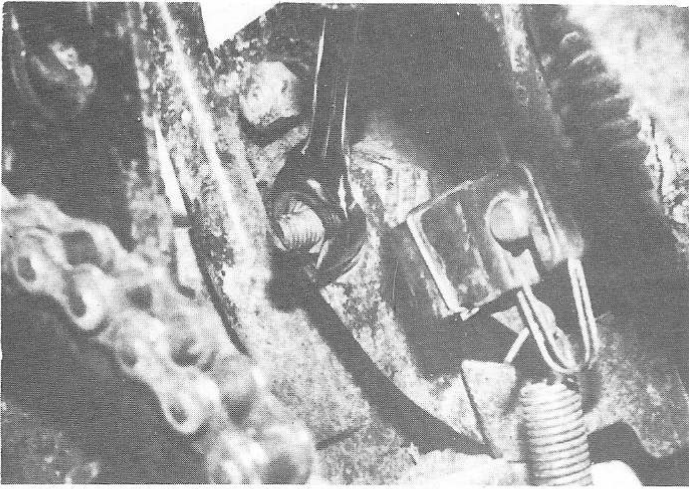
10.7c If the nut is tight and the wrench doesn't provide enough leverage, use a hammer and punch



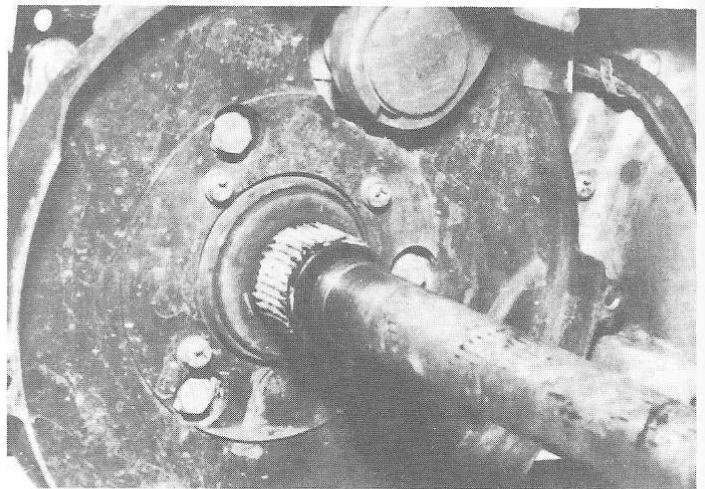
10.8 Loosening the caliper nuts (you may have to hold the bolt to keep it from turning)



10.10 A magnet will pull the caliper piston out



10.11 Loosening the caliper adjusting bolt locknut



10.12 Apply grease to the splines so the disc is free to move back-and-forth as the brake is applied

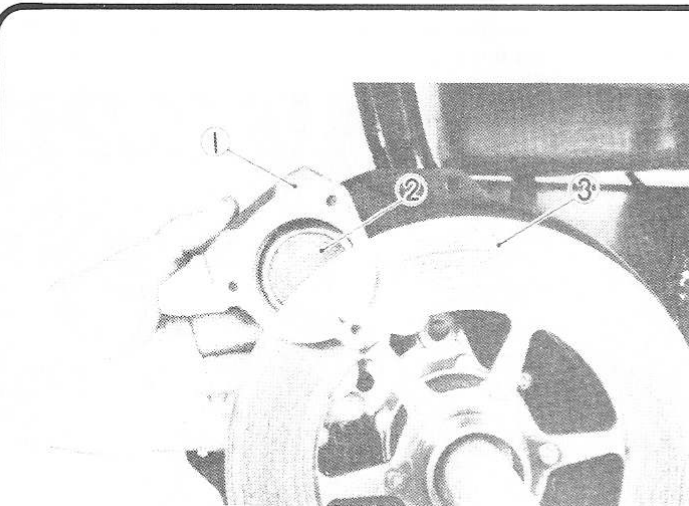


Fig. 6.5 On YTM/YFM 200/225 models, the caliper inner section (1) and pad (2) can be detached as the disc/hub (3) is moved to the right (Sec 10)

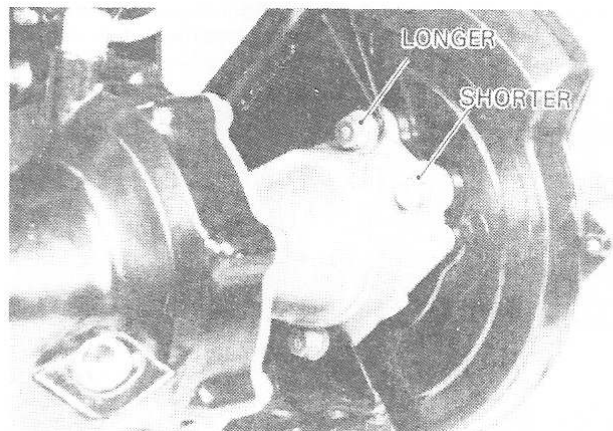


Fig. 6.6 On YTM/YFM 200/225 models, the longer caliper mounting bolt must be installed in the top hole and the shorter bolt in the rear hole (Sec 10)

8 Release the parking brake, then loosen and remove the nuts/bolts (photo) to detach the outer caliper section (the outer pad fits in the outer caliper section).

9 Slide the disc away from the caliper, then remove the inner pad from the caliper. *Always replace both pads as a set if either one is worn to the limit.*

10 Remove the caliper piston with a magnet (photo) and check it for rust, burrs and other damage. Replace it with a new one if it doesn't slide smoothly in the caliper bore. Check the disc as described in Section 7.

11 Loosen the locknut (photo) and turn the brake adjuster in a counterclockwise direction, then push the new pad into the caliper bore. 12 Apply a small amount of grease to the disc splines on the axle (photo), then install the disc and slide it back-and-forth on the splines. Wipe off any excess grease to avoid contaminating the disc.

13 Install the outer caliper section and pad and tighten the nuts to the specified torque.

14 Tighten the ring nut to the specified torque, then bend one of the lock washer tabs to keep it from loosening (always use a *new* washer during installation).

15 Install the disc cover and adjust the brake as described in Chapter 1.

All others

16 Disconnect the rear brake cables, springs and pins from the brake lever at the caliper.

17 Remove the nuts and separate the outer caliper section and pad from the caliper.

18 Remove the disc cover screws and detach the cover.

19 Remove the caliper mounting bolts and separate the caliper and inner pad from the mount while pulling out on the disc/hub assembly. *Always replace both pads as a set if either one is worn to the limit.*

20 Remove the caliper piston with a magnet and check it for rust, burrs and other damage. Replace it with a new one if it doesn't slide smoothly in the caliper bore. Check the disc as described in Section 7.

21 Installation is the reverse of removal. Lubricate the brake disc hub splines and make sure it is free to slide back-and-forth on the axle before installing the caliper (wipe off any excess grease to avoid contaminating the disc). Be sure to tighten the bolts/nuts to the specified torque. *The longer caliper mounting bolt must be installed in the top hole and the shorter bolt in the rear hole.*

22 Adjust the brake as described in Chapter 1.

11 Hydraulic disc brake calipers — overhaul

1 If either caliper is leaking fluid around the piston, it should be removed and overhauled to restore braking performance. Before disassembling the caliper, read through the entire procedure and make sure you have the correct caliper rebuild kit. Also, you will need some new, clean brake fluid of the recommended type, some clean rags, a one-to-two inch micrometer and a telescoping gauge.

2 **Caution:** *Disassembly, overhaul and reassembly of the brake calipers must be done in a spotlessly clean work area to avoid contamination and possible failure of the brake hydraulic system components. If such a work area is not available, have the caliper rebuilt by a dealer service department or motorcycle repair shop.*

3 Remove the brake pads from the caliper (Section 10).

4 Operate the brake lever slowly to force the piston out of the caliper. Place a drip pan under the caliper to catch any brake fluid. Avoid spilling the brake fluid on painted surfaces, plastic or rubber parts.

5 Disconnect the banjo bolt from the fitting at the junction of the brake hose and the caliper.

6 Carefully remove the rubber dust boot from the caliper body. Remove the caliper-to-bracket bolt, the shroud, the collar and the two dust boots.

7 Grasp the piston by hand (use a shop towel if necessary) and pull it straight out of the caliper. *Do not use pliers and do not pry on the piston with metal tools as it may be damaged.* If the piston is difficult to remove, reconnect the brake hose to the caliper body, position the caliper over a box stuffed with clean rags and slowly depress the brake lever until the hydraulic pressure forces the piston out of the caliper. Do not allow the piston to fall onto a hard surface, as damage will result. If compressed air is available it can also be used to remove the piston. The pressure must be kept extremely low or the piston can fly out of the caliper and be damaged or cause injury. Place the air nozzle close to the hose fitting but do not hold it against the hole. Position the caliper

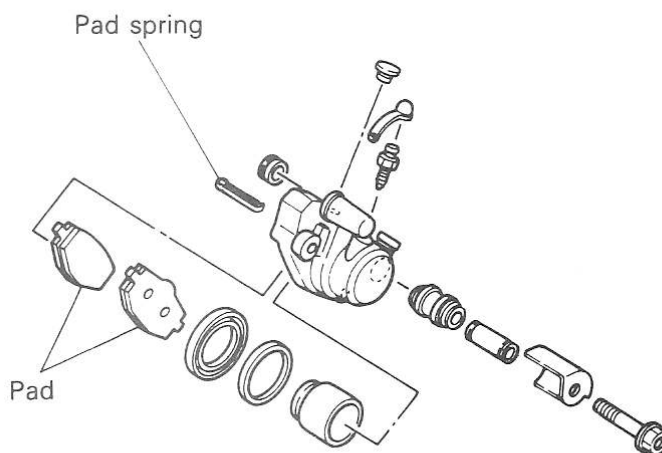


Fig. 6.7 YTZ 250 brake caliper components — exploded view (Sec 11)

over a box stuffed with clean rags during this procedure.

8 Remove the rubber piston seal. To avoid scratching the caliper bore, use a wood or brass tool to remove the seal.

9 Clean all of the components except the pads with brake cleaning solvent (available at auto parts stores). Isopropyl alcohol or clean brake fluid will also work. *Do not, under any circumstances, use a petroleum-based solvent to clean brake parts.* If compressed air is available, use it to dry the parts thoroughly.

10 Check the caliper bore and the outside of the piston for scratches, nicks and score marks. If damage is evident, the caliper must be replaced with a new one.

11 Measure the inside diameter of the caliper bore. Compare the results to the Specifications. If the bore is worn beyond the allowable limit, the caliper must be replaced with a new one. If the necessary precision measuring tools are not available, a dealer service department or motorcycle repair shop can make the measurement for you.

12 Clean all the parts as previously described, then check the caliper holes, collar, bolt and all other parts for evidence of excessive wear. Replace all rubber parts with new ones.

13 Lubricate the new piston seal with clean brake fluid and install it in the groove in the caliper bore.

14 Apply a coat of clean brake fluid to the inside of the caliper bore and carefully push the piston into the caliper.

15 Install the rubber dust boots (make sure they are properly seated).

16 Apply silicone grease to the bracket pin and the caliper-to-bracket bolt. Attach the caliper bracket, collar and shroud with the bolt (make sure the caliper slips over the pin). The caliper should move freely back-and-forth on the pin and bolt.

17 Reconnect the hydraulic brake line to the caliper with the banjo bolt (tighten the bolt to the specified torque).

18 Reinstall the caliper, then refer to Section 14 and bleed the brakes.

12 Front disc brake master cylinder — removal, overhaul and installation

1 If the master cylinder is leaking fluid, or if the lever does not produce a firm feel when the brake is applied, and bleeding the system does not help, master cylinder overhaul is recommended. Before disassembling the master cylinder, read through the entire procedure and make sure that you have the correct rebuild kit. Also, you will need some new, clean brake fluid of the recommended type, some clean rags, internal snap-ring pliers, a zero-to-one inch micrometer and a small hole gauge. To prevent damage to paint and plastic from spilled brake (the cable will have to be detached from the lever if the brake assembly is moved to a workbench).

2 **Caution:** *Disassembly, overhaul, and reassembly of the brake master cylinder must be done in a spotlessly clean work area to avoid contamination and possible failure of the brake hydraulic system components. If such a work area is not available, have the master cylinder rebuilt by a dealer service department or motorcycle repair shop.*

- 3 Pull back the rubber boot, loosen the master cylinder banjo fitting bolt and separate the hose and bolt from the master cylinder as a unit. Have a container handy to catch any brake fluid that may drip out of the master cylinder fitting.
- 4 Plug the hose end with a bolt and nut, then position the hose upright to avoid excessive loss of fluid.
- 5 Remove the lever pivot bolt and locknut, then separate the lever and spring from the master cylinder.
- 6 Remove the two screws and detach the master cylinder from the handlebar.
- 7 Remove the cover and the rubber diaphragm, then drain the brake fluid into a container. Wipe any remaining fluid out of the reservoir with a clean rag.
- 8 Carefully remove the rubber dust boot from the piston assembly.
- 9 Using snap-ring pliers, remove the snap-ring and slide out the piston, the cups and the spring. Lay the parts out in the proper order to prevent confusion during reassembly.
- 10 Clean all of the parts with brake cleaning solvent (available at auto parts stores), isopropyl alcohol or clean brake fluid. *Do not, under any circumstances, use a petroleum-based solvent to clean brake parts.* If compressed air is available, use it to dry the parts thoroughly. Check the master cylinder bore for scratches, nicks and score marks. If damage is evident, the master cylinder must be replaced with a new one.
- 11 Measure the bore with a small hole gauge and micrometer and compare the results to the Specifications. If the bore is worn beyond the allowable limit, the master cylinder must be replaced with a new one. If the necessary precision measuring tools are not available, a dealer service department or motorcycle repair shop can make the measurement for you.
- 12 The rebuild kit should contain a new piston; use it regardless of the condition of the old one.
- 13 Before reassembling the master cylinder, soak the new rubber cup seals in clean brake fluid for ten or fifteen minutes. Lubricate the master cylinder bore with clean brake fluid, then carefully insert the piston and related parts in the reverse order of disassembly. *The larger diameter lips of the cups must be inserted first (so they face in).*
- 14 Install the washer (if equipped) and the snap-ring (make sure the snap-ring is properly seated in the groove with the sharp edge facing out). Install the rubber dust boot.
- 15 Attach the master cylinder to the handlebar and tighten the screws securely. The mark on the master cylinder clamp should be facing up. Install the brake lever/spring and tighten the pivot bolt locknut.
- 16 Connect the brake hose to the master cylinder, then bleed the system as described in Section 14.

13 Rear disc brake master cylinder — removal, overhaul and installation

- 1 If the master cylinder is leaking fluid, or if the pedal does not produce a firm feel when the brake is applied, and bleeding the system does not help, master cylinder overhaul is recommended. Before disassembling the master cylinder, read through the entire procedure and make sure that you have the correct rebuild kit. Also, you will need some new, clean brake fluid of the recommended type, some clean rags, internal snap-ring pliers, a zero-to-one inch micrometer and a small hole gauge. Be careful not to get brake fluid on painted or plastic parts of the machine.
- 2 **Caution:** *Disassembly, overhaul, and reassembly of the brake master cylinder must be done in a spotlessly clean work area to avoid contamination and possible failure of the brake hydraulic system components. If such a work area is not available, have the master cylinder rebuilt by a dealer service department or motorcycle repair shop.*
- 3 Loosen the locknut on the master cylinder pushrod, then remove the banjo bolt and detach the master cylinder-to-caliper hose (be careful not to spill too much fluid). Plug the hose end with a bolt and nut to prevent excessive loss of fluid.
- 4 The master cylinder reservoir is held to the frame by one bolt. Remove the reservoir mount bolt and separate the reservoir assembly from the frame. Do not detach the hose from the reservoir or master cylinder unless it is absolutely necessary.
- 5 Remove the two bolts attaching the master cylinder to the frame. Turn the pushrod to disengage the master cylinder/reservoir from the pedal.

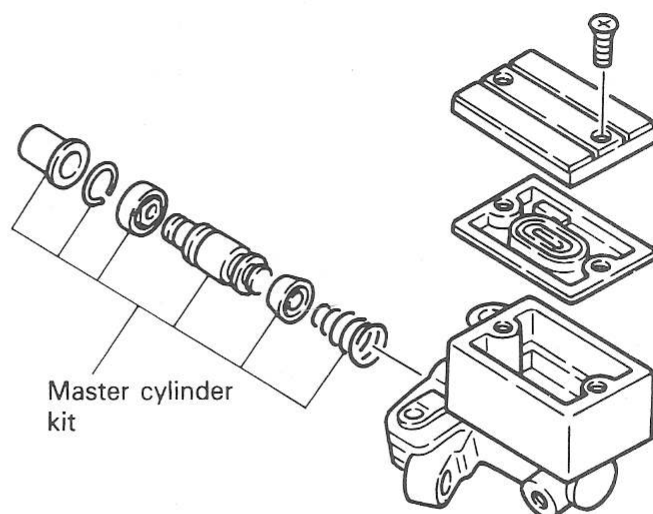


Fig. 6.8 YTZ 250 brake master cylinder components — exploded view (Sec 12)

- 6 With the assembly over a drain pan, remove the reservoir cap and allow the fluid to drain into the pan.
- 7 Pull the rubber dust boot out of the grooved retainer nut on the master cylinder pushrod. It is not necessary to completely remove the dust boot from the pushrod.
- 8 Remove the snap-ring from the bore. The pushrod and piston are spring-loaded and will fly out under pressure so be careful of any brake fluid which may spurt out during this part of the procedure.
- 9 Pull the pushrod, the master cylinder piston and the spring from the master cylinder body. If the piston seems to be stuck in the cylinder bore, it may be necessary to apply a small amount of low air pressure to the fluid outlet to force the piston and cup out of the master cylinder. Lay the parts out in the proper order to prevent confusion during reassembly.
- 10 Clean all the parts with brake cleaning solvent, isopropyl alcohol or clean brake fluid. *Do not, under any circumstances, use a petroleum-based solvent to clean the brake parts.* If compressed air is available, use it to dry the parts thoroughly. Check the master cylinder bore for scratches, nicks and score marks. If damage is evident, the master cylinder must be replaced with a new one.
- 11 Measure the bore with a small hole gauge and micrometer and compare the results to the Specifications. If the bore is worn beyond the allowable limit, the master cylinder must be replaced with a new one. If the necessary precision measuring tools are not available, have a dealer service department or motorcycle repair shop make the measurement for you.
- 12 The rebuild kit should contain a new piston; use it regardless of the condition of the old one.
- 13 Before reassembling the master cylinder, soak the new rubber cup seals in clean brake fluid for 10 to 15 minutes. Lubricate the master cylinder bore with clean brake fluid and carefully insert the spring, piston and related parts in the reverse order of disassembly.
- 14 Install the snap-ring (make sure it is seated in the groove).
- 15 Install the master cylinder and reservoir assembly by reversing the removal procedure.
- 16 When the master cylinder reservoir assembly has been reinstalled, bleed the system as described in Section 14. Adjust the brake as described in Chapter 1.

14 Hydraulic disc brakes — bleeding

- 1 Bleeding the brakes is simply the process of removing all the air bubbles from the master cylinder, the lines and the brake calipers. Bleeding is necessary whenever the brake fluid is changed, when a component or hose is replaced, or when the master cylinder or caliper is overhauled. Leaks in the system may also allow air to enter, but leaking brake fluid will reveal its presence and warn you of the need for repair.
- 2 To bleed the brake, you will need some new, clean brake fluid of

the recommended type, a length of clear vinyl or plastic tubing (3/16-inch ID), a plastic container, some rags and a wrench to fit the brake caliper bleeder valve.

3 Cover painted components to prevent damage in the event that brake fluid is spilled.

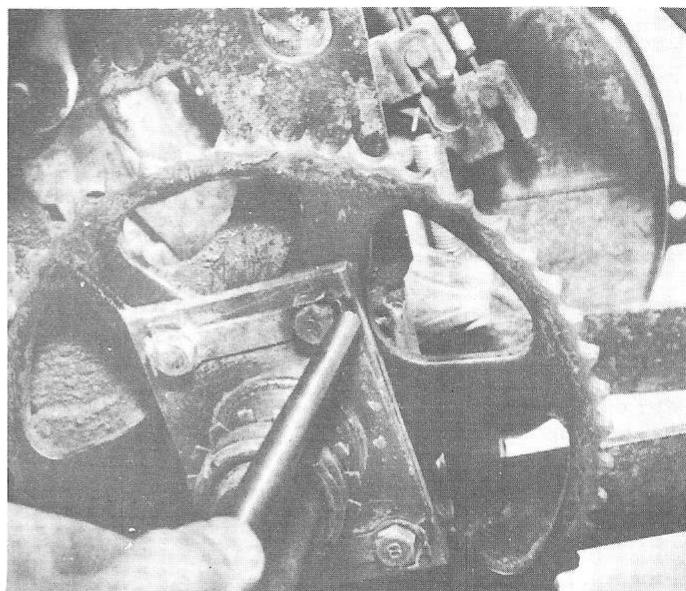
4 Attach one end of the clear vinyl or plastic tubing to the brake caliper bleeder valve and submerge the other end in some clean brake fluid in the plastic container.

5 Remove the reservoir cover and check the fluid level. Do not allow the fluid level to drop below the lower mark during the bleeding procedure. Leave the diaphragm in place.

6 Carefully pump the brake lever or pedal three or four times and hold it while opening the caliper bleeder valve. When the valve is opened, brake fluid will flow out of the caliper into the clear tubing and the lever or pedal will move.

7 Retighten the bleeder valve, then release the brake lever or pedal gradually. Repeat the process until no air bubbles are visible in the brake fluid leaving the caliper and the lever or pedal is firm when applied. Remember to add fluid to the reservoir as the level drops. *Use only new, clean brake fluid of the recommended type. Never reuse the fluid lost during bleeding. If bleeding is difficult, it may be necessary to let the brake fluid in the system stabilize for a few hours. Repeat the bleeding procedure when the tiny bubbles in the system have settled out.*

8 Replace the reservoir cover, wipe up any spilled brake fluid and check the entire system for leaks.



16.3a Flatten the lock plate tabs before loosening the sprocket mounting bolts

15 Brake discs — removal and installation

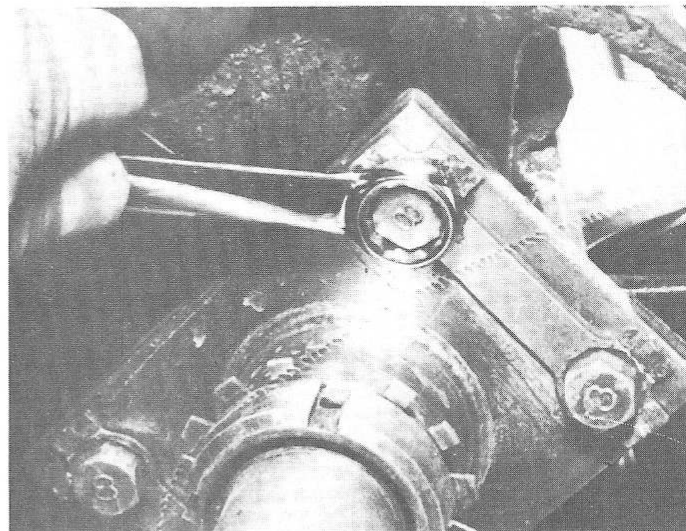
Hydraulic disc brakes

1 Refer to Section 5 when removing the front brake disc (it is part of the wheel disassembly procedure).

2 When removing the rear disc, remove the axle by referring to Section 17, then unbolt the disc from the hub. Be sure to use thread locking compound on the bolts when they are reinstalled.

Mechanical disc brakes

3 The disc on these models is removed as part of the brake pad replacement procedure (refer to Section 10). Note, however, that the right rear wheel and hub must be removed from the axle to slip the disc completely off. The disc rides on a splined sleeve that fits over the axle splines and mates with the seal in the bearing holder. Be sure to apply high-temperature grease to the sleeve that mates with the seal lip and the splines on the axle.



16.3b The bolts are very tight, so loosen them before removing the hub from the axle (YT 125/175)

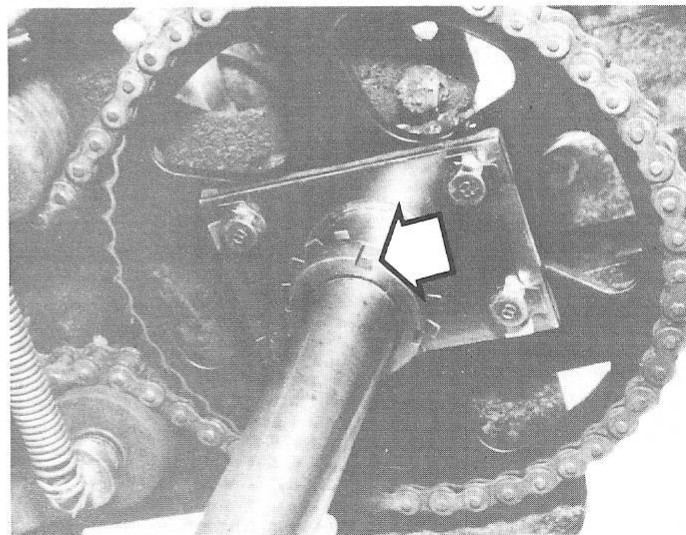
16 Drive sprocket — removal and installation

1 Remove the left rear wheel (Section 4).

2 Remove the drive chain according to the procedure in Chapter 1.

3 Flatten the lock tabs (if equipped) with a hammer and punch, then remove the mounting bolts/nuts and detach the sprocket from the hub. *On YT 125/175 models, the ring nut must be removed and the sprocket hub must be slid off the axle to remove the sprocket (flatten the lock tabs and loosen the bolts before removing the hub) (photos).*

4 Installation is the reverse of removal. Be sure to use new lock plates and tighten the bolts to the specified torque. Bend up the lock tabs to keep the bolts/nuts from loosening. *On YT 125/175 models, be sure to apply grease to the sprocket hub sleeve where it contacts the wheel bearing seal lip. Also, tighten the axle ring nut to the specified torque and bend over the lock washer tab (photo) to keep it from loosening.*



16.4 Be sure to bend one of the tabs into the ring nut slot (the one that lines up the best) to keep the nut from loosening

17 Rear axle — removal, inspection and installation

1 Refer to Section 4 and remove the rear wheels.

Removal — chain drive models

YT 125/175

2 Refer to Chapter 1 and remove the drive chain from the rear sprocket. Refer to Section 10 and remove the disc cover, then apply the parking brake.

3 Straighten the lock washer tab on the right-hand side, then loosen

the ring nut with a pin-type spanner wrench or a hammer and punch.

4 Loosen and remove the nuts and separate the outer caliper section and pad from the inner caliper section.

5 Slide off the disc and splined sleeve and tap the axle out of the bearings toward the left side (install the nut on the end of the axle and use a soft-faced hammer to avoid damaging the axle threads). Slide the sprocket/hub off the axle.

All others

6 Remove the sprocket (Section 16), then loosen and remove both ring nuts from the axle (On YTZ 250 models, the sprocket/hub can be slid off the axle after the nuts are removed). Apply the brake when loosening the nuts.

7 Pull the sprocket hub off the axle.

8 Remove the caliper and disc cover (if equipped), then slide the disc/hub off the axle (on YTZ 250 models, the caliper bracket must be separated from the mount and the disc/hub cannot be removed until after the axle is out). Tap the axle out toward the right side (install the nut on the end of the axle and use a soft-faced hammer to avoid damaging the axle threads).

Removal — shaft drive models

YT 60

9 The axle removal procedure on this model is part of the final drive disassembly procedure (see Section 20).

All others

10 Apply the parking brake, then loosen and remove the ring nuts on the left side of the axle (use a pin-type spanner wrench or a hammer and punch).

11 Release the parking brake, then refer to Section 10 and remove the outer caliper section, disc cover and disc.

12 Tap the axle out toward the right side (install the nut on the end of the axle and use a soft-faced hammer to avoid damaging the axle threads).

Inspection (all models)

13 Inspect all splined areas of the axle for indentations, wear and damage.

14 Also, check all threaded areas for damage and wear of any kind.

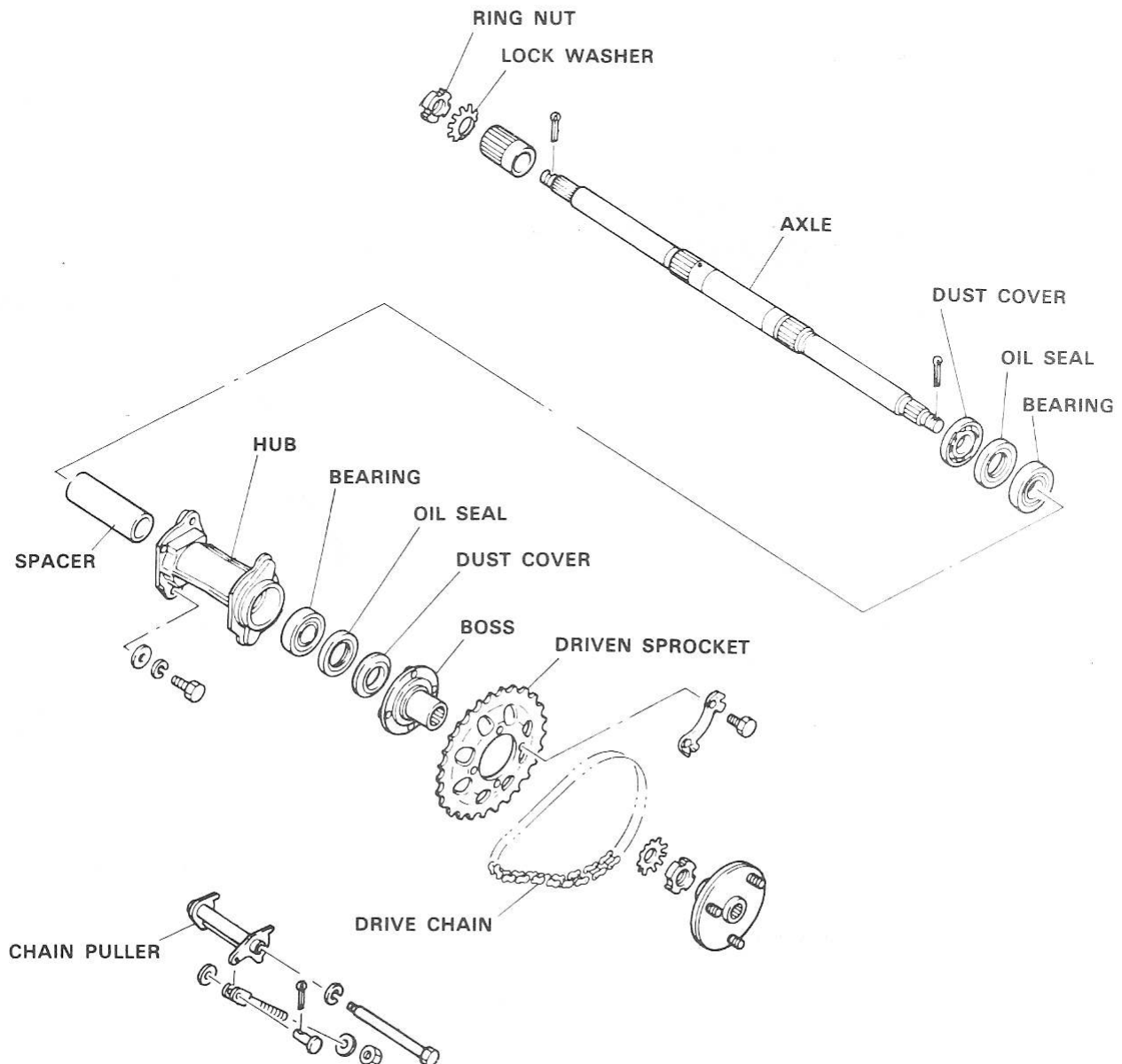


Fig. 6.9 Typical chain drive model rear axle components — exploded view (YT 175 shown) (Sec 17)

15 Take the axle to a Yamaha dealer or automotive machine shop and have them check it for runout. Replace the axle with a new one if runout is beyond the service limit.

Installation (all models)

16 Installation is the reverse of removal. Be sure to use red Loctite on the large ring or hex nuts on the axle. Tighten the inner nut first, followed by the outer nut (hold the inner nut to keep it from turning when tightening the outer nut). If a lock washer is installed, be sure to use a new one and bend one of the tabs into the ring nut recess.

17 On YT 175 models only, install the lock washer and ring nut on the right side of the axle and thread it on until its outer face is 9.65-inches (245.5 mm) from the end of the axle. Tighten the ring nut on the *left* side of the axle to the specified torque, then tighten the right one. Always use new lock washers and bend one of the tabs into the ring nut on each end.

18 On YT 125 models, the ring nuts should be threaded on an equal amount. Make sure the lock washer inner teeth slip over the splines on the axle.

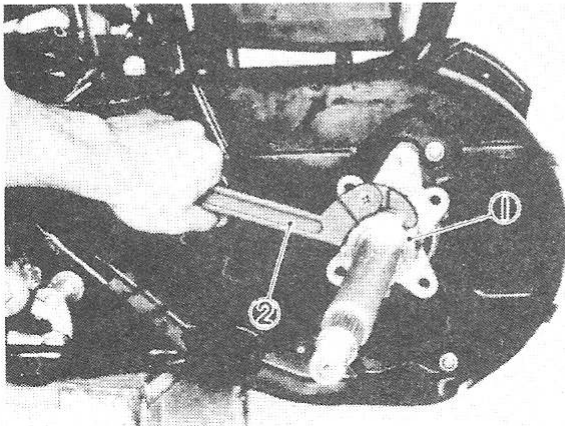
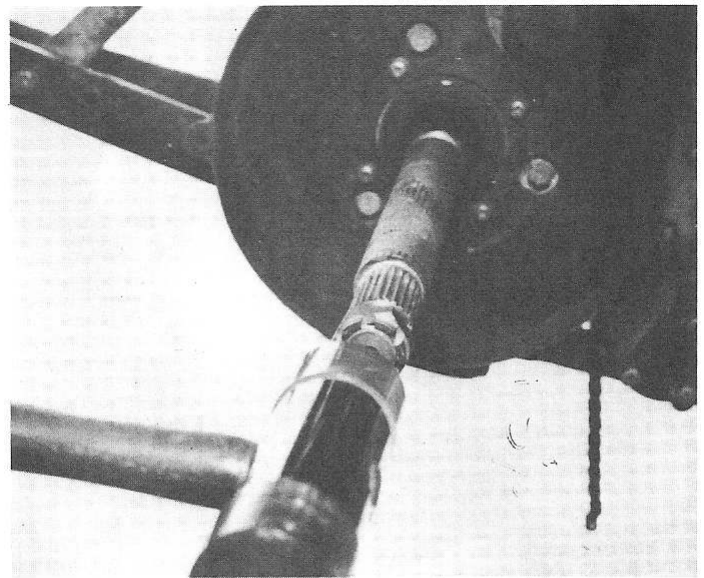


Fig. 6.10 When removing the axle on YTM/YFM 200/225 models, loosen and remove the ring nuts (1) on the left side with a pin-type spanner wrench (2) or a hammer and punch (Sec 17)



17.5 On YT 125/175 models, tap the axle out toward the left side

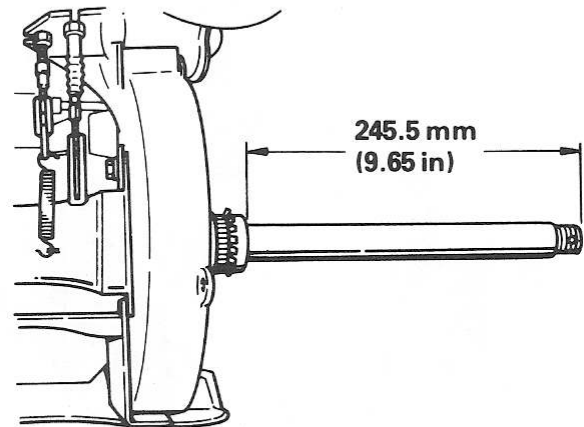


Fig. 6.11 When installing the axle on YT 175 models, thread the right side ring nut onto the axle until its outer face is the specified distance from the axle end (Sec 17)

18 Wheel bearings — inspection and maintenance

1 Wheel bearing maintenance is often neglected because the bearings are relatively inaccessible. The bearings should be removed, cleaned, inspected and repacked every two years (more often if the machine is frequently washed at car washes with high-pressure nozzles). Before beginning, read through the entire Section to familiarize yourself with the procedure.

2 To do the job properly, you will need some medium-weight, all-purpose grease (do not use automotive wheel bearing grease), a large drift punch, a brass or plastic-tipped hammer, some clean solvent, a clean container and a parts brush.

3 New seals and possibly new bearings will also be required.

Rear wheel bearings

Note: This procedure applies only to chain-driven machines. On shaft drive models, the rear wheel bearing in the final drive unit should be removed and installed by a dealer service department, so have them both done at the same time to ensure that it is done correctly.

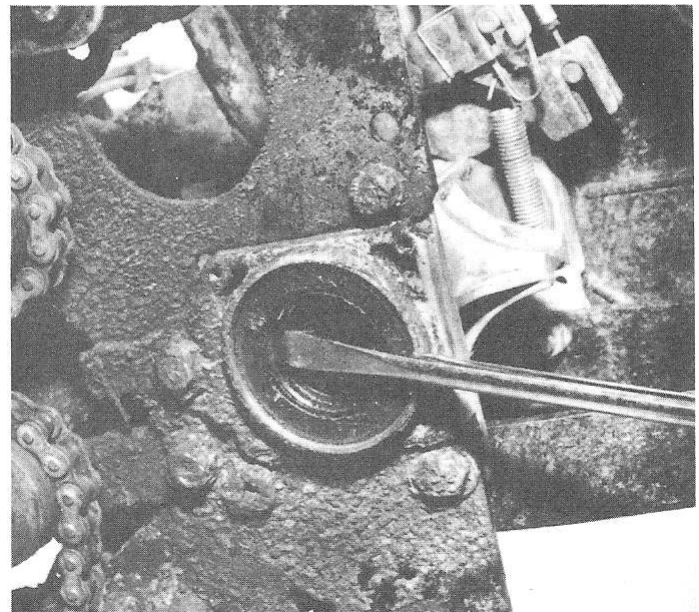
4 Refer to Section 17 and remove the rear axle.

5 Using a large screwdriver, pry the dust seal (if equipped) and seal out of each side of the bearing holder (photo). Be careful not to damage the area around the seal. Refer to Steps 8 through 19 of this Section for bearing removal and inspection. It is identical for both front and rear wheel bearings.

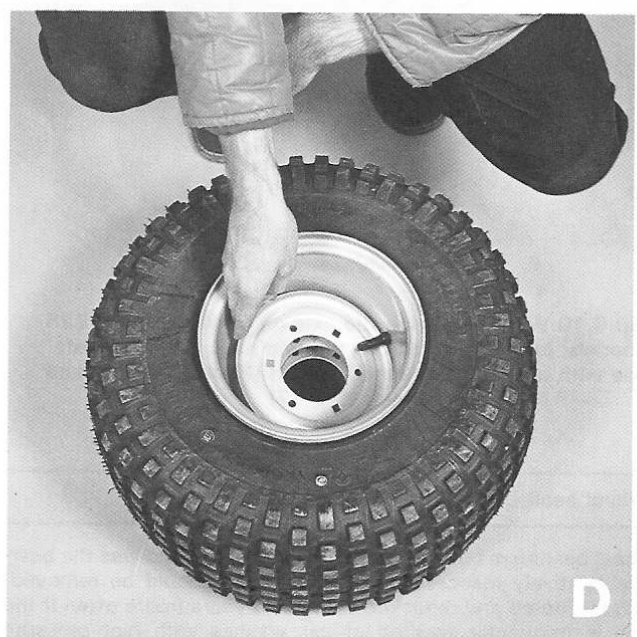
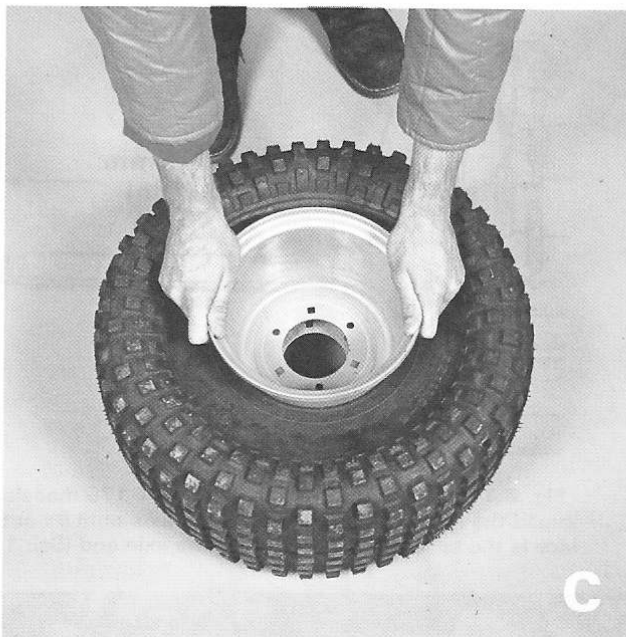
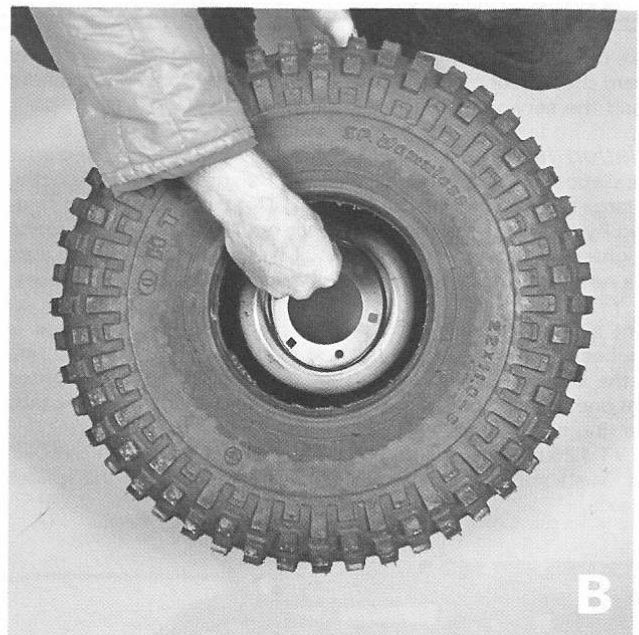
6 After the bearings and seals have been reinstalled in the holder, install the axle by referring to Section 17.

Front wheel bearings

7 Begin by removing the wheel from the machine.



18.5 Prying out a rear hub seal (YT 125/175)

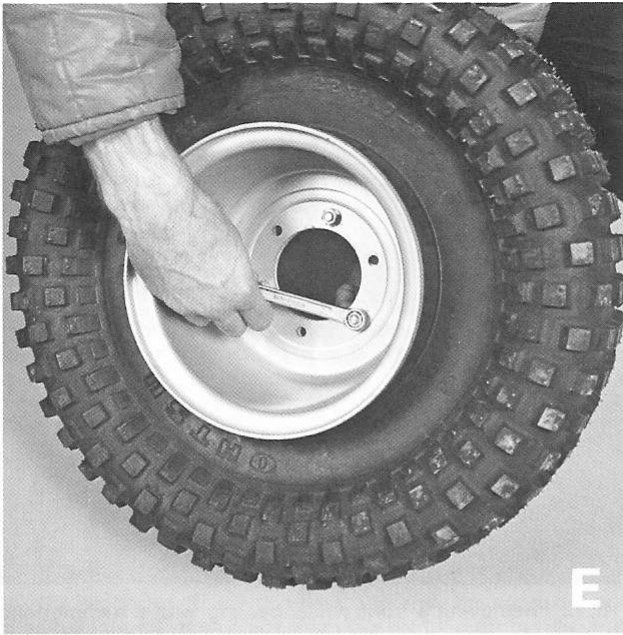


A Install the bead strengthener to the outer bead and install the first rim half (bead strengtheners are included only on some models)

B Position the sealing O-ring into the ring groove on the rim

C Install the second rim half and align the bolt holes

D Install the side plates and align the bolt holes

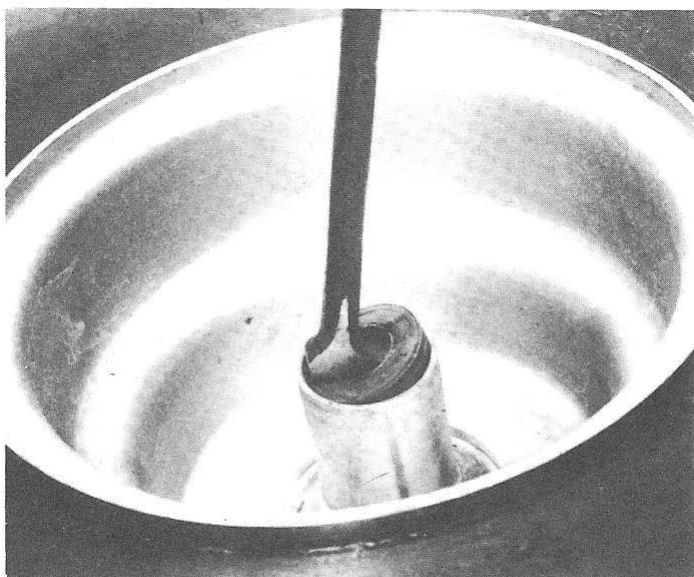


E Install the rim retaining bolts from the outside of the wheel, then install the washers and nuts and tighten them to the specified torque

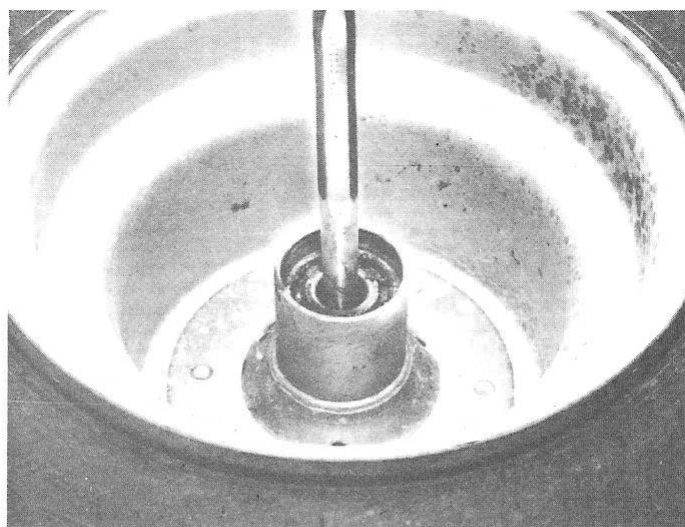
F Apply a detergent solution to the tire beads and rim edges

G Inflate the tire to the recommended maximum pressure to seat the beads, then deflate the tire

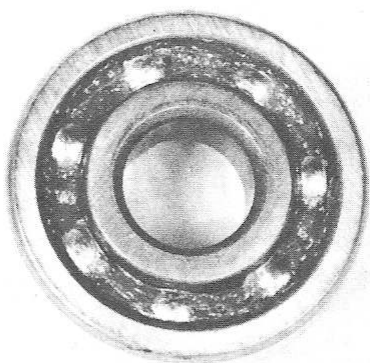
H Inflate the tire again to the correct pressure, then measure the circumference with a tape measure (be sure both rear tires are inflated to the same circumference)



18.8 Prying out a front hub seal (it may be difficult to use a screwdriver as the wheel is not very large in diameter)



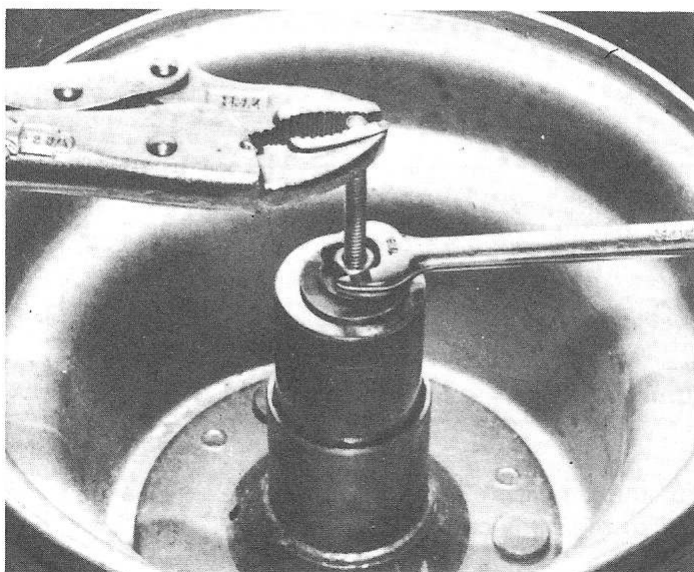
18.12 Removing a front wheel bearing with a hammer and punch



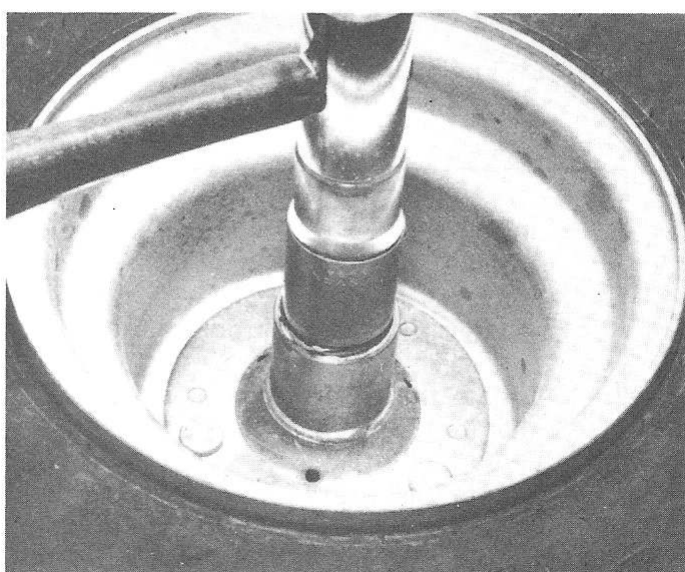
18.15 Pack the wheel bearings approximately 2/3 full of clean, high-quality grease (do not use automotive wheel bearing grease)



18.17a Installing a front wheel bearing with a hammer and socket



18.17b Installing a front wheel bearing with a homemade tool that will apply even pressure (preferred method)



18.18 Installing a front hub seal (tap very gently so the seal isn't damaged — it won't take much pressure to install it)

- 8 Using a pry bar, pry the dust seal (if equipped) and the seal out of one side of the hub (photo). If necessary, cushion the hub with a shop towel to avoid damaging the area around the seal.
- 9 Wipe all dirt and grease from the exposed portion of the bearings and the surrounding hub area.
- 10 Remove the other seal(s) in the same manner.
- 11 The bearings are held in the hub by an interference fit and must be driven out with a long drift punch.
- 12 Insert the punch through one side of the hub and knock the center collar over to one side. Run the punch down the side of the hub until it makes contact with the outer race of the bearing. Tap on the punch with a hammer (around the perimeter of the outer bearing race) until the bearing pops out of the hub (photo). Do not apply force to the inner race.
- 13 Remove the center collar. Insert the drift punch through the open end of the hub and knock the bearing out of the other end.
- 14 Wash the bearings thoroughly with clean solvent to remove the old grease. Dry the bearings (do not spin them with compressed air), then check them for roughness and binding, turning them slowly by hand. If any roughness is noted, they must be replaced with new ones. Most bearings will have some play between the races and the balls. If the play is excessive, replace them with new ones.
- 15 Pack the bearings with clean grease until they are approximately two-thirds full (photo), then place them in a refrigerator or freezer so they will shrink. This will ease installation.
- 16 Check to make sure that the bearing mounts in the hub are clean, then apply a light coat of grease to the outer circumference of the bearings. Position one of the bearings in the hub mount and push it in until it stops.
- 17 Seat the bearing in the hub with a large socket and hammer (photo). Do not hammer on the inner race as the bearing will be damaged. **Note:** *As an alternative, the bearing can be pressed into the hub with a tool assembled from a length of threaded rod, some nuts and washers and a large socket. Position the socket against the outer race of the bearing, then insert the threaded rod through the hub and attach the large washer and nut to the lower end (the washer must bear against the end of the hub). Slip a washer and nut over the socket end, then slowly tighten the nut while holding the threaded rod to keep it from turning (photo). The pressure will force the bearing into the hub (make sure it remains square with the hub bore). Turn the wheel over and install the collar, followed by the remaining bearing. Make sure they are properly seated.*
- 18 Apply a very thin coat of grease to the outer circumference of each seal and tap them into place in the hub using a large socket, or piece of pipe with the same diameter as the seal, and a hammer (photo). Apply pressure evenly to the outer circumference of the seal only. Install the dust seals (if equipped).
- 19 Reassembly is the reverse of disassembly.

19 Tires — removal, repair and installation

- 1 Tubeless tires come as standard equipment on all ATV's. They are generally safer than tube-type tires, but if problems occur they require special repair techniques.

Removal

- 2 Because the force required to break the rim seal involves special equipment, it is suggested that you take the tire and rim to a dealer or reputable repair shop. Servicing these units is often frustrating.
- 3 To remove the tire, first remove the wheel and deflate the tire by pressing on the center of the valve.
- 4 When the tire is completely deflated, push the bead of the tire away from the rim. A special tool is available for bead breaking (it is a large slide-hammer and is the easiest way to release the bead).
- 5 If the tool is too costly or is unavailable, there are alternate methods. One of them is to use a length of smooth hardwood approx-

imately 18-inches long, three-to-four inches wide and 1/2 to 3/4-inch thick. Chamfer one end of the wood to an angle that will fit between the tire and the rim at the bead. Insert the angled end deeply into the joining surfaces and drive it down into the bead with a large hammer, forcing the bead away from the rim at several locations around the rim perimeter until the bead is released. Lubricate the bead with soapy water if it proves obstinate.

- 6 With the beads free, remove the bolts from the rim. Separate the rim halves, remove the O-ring seal from between the rim halves, and remove the rim plates. Check the rim for damage, flat spots and dents.
- 7 Check the tire for cuts, punctures, wear and other damage. Replace the tire if there is any doubt about its condition.

Repair — cold patch method

- 8 Check the tire tread for foreign objects. Chalk mark the punctured area and remove the object.
- 9 Clean and roughen the punctured area on the inside of the tire with a tire rubber cleaner or wire brush. Clean the area with a greaseless solvent such as acetone. **Caution:** *Do not use gasoline.*
- 10 Apply rubber cement around the torn area on the inside of the tire and allow it to dry until tacky before applying the patch. Do not touch the cemented surface with your hands.
- 11 Remove the lining from the patch, center it over the puncture and press the patch against the puncture with a patch roller or the handle of a screwdriver. Press hard and hold it for at least 30 seconds.

Repair — plug method

- 12 This method is to be used only for emergency repair. Replace the plug as soon as possible with a cold patch.
- 13 It is not necessary to remove the wheel from the machine or the tire from the rim. Find the puncturing object, mark its location and remove it from the tire.
- 14 Insert the rubber plug through the eye of the inserting needle (this equipment is available at auto parts stores), apply the cement to the plug and insert the needle until the plug is all the way in the tire. Twist the needle several times and pull it straight out. Trim the plug 1/16-inch (2 mm) from the tire surface.

Installation

- 15 Before replacing the tire on the rim, check the valve for leaks and damage. Check the O-ring for corrosion, distortion and wear.
- 16 Clean the rim bead seats and flanges. Apply clean, warm water to the rim flanges, bead seat and the base.
- 17 Place the rim with the valve into the tire. Install the rim plate. Seat a new O-ring in the groove on the rim and install the other rim and rim plate.
- 18 Align the rim bolt holes and install the bolts. Install each washer and tighten the nuts to the specified torque.
- 19 Inflate the tire to seal the bead.
- 20 Deflate the tire and leave it deflated for one hour before reinflating it to the specified pressure. *Both tires must have the same circumference to prevent improper handling. Measure this with a cloth tape measure.*

20 Shaft drive assembly — general information

The shaft drive assembly consists of the output gear assembly, which is attached to the engine, the driveshaft and U-joint, which run inside the left swingarm tube, and the final drive assembly, which is attached to the rear of the left swingarm tube and mates with the rear axle and hub.

Because of the special tools and expertise required to diagnose, service and repair the shaft drive components, it is recommended that any work required be left to a Yamaha dealer service department. Due to the fact that most of the components run in an oil bath, problems with this type of a drivetrain are few and far between.

Chapter 7 Electrical system

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Specifications

Headlight bulb type

YT 125/175	6V, 25W/25W
YTM 200/225 and YFM 200	45W/45W
YTZ 250	30W/30W

Taillight bulb type

YT 125/175	5.3W
YTM 200/225	8W
YFM 200	7.5W
YTZ 250	3.8W

Lighting/charge coil resistance

YT 60	0.63 ± 10% ohms at 68°F
YT 125/175	0.46 ± 10% ohms at 68°F
YTM 200 K	0.78 ± 10% ohms at 68°F
All others	
Lighting coil	0.34 ± 10% ohms at 68°F
Charge coil	0.4 ± 10% ohms at 68°F

Starter motor

Minimum brush length	0.200 in (5 mm)
Spring pressure	14 to 21 oz (400 to 600 g)
Minimum commutator diameter	0.866 in (22.0 mm)
Mica undercut	
YTM 200 EK	0.071 in (1.8 mm)
All others	0.022 in (0.55 mm)
Starter relay coil resistance	3.43 ± 5% ohms at 68°F

1 General information

The electrical system consists of an AC generator, headlight, taillight, handlebar switches and the connecting wires. YTZ 250 models also have a thermostatic switch for the cooling system and a voltage regulator. Additional components, including a starter motor, starter relay, starting circuit cut-off relay, neutral switch, battery, voltage regulator/rectifier, switch, fuse and wire harness are required on electric-start models.

The AC generator supplies the current to operate the lights and, on electric-start models, to charge the battery. The solid state regulator/rectifier changes the alternating current to direct current, needed to charge the battery, and maintains the generator output within the specified range. The generator consists of the lighting/charging

coils and a permanent magnet rotor mounted on the end of the crankshaft.

The starter motor will operate only when the transmission is in neutral. The starter will operate with the switch in any position, but the engine will start only with the switch in the *Run* position. The cut-off relay prevents current from reaching the starter motor when the transmission is in gear.

Keep in mind that electrical parts, once purchased, cannot usually be returned. To avoid unnecessary expense, make very sure the faulty component has been positively identified before buying a replacement part. **Caution:** *The rectifier can be damaged if subjected to overcharging. Care should be taken to avoid short circuits and incorrect connection of the battery leads. Never connect the rectifier directly to the battery for any reason.*

2 Electrical troubleshooting

A typical electrical circuit consists of an electrical component, the switches, relays, etc. related to that component and the wiring and connectors that hook the component to both the battery and the frame. To aid in locating a problem in any electrical circuit, complete wiring diagrams for each model are included at the end of this Chapter.

Before tackling any troublesome electrical circuit, first study the appropriate diagrams thoroughly to get a complete picture of what makes up that individual circuit. Trouble spots, for instance, can often be narrowed down by noting if other components related to that circuit are operating properly or not. If several components or circuits fail at one time, chances are the fault lies in the fuse or ground connection, as several circuits often are routed through the same fuse and ground connection.

Electrical problems often stem from simple causes, such as loose or corroded connections or a blown fuse. Prior to any electrical troubleshooting always visually check the condition of the fuse, wires and connections in the problem circuit.

If testing instruments are going to be utilized, use the diagrams to plan where you will make the necessary connections in order to accurately pinpoint the trouble spot.

The basic tools needed for electrical troubleshooting include a test light or voltmeter, a continuity tester, which includes a bulb, battery and set of test leads, and a jumper wire, preferably with a circuit breaker incorporated, which can be used to bypass electrical components. Specific checks described later in this Chapter may also require an ammeter or ohmmeter.

Voltage checks should be performed if a circuit is not functioning properly. Connect one lead of a test light or voltmeter to either the negative battery terminal or known good ground. Connect the other lead to a connector in the circuit being tested, preferably nearest to the battery or fuse. If the bulb lights, voltage is reaching that point, which means the part of the circuit between that connector and the battery is problem-free. Continue checking the remainder of the circuit in the same manner. When you reach a point where no voltage is present, the problem lies between there and the last good test point. Most of the time the problem is due to a loose connection. Keep in mind that some circuits only receive voltage when the ignition switch is in the *Run* position.

One method of finding short circuits is to remove the fuse and connect a test light or voltmeter in its place to the fuse terminals. There should be no load in the circuit. Move the wiring harness from side-to-side while watching the test light. If the bulb lights, there is a short to ground somewhere in that area, probably where insulation has rubbed off a wire. The same test can be performed on other components in the circuit, including the switch.

A ground check should be done to see if a component is grounded properly. Disconnect the battery and connect one lead of a self-powered test light (such as a continuity tester) to a known good ground. Connect the other lead to the wire or ground connection being tested. If the bulb lights, the ground is good. If the bulb does not light, the ground is not good.

A continuity check is performed to see if a circuit, section of circuit or individual component is capable of passing electricity. Disconnect the battery and connect one lead of a self-powered test light (such as a continuity tester) to one end of the circuit being tested and the other lead to the other end of the circuit. If the bulb lights, there is continuity, which means the circuit is passing electricity properly. Switches can be checked in the same way.

Remember that all electrical circuits are designed to conduct electricity from the battery, through the wires, switches, relays, etc. to the electrical component (light bulb, motor, etc.). From there it is directed to the frame (ground) where it is passed back to the battery. Electrical problems are basically an interruption in the flow of electricity from the battery or back to it.

3 Battery — inspection and maintenance (electric-start models only)

1 Most battery damage is caused by heat, vibration, or a low electrolyte level, so keep the battery securely mounted, check the electrolyte level frequently and make sure the charging system is func-

tioning properly.

2 Refer to Chapter 1, *Tune-up and routine maintenance*, for electrolyte level and specific gravity checking procedures.

3 Check around the base inside of the battery for sediment, which is the result of sulfation caused by low electrolyte levels. These deposits will cause internal short circuits, which can quickly discharge the battery. Look for cracks in the case and replace the battery if either of these conditions is found.

4 Check the battery terminals and cable ends for tightness and corrosion. If corrosion is evident remove the cables from the battery and clean the terminals and cable ends with a wire brush or knife and emery paper. Reconnect the cables and apply a thin coat of petroleum jelly to the connections to slow further corrosion.

5 The battery case should be kept clean to prevent current leakage, which can discharge the battery over a period of time, especially when it sits unused. Wash the outside of the case with a solution of baking soda and water. **Caution:** *Do not get any baking soda solution in the battery cells.* Rinse the battery thoroughly, then dry it.

6 If acid has been spilled on the frame or battery box, neutralize it with the baking soda and water solution, dry it thoroughly, then touch up any damaged paint. Make sure the battery vent tube is directed away from the frame and is not kinked or pinched.

7 If the machine sits unused for long periods of time, disconnect the cables from the battery terminals. Refer to Section 4 and charge the battery once every month.

4 Battery — charging

1 If the machine sits idle for extended periods or if the charging system malfunctions, the battery can be charged from an external source.

2 To properly charge the battery you will need a charger of the correct rating, a hydrometer, a clean rag and a syringe for adding distilled water to the battery cells.

3 The maximum charging rate for any battery is 1/10 of the rated amp/hour capacity. As an example, the maximum charging rate for a 14 amp/hour battery would be 1.4 amps. If the battery is charged at a higher rate it could be damaged.

5 When charging the battery always remove it from the machine and be sure to check the electrolyte level before hooking up the charger. Add distilled water to any cells that are low.

6 Loosen the cell caps, hook up the battery charger leads (red to positive, black to negative), cover the top of the battery with a clean rag, then, and only then, plug in the battery charger. **Warning:** *Remember, the gas escaping from a charging battery is explosive, so keep open flames and sparks well away from the area.* Also, the electrolyte is extremely corrosive and will damage anything it comes in contact with.

7 Allow the battery to charge until the specific gravity is as specified (refer to Chapter 1 for specific gravity checking procedures). The charger must be unplugged and disconnected from the battery when making specific gravity checks. If the battery overheats or gases excessively, the charging rate is too high. Either disconnect the charger or lower the charging rate to prevent damage to the battery.

8 If one or more of the cells does not show an increase in specific gravity after a long slow charge, or if the battery as a whole does not take a full charge, it is time for a new battery.

9 When the battery is fully charged, unplug the charger first, then disconnect the leads from the battery. Install the cell caps and wipe any electrolyte off the outside of the battery case.

5 Fuse — check and replacement (electric-start models only)

1 The fuse is located in the electrical component box at the rear of the frame. It protects the main, headlight and ignition system wiring and components from damage caused by short circuits.

2 If the fuse blows, be sure to check the wiring harness very carefully for evidence of a short circuit. Look for bare wires and chafed, melted or burned insulation. If the fuse is replaced before the cause is located the new fuse will blow immediately.

3 Never, under any circumstances, use a higher rated fuse or bridge the fuse holder terminals, as damage to the electrical system could result.

4 Occasionally a fuse will blow or cause an open circuit for no obvious reason. Corrosion of the fuse ends and fuse holder terminals may occur and cause poor fuse contact. If this happens remove the corrosion with a wire brush or emery paper, then spray the fuse ends and terminals with electrical contact cleaner.

6 Lighting system — check

Manual-start models

YT 125/175

1 Check all wires and connections to make sure they are undamaged and securely attached. Check the bulbs for burned out filaments and make sure they are the correct capacity.

2 With the engine running the lights should be balanced, which means that the voltage in the lighting circuit should be the same at all points at a given rpm. The voltage can be checked with a multimeter by connecting one test lead to any light circuit wire connection and the other test lead to a good ground. The multimeter selector switch should be in the *20 volts AC* range.

3 Start the engine and note the voltage reading. It should be 6 volts (5.8 volts on YT 125 models) or more at 3000 rpm and 8.3 volts or less at 8000 rpm.

4 If the measured voltage is too high or too low, check again for bad connections, damaged wires, burned out bulbs or bulb capacities that are incorrect.

5 Refer to Section 16 and check the lighting coil resistance.

YTM 200K

6 Check all wires and connections to make sure they are undamaged and securely attached. Check the bulbs for burned out filaments.

7 Using a multimeter, check the voltage at the yellow/red wire connected to the light switch. Set the multimeter selector switch to the 20 volts AC range. One test lead should be attached to the wire and the other to a good ground.

8 Start the engine and place the switch in the high beam position. The voltage should be 12 volts or more at 3000 rpm and 18 volts or less at 8000 rpm.

9 If the measured voltage is too high or too low, check again for bad connections, damaged wires, burned out bulbs or bulb capacities that are incorrect. If no voltage is indicated, check the wires and connections from the engine to the switch, then refer to Section 16 and check the lighting coil resistance. If the wires are damaged or disconnected no voltage will reach the switch. If the lighting coil is defective no voltage will be produced.

10 If the voltage was as specified, repeat the check at the headlight bulb connector. Unplug the headlight wire connector and connect the test leads to the yellow and black wires, then to the green and black wires. If the voltage is not as specified, check the dimmer switch as described in Section 10.

YTZ 250

11 Check all wires and connections to make sure they are undamaged and securely attached. Check the bulbs for burned out filaments.

12 Using a multimeter, check the voltage at the light switch wire. Attach one test lead to the yellow/red wire and the other lead to a good ground. The multimeter selector switch should be in the *20 volts AC* position. Start the engine and run it at 1500 rpm.

13 If the voltage is more than 12 volts, the regulator is probably faulty and should be replaced. If it is less than 12 volts, proceed to Step 14. If no voltage is indicated, check the wires and connections from the engine to the switch, then refer to Section 16 and check the lighting coil resistance. If the wires are damaged or disconnected no voltage will reach the switch. If the lighting coil is defective no voltage will be produced.

14 If the voltage is as specified, repeat the check at the headlight bulb connector. Unplug the headlight wire connector and connect the test leads to the yellow and black wires, then to the green and black wires. If the voltage is not as specified, check the wires and connections between the switch and light, then refer to Section 10 and check the switch.

Electric-start models

15 If the headlight does not work with the engine running check the voltage at the headlight connector with a multimeter. The selector switch should be in the 20 volts AC position.

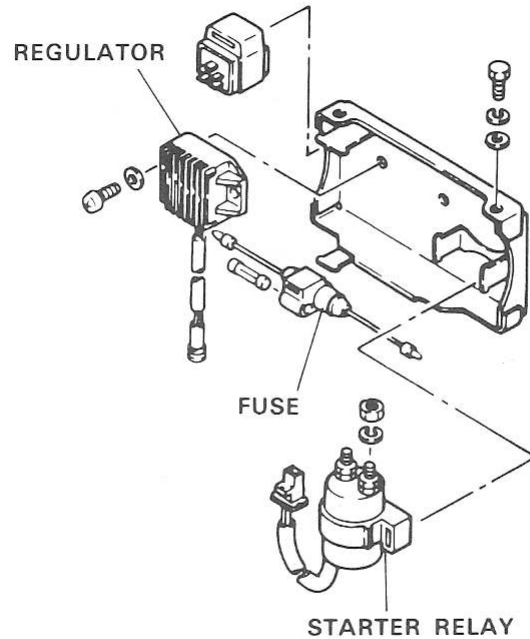


Fig. 7.1 On electric-start models, the fuse, starter relay, starting circuit cut-off relay and regulator/rectifier are mounted together at the rear of the machine (Sec 5)

16 Unplug the connector and attach the test leads to the yellow and black wire terminals. Start the engine and check the voltage with the switch in the high beam position. It should be 11.3 volts or more at 3200 rpm and 18 volts or less at 8000 rpm. **Note:** *The voltage check can be made at any point in the lighting circuit and the voltage readings should be as specified.*

17 If the measured voltage is too high or too low, check for bad connections, damaged wires, burned out bulbs or bulbs of the wrong capacity.

18 If no voltage is indicated refer to Section 16 and check the lighting coil resistance. If the voltage is excessive refer to Section 17 and check the voltage regulator.

19 If the lighting coil resistance is as specified, check for voltage at the yellow/red wire on the light switch. It should be as indicated in Step 16. If there is no voltage there is an open or poor connection between the AC generator and the light switch.

20 If the voltage at the switch is as specified, check for voltage at the blue wire on the main switch (YTM models only). If no voltage is noted the light switch is defective or there is an open or poor connection between the light switch and the main switch.

21 If the voltage at the main switch is as specified, check for voltage at the blue/black wire on the light switch. If there is no voltage the main switch is defective or there is an open or poor connection between the switches (see Section 10).

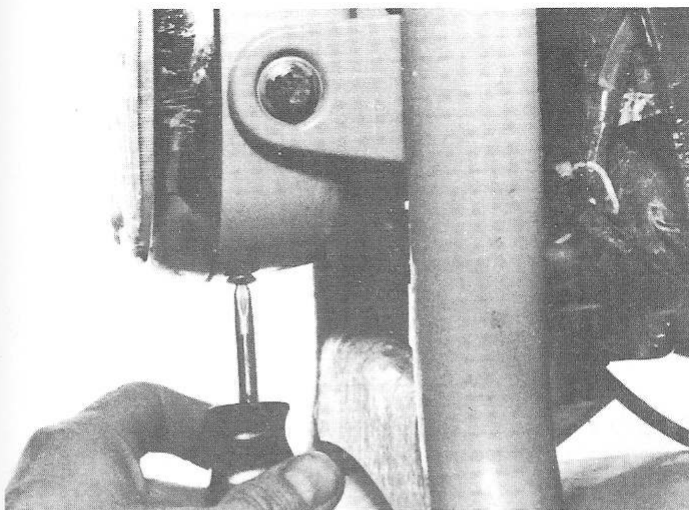
22 Check for voltage at the headlight connector (high and low beam). Attach the test leads to the yellow wire and black wire, then move the lead from the yellow wire to the green wire and make a second check. If there is no voltage the light switch is defective (see Section 10). If the voltage is as specified check the headlight wiring for a poor connection or bad ground.

23 If the lights do not work with the main switch on *Light* (engine off), check the battery, wires and wire connections.

24 If the battery is in good condition and the wires and connections are undamaged, check for battery voltage at the main switch, the light switch and the light connector terminals with a multimeter or test light. Set the selector switch to the 20 volts DC range and connect the test leads to the appropriate wire terminal and a good ground or the negative battery terminal.

25 If voltage is present at one switch, but not the next one, check the wires and connections between them then refer to Section 10 and check the switch itself.

26 If voltage is present all the way to the light wire connector, check the bulb(s) and look for a bad ground or poor connection.



7.1 The headlight bulb on some models is accessible after removing the screws and detaching the lens

7 Headlight bulb — replacement

- 1 The headlight bulb can be replaced by turning the handlebars to expose the back of the lens assembly and detaching the rubber boot. On models with a headlight bucket, remove the screws (photo), pull out on the bottom of the lens assembly and separate it from the bucket.
- 2 Push in and turn the bulb holder counterclockwise, pull it out of the lens assembly, then withdraw the bulb and insert the new one.
- 3 Install the bulb holder and turn it clockwise to seat it, then attach the rubber boot.

8 Taillight bulb — replacement

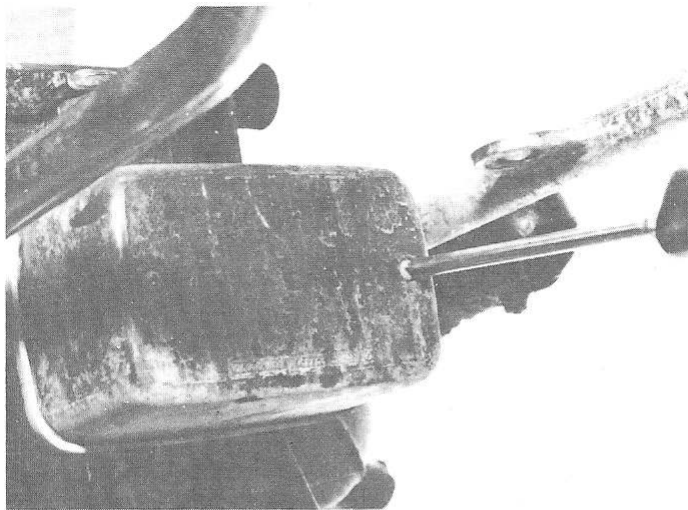
- 1 Taillight bulb replacement requires removal of the plastic lens, which is held in place with screws (photo), and the bulb.
- 2 To remove the bulb, push in and turn it counterclockwise. Check the socket terminals for corrosion and clean them if necessary. Line up the pins on the new bulb with the slots in the socket, push in and turn the bulb clockwise until it locks in place.
- 3 When replacing the lens make sure the rubber gasket is not kinked or pinched and do not overtighten the screws.

9 Handlebar switches — removal and installation

- 1 The handlebar switches are composed of two halves that clamp around the handlebars. They are easily removed for cleaning or inspection by taking out the clamp screws and carefully pulling the switch halves away from the handlebars.
- 2 To completely remove the switches, the wiring harness should be unplugged and pulled free and any cable ties should be released or cut and replaced with new ones. On YT 60 models the switch must also be separated from the throttle cable.
- 3 When installing the switches make sure the wiring harnesses are properly routed to avoid pinching or stretching the wires.

10 Handlebar switches — check

- 1 Generally speaking, the switches are reliable and trouble-free. Most troubles, when they do occur, are caused by dirty or corroded contacts, but wear and breakage of internal parts is a possibility that should not be overlooked. If breakage does occur the entire switch and related wiring harness will have to be replaced with a new one, since individual parts are not usually available.
- 2 The switches can be checked for continuity with an ohmmeter or



8.1 Removing the taillight lens screws

a continuity test light. Always disconnect the battery ground cable, which will prevent the possibility of a short circuit, before making the checks.

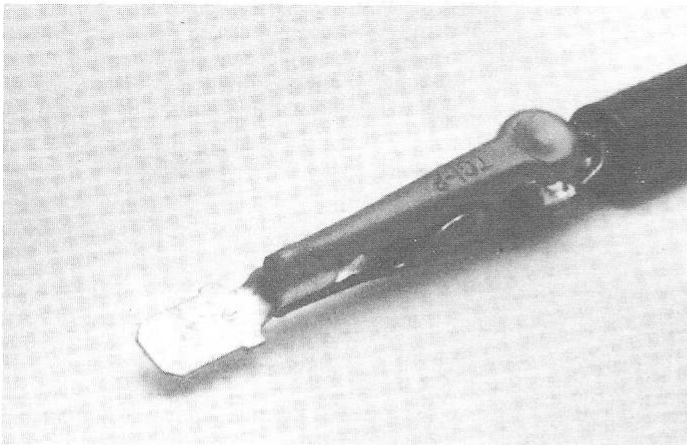
- 3 Trace the wiring harness of the switch in question and unplug the harness connectors.
- 4 Using the ohmmeter or test light, check for continuity between the terminals of the switch harness with the switch in the various positions. Refer to the illustrations on the appropriate wiring diagram at the end of this Chapter. For YT 175 models use the YT 125 diagram. Continuity should exist between the terminal wires connected by the solid line when the switch is in the indicated position.
- 5 If the continuity check indicates that a problem exists, disassemble the switch and spray the switch contacts with electrical contact cleaner. If they are accessible, the contacts can be scraped clean with a knife or polished with emery cloth. If switch components are damaged or broken it will be obvious when the switch is disassembled.

11 Neutral/reverse switch — check (electric-start models only)

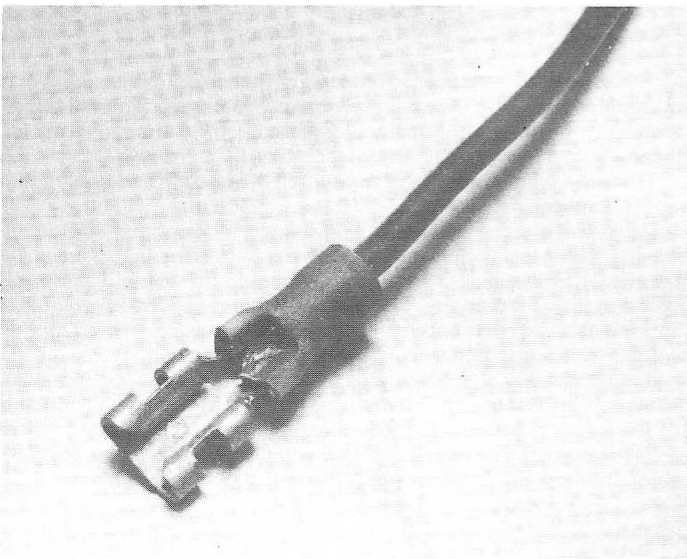
- 1 The neutral switch, which is threaded into the crankcase on the lower left side of the engine, operates an indicator light when the transmission is in Neutral. More importantly, it is connected to the starter relay and will allow the engine to be started only if the transmission is in Neutral. The reverse switch, also mounted on the lower left side of the engine, provides current to the indicator light when the transmission is in Reverse (not all models).
- 2 It can be checked with an ohmmeter or a continuity test light. Disconnect the switch wire, then touch one ohmmeter or light probe to the switch and touch the other probe to the engine crankcase. The meter or light should indicate continuity when the transmission is in Neutral and no continuity when the transmission is in gear.
- 3 If the switch is defective it must be replaced with a new one. You may have to remove the footpeg and shift lever to gain access to the switch. **Note:** Before unscrewing the switch from the crankcase tip the machine slightly to the right and support it so it cannot fall. This will prevent oil from running out of the hole in the crankcase when the switch is removed. Install and tighten the new switch after coating the threads with thread sealant (do not use teflon tape), then hook up the switch wire.

12 Starter relay — check

- 1 Position the main switch to *On*, the engine stop switch to *Off* and make sure the transmission is in *Neutral*. Push the start button and listen for a *click* from the relay. If no sound is heard, turn the switch off and check the connector in the wiring harness attached to the relay (red/white and black wires). Check for battery voltage at the wire ter-



12.3 The ohmmeter leads can be attached to the tab connector, then the connector can be inserted into the terminal



14.5 Automotive-type tab connectors (female) will allow you to apply voltage to the relay terminals without accidentally causing a short circuit

minals (the switch must be *On*). If no voltage is indicated check the starting circuit cut-off relay, the stop switch, the main switch, the fuse and all wiring and connections, in that order.

2 If voltage is indicated at the red/white wire terminal and not the black terminal, check the solenoid coil as follows.

3 Make sure the main switch is *Off*, then disconnect the relay wiring harness connector. Attach the leads from an ohmmeter to the red/white and black wires leading to the relay and place the ohmmeter selector switch in the *Rx 1* position. Use automotive-type male tab connectors (photo) to attach the ohmmeter leads to the wire terminals. The ohmmeter should indicate 3.43 ohms. If the reading is greater than 3.43 ohms, or if it is zero, the solenoid is defective and should be replaced with a new one.

13 Starter relay — removal and installation

1 Make sure the main switch is *Off*, then disconnect the negative cable from the battery.

2 Carefully pry up the plastic cover on the relay and remove both large cables.

3 Unplug the small wire connector, then slide the relay out of the mount.

4 Installation is the reverse of removal. Reconnect the negative battery cable *after* all the other electrical connections are made.

STARTING CIRCUIT CUT-OFF RELAY (ohms $\times 10$)

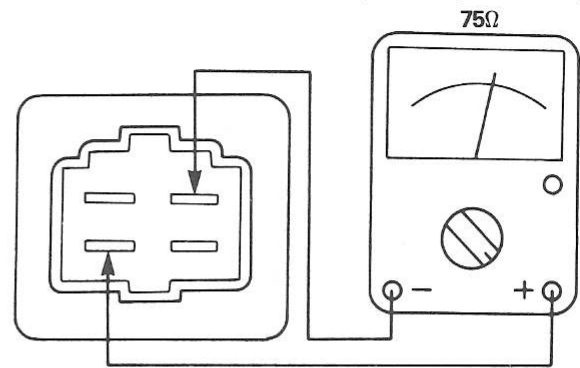


Fig. 7.2 Check the starting circuit cut-off relay coil winding resistance by attaching the ohmmeter leads to the terminals as shown here (Sec 14)

STARTING CIRCUIT CUT-OFF RELAY

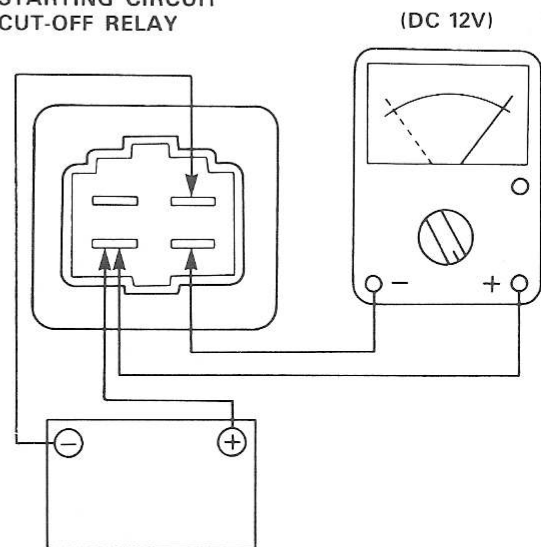


Fig. 7.3 Checking the relay operation by applying 12 volts and checking for continuity between the terminals (the solid line on the ohmmeter indicates the position of the needle when the battery is connected; the dashed line indicates the needle position when the battery is not connected) (Sec 14)

14 Starting circuit cut-off relay — check

1 The starting circuit cut-off relay is located at the rear of the machine, on the same mount as the starter relay and regulator/rectifier.

2 The relay is attached to a frame tab by a rubber cushion mount. It can be identified by examining the wiring at the connector. Look for a connector with a sky blue and three red/white wires attached to it.

3 Pull the relay out, then depress the connector lock and separate the connector from the relay.

4 Using an ohmmeter, check the resistance of the relay coil windings. Hook up the ohmmeter leads as indicated in the accompanying illustration. The resistance should be 75 ohms. If it is not, replace the relay with a new one. If the resistance is as specified, proceed to Step 5.

5 Connect the battery and an ohmmeter to the relay terminals as shown in the accompanying illustration. Use jumper leads with automotive-type female tab connectors (photo) to hook up the battery. With the battery connected the ohmmeter should read zero ohms. With the battery disconnected the ohmmeter should read infinite resistance. **Note:** A continuity test light can be used in place of an ohmmeter. If a light is used, it should glow when the battery is connected and go out when it is disconnected.

6 If the relay fails the check, replace it with a new one.

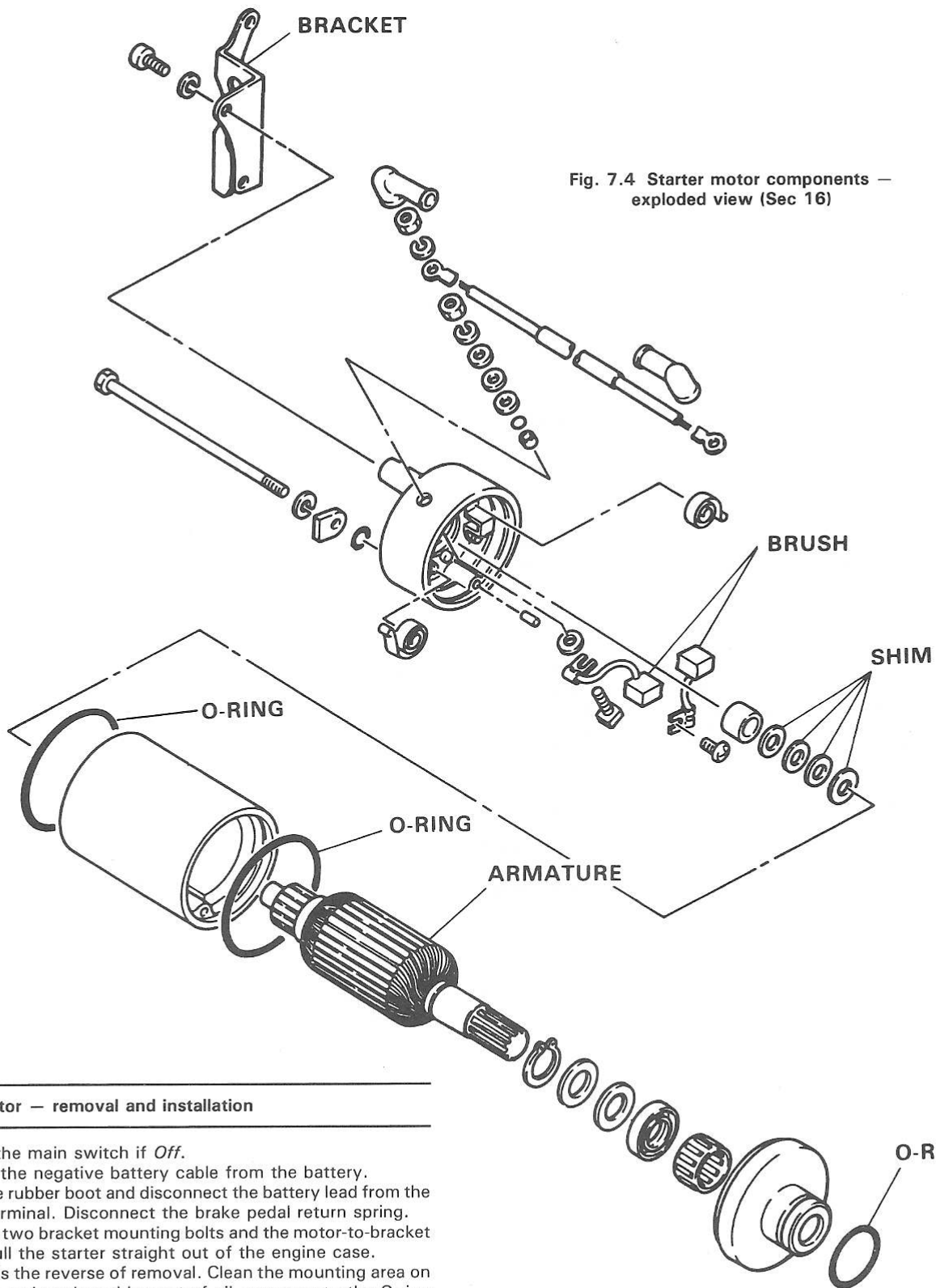


Fig. 7.4 Starter motor components — exploded view (Sec 16)

15 Starter motor — removal and installation

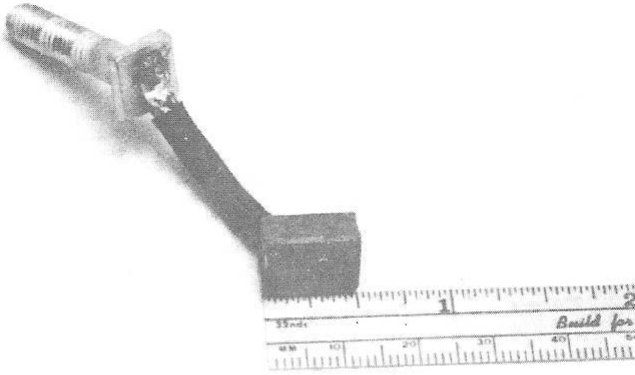
- 1 Make sure the main switch is *Off*.
- 2 Disconnect the negative battery cable from the battery.
- 3 Pull back the rubber boot and disconnect the battery lead from the starter motor terminal. Disconnect the brake pedal return spring.
- 4 Remove the two bracket mounting bolts and the motor-to-bracket screws, then pull the starter straight out of the engine case.
- 5 Installation is the reverse of removal. Clean the mounting area on the engine case and apply a thin coat of oil or grease to the O-ring on the starter before sliding it back into place.

16 Starter motor — disassembly, inspection and reassembly

Dissassembly

- 1 Remove the two long case screws and separate the end covers from the motor. Don't lose the shims that fit over the ends of the armature. The armature is free to slip out of the case, so support it securely.

- 2 Remove the brush lead mounting screw, pull back the spring and carefully slide the brush assembly out.
- 3 The other brush can be removed by loosening the nut on the battery cable mounting bolt.
- 4 Pull back the spring and slide the brush attached to the bolt out of the holder.
- 5 Clean the motor components thoroughly to remove brush residue, oil and dirt.



16.6 Measuring the starter motor brush length with a ruler (note that the bolt does not have to be removed from the motor cover for this procedure)

Inspection

6 The parts of the starter motor that most likely will require attention are the brushes. Measure the length of the one attached to the bolt (photo) and compare it to the Specifications. If either one or both brushes are worn beyond the specified limits, replace them with new ones. If the brushes are not worn excessively, cracked, chipped, or otherwise damaged, they may be reused.

7 Inspect the commutator for scoring, scratches and discoloration. The commutator can be cleaned and polished with crocus cloth, but do not use sandpaper or emery paper. After cleaning wipe away any residue with a cloth soaked in an electrical system cleaner or denatured alcohol. Measure the commutator diameter and compare it to the specifications (photo). If it is less than the service limit the motor must be replaced with a new one.

8 The mica insulation between the commutator segments should be 0.020 to 0.030-inch below the copper. If it isn't it can be undercut with a hacksaw blade ground to fit the grooves.

9 Using an ohmmeter or a continuity test light, check for continuity between the commutator bars (photo). Continuity should exist between each bar and all of the others. Check for continuity between the commutator bars and the armature shaft. There should be no continuity between the commutator and the shaft. If the checks indicate otherwise, the armature is defective.

10 Check for continuity between the motor end cover and the battery cable terminal bolt. There should be no continuity. Continuity should exist between the battery cable terminal and the brush lead. If the checks indicate otherwise, the insulator between the bolt and cover is defective.

11 Check the starter drive gear for worn, cracked, chipped or broken teeth. If the gear is damaged or worn, the motor must be replaced.

12 Check the bearing inside the cover for wear or damage. Make sure the armature rotates smoothly without binding or excessive side play.

13 Check the armature shaft ends and the bushing in the cover for excessive wear and scoring. If wear or damage has occurred, a new motor will be required.

Reassembly

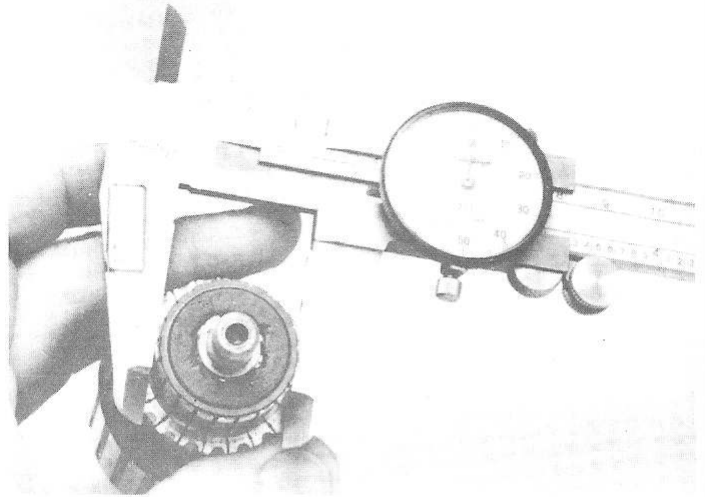
14 Slip the shims onto the ends of the armature in the correct order, then apply a thin coat of high-temperature grease to the bushing and bearing and install the armature in the motor case. Make sure the thrust washers do not fall off the shaft as the armature passes through the motor — they are attracted by the magnets in the case.

15 Attach the brush end cover to the motor by slipping the brushes carefully over the commutator and engaging the armature end in the cover bushing.

16 Attach the remaining cover to the motor.

17 Make sure the covers are seated properly on the motor case with the marks aligned, then install and tighten the two long screws.

18 Check the large O-ring on the gear end of the motor. If it is damaged or cracked replace it with a new one before installing the motor.



16.7 Measuring the commutator diameter with a dial caliper



16.9 Checking for continuity between the commutator bars

17 AC generator — check

Output — manual-start models

1 The AC generator output check is described in detail as part of the lighting system check. If the voltage indicated during the lighting system check (Section 6) was incorrect, and the wires and connections between the engine and the switch are in good condition, the lighting coil resistance should be checked.

Output — electric-start models

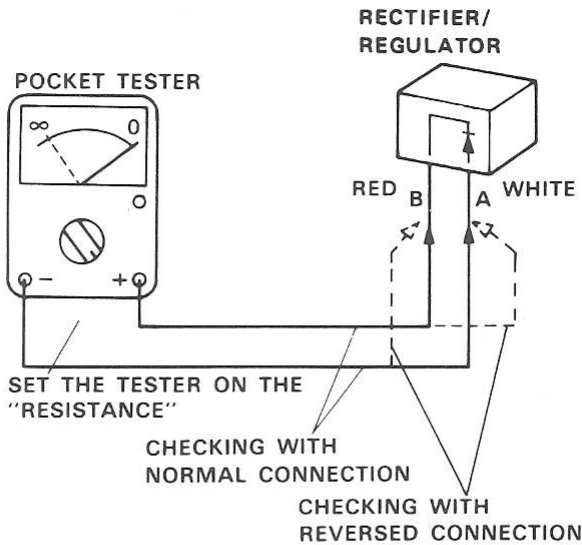
2 Remove the seat/rear fender assembly, then attach the multimeter test leads to the battery terminals, red to positive and black to negative. Place the multimeter selector switch in the 20 volts DC range.

3 Start the engine and run it at approximately 1500 rpm while noting the reading on the meter. It should be 12-to-16.5 volts on YFM 200N models and 14-to-15 volts on all other models.

4 If the specified voltage is not reached, check all wires and connections, the battery, the charging coil resistance and the regulator/rectifier. If the battery and charging coil are in good condition, the regulator is probably defective and should be replaced with a new one. Have the results verified before purchasing a new one.

Lighting/charging coil resistance check

5 Disconnect the lighting/charging coil wire harness running from the engine. On electric-start models the charging coil wire is white,



Checking element	Pocket test connecting point		Good	Replace (element shorted)	Replace (element opened)
	(+) (red)	(-) (black)			
1	A	B	○	○	×
2	B	A	×	○	×

Fig. 7.5 When checking the rectifier, hook up the test leads as shown (the 0 on the chart indicates continuity; the X indicates no continuity) (Sec 18)

while on manual-start models, the lighting coil wire is yellow/red.
 6 Connect one ohmmeter lead to the wire and the remaining lead to a good ground on the engine. Compare the ohmmeter reading to the Specifications. If it is not as specified, the coil is probably defective and should be replaced with a new one.

7 If this check has indicated a defective coil, refer to Chapter 2, remove the rotor and stator plate, separate the coil from the plate and take it to a Yamaha dealer to have the results confirmed.

18 Voltage regulator/rectifier — check

1 If the voltage output is excessive (Section 17), the regulator is probably defective and should be replaced with a new one.

Test step	Water temperature	Pocket tester ($\Omega \times 1$)
1	0 ~ 98°C (32 ~ 208.4°F)	Discontinuity
2	more than 105 ± 3°C (more than 221.0 ± 37.4°F)	Continuity
3*	105 to 98°C (221 to 208.4°F)	Continuity
4*	less than 98°C (less than 208.4°F)	Discontinuity

Test 1 & 2; Heat-up tests

Test 3* & 4*; Cool-down tests

Fig. 7.6 When checking the thermostatic switch on YTZ 250 models, the resistance should be checked at various temperatures (Sec 19)

2 The rectifier (electric-start models only) can be checked with an ohmmeter by hooking the red test lead to the red rectifier wire and the black test lead to the white rectifier wire. The selector switch should be in the *Rx1* position). No continuity should be indicated.

3 Reverse the test leads (red-to-white wire and black-to-red wire) and repeat the check. There should be continuity indicated.

19 Thermostatic switch — check (YZZ 250 only)

1 The thermostatic switch is threaded into the thermostat housing, just to the rear of the left radiator. If the coolant warning light does not come on for three seconds when the engine is started or when the coolant temperature exceeds 208.4°F, check it as follows.

2 Make sure the bulb is in working condition and that the AC generator is producing current (Section 17). Check all wires and connections in the circuit for damage and security.

3 Refer to Chapter 1 and drain the cooling system, then detach the wire and remove the thermostatic switch.

4 Attach one ohmmeter test lead to the switch wire terminal and the other test lead to the switch body, then immerse the inner end of the switch in a pan of water, along with a thermometer.

5 While heating the water on a stove, check for continuity with the water at the temperatures indicated on the accompanying chart.

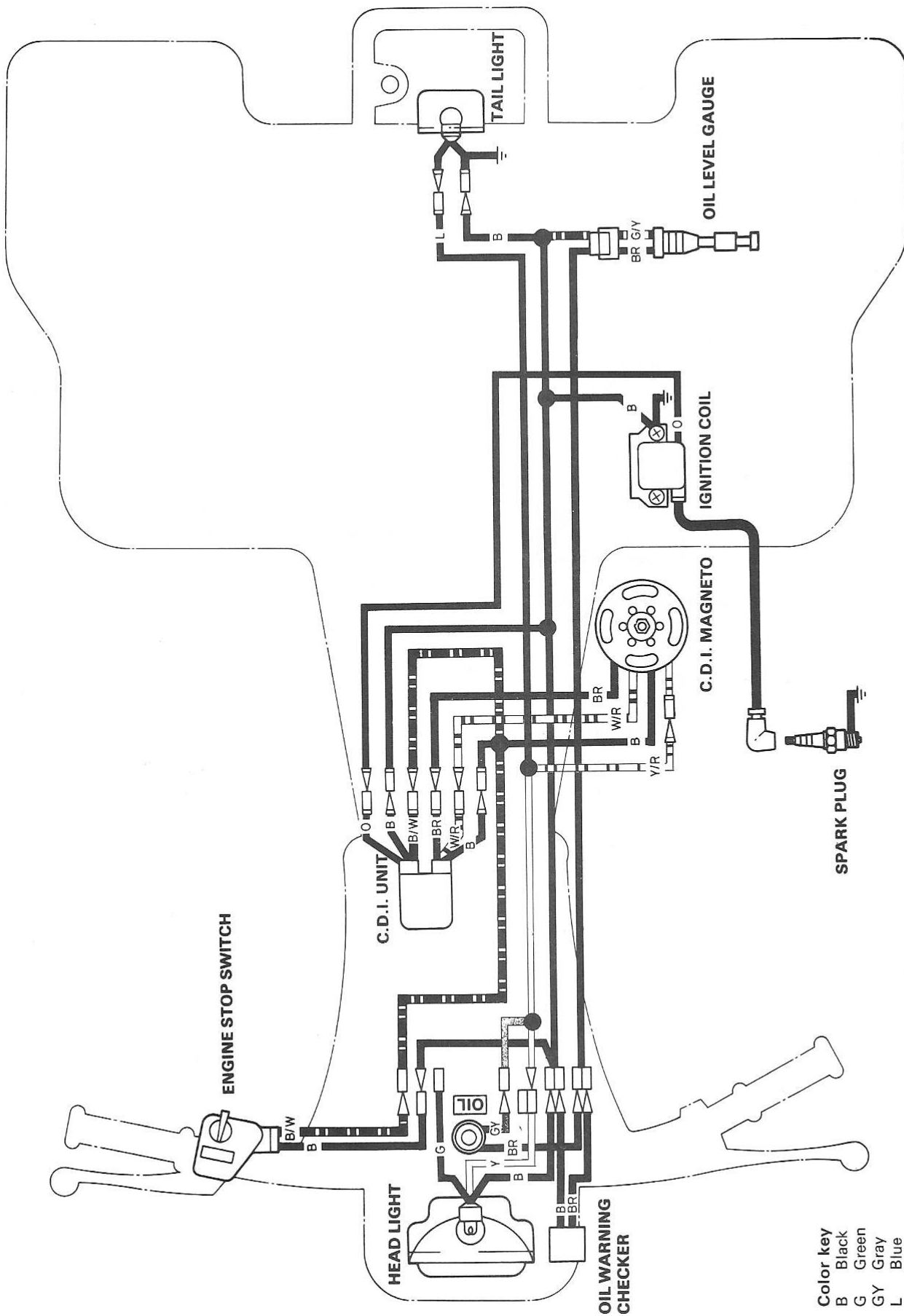


Fig. 7.7 YZ175 wiring diagram

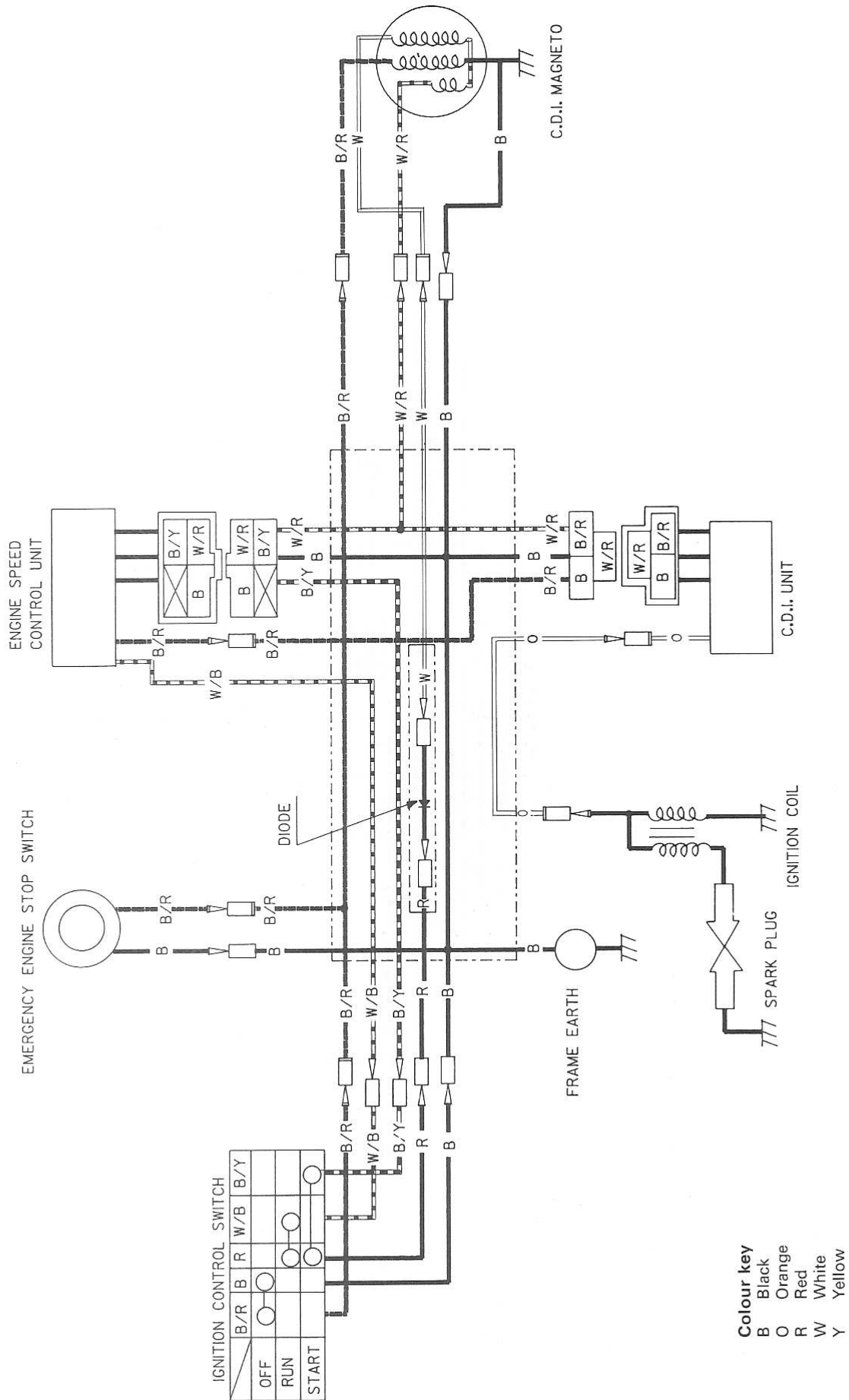


Fig. 7.8 YT60 wiring diagram

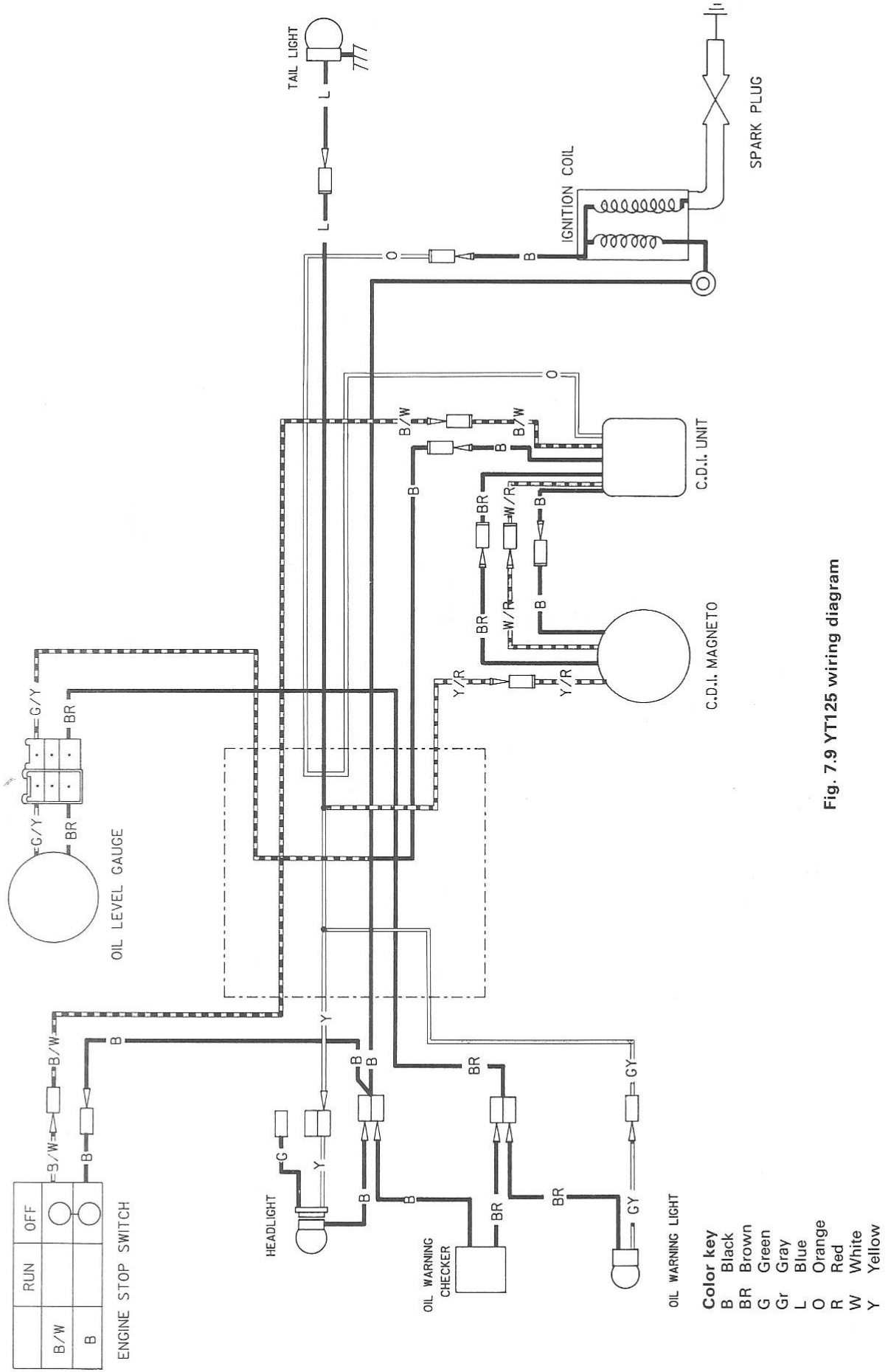
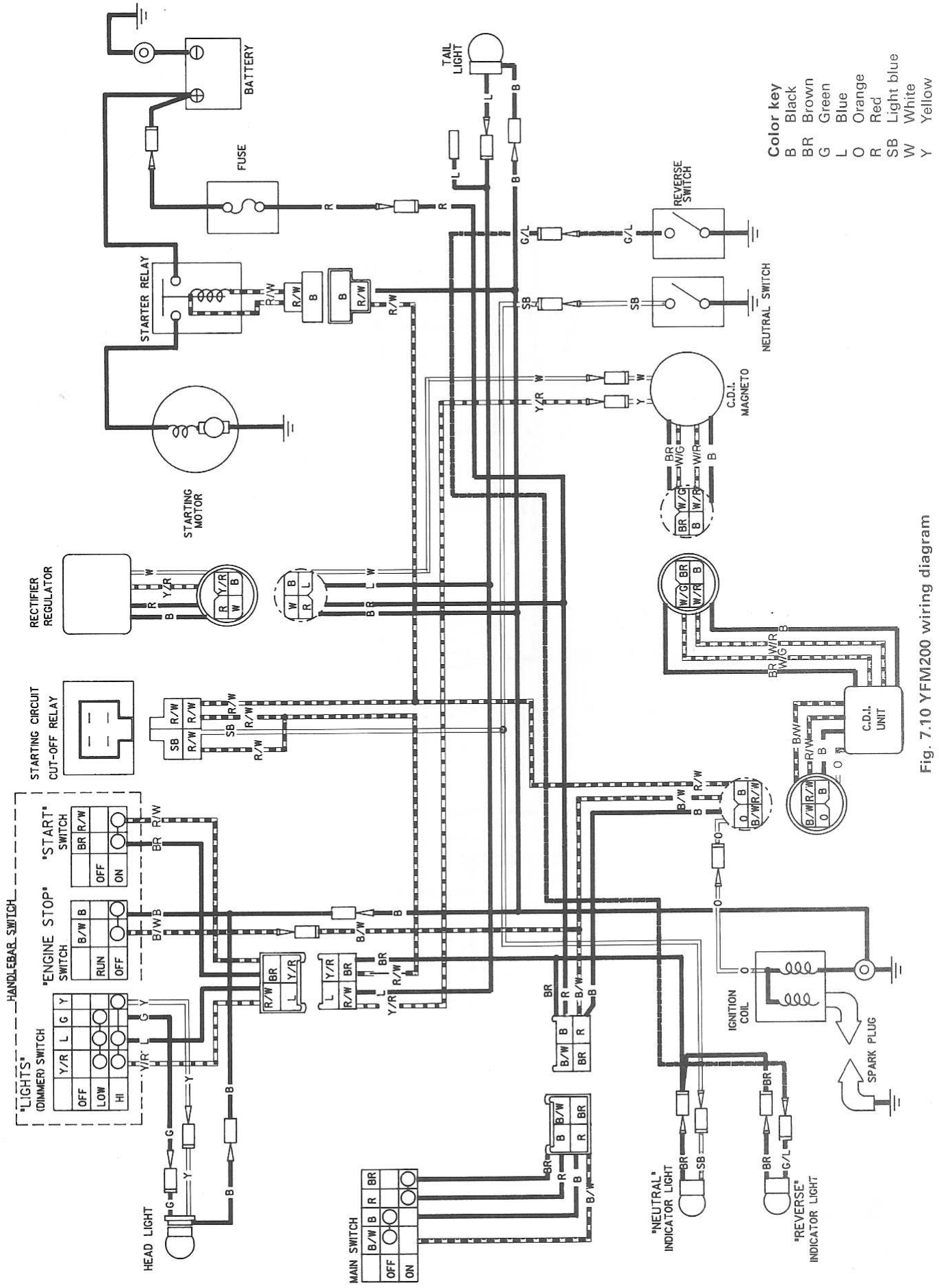


Fig. 7.9 YT125 wiring diagram



- Color key**
- B Black
 - BR Brown
 - G Green
 - L Blue
 - O Orange
 - R Red
 - SB Light blue
 - W White
 - Y Yellow

Fig. 7.10 YFM200 wiring diagram

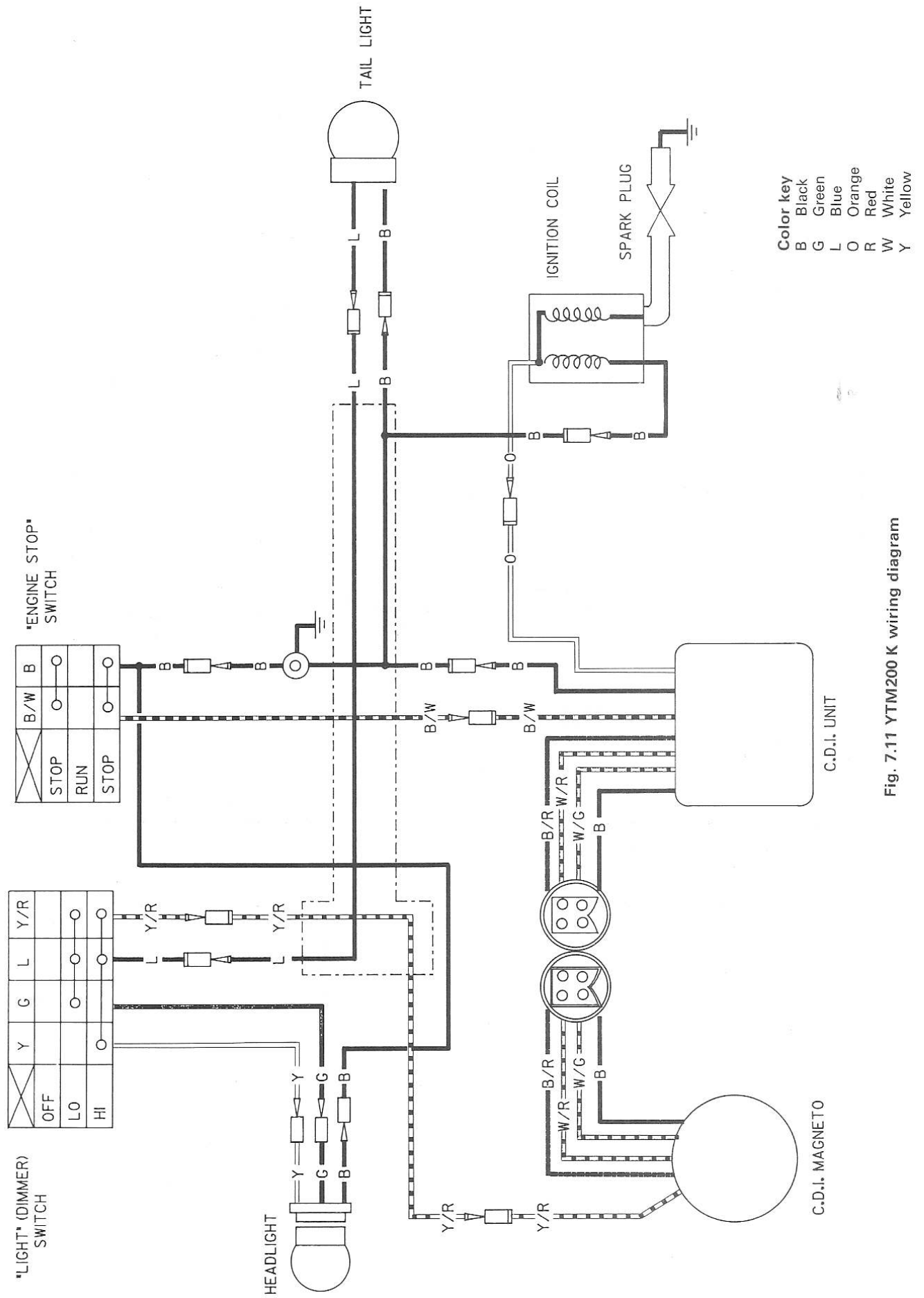


Fig. 7.11 YTM200 K wiring diagram

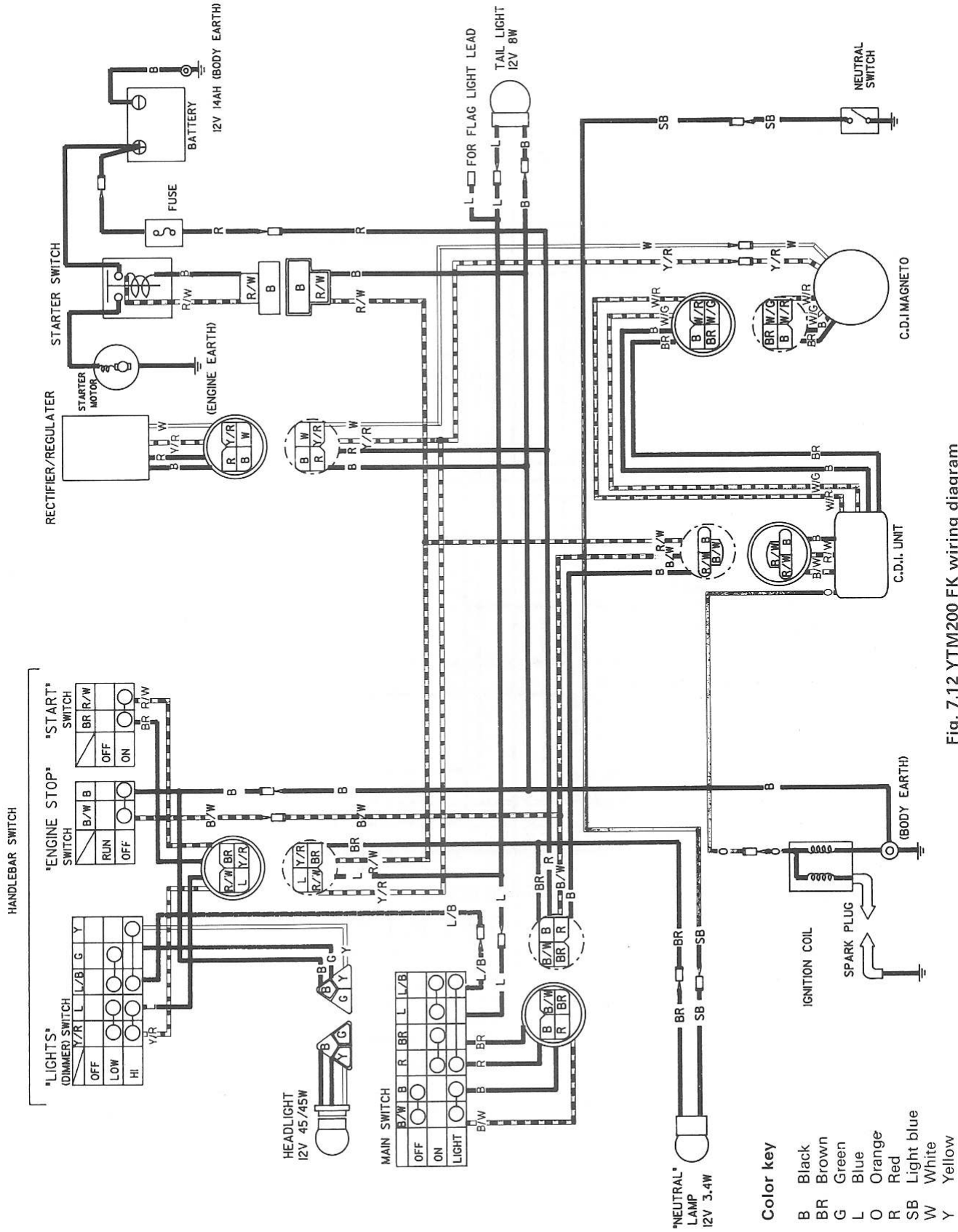


Fig. 7.12 YTM200 FK wiring diagram

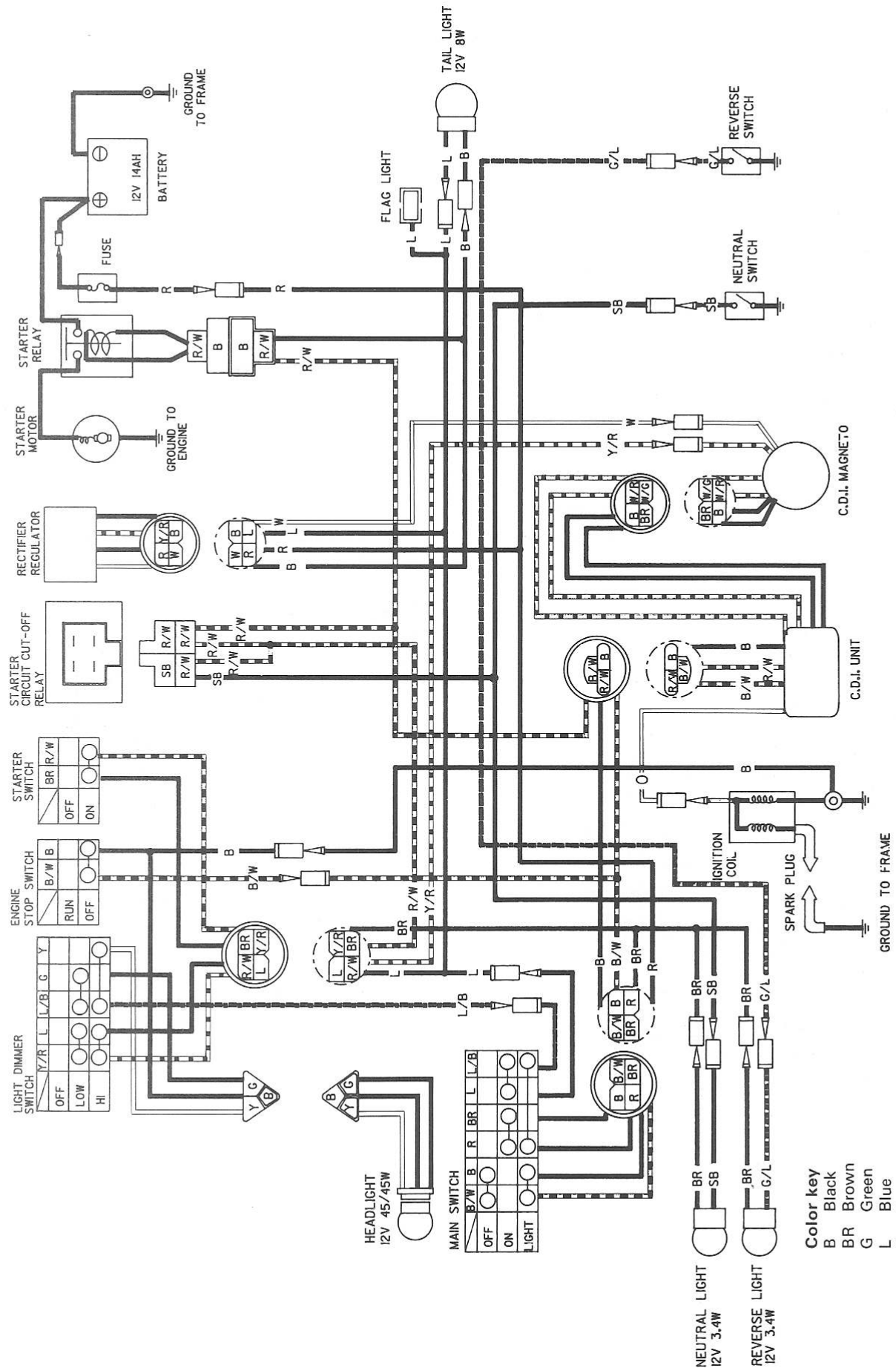


Fig. 7.13 YTM200 ERN wiring diagram

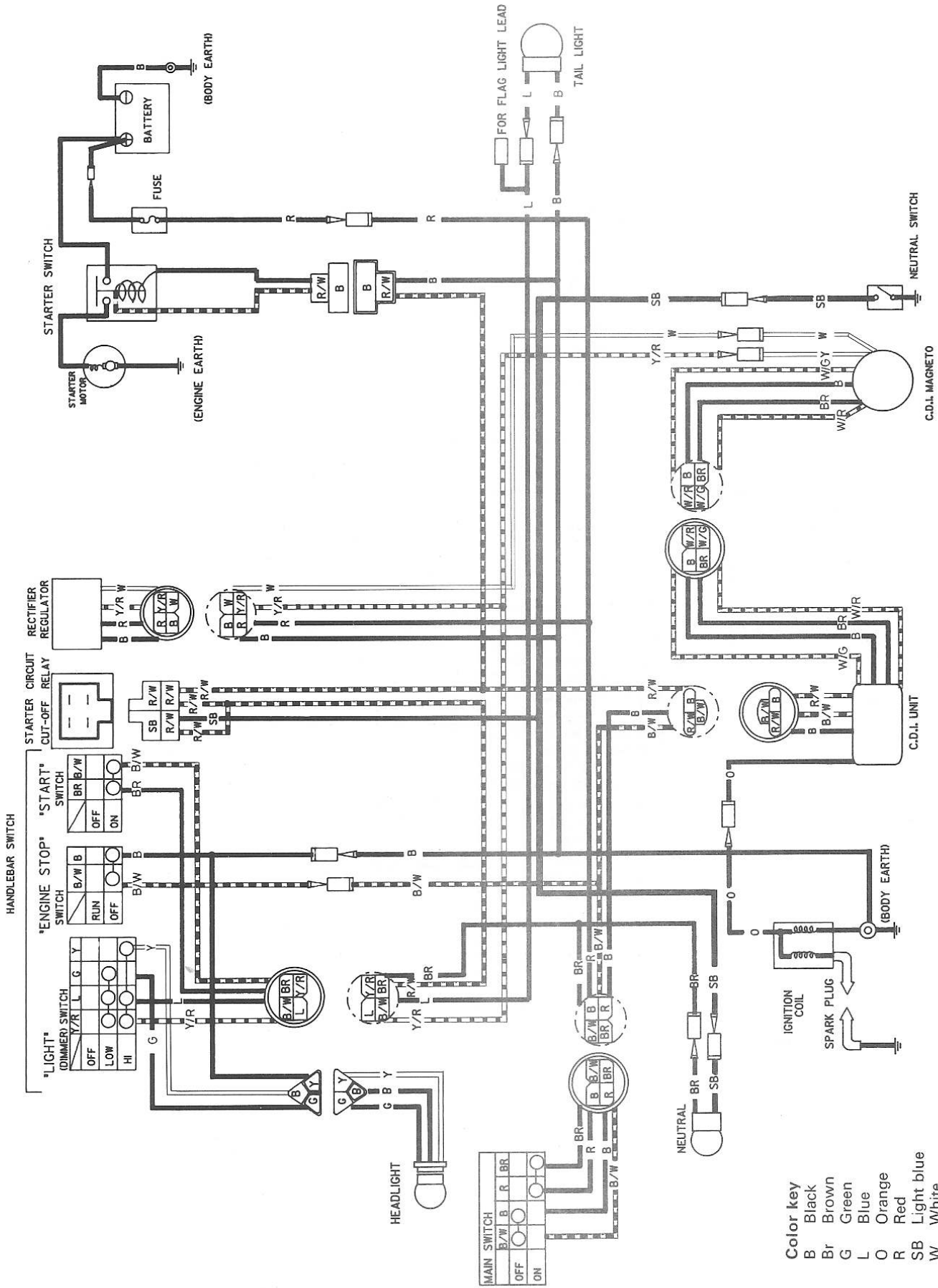


Fig. 7.14 YTM225 wiring diagram

- Color key**
- B Black
 - Br Brown
 - G Green
 - L Blue
 - O Orange
 - R Red
 - SB Light blue
 - W White
 - Y Yellow

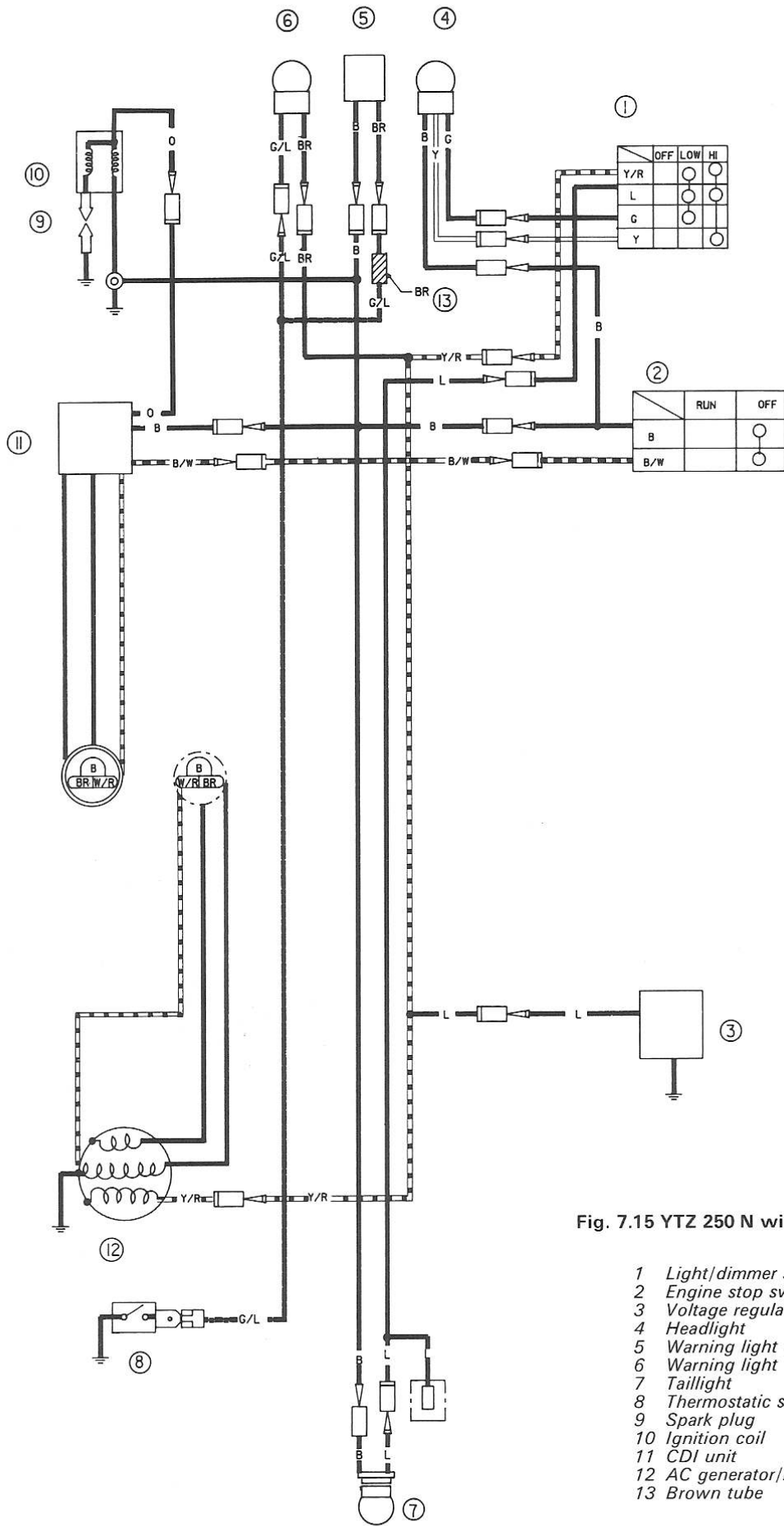


Fig. 7.15 YTZ 250 N wiring diagram

- 1 Light/dimmer switch
- 2 Engine stop switch
- 3 Voltage regulator
- 4 Headlight
- 5 Warning light checker
- 6 Warning light
- 7 Taillight
- 8 Thermostatic switch
- 9 Spark plug
- 10 Ignition coil
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- 13 Brown tube

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