YAMAHA TY80

CIRCA 1975

OWNERS SERVICE MANUAL

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IQAN TRAINING?

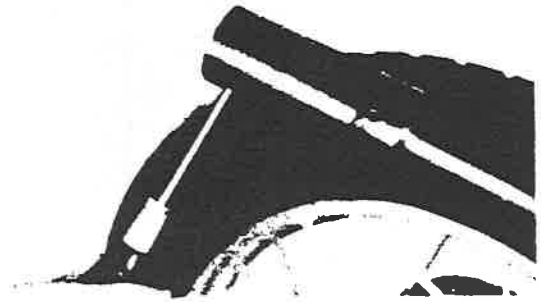
Parker L90
Load Sensing Valves
02-02-12
VanTech

MAINTENANCE – MUFFLER/SPARK ARRESTER

1. Using a rounded scraper, remove excess carbon deposits from manifold area of muffler. Check muffler gasket condition. The gasket seat is located around the cylinder exhaust port.

2. Carbon deposits within the muffler may be removed by lightly tapping the outer shell with a hammer and then blowing out with compressed air. Heavy wire, such as a coat hanger, may be inserted to break loose deposits. Use care.

3. Remove Phillips screw holding spark arrester in place. Remove spark arrester. Clean carbon from arrester assembly with scraper. Re-install.



MAINTENANCE – CYLINDER HEAD

1. Remove spark plug.

2. Using a rounded scraper, remove carbon deposits from combustion chamber. Take care to avoid damaging the spark plug threads. Do not use a sharp instrument. Avoid scratching the material.

3. Place head on a surface plate. There should be no warpage. Correct by re-surfacing. Place 400-600 grit wet sandpaper on surface plate and re-surface head using a figure-eight sanding pattern. Rotate head several times to avoid removing too much mateiral from one side.

4. Clean spark plug gasket mating surface thoroughly.

5. Wash head in solvent and wipe dry.

6. Install new cylinder head gasket during reassembly.

CYLINDER HEAD NUT TORQUE: 1.0kg-m (85in-lbs)

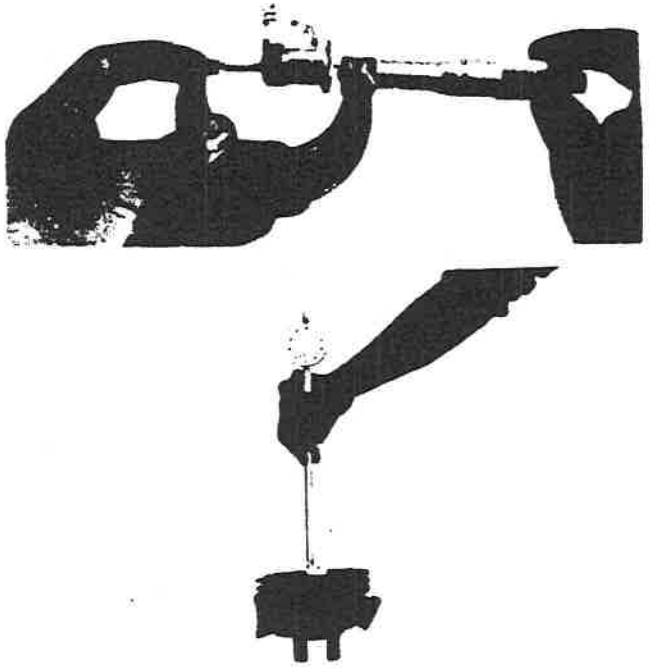
MAINTENANCE – CYLINDER

1. Using a rounded scraper, remove carbon deposits from exhaust port.

2. Remove cylinder base gasket and clean gasket seat on cylinder and crankcase thoroughly.

3. Check cylinder bore. Using a cylinder hone, remove any scoring. Hone lightly, using smooth stones. Hone no more than required to avoid excess piston clearance.

4. Using a cylinder gauge set to standard bore size, measure the cylinder. Measure at six points; at top, center, and ½" from bottom of skirts, in line with the wrist pin and at right angle to pin. Compare minimum and maximum measurements. If over tolerance, and not correctable by honing, re-bore to next over-size.



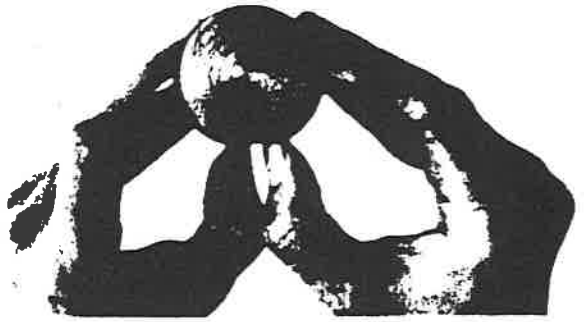
MAX. ALLOWABLE TAPER:	0.05mm
MAX. ALLOWABLE OUT-OF-ROUND:	0.005mm

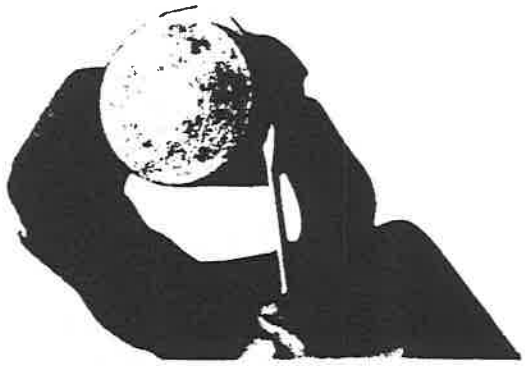
5. Wash cylinder thoroughly with soap and water.
   Dry. Coat walls with light oil film immediately.

6. During re-assembly, always use a new cylinder base gasket.

MAINTENANCE – PISTON RINGS

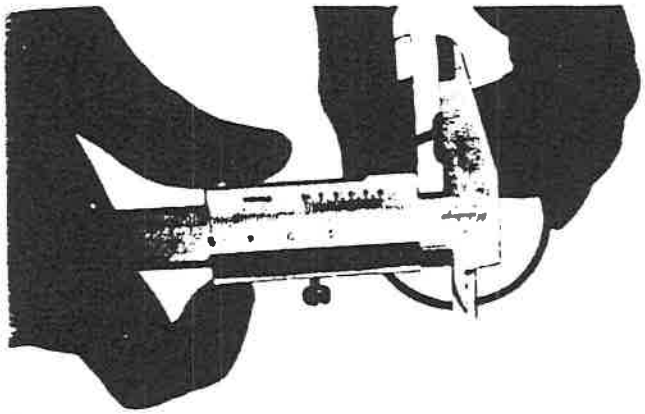
1. Remove rings from piston. Remove ring expander from lower ring groove.





2. Check rings for scoring. If any severe scratches are noticed, replace set.

3. Measure ring end gap in free position. If beyond tolerence, replace set.



TOP RING END GAP, FREE	approx. 7.5mm
LOWER RING END GAP, FREE	approx. 4mm

4. Insert each ring into cylinder. Push down approximately ¾" using piston crown to maintain right-angle to bore. Measure installed end gap. If beyond tolerance, replace set.

	MIN	MAX
TOP RING END GAP, INSTALLED	0.15 (mm)	0.35 (mm)
2ND RING END GAP, INSTALLED	0.15 (mm)	0.35 (mm)

5. Holding cylinder towards light, check for full seating of ring around bore. If not fully seated, check cylinder. If cylinder not out-of-round, replace it.

6. Check ring expander. If worn excessively, or broken, replace set.

7. With rings installed in grooves, insert feeler gauge between ring edge and groove. If beyond tolerance, replace ring and/or piston as rquired.

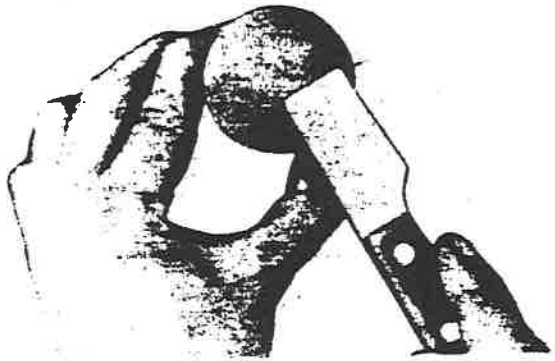
	MIN	MAX
2ND RING GROOVE CLEARANCE	0.03 (mm)	0.08 (mm)

9. During installation, make sure ring ends are properly positioned on either side of locating pin in ring groove. Make sure ring expander is positioned in like manner. Apply liberal coating of two-stroke oil to rings.

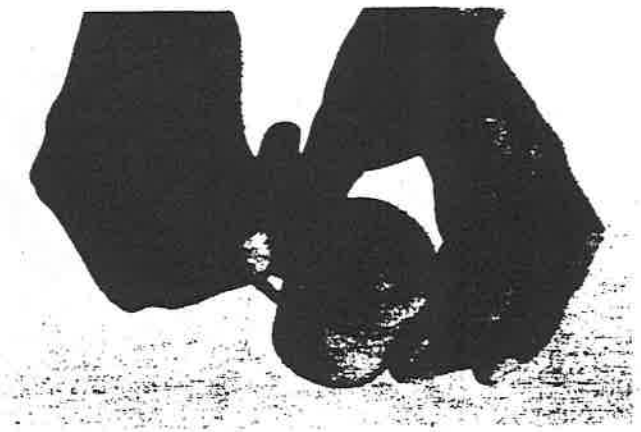
10. New rings require break-in. Follow first portion of new machine break-in procedure.

MAINTENANCE – PISTON

1. Using a rounded scraper, remove carbon deposits from piston crown.



2. Break a used piston ring in two. File end square. De-burr edges to avoid scratching ring groove and clean carbon deposits from ring grooves.

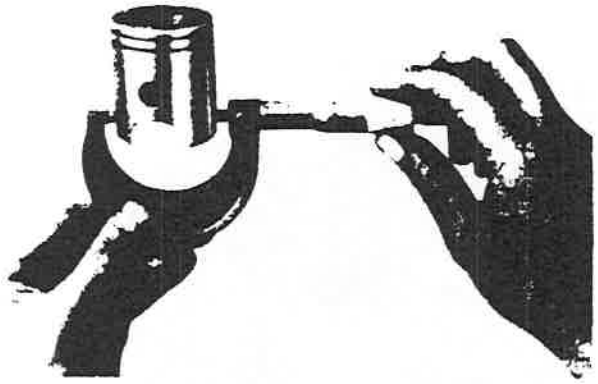


3. Using 400-600 grit wet sandpaper, lightly sand scor marks and lacquer deposits from sides of piston. Sand in cross-hatch pattern. Do not sand excessively.

4. Wash piston in solvent and wipe dry.

5. Using an outside micrometer, measure piston diameter. The piston is cam-ground and tappered. The only measuring point is at right-angles to the wrist pin holes about ½" from the bottom of the piston skirts. Compare piston diameter to cylinder bore measurements.

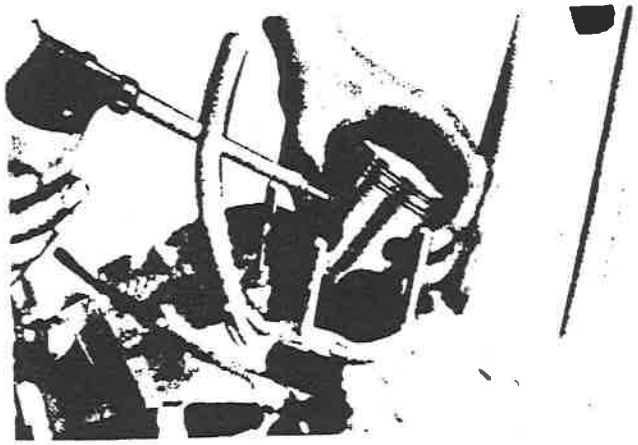
STANDARD PISTON DIA: 47mm



Piston maximum diameter subrtacted from minimum cylinder diameter gives piston clearance. If beyond tolerance, hone cylinder to tolerance or rebore to next over-size and fit new piston.

	MIN	MAX
NOMINAL PISTON CLEARANCE	0.035 (mm)	0.040 (mm)
MAXIMUM WEAR LIMIT	0.100 (mm)	

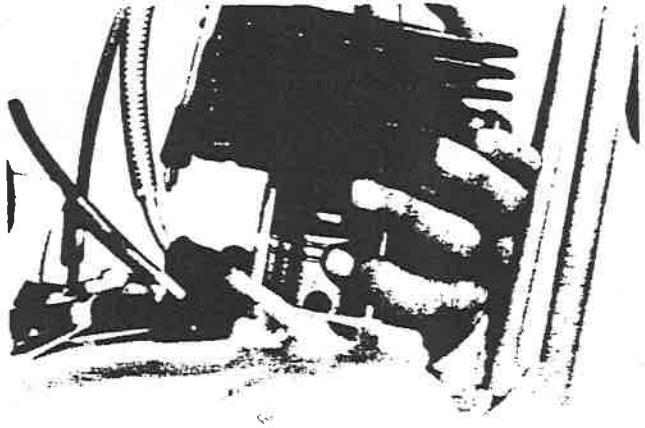
6. During re-assembly, coat the piston skirt areas liberally with two-stroke oil.



7. Install new piston pin clirclips and make sure they are fully seated within their grooves.

8. Take care during installation to avoid damaging the piston skirts against the crankcase as the cylinder is installed. Note the two induction holes in the piston skirt. These must be to the rear during installation.

9. Make sure the rings are properly positioned as the cylinder is installed.



MAINTENANCE – PISTON PIN, BEARING AND CONNECTING ROD

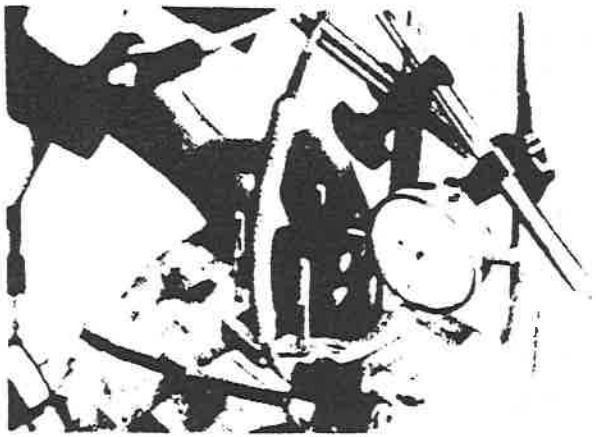
1. Check the pin for signs of wear. If any wear is evident, replace pin and bearing.

2. Check the pin and bearing for signs of heat discoloration. If excessive (heavily blued), replace both.

3. Check the bearing cage for excessive wear. Check the rollers for signs of flat sports. If found, replace pin and bearing.

4. Apply a light film of oil to pin and bearing surfaces. Install in connecting rod small end. Check for play. There should be no noticeable vertical play. If play exists, check connecting rod small end diameter and wear. Replace pin and bearing or all as required.

5. Rotate the crankshaft to top dead center. Mount a dial gauge at right angels to the connecting rod small end and measure axial play. (Hold bottom of rod to one side and rock top of rod from side to side.)



6. Remove the dial gauge and slide the connecting rod to one side. Insert a feeler gauge between the side of the connecting rod big end and the crank wheel. Measure clearance.

7. If any of these measurements exceed tolerance, crankshaft repair is required. Take the machine to your Authorized Dealer.

8. During reassembly, apply a liberal coating of two-stroke oil to the piston pin and bearing. Apply several drops of oil to the connecting rod big end. Apply several drops of oil into each crankshaft bearing oil delivery hole.

.078 .031

	Max	Min
Connecting rod axial play	2.0mm	0.8mm
Connecting rod/crank web clearance	0.5mm	0.4mm

.020 .016

TROUBLESHOOTING – TOP END AND MUFFLER

If performance is not up to par, the following procedure will indicate if top end repair is required.

1. Adjust ignition timing.

2. Make a spark plug reading. Adjsut spark plug and/or carburetion as required.

3. Decarbonize muffler/spark arrester assembly. Decarbonize cylinder head and piston crown. Take care that carbon does not drop into crankcase cavity or foul ring grooves. Reassemble.

4. Warm up engine. Insert compression gauge into spark plug hole. With ignition off and throttle on, kick engine over briskly several times. If compression measurement exceeds tolerances, disassemble cylinder head and decarbonize.

	Nominal
COMPRESSION PRESSURE	5.5kg/cm² (650-700r.p.m.)

5. Reassemble and re-check compression pressure. If no improvement, disassemble top end complete.

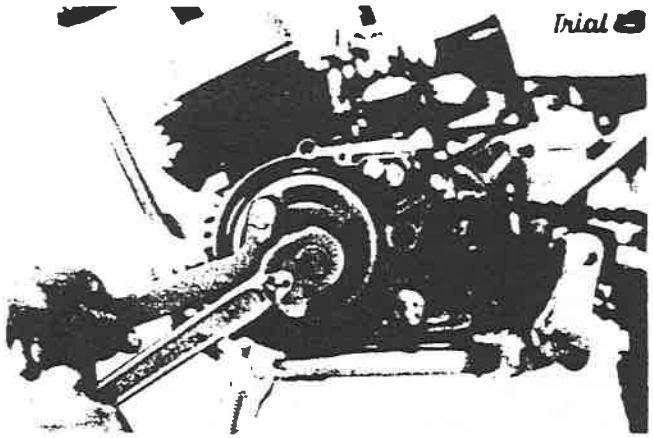
IGNITION

NOTE: For timing procedure, see "Mechanical Adjustments, Ignition Timing." For theory of operation and troubleshooting, see "Electrical System."

1. Remove shift lever and left crankcase cover.

2. Disconnect clutch cable.

3. Remove the Flywheel Magneto securing nut, lock washer and flat washer. Note installation order and direction.



4. Install the Magneto Flywheel Puller.

   NOTE: The puller body has a left-hand thread.

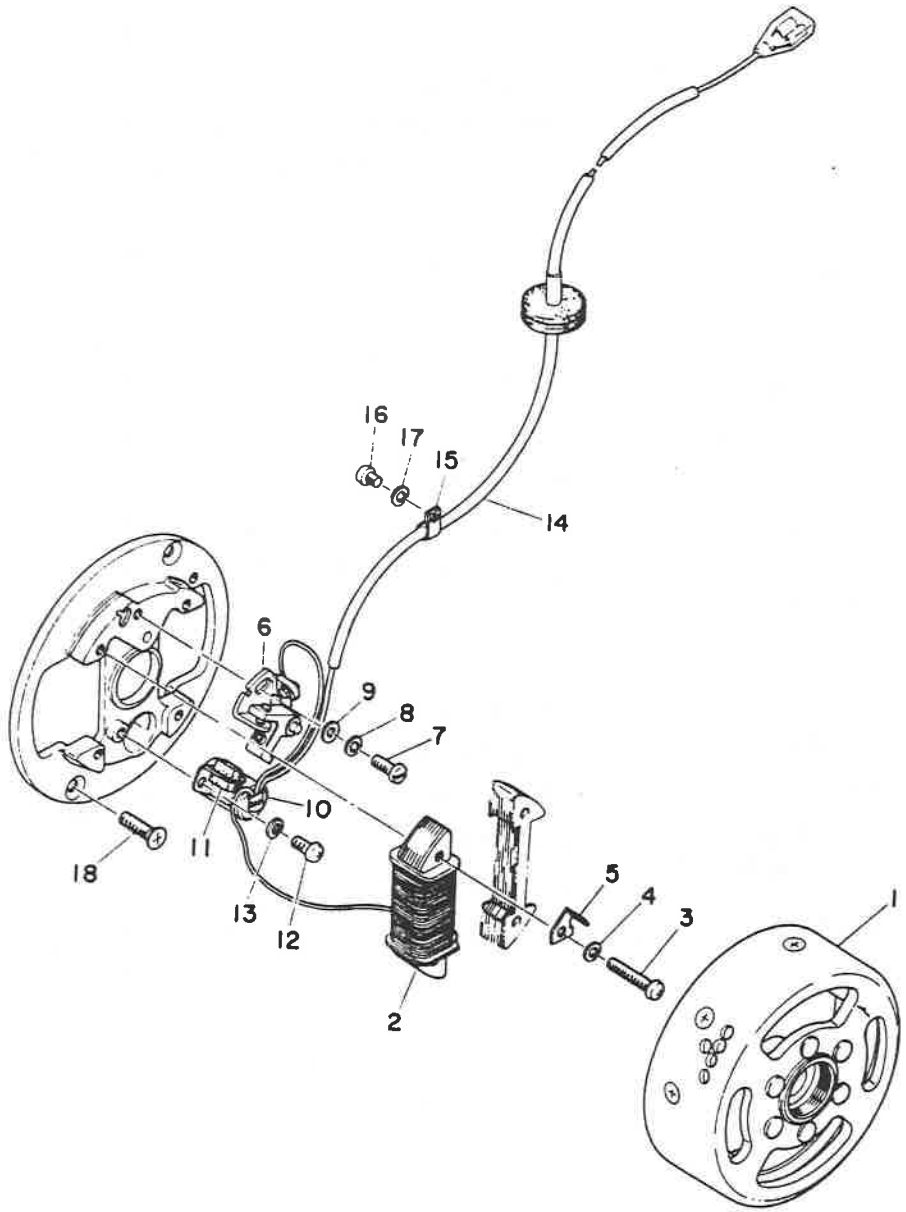
5. Tighten the puller body thoroughly into the flywheel. While holding the body, tighten the push bolt. This will pull the flywheel off the tapered end of the crankshaft.

   NOTE: If the flywheel is frozen on the taper, keep pressure on the push bolt while tapping on the end of the bolt with a light steel hammer.

6. With the flywheel removed, the magneto backing plate is exposed, allowing for replacement of any assembly terein.

7. The Ignition source coil is located on the left hand side of the backing plate.

FLYWHEEL MAGNETO



1. Rotor ass'y
2. Source coil
3. Panhead screw
4. Spring washer
5. Timing plate
6. Contact Breaker ass'y
7. Panhead screw
8. Spring washer
9. Plain washer
10. Condenser
11. Lubricator
12. Panhead screw
13. Spring washer
14. Wire lead
15. Lead clamp
16. Panhead screw
17. Spring washer
18. Flathead screw

MAINTENANCE

1. Apply a few drops of light-weight machine oil or distributor lubricant to the point cam lubricating wich.

2. The ignition points can be lightly filed with an ignition point file or sanded with 400-600 grit sandpaper. Place a piece of clean paper between the points, let them close, and repeatedly remove the paper until no residue shows. The paper should be dipped in lacquer thinner or point cleaning fluid to provide a solvent to remove oil and sanding residue from point surfaces.

3. Point replacement should only occur when point gap exceeds maximum tolerance; when the points are severely pitted; or if the points become shorted or show faulty operation.

POINT GAP	0.3 ~ 0.4 mm

NOTE: There is no separate point gap adjustment. Point gap is directly related to ignition timing and cam follower wear.
New points, when installed, should be lightly burnished and thoroughly cleaned per paragraph number two.

4. When replacing ignition condenser, source coil, or lighting source coil, soldering is required. Use a low wattage gun. Do not allow wiring to overheat as lacquer insulation on coil windings may be destroyed. The use of a heat sink is recommended.

5. When installing magn to flywheel, make sure woodruff key is properly seated in keyway in crankshaft. Apply a light coating of lithium soap base grease to tapered portion of crankshaft end. Carefully install flywheel taking care to align for woodruff key. Install flat washer, lock washer and lock nut. Tighten carefully to recommended torque value.

Flywheel Securing Nut Torque:	3.5 ~ 4.0 kg-m (300 ~ 350 in-lbs.)

NOTE: Whenever the Magneto Flywheel is removed, Ignition Timing must be re-set.

CLUTCH, SHIFTER AND KICK STARTER

NOTE: Clutch adjustment is covered in Chapter VII, "Mechanical Adjustments."

1. Remove the kick start lever.

2. Remove footrest assembly to provide clearance for crankcase cover removal.

3. If cylinder is in place, remove oil pump delivery line from intake manifold.

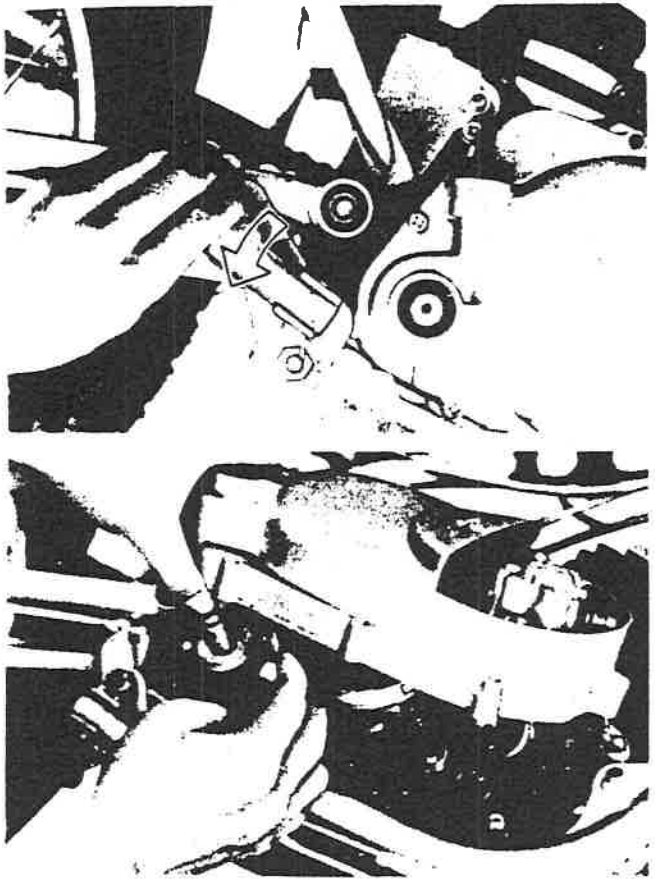
4. Remove the Autolube pump cover.

5. Remove the clip and rotate the pump pulley to increase cable slack and remove the cable end from its seat in the pulley.

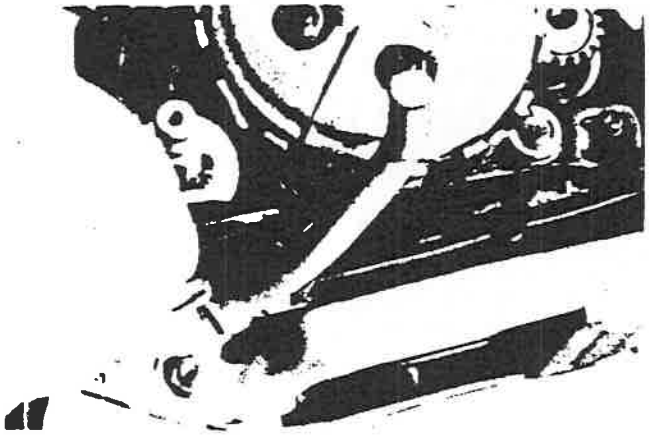
6. Using a 10mm wrench, loosen the cable adjustor locknut. Remove the adjustor and cable.

7. Remove the pivot shaft nut, loosen the footrest mounting nut, and turn the footrest ass'y so that don't touch crankcase cover.
Remove the Allen bolts holding the side cover in place. Push down on the brake pedal to provide clearance and remove the cover.

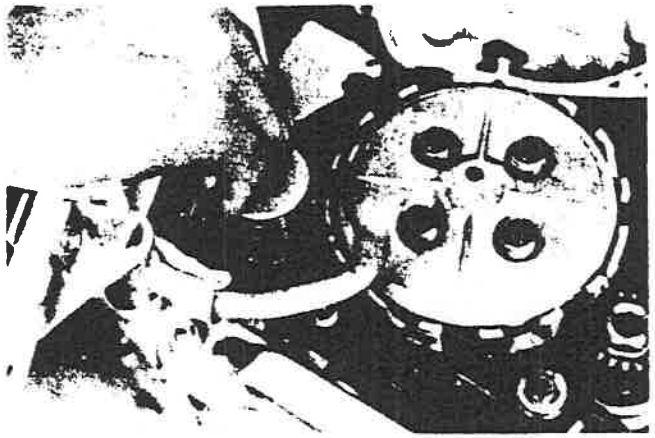
NOTE: The Autolube pump assembly need not be removed for this procedure.



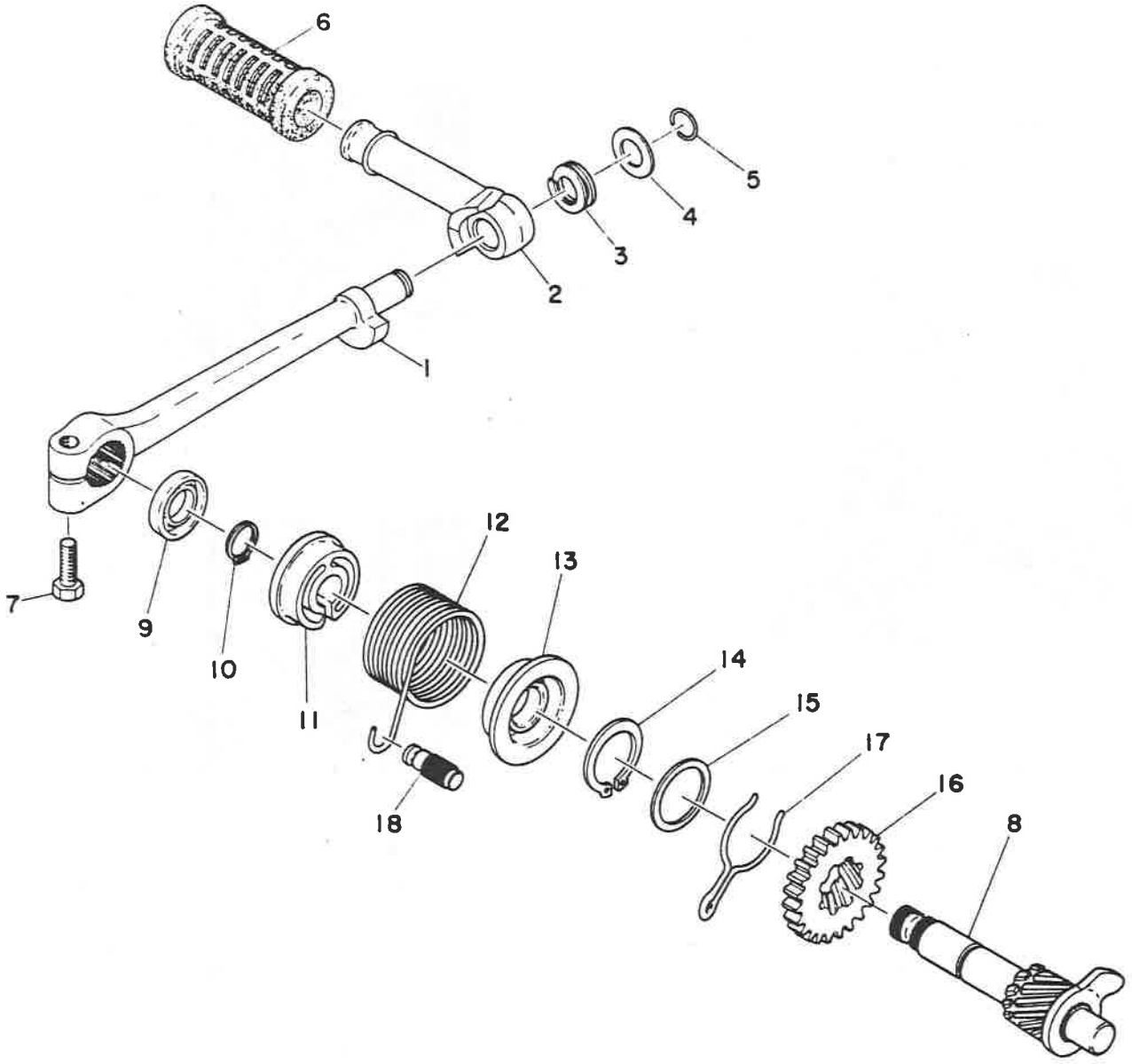
8. To remove kick start assembly, first disconnect return spring from post in case and allow it to unwind.



9. Pull out the kick starter assembly.

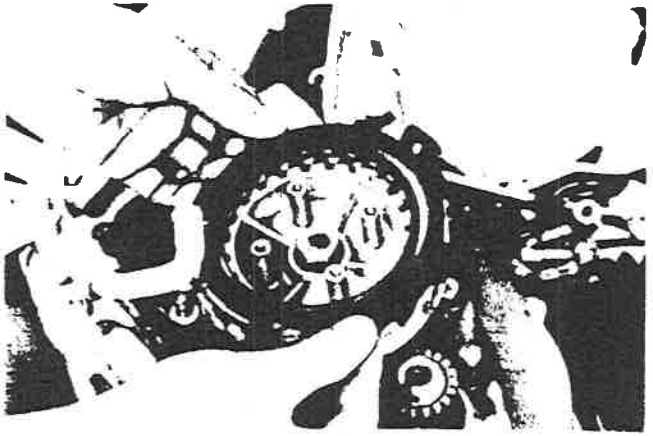


KICK STARTER



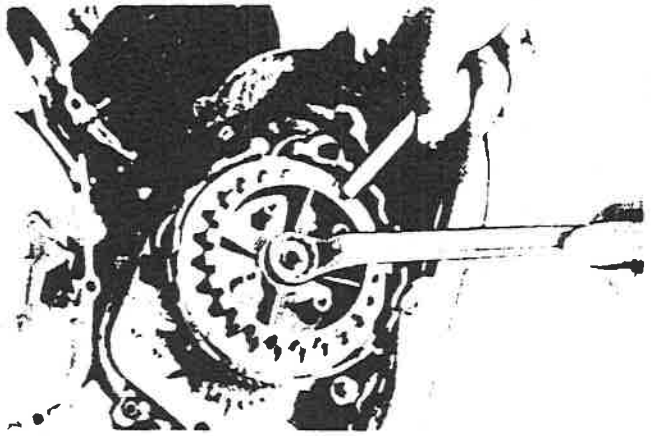
1. Kick crank
2. Kick lever
3. Kick crank spring
4. Kick lever washer
5. Kick lever clip
6. Kick lever caver
7. Bolt
8. Kick axle ass'y
9. Oil seal
10. Circlip
11. Kick spring cover
12. Kick spring
13. Kick spring guide
14. Circlip
15. Shim
16. Kick gear
17. Kick clip
18. Kick spring stopper

10. Remove the Phillips screws (4) holding the pressure plate. Remove the clutch springs, pressure plate and push rod. Remove the clutch plates, friction plates, and cushion rings.



NOTE: When removing Phillips spring screws, loose en each screw in several stages working in a cross-hatch pattern to avoid any unnecessary warpage. Note the condition of each piece as it is removed and its location with the assembly.

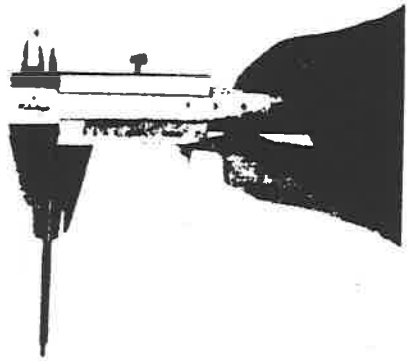
11. Using the clutch holding tool, remove the clutch securing nut. Remove the clutch boss and driven gear (clutch housing).



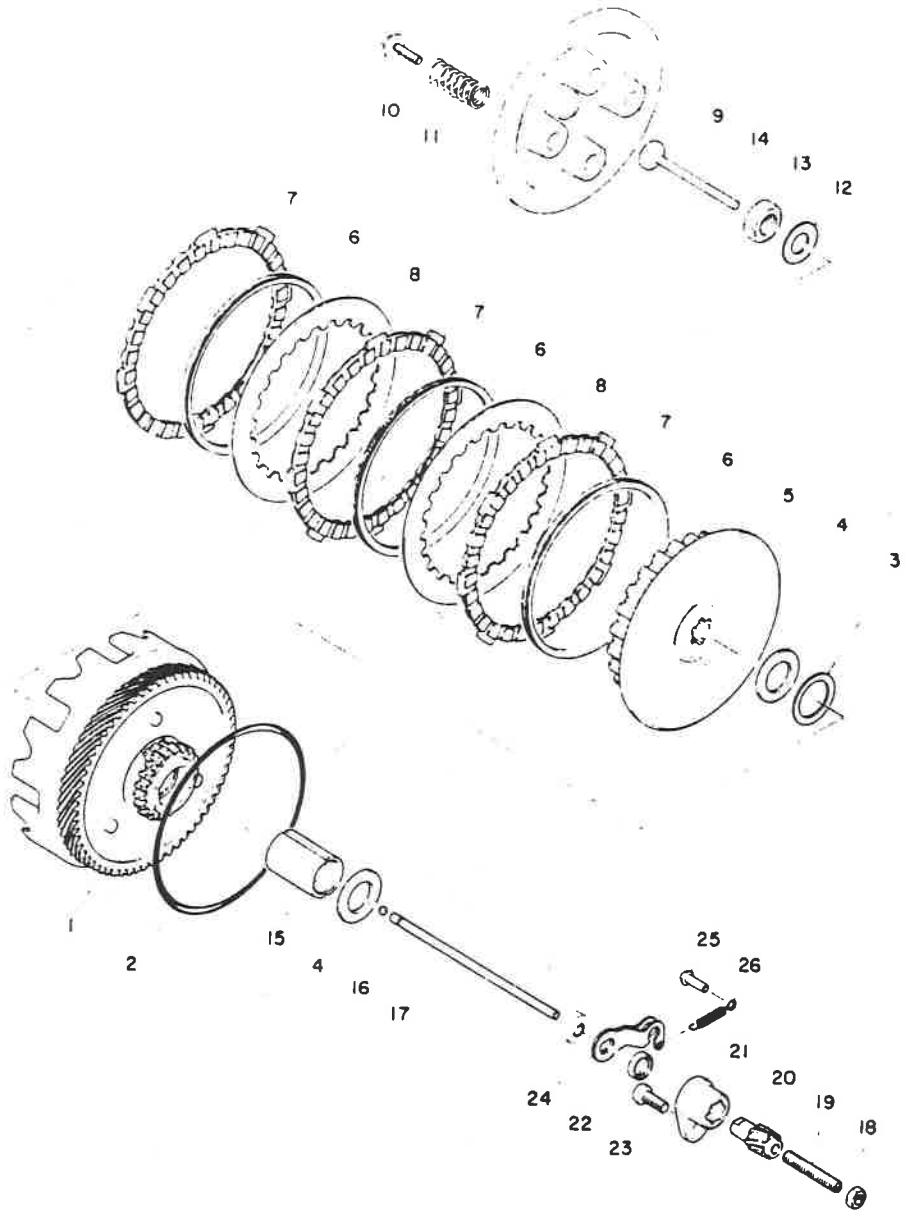
12. If the clutch housing spacer and thrust plate remain on the transmission main shaft, remove them.

TROUBLESHOOTING – CLUTCH ASSEMBLY

1. Measure the composition friction plates at three or four points. If their minimumt thickness exceeds tolerance, replace.



	NEW	WEAR LIMIT
FRICTION PLATE THICKNESS	3.5mm	3.2mm



1. Driven gear comp.
2. O-ring
3. Thrust plate 1
4. Thrust plate 2
5. Clutch boss
6. Cushion ring
7. Friction plate
8. Clutch plate
9. Pressure plate
10. Bolt
11. Clutch spring
12. Vellevile wahser
13. Clutch boss nut
14. Push rod 1
15. Spacer
16. Ball
17. Push rod 2
18. Nut
19. Adjusting screw
20. Push screw
21. Push screw housing
22. Oil seal
23. Panhead screw
24. Push lever
25. Spring fork
26. Return lever spring

2. Check the plates for signs of warpage and heat damage, replace as required.

   NOTE: For optimum performance, if any plate requires replacement, it is advisable to replace the entire set.

3. Check each clutch plate for signs of heat damage and warpage. Place on surface plate (plate glass is acceptable) and use feeler gauge as illustrated. If warpage exceeds tolerance, replace.

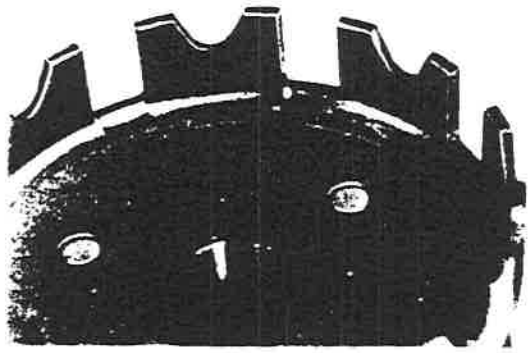
CLUTCH PLATE WARP ALLOWANCE	0.05mm MAXIMUM

4. Thoroughly clean the clutch housing and spacer. Apply a light film of oil on the bushing surface and spacer. Fit the spacer into the bushing. It should be a smooth, thumb-press ift. The spacer should rotate smoothly within the bushing.

5. Check the bushing and spacer for signs of galling, heat damage, etc. If severe, replace as required.

6. Apply thin coat of oil on transmission main shaft and bushing spacer I.D. Slip thrust plate and spacer over main shaft. Spacer should fit with approximately same "feel" as in clutch housing. Replace as required.

7. Check dogs on driven gear (clutch housing). Look for cracksand signs of galling on edges. If moderate, deburr. If severe, replace.



8. Check splines on clutch boss for signs of galling. If moderate, deburr. If severe, replace.

   NOTE: Galling on either the friction plate dogs of the clutch housing or clutch plate spliens of the clutch boss will cause erratic clutch operation.

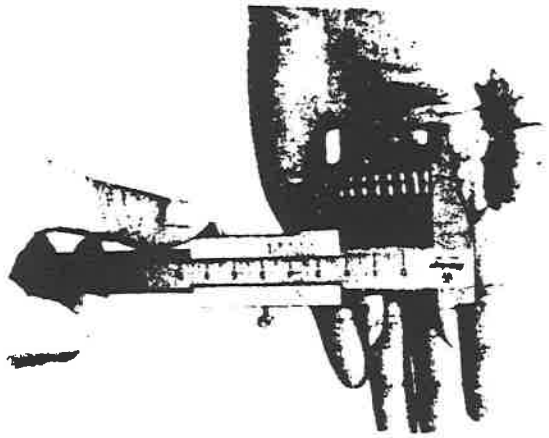
9. Fit the clutch thrust plates (2) and clutch boss with a light film of oil on all parts. Check for smooth rotation. Check for signs of excessive wear, all parts. Replace as necessary.

10. If clutch operation has been abnormal, and the above procedures show no major failures, install the clutch housing on the transmission main shaft with thrust plates, bearing spacer, and clutch boss in their proper positions for reassembly. Do not install clutch or friction plates. Install bellevile spring and clutch securing nut. Torque to standard assembly value.

CLUTCH SECURING NUT TORQUE:	4.0~4.5kg-m (350~400 in-lbs)

11. With transmission in neutral and primary driven gear stationary, clutch boss should turn without drag within the clutch housing. If housing does not turn easily, indicating insufficient housing end play, check all thrust plates for incorrect thickness. Correct by installing thinner thrust plates. Clutch housing end play is given in table and can be measured with a dial gauge.

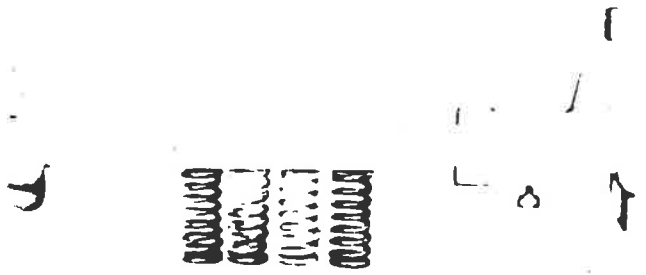
	Nominal	Min	Max
Clutch Housing End Play	0.15 (mm)	0.10 (mm)	0.30 (mm)



	New	Min
Clutch Spring Free Length	31.5mm	30.5mm

NOTE: For optimum clutch operation it is advisable to replace the clutch springs as a set if one or more are faulty.

13. Set the clutch spring set on a level surface. Rotate each spring until all are at approximately the same vertical angle and maximum apparent height. Place straight edge across set. If any spring exceeds tolerance, replace that spring.



Clutch Spring Set Maximum Length Difference	1.0 mm

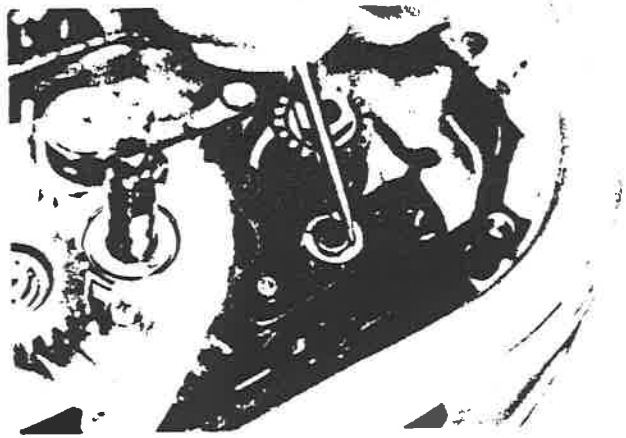
14. During installation of the clutch assembly, do not allow the cushion rings to become twisted. Take care that the thrust plates do not slip out of position as the housing and clutch boss are installed. Install all parts with a heavy coat of 10W-30 motor oil on their mating surfaces.

CLUTCH SECURING NUT TORQUE: 4.0 ~ 4.5kg-m (350 ~ 400 in-lbs)

SHIFT MECHANISM

NOTE: Shifter maintenance and adjustment should be performed with clutch assembly remvoed.

1. Remove the "E" clip securing change lever number two. Push down on change lever number three and remove the assembly.



2. Check the levers, pivots and springs for damage or wear and replace as required.

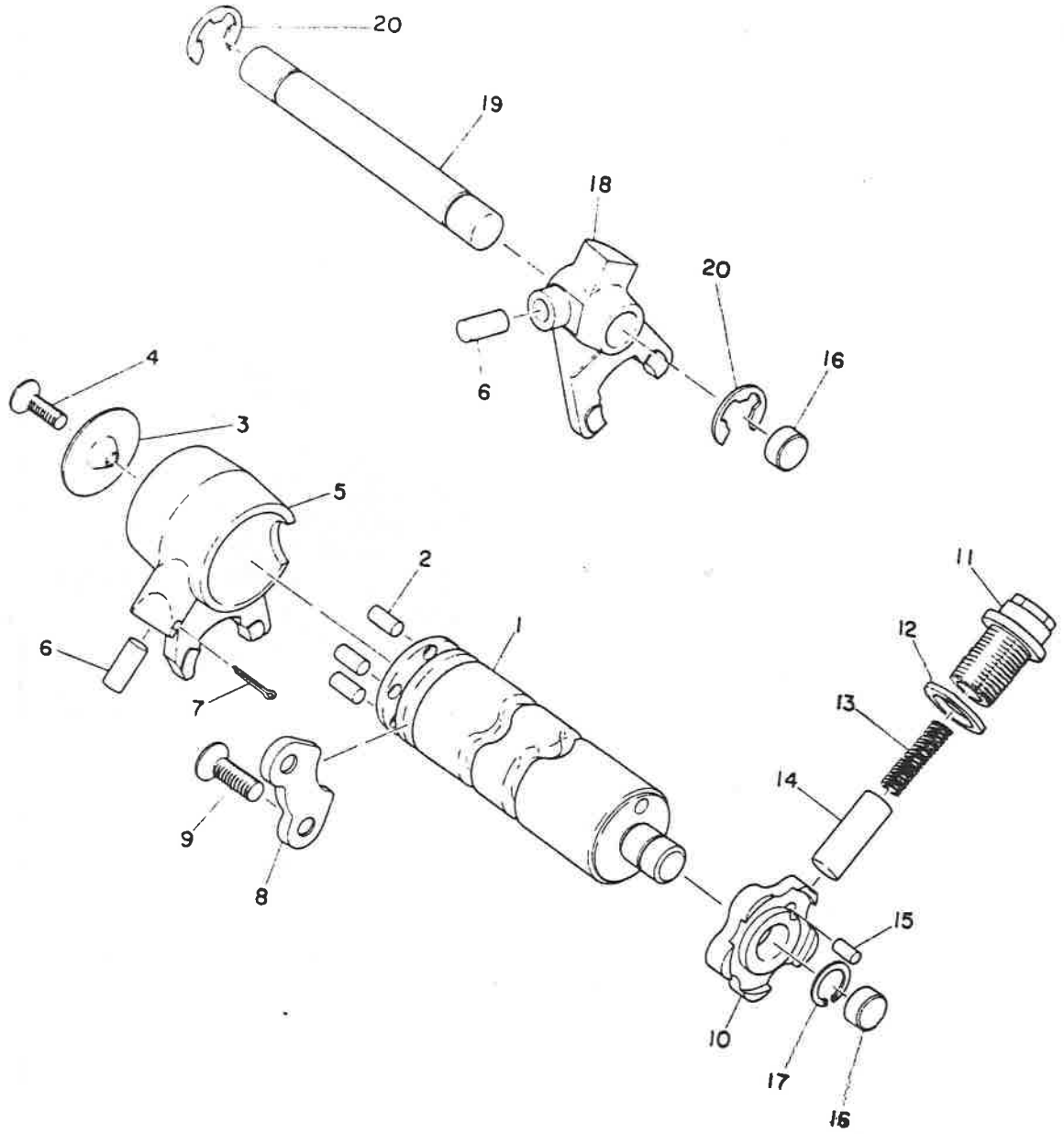
3. Turn change shaft in case. It must not bind or catch.

4. If it does, remove and file off any burrs or straighten if bent. Replace if damage is too extensive.

5. Remove shift cam stopper bolt, spring and detent from top, left-hand side of crankcase.

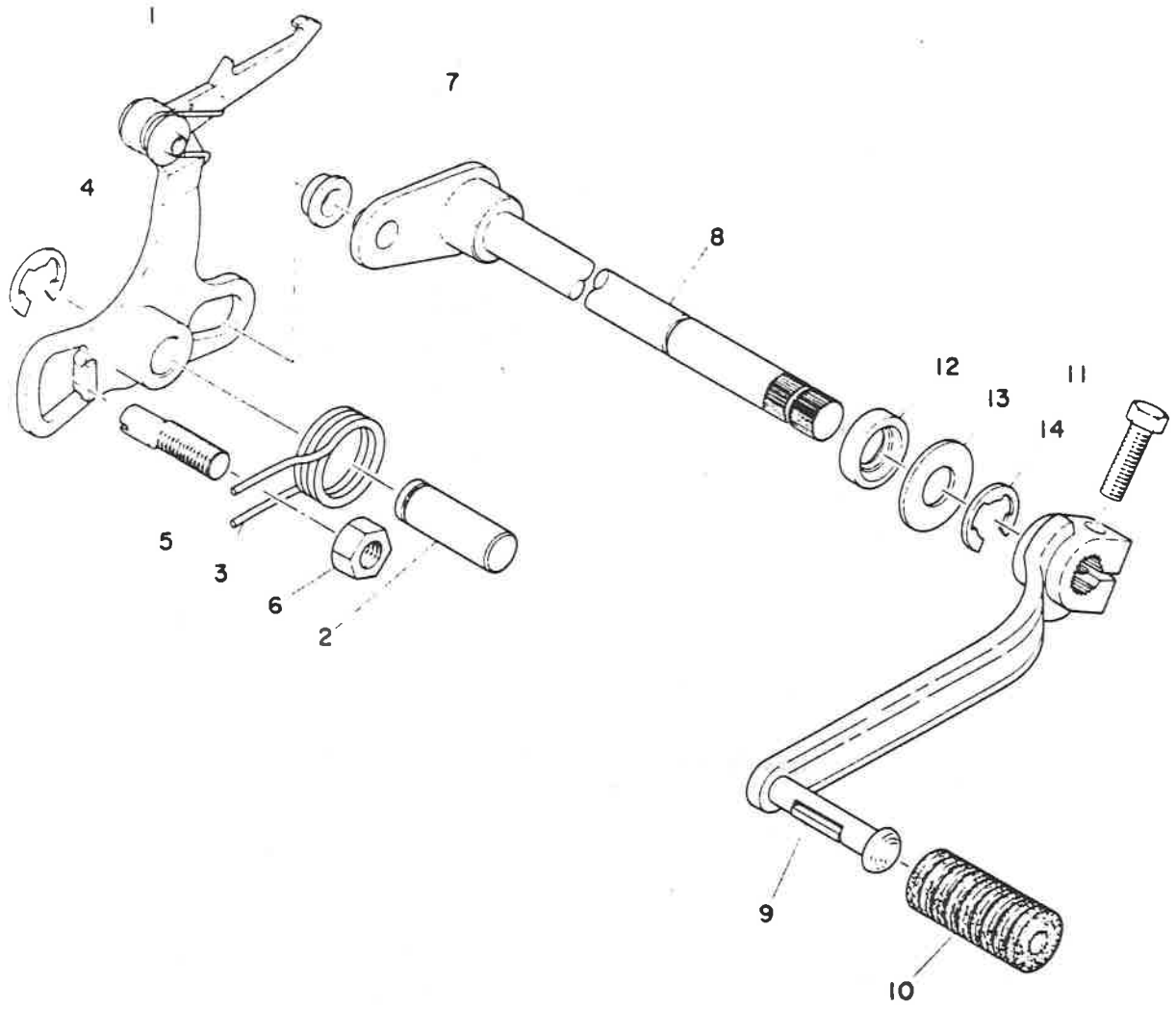
6. With the rear wheel off the ground, rotate the clutch shaft with one hand and turn the shift drum from lock to lock with the other hand. If the transmission doesn't shift through all gears smoothly, the engine should be disassembled and the transmission checked.

SHIFTER 1



1. Shift cam
2. Dowel pin
3. Side plate
4. Flathead screw
5. Shift fork 1
6. Dowel pin
7. Cotter pin
8. Stopper plate 2
9. Flathead screw
10. Stopper plate 1
11. Spring screw
12. Drain plug gasket
13. Cam stopper spring
14. Cam stopper
15. Dowel pin
16. Blind plug
17. Circlip
18. Shift fork 2
19. Shift fork guide bar
20. Circlip

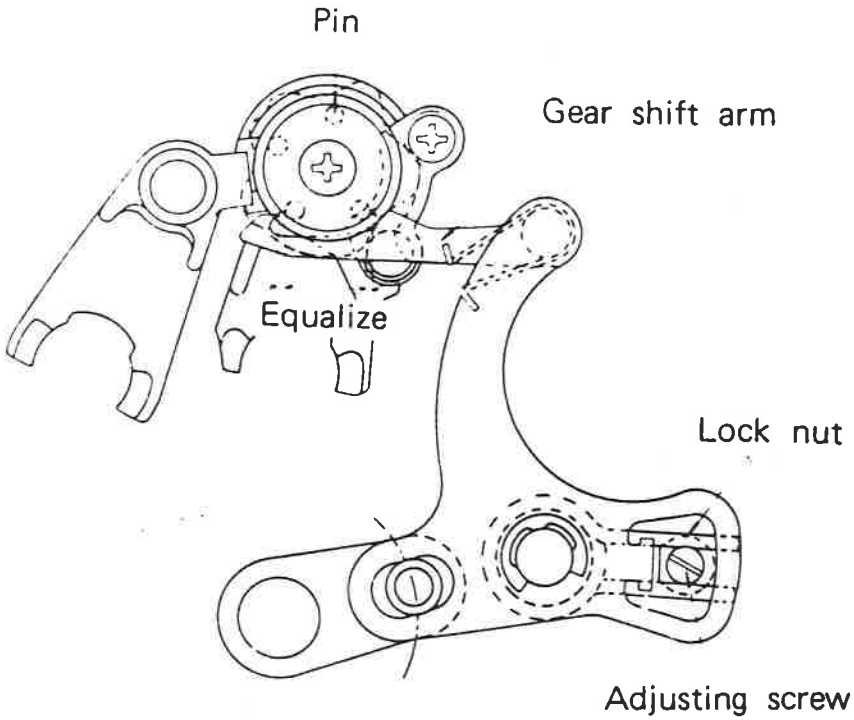
SHIFTER 2



1. Change lever ass'y
2. Shaft
3. Shaft return spring
4. Circlip
5. Adjusting screw
6. Nut
7. Change lever roller
8. Change shaft ass'y
9. Change pedal
10. Change pedal cover
11. Bolt
12. Oil seal
13. Change axle washer
14. Circlip

ADJUSTMENT

1. In 2nd gear, check for proper centering. Change adjustment on screw as required.



3. While arm is butted against adjusting screw, measure clearance between Change Lever and shift drum dowel pin.

4. Repeat steps (2) and (3) shifting from 3rd - 2nd. Clearance must equal (3) above. Change adjustment using screw as required.

5. Repeat Step (1).

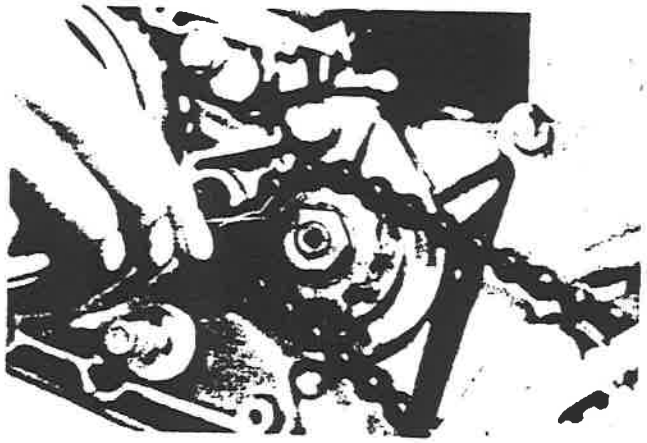
DRIVE SPROCKETS AND CHAIN

NOTE: Please refer to Maintenance Intervals and Lubrication Intervals charts for additional information.

DRIVE SPROCKET

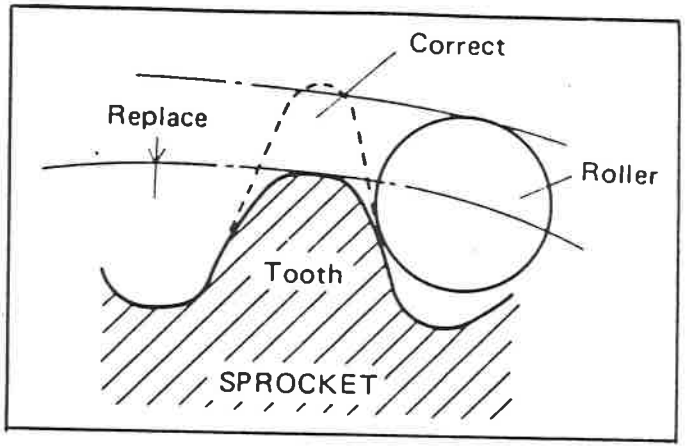
With the left crankcase cover removed, proceed as follows:

1. Using a blunt chisel, flatten the drive sprocket lock washer tab.

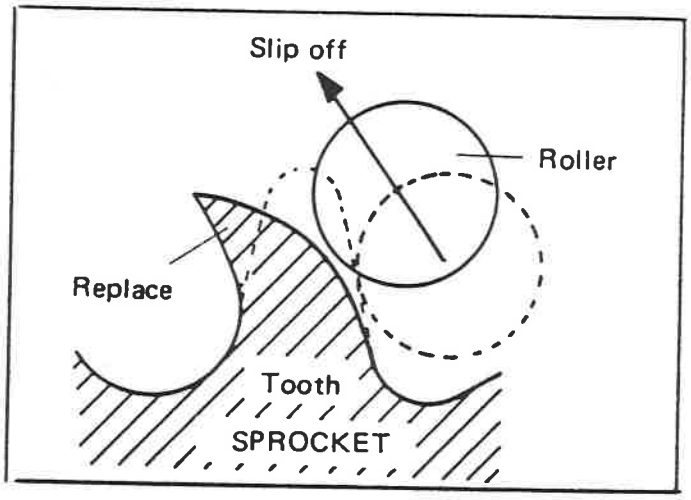


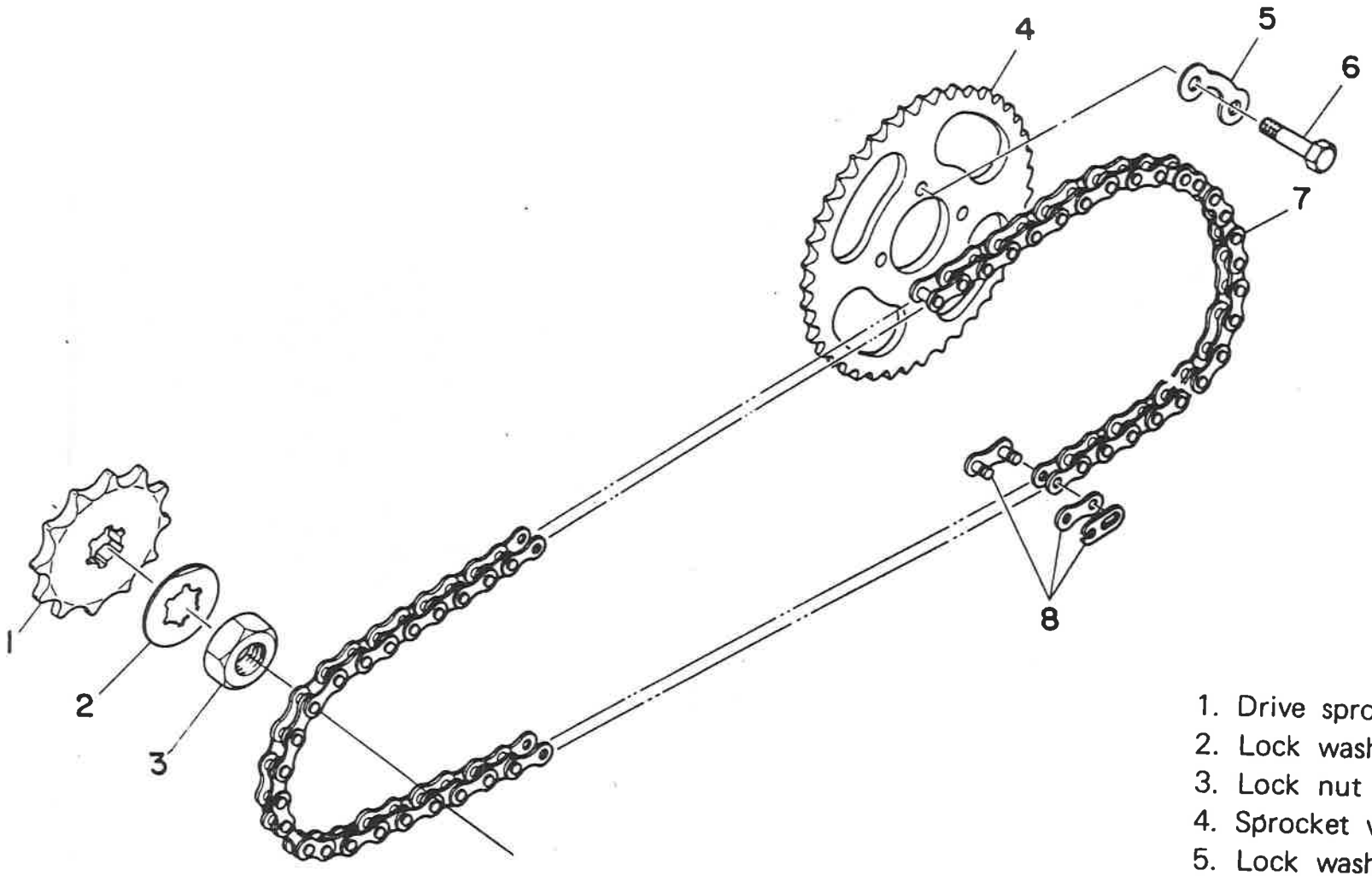
2. With the drive chain in place, transmission in gear, firmly apply the rear brake. Remove the sprocket securing nut. Remove the sprocket.

3. Check sprocket wear. Replace if wear decreases tooth height to a point approaching the roller center line.



4. Replace if tooth wear shows a pattern such as that in the illustration, or as precaution and common sense dictate.





1. Drive sprocket
2. Lock washer
3. Lock nut
4. Sprocket wheel gear
5. Lock washer
6. Fitting bolt
7. Chain
8. Chain joint

5. During drive sprocket reassembly, make sure the lock washer splines are properly seated on the drive shaft splines. Tighten securing nut thoroughly to specified torque value. Bend lock washer tab fully against securing nut flats.

Drive Sprocket Securing Nut Torque: 4.0 - 4.5kg-m (350 - 40- in-lbs)

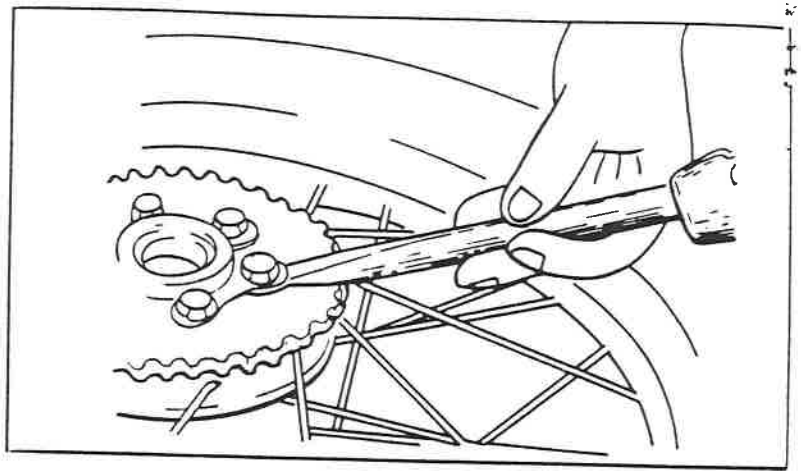
DRIVEN SPROCKET

With the rear wheel removed, proceed as follows:

1. Using a blunt chisel, flatten the securing bolt lock washer tabs. Remove the securing bolts (4). Remove the lock washers and sprocket.

2. Check sprocket wear per procedures for the drive sprocket.

3. During reassembly, make sure the sprocket and sprocket seat are clean. Tighten the securing bolts in a cross-hatch pattern. Bend the tabs of the lock washers fully against the securing bolt flats.



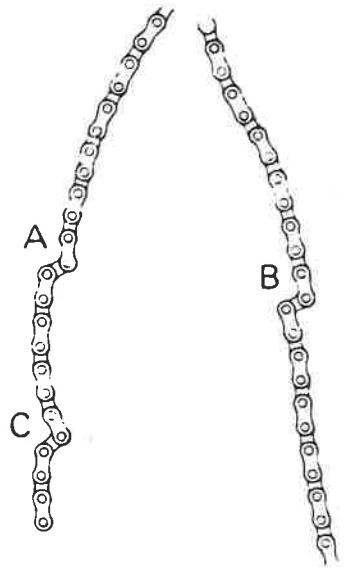
Driven Sprocket Securing Bolt Torque: 2.0 kg-m (175 in-lbs)

CHAIN

NOTE: Please refer to Maintenance and Lubrication Intervals charts for additional information.

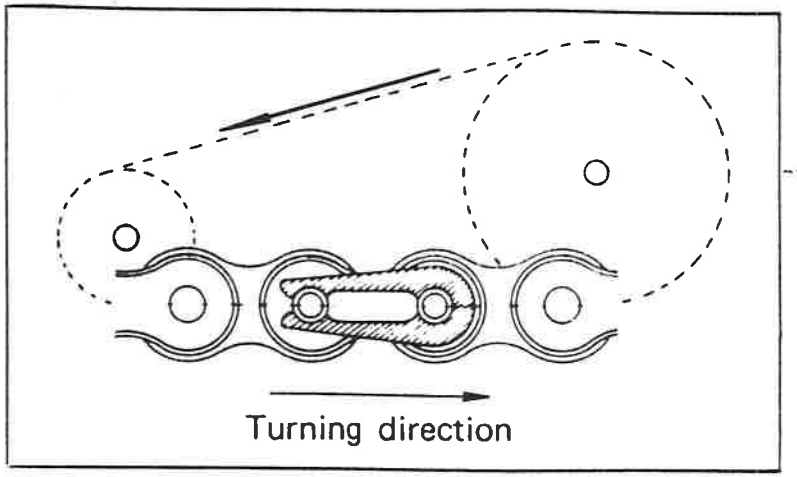
1. Using a blunt-nosed pliers, remove the master link clip and side plate. Remove the chain.

2. Check the chain for stiffness. Hold as illustrated. If stiff, soak in solvent solution, clean with medium bristle brush, dry with high pressure air. Oil chain thoroughly and attempt to work out kinks. If still stiff, replace.



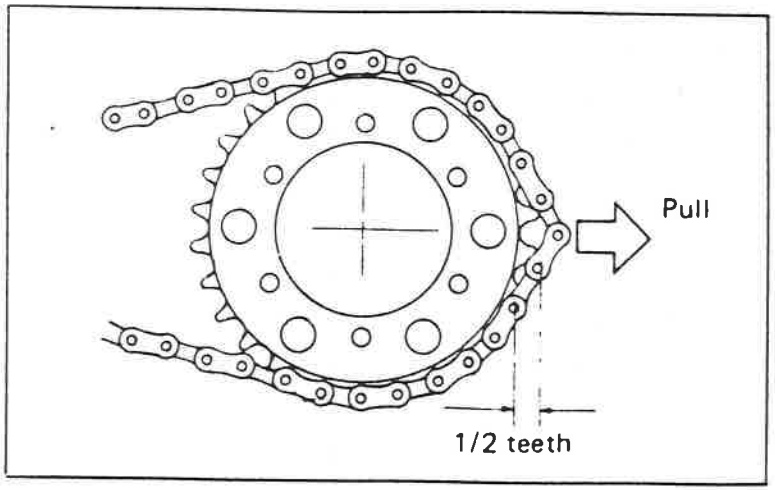
3. Check the side plates for visible wear. Check to see if excessive play exists in pins and rollers. Check for damaged rollers. Replace as required.

4. During reassembly, the master link clip must be installed with the rounded end facing the direction of travel.



TROUBLESHOOTING

With the chain installed on the machine, excessive wear may be roughly determined by attempting to pull the chain away from the rear sprocket. If the chain will lift away more than one-half the length of the sprocket teeth, remove and inspect.



If any portion of the chain shows signs of damage, or if either sprocket shows signs of excessive wear, remove and inspect.

MAINTENANCE

The chain should be lubricated per the recommendations given in the Maintenance and Lubrication Intervals charts. More often if possible. Preferably after every use. See "Chassis and Suspension, Swing Arm", for additional information regarding chain guide and oiler.

1. Wipe off dirt with shop rag. If accumulation is severe, use soft bristle brush, then rag.

2. Apply lubricant between roller and side plates on both inside and outside of chain. Don't skip a portion as this will cause uneven wear. Apply thoroughly.. Wipe off excess.

NOTE: Chain and lubricant should be at room temperature to assure penetration of lubricant into rollers.

Choice of lubricant is determined by use and terrain. SAE 20wt. or 30wt. may be used, but several specialty types by accessory manufactures offer more penetration, corrosion resistance and shear strength for roller protection.

In certain areas, semi-drying lubricants are preferrable. These will resist picking up sand particles, dust, etc. Consult your Authorized Yamaha Dealer.

3. Periodically, remove the chain. Wipe and/or brush excess dirt off. Blow off with high pressure air.

4. Soak chain in solvent, brushing off remaining dirt. Dry with high pressure air. Lubricate thoroughly while off machine. Work each roller thoroughly to make sure lubricant penetrates. Wipe off excess. Re-install.

CABLES

NOTE: See Maintenance and Lubrication Intervals Charts for additional information.

Cable maintenance is primarily concerned with preventing deterioration through rust and weathering; and providing for proper lubrication to allow the cable to move freely within its housing.

Cable removal is straight-forward and uncomplicated. Removal will not be discussed within this section. For details, see the individual maintenance section for which the cable is an integral part.

Cable routing is of paramount importance, however. For details of cable routing, see the cable routing diagrams at the end of this manual.

MAINTENANCE

1. Remove the cable.

2. Check for free movement of the cable within its housing. If movement is obstructed, check for fraying of the cable strands. If fraying is evident, replace the cable assembly.

3. To lubricate cable, hold in vertical position. Apply lubricant to uppermost end of cable. Leave in vertical position until lubricant appears at bottom end. Allow excess to drain and re-install.

NOTE: Choice of lubricant depends upon conditions and preference. However, a semi-drying, graphite-base lubricant will probably perform most adequately under most conditions.

Under certain conditions, a water displacing lubricant is more suitable. Check with the Authorized Yamaha Dealer in your area.

THROTTLE CABLE CYLINDER

The throttle cable cylinder (junction point for Autolube control cable) must be periodically maintaind also.

1. Remove throttle cable number one from handlebar housing.

2. Remove throttle cable number two from carburetor mixing chamber top.

3. Remove Autolube pump cable from pump pulley. Remove cable adjuster.

4. Remove seat and fuel tank.

5. Remove cable/cylinder assembly complete.

6. Remove cylinder cap, throttle cable two and Autolube pump cable.

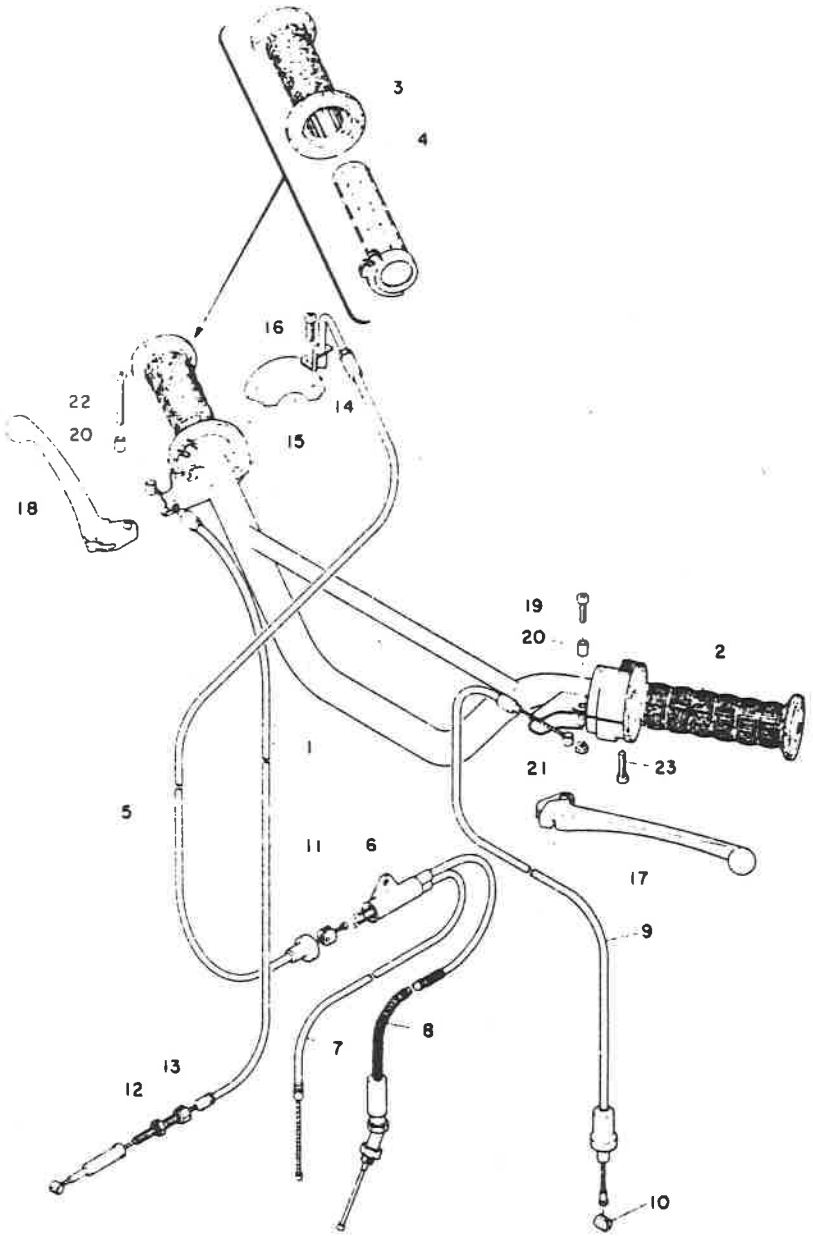
7. Wash assembly thoroughly in solvent.

8. Lubricate all associated cables.

9. Apply a thin coating of lubricant to cylinder walls.

NOTE: A small amount of lithium soap base grease may be used in lieu of cable lubricant. However, if machine is to be used in extreme cold, this should be avoided.

10. Reassemble all cables. Make sure cylinder is sealed from ravages of weather and riding conditions. Reinstall. See cable routing diagrams for correct installation position. See Mechanical Adjustments Chapter for correct cable adjustment.



1. Handle
2. Grip left
3. Grip right
4. Guide tube
5. Throttle wire
6. Cylinder
7. Throttle wire 2
8. Pump wire
9. Clutch wire
10. Wire end
11. Brake wire
12. Wire adjusting nut
13. Wire adjusting bolt
14. Grip cap upper
15. Grip can under
16. Pan head screw
17. Lever left
18. Lever right
19. Pan head screw
20. Lever collar
21. Nut
22. Lever fitting screw
23. Pan head screw

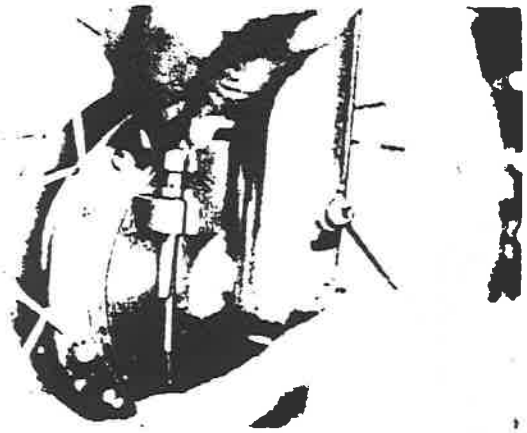
CAPTER IX CHASSIS AND SUSPENSION

1. WHEELS AND TIRES

1. Front Wheel

1. Removal

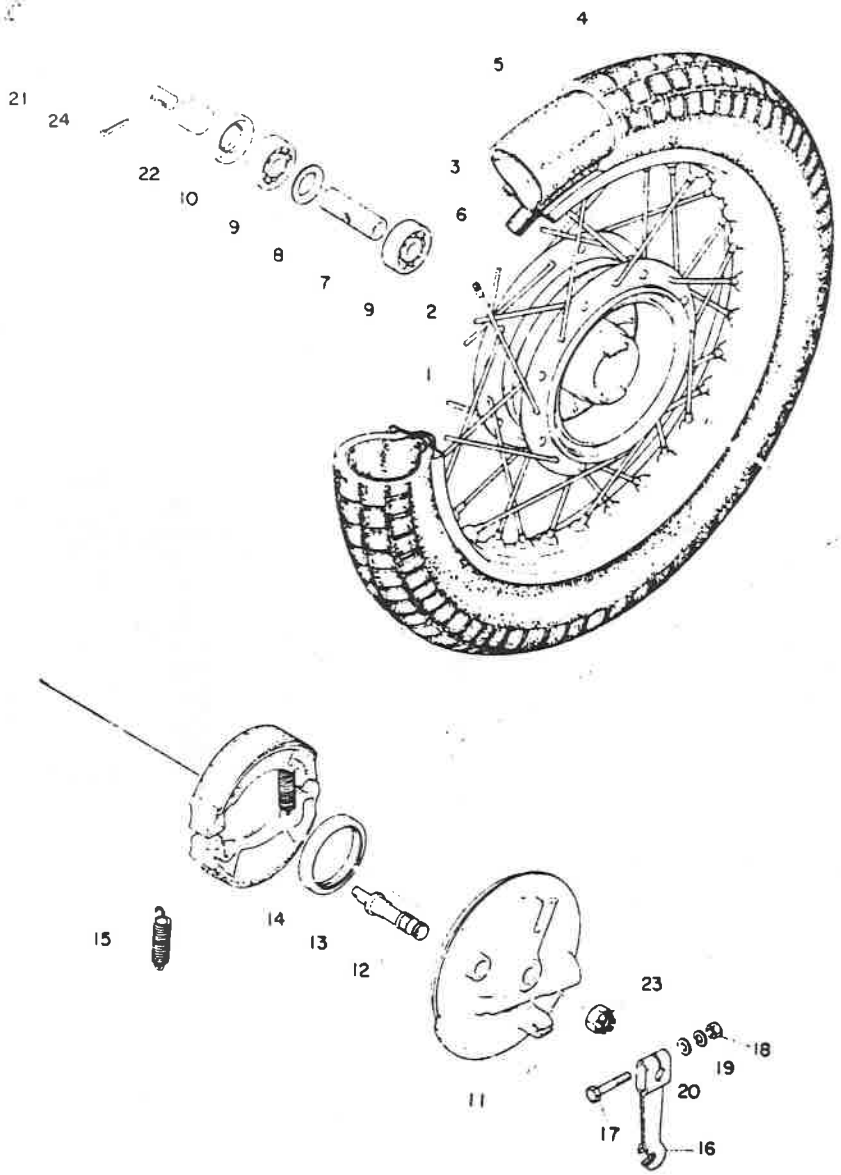
1. Disconnect the brake cable.



2. Remove cotter pin from front wheel nut

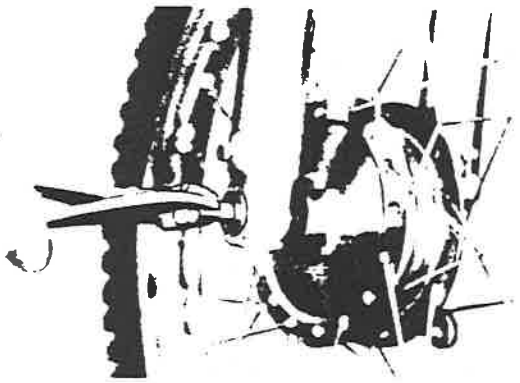
3. Remove the front wheel nut.

FRONT WHEEL



1. Front hub
2. Spoke set
3. Rim
4. Tire
5. Tube
6. Rim band
7. Bearing spacer
8. Spacer flange
9. Bearing
10. Oil seal
11. Brake shoe plate
12. Cam shaft
13. Oil seal
14. Brake shoe comp.
15. Return spring
16. Cam shaft lever
17. Bolt
18. Nut
19. Spring washer
20. Plain washer
21. Wheel shaft
22. Wheel shaft coller
23. Shaft nut
24. Cotter pin

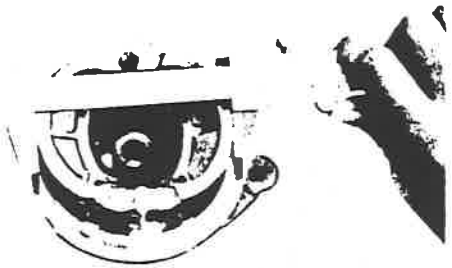
4. Remove the front wheel axle by simultaneously twisting and pulling out on the axle.



5. Raise the front of the machine and set it on a box. Then remove the wheel assembly.

2. Checking Brake Shoe Wear

1. Measure the outside diameter at the brake shoe with slide calipers. If it measures less than specified replace.



FRONT BRAKE SHOE DIAMETER:	95mm
REPLACEMENT LIMIT:	90mm

2. Brake Drum

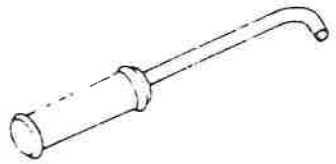
Oil or scratches on the inner surface of the brake drum will impair braking performance or result in abnormal noises. Remove oil by wiping with a rag soaked in lacquer thinner or solvent. Remove scratches by lightly and evenly rubbing with emery cloth.

3. Replacing Wheel Bearings

If the bearings allow excessive play in the wheel or if it does not turn smoothly, replace the bearing as follows:

1. First clean and outside of the wheel hub.

2. Insert the bend end of the special tool into the hole located in the center of the bearing spacer, and drive the spacer out from the hub by tapping the other end of the special tool with a hammer. (Both bearing spacer and spacer flange can easily be removed.)



3. Push out the bearing on the other side.

4. To install the wheel bearing, reverse the above sequence. Be sure to grease the bearing before installation and use the bearing fitting tool (furnished by Yamaha).

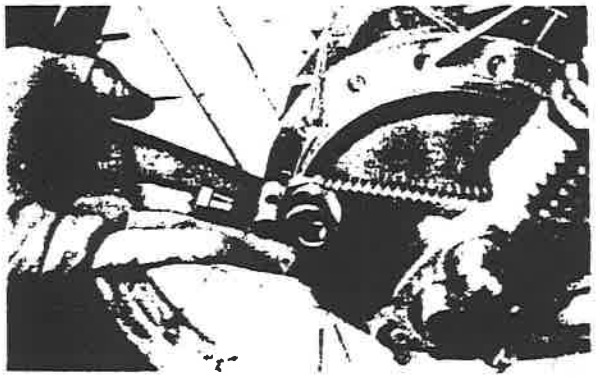
5. Check the lips of the seals for damage or warpage. Replace if necessary.

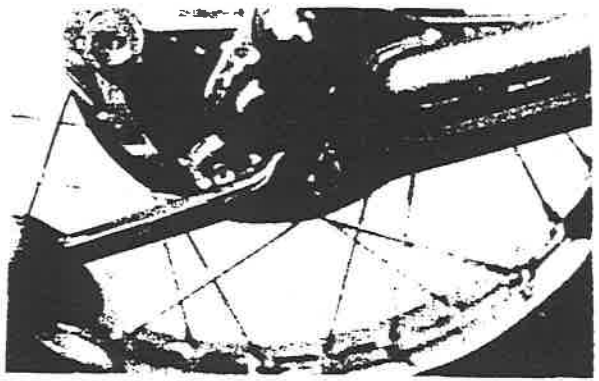
2. Rear Wheel

The rear wheel is 14-in. size, and the rear tire is Trials Universal. A single leading-shoe type brake is used. A labyrinth seal between the wheel hub and the brake plate is provided to prevent water and dust leakage.

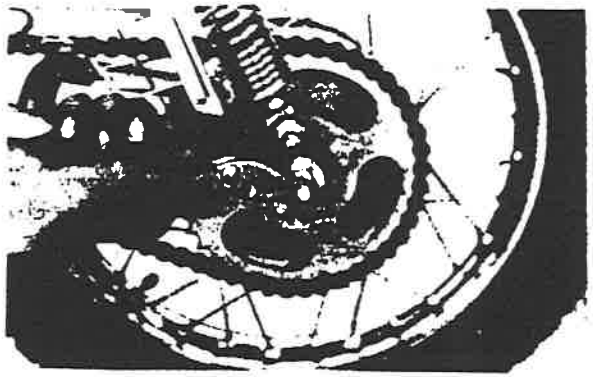
1. Removal

1. Remove the tension bar and brake rod from rear shoe plate.



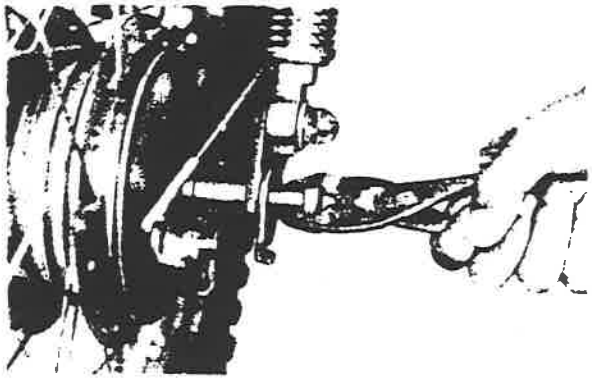


2. Remove cotter pin from rear wheel shaft nut.



3. Remove the rear wheel shaft nut.

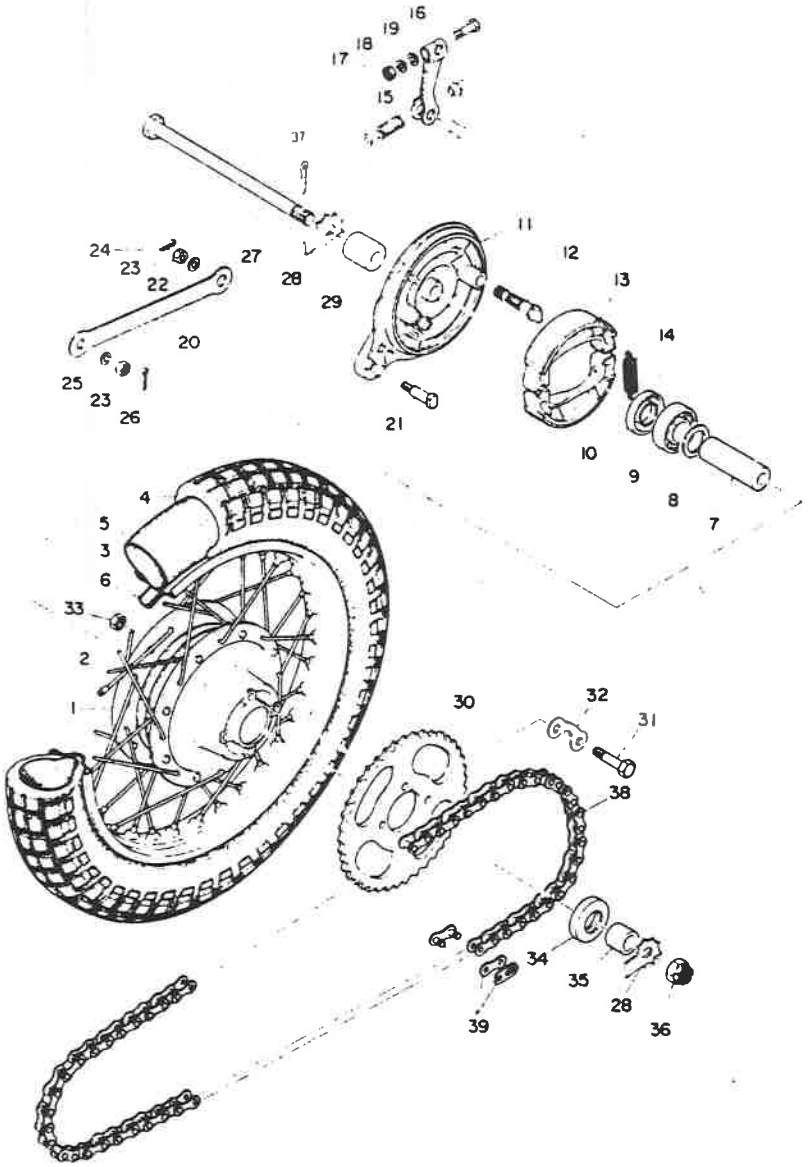
4. Pull out the rear wheel shaft by simultaneously twisting and pulling out.



5. Remove the rear brake shoe plate.

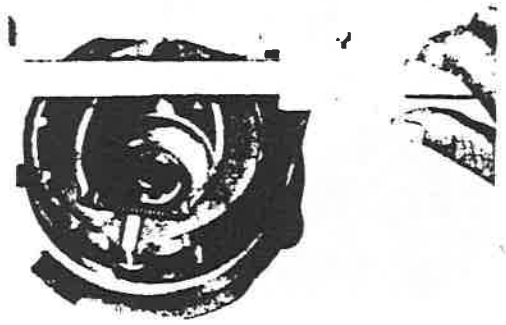
6. Lean the machine to the left and remove the rear wheel assembly.

REAR WHEEL



1. Rear hub
2. Spoke set
3. Rim
4. Tire
5. Tube
6. Rim band
7. Bearing spacer
8. Spacer flange
9. Bearing
10. Oil seal
11. Brake shoe plate
12. Shift cam
13. Brake shoe comp.
14. Return spring
15. Cam shaft lever
16. Bolt
17. Nut
18. Spring washer
19. Plain washer
20. Tension Bar
21. Tension bar bolt
22. Spring washer
23. Nut
24. Cotter pin
25. Plain washer
26. Cotter pin
27. Wheel shaft
28. Chain puller
29. Wheel shaft cotter
30. Sprocket wheel gear
31. Fitting bolt
32. Lock washer
33. Nut
34. Oil seal
45. Shaft coller
36. Shaft nut
37. Cotter pin
38. Chain
39. Chain joint

2. Checking Brake Shoe Wear
   1. Measure the outside diameter at the brake shoe with slide calipers. If it measures less than specified replace it.



REAR BRAKE SHOE DIAMETER:	110mm
REPLACEMENT LIMIT:	105mm

   2. Smooth out a rough shoe surface with sandpaper or with a file.

   3. Brake Drum
      Oil or scratches on the inner surface or the brake drum will impair braking performance or result in abnormal noises. Remove oil by wiping with a rag soaked in lacquer thinner or solvent. Remove scratches by lightly and evenly rubbing with emery cloth.

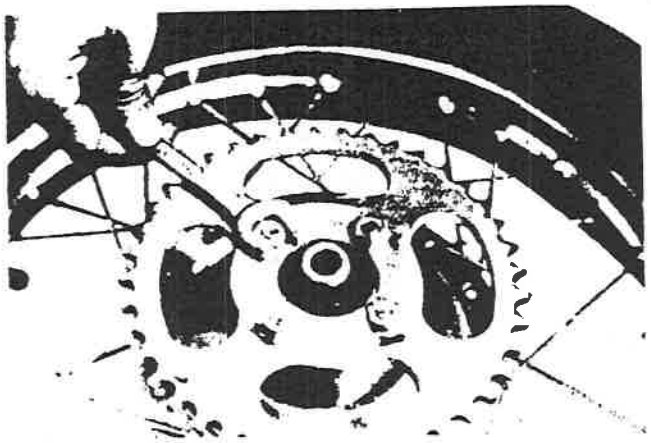
   4. Replacing Wheel Bearings.
      See front wheel section.

   5. Spokes
      Check the spokes. If they are loose or bent, tighten or replace them. If the machine is ridden in rough country often, or raced, the spokes should be checked regularly.

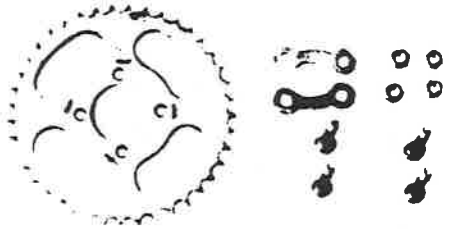
   6. Rear Wheel Sprocket
      1. Inspection
         A worn sprocket will result in excessive chain noise and shorten the life of the chain. Check the sprocket for worn teeth, and replace sprocket if they are worn.

2. To replace the sprocket, take the following steps.
   1. Bend the lock washer ears flat.

   2. Remove the sprocket fitting bolts.



3. Check the lock washer and fitting bolt for breakage and damage. If the lock washer is not bent over the fitting bolt head, or is broken, or if the bolt is loose, the sprocket can come loose. Make sure that both lock washers and the mounting bolts are tight when installing new sprocket.



3. Checking Rims and Spokes
(Front & Rear Wheels)

1. Checking for loose spokes

Loose spokes can be checked by bracing the machine off the ground so that the wheel can spin free. Slowly revolve the wheel and at the same time let the metal shaft of a fairly heavy screwdriver bounce off each spoke. If all the spokes are tightened approximately the same then the sound given off by the screwdriver hitting the spokes should sound the same. If one spoke makes a dull flat sound, then check it for looseness.

2. Checking rim "run-out"

While you have the wheel elevated, you should check that it does not have too much run-out. "Run-out" is the amount the wheel deviates from a straight line as it spins. Spin the wheel, and solidly anchor some sort of a pointer about 1/8" away from the side of the rim. As the wheel spins, the distance between the pointer and the rim should not change more than 1/16" total. Any greater fluctuation means that you should have your dealer remove this rim warpage by properly adjusting the spokes.

LATERAL RUN-OUT LIMITS: 2mm 0.07" (1/16")
VERTICAL RUN-OUT LIMITS: 2mm 0.07" (1/16")

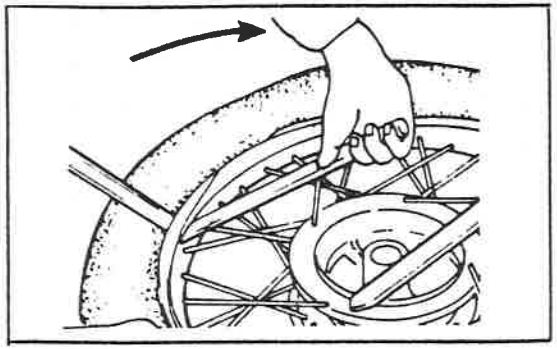
4. Tire Repairs

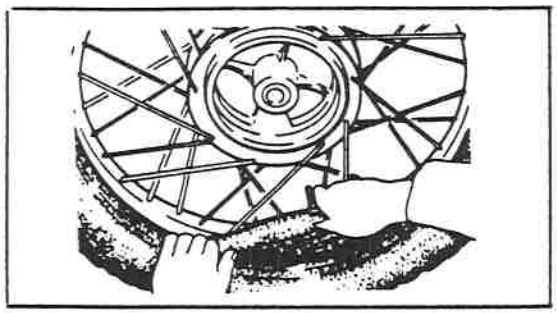
1. Removal

1. Remove valve cap, valve core, and valve stem lock nut.

2. When all air is out of tube, separate tire bead from rim (both sides) by stepping on tire with your foot.

3. Use two tire removal irons (with rounded edges) and begin to work the tire bead over the edge of the rim, starting 180° opposite the tube stem. Take care to avoid pinching the tube as you do this.





4. After you have worked one side of the tire completely off the rim, then you can slip the tube out. Be very careful not to damage the stem while pushing it back out to the rim hole.

NOTE: If you are changing the tire itself, the finish the removal by working then tire off the same rim edge just previously mentioned.

2. Installing Tire

Reinstalling the tire assembly can be accomplished by reversing the disassembly procedure. The only difference in procedure would be right after the tube has been installed, but before the tire has been completely slipped onto the rim, inflate the tube. This removes any creases that might exist. Release the air and continue with reassembly. Also, right after the tire has been completely slipped onto the rim, check to make sure that the stem is squarely in the center of the hole in the rim.

TIRE PRESSURE	Front	20 lbs/in² (1.4 kg/cm²)	Normal Riding (use 4 - 6 p.s.i. for max. traction at slow speeds)
	Rear	28 lbs/in² (2.0 kg/cm²)	

2. FRONT FORKS AND STEERING HEAD

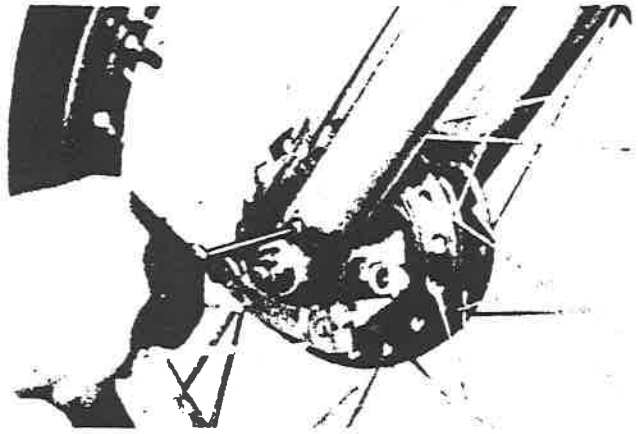
1. General - The front forks on your machine utilize chrome plated tubular steel fork legs (inner tubes) and tubular aluminum sliders (outer tubes). The bearing surface is the entire inside surface of the aluminum outer tube.

   The steering head pivot is supported by two sets of uncaged ball and race bearing assemblies.

2. Front Fork Oil Change

   1. Remove cap bolts on inner fork tubes.

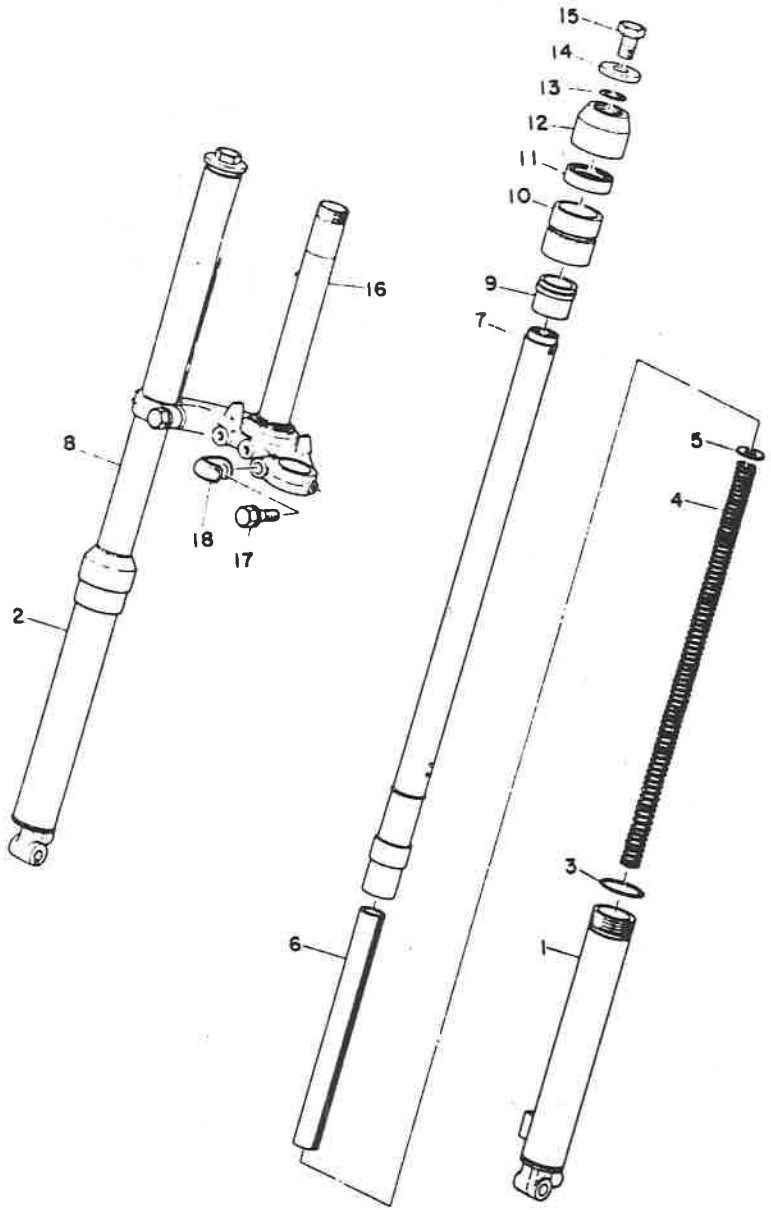
   2. Remove drain screw from each outer tube with open container under each drain hole.



3. After most of oil has drained, slowly raise and lower outer tubes to pump out remaining oil.

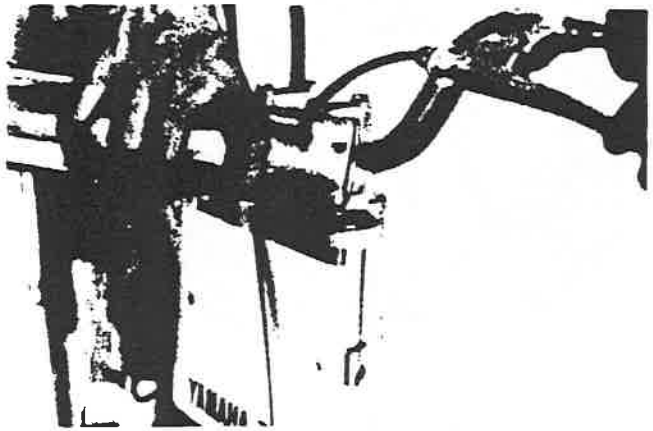
4. Replace drain screws.

NOTE: Check gaskets, replace if damaged.



1. Outer tube left
2. Outer tube right
3. O-ring
4. Fork spring
5. Spring upper washer
6. Spacer
7. Inner tube left
8. Inner tube right
9. Slide metal
10. Outer nut comp.
11. Oil seal
12. Dust seal
13. Packing
14. Cap washer
15. Cap bolt
16. Under bracket comp.
17. Under bracket bolt
18. Clip

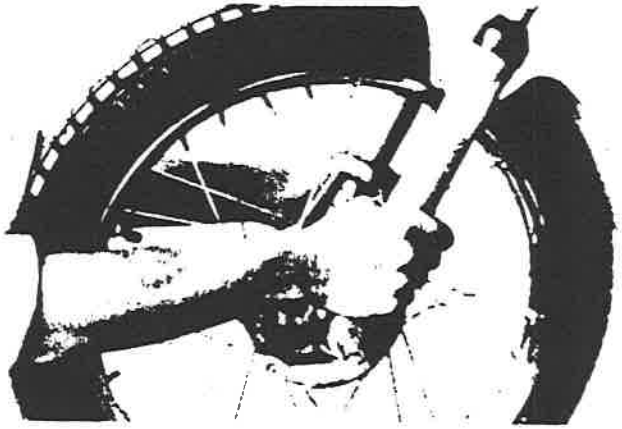
5. Measure correct amount of oil and pour into each leg.



Recommended Oil: Non-foaming hydraulic fluid. 10, 20, 30wt. (fork oil)
Quantity: 85cc 2.9oz. (per leg)

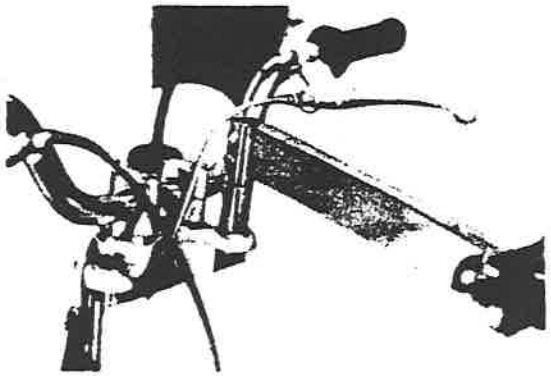
NOTE: Select the weight oil that suits local conditions and your preference (lighter for less damping; heavier for more damping).

6. After filling, slowly pump the outer tubes up and down to distribute the oil.



7. Inspect O-ring on inner tubes and replace if damaged.

8. Replace fork cap bolts and torque to specification.



FORK CAP TORQUE: 3.5 - 4.0 kg-m (300 - 350 in-lbs)

3. Front Fork Disassembly

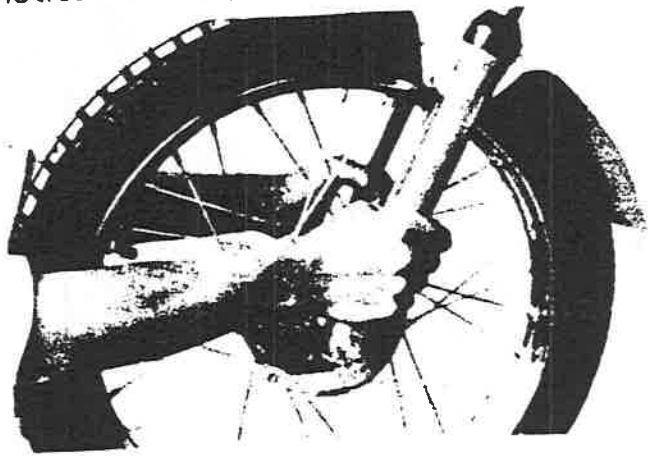
1. With the front wheel removed, the fork legs can be removed from the upper and lower brackets.

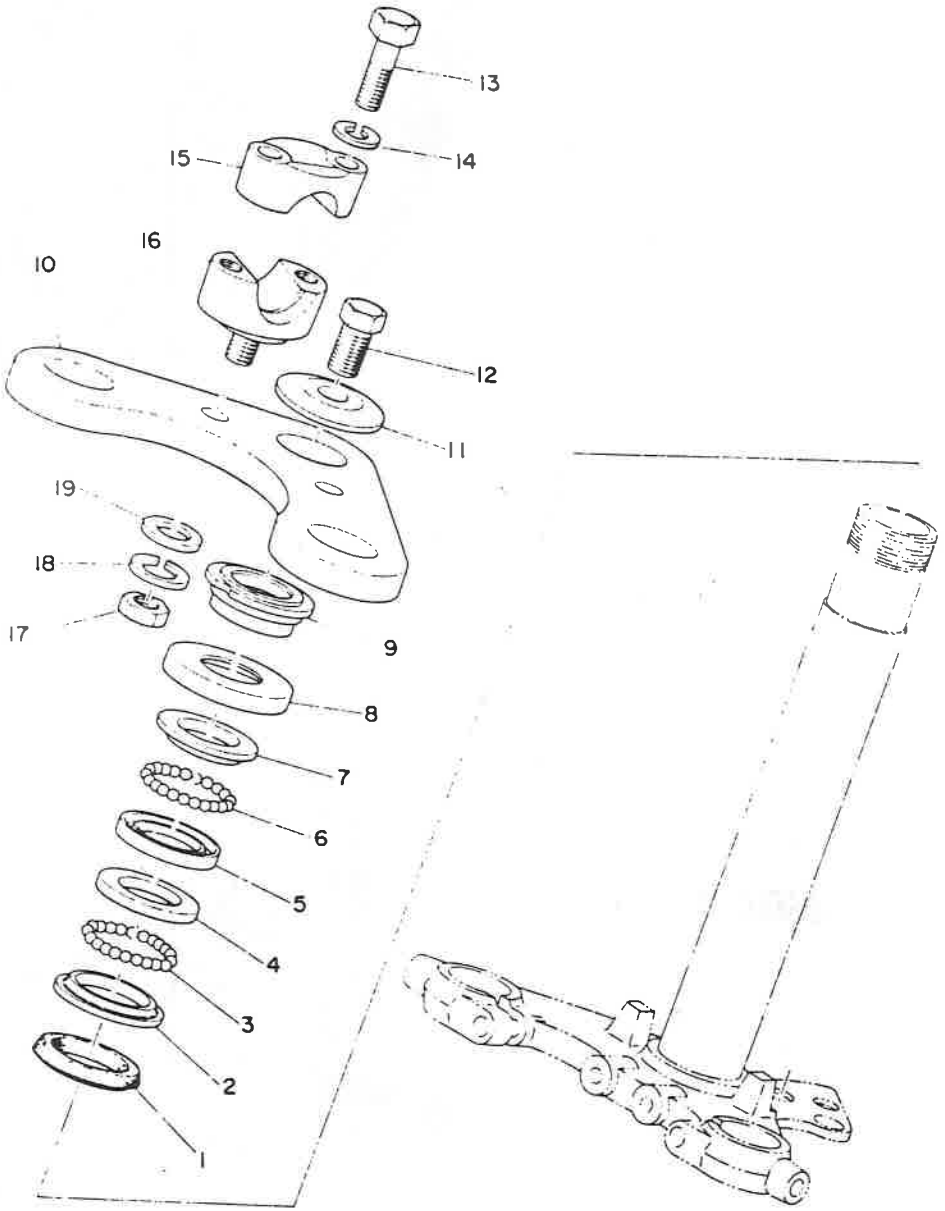
2. Disassembly procedure for individual fork tube assembly is found in DT250A/360A Service Manual.

NOTE: Proper fork seal installation is important. Also, carefully tap seal in with large socket to avoid damage to aluminum fork tube.

4. Steering Head Adjustment

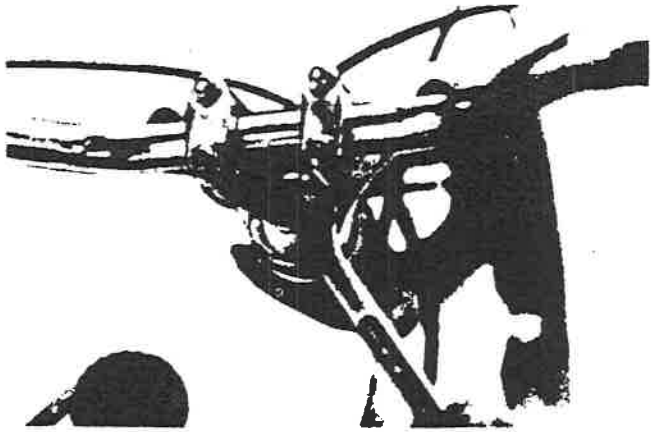
1. With front wheel elevated, grap bottoms of fork legs and gently push and pull to check steering head freeplay. There should be no noticeable freeplay.





1. Dust seal 1
2. Ball race 1
3. Ball
4. Ball race 2
5. Ball race 2
6. Ball
7. Ball race 1
8. Ball race cover
9. Fitting nut
10. Handle crown
11. Crown washer
12. Fitting bolt
13. Bolt
14. Spring washer
15. Handle holder upper
16. Handle holder under
17. Nut
18. Spring washer
19. Plain washer

2. Loosen stem bolt.



3. Use steering nut wrench to tighten adjust nut. Tighten until freeplay is eliminated.

CAUTION:
Forks must swing from lock to lock without binding or catching.

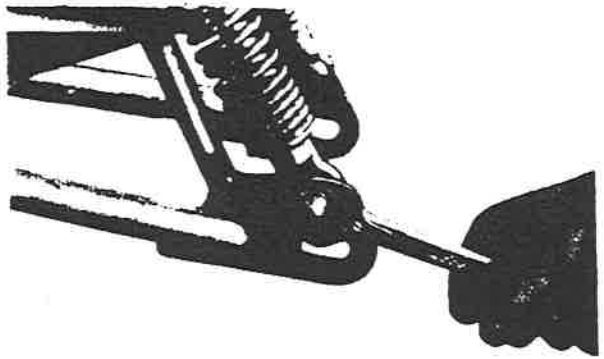
4. Tighten stem bolt and torque to specification.

STEM BOLT TORQUE:	3.5 - 4.0 kg-m (300 - 350 in-lbs)

3. REAR SHOCK ABSORBERS AND SWING ARM

1. Rear Shock Removal and Inspection

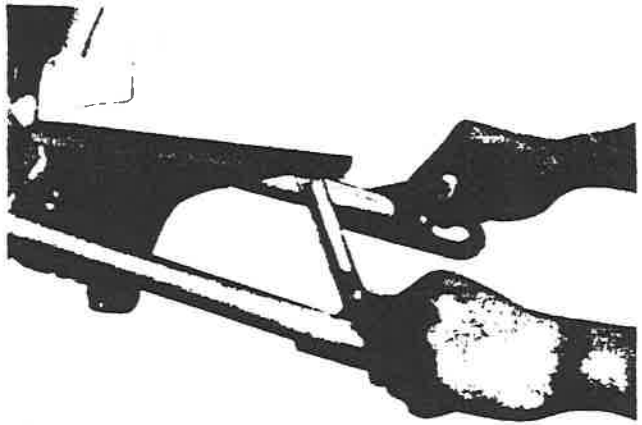
1. After rear wheel has been removed, remove Phillip head screw, crown nut and cup washer from each shock.



2. Remove shock.
3. Operate shock absorber to check damping. As you push down, only slight damping should be felt. Return stroke will have considerable damping. If there is no damping, replace shock.

2. Swing Arm Inspection

1. With rear wheel and shock absorbers removed, grasp the ends of the arm and move from right to left to check for freeplay.



Swing Arm Freeplay:	1.0mm	0.04in.

2. If freeplay is excessive, remove swing arm and replace swing arm bushings.

CHAPTER X ELECTRICAL SYSTEM

1. GENERAL INFORMATION AND SCHEMATICS

1. General

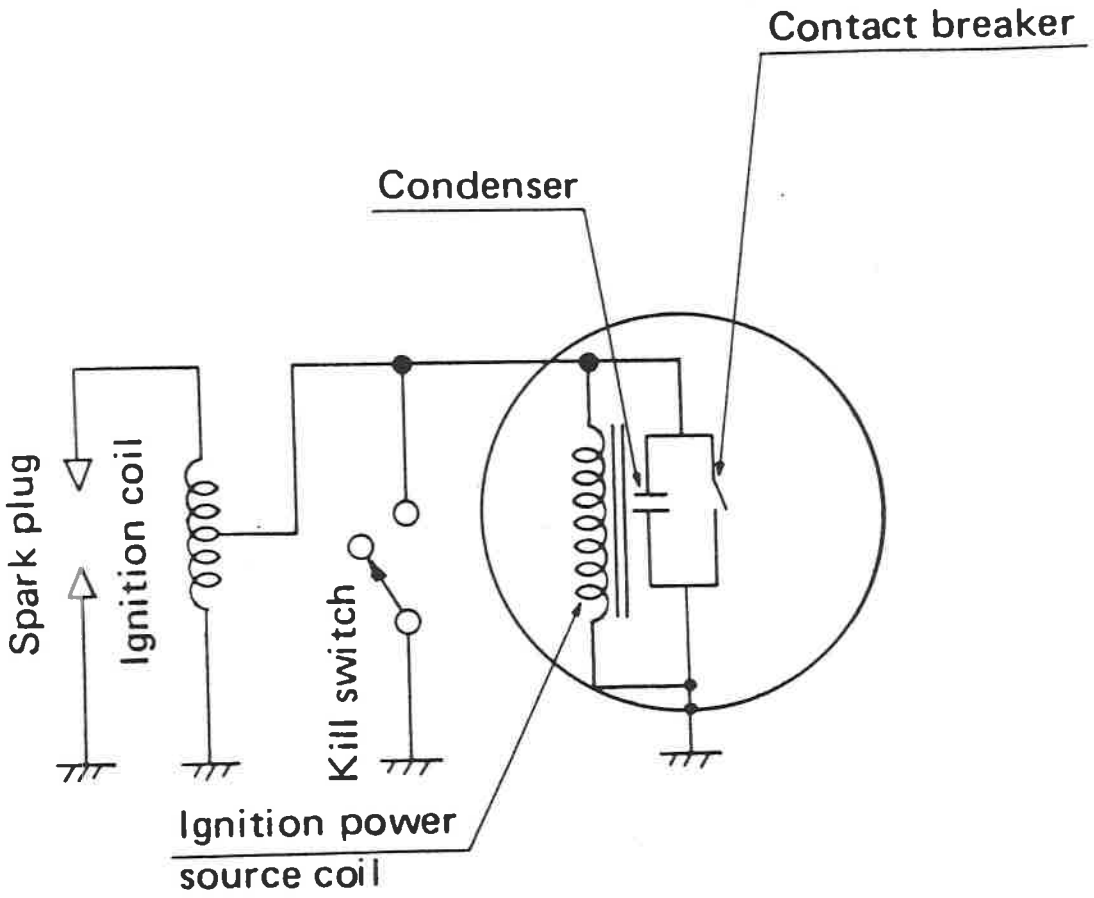
1. The TY80A uses a flywheel magneto to generate electrical current/voltage for the ignition system and the lighting system. There are two coils attached to the magneto backing plate. The righthand coil supplies primary voltage to the ignition coil. The left-hand coil provides alternating current (A.C.) for operation of the lights and horn.

NOTE: If headlight filament burns out while engine is running, the tail lamp filament may also burn out because of excess voltage. Always check taillight operation when replacing headlight.

2. Table of Component Parts

PART NAME	MANUFACTURER	MODEL/TYPE
Flywheel Magneto	MITSUBISHI	FOT00173Z
Ignition Coil	HITACHI	CM61–20M
Contact Breaker Ass'y	HITACHI	
Condenser	HITACHI	
Spark Plug	N.G.K.	B–6HS

3. Electrical Wiring Diagram

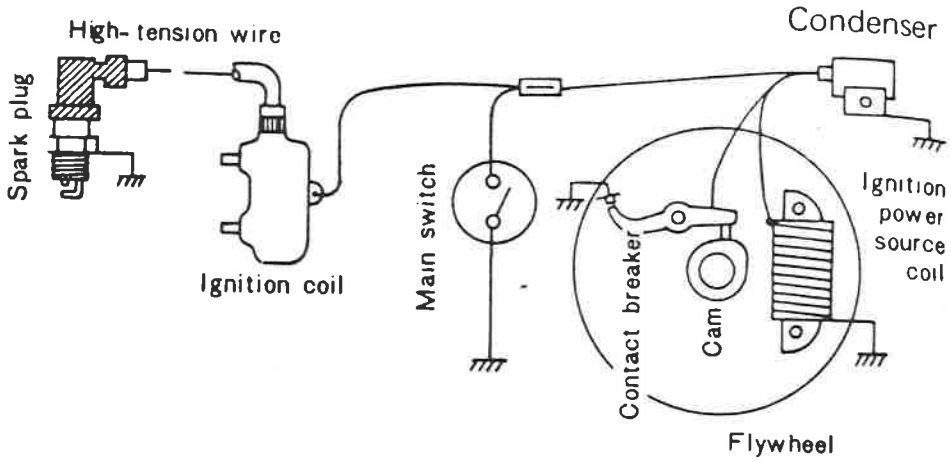


2. Magneto Ignition System

1. Description

The ignition system consists of the following parts:

1. Flywheel magneto
2. Ignition source coil
3. Contact breaker assembly (points)
4. Ignition condenser
5. Ignition coil (voltage step-up coil)
6. Kill button
7. Spark plug



As the flywheel rotates, the contact breaker points begin to open and close, alternately. This make-and-brake operation develops an electomotive force in the ignition power source coil, and produces a voltages in the ignition coil primary windings. The ignition coil is a kind of transformer, with a 1:50 turn ratio of the primary to the secondary winding. The voltage (150-300V) which is produced in the primary coil, is stepped up to 12,000-14,000V by mutual-induction and the electric spark jumps across the spark plug electrodes.

2. Ignition Timing

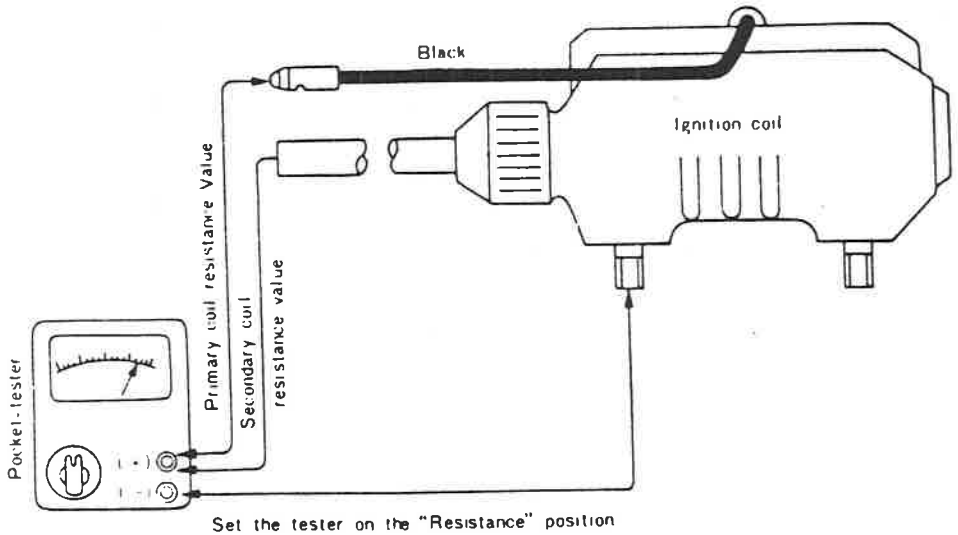
Refer to "Mechanical Adjustments, Ignition Timing" for step-by-step procedure.

Spark Test:

Remove the spark plug from the cylinder head and reconnect the high voltage lead. Then hold the spark plug approximately 7mm away from the head and see if it sparks as you crank the kickstarter. If it sparks at 7mm, or so, and has blue while color, the ignition coil should be considered to be in good condition.

3. Ignition Coil

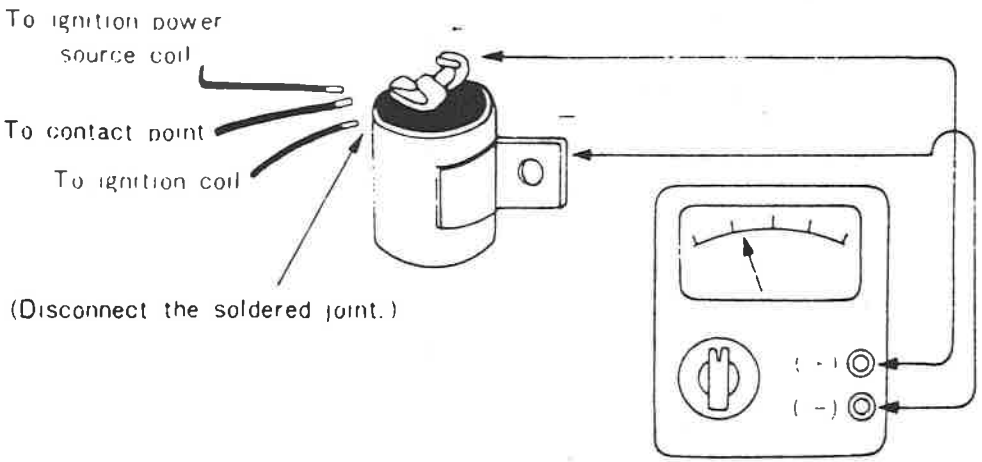
Primary coil res.	1.7 Ω + 10% (20 °C or 68 °F)
Secondary coil res. . . .	6.0 K Ω + 10% (20 °C or 68 °F)



Burned contact points greatly affect the flow of current in the primary winding of the ignition coil. If the contact points show excessive wear, or the spark is weak (the ignition coil is in good condition), check the condenser.

4. Condenser

The condenser instantly stores a static electric charge as the contact breaker points separate, and the energy stored in the condenser discharges instantly when the points are closed. If it were not for the condenser, an electric arc would jump across the separating contact points causing them to burn.



Set the tester on the "MΩ" position.

Insulation resistance tests should be conducted by connecting the tester as shown. If the pointer swings fully and the reading is more than 3MΩ, the insulation is in good condition.

If the insulation is faulty, the pointer will stay pointing at the uppermost reading, indicating very little resistance.

NOTE: After this measurement, the condenser should be discharged by connecting the positive and negative sides with a thick wire.

Capacity tests can be performed by simply setting the tester to the condenser capacity. The tester should be connected with the condenser in the same way as in the case of the insulation resistance test. Before this measurement, be sure to set the tester correctly. If the reading is within 0.3 μF + 10%, the condenser capacity is correct.

CHAPTER XI MISCELLANEOUS

CONVERSION TABLES

LENGTHS

Multiply	By	To Obtain
Millimeters (mm)	0.03937	Inches
Inches (in)	25.4	Millimeters
Centimeters (cm)	0.3937	Inches
Inches (in)	2.54	Centimeters

Multiply	By	To Obtain
Kilometers (km)	0.6214	Miles
Miles (mi)	1.609	Kilometers
Meters (m)	3.281	Feet
Feet (ft)	0.3048	Meters

WEIGHTS

Kilograms (kg)	2.205	Pounds
Pounds	0.4536	Kilograms

Grams (g)	0.03527	Ounces
Ounces (oz)	28.25	Grams

VOLUMES

Cubic centimeters (cc)	0.06102	Cubic inches
Cubic inches (cu.in.)	16.387	cc.
Liters (l)	0.264	Gallons
Gallons (gal)	3.785	Liters
U.S. gallons	1.2	Imperial gals.
Imperial gallons	4.537	Liters

Imperial gallons	277.274	cu.in.
Liters (l)	1.057	Quarts
Quarts (qt)	0.946	Liters
Cubic centimeters (cc)	0.0339	Fluid ounces
Fluid ounces (fl.oz.)	29.57	cc.

OTHERS

Metric horsepower (qs)	1.014	bhp
Brake horsepower (bhp)	0.9859	ps.
Kilogram-meter (kg-m)	7.234	Foot-pounds
Kilograms/sq.cm	14.22	Pounds/sq.in. (Lbs/in^2 or psi)
Centigrade (C°)	(C° x 9/5) + 32	Fahrenheit (F°)

Foot-pounds (ft-lbs)	0.1383	kg-m
Kilometers per liter (km/l)	2.352	mph
Miles per gallon (mpg)	0.4252	km/l

Inches to Millimeters

	0	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
0		0.254	0.508	0.762	1.016	1.270	1.524	1.778	2.032	2.286
0.1	2.540	2.794	3.048	3.302	3.556	3.810	4.064	4.318	4.572	4.826
0.2	5.080	5.334	5.588	5.842	6.096	6.350	6.604	6.858	7.112	7.366
0.3	7.620	7.874	8.128	8.382	8.636	8.890	9.144	9.398	9.652	9.906
0.4	10.160	10.414	10.668	10.922	11.176	11.430	11.684	11.938	12.192	12.446
0.5	12.700	12.954	13.208	13.462	13.716	13.970	14.224	14.478	14.732	14.986
0.6	15.240	15.494	15.748	16.002	16.256	16.510	16.764	17.018	17.272	17.526
0.7	17.780	18.034	18.288	18.542	18.796	19.050	19.304	19.558	19.812	20.066
0.8	20.320	20.574	20.828	21.082	21.336	21.590	21.844	22.098	22.352	22.606
0.9	22.860	23.114	23.368	23.622	23.876	24.130	24.384	24.638	24.894	25.146
1.0	25.400	25.654	25.908	26.162	26.416	26.670	26.924	27.178	27.432	27.686

0.001"=0.0254mm 0.003"=0.0762mm 0.005"=0.1270mm 0.007"=0.1778mm 0.009"=0.2286mm
0.002"=0.0508mm 0.004"=0.1016mm 0.006"=0.1524mm 0.008"=0.2032mm 0.010"=0.254mm

Millimeters to Inches

	0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
0		0.0039	0.0079	0.0018	0.0157	0.0197	0.0236	0.0276	0.0315	0.0354
1	0.0394	0.0433	0.0472	0.0512	0.0551	0.0591	0.0630	0.0669	0.7099	0.0748
2	0.0787	0.0827	0.0866	0.0906	0.0945	0.0984	0.1024	0.1063	0.1102	0.1142
3	0.1181	0.1200	0.1260	0.1299	0.1339	0.1378	0.1417	0.1457	0.1496	0.1535
4	0.1575	0.1614	0.1654	0.1693	0.1732	0.1772	0.1811	0.1850	0.1890	0.1929
5	0.1969	0.2000	0.2047	0.2087	0.2126	0.2165	0.2205	0.2244	0.2283	0.2323
6	0.2362	0.2402	0.2441	0.2480	0.2520	0.2559	0.2598	0.2638	0.2677	0.2717
7	0.2756	0.2795	0.2835	0.2874	0.2913	0.2953	0.2992	0.3031	0.3071	0.3110
8	0.3150	0.3189	0.3228	0.3268	0.3307	0.3346	0.3386	0.3425	0.3465	0.3504
9	0.3542	0.3583	0.4016	0.3661	0.3701	0.3740	0.3780	0.3819	0.3858	0.3898
10	0.3937	0.3976	0.4016	0.4055	0.4094	0.4134	0.4173	0.4213	0.4252	0.4291

0.01mm=0.004 0.03mm=0.0012 0.05mm=0.0020 0.07mm=0.0028 0.09mm=0.0035
0.02mm=0.008 0.04mm=0.0016 0.06mm=0.0024 0.08mm=0.0031 0.10mm=0.0039

CLEANING AND STORAGE

A. Cleaning

Frequent thorough cleaning of your motorcycle will not only enchance it's appearance but will improve general performance and extend the useful life of many components.

1. Before cleaning the machine:
   a. Block off end of exhaust pipe to prevent water entry; a plastic bag and strong rubber band may be used.
   b. Remove air cleaner or protect it from water with plastic covering.
   c. Make sure spark plug(s), gas cap, oil tank cap, transmission oil filler cap and battery caps are properly installed.
2. If engine case is excessively greasy, apply degreaser with a paint brush. Do not apply degreaser to chain, sprockets, or wheel axles.
3. Rinse dirt and degreaser off with garden hose, using only enough hose pressure to do the job. Excessive hose pressure may cause water seepage and contamination of wheel bearings, front forks, brake drums, and transmission seals. Many expensive repair bills have resulted from improper high-pressure detergent applications such as those available in coil-operated car washes.
4. Once the majority of dirt has been hosed off, wash all surfaces with warm water and mild, detergent-type soap. An old tooth brush or bottle brush is handy to reach those hard-to-get-to places.
5. Rinse machine off immediately with clean water and dry all surfaces with a chamois skin, clean towel, or soft absorbent cloth.
6. Immediately after washing, remove excess moisture from chain and lubricate to prevent rust.
7. Chrome-plated parts such as handlebars, rims, spokes, forks, etc., may be further cleaned with automotive chrome cleaner.
8. Clean the seat with a vinyl upholstery cleaner to keep the cover pliable and glossy.
9. Automotive-type wax may be applied to all painted and chrome-plated surfaces. Avoid combination cleaner-waxes. Many contain abrasives which may mar paint or protective finish on fuel and oil tanks.
10. After finishing, start the engine immediately and allow to idle for several minutes.

B. Storage

Long term storage (30 days or more) of your motorcycles will require some preventive procedures to insure against deterioration. After cleaning machine thoroughly, prepare for storage as follows:

1. Drain fuel tank, fuel lines, and carburetor floa+ bowl(s).
2. Remove empty fuel tank, pour a cup of 10W to 30W oil in tank, shake tank to coat inner surfaces thoroughly and drain off excess oil. Reinstall tank.
3. Remove spark plug, pour about one tablespoon of 10W to 30W oil in spark plug hole and reinstall spark plugs. Kick engine over several times (with ignition off) to coat cylinder walls with oil.
4. Remove drive chain. Clean thoroughly with solvent and lubricate with graphite-base chain lubricant. Reinstall chain or store in a plastic bag (tie to frame for safe-keeping).
5. Lubricate all control cables.
6. Remove battery and charge. Store in a dry place and re-charge once a month. Do not store battery in an excessively warm or cold place (less than 32°F or more than 90°F).
7. Block up frame to raise both wheels off ground. (Main stands can be used on machines so equipped.)
8. Deflate tires to 15psi.
9. Tie a plastic bag over exhaust pipe outlet(s) to prevent moisture entering.
10. If storing in humid or salt-air atmosphere, coat all exposed metal surfaces with a light film of oil. Do not apply oil to rubber parts or seat cover.

CABLE ROUTING DIAGRAMS