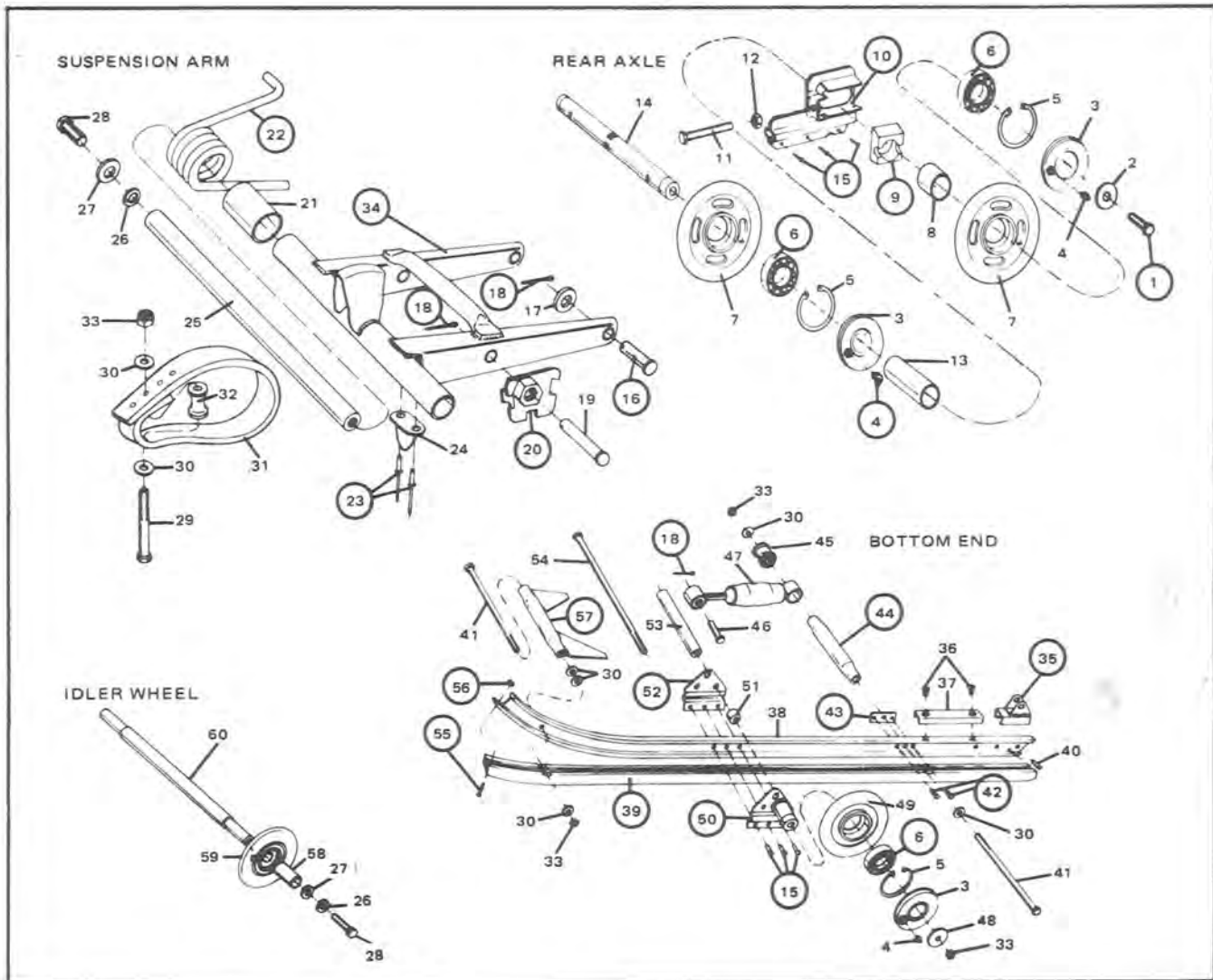


SECTION 01  
SUB-SECTION 02 (SLIDE SUSPENSION)

SLIDE SUSPENSION-TORQUE REACTION



- |                         |                     |                            |                                  |
|-------------------------|---------------------|----------------------------|----------------------------------|
| 1. Bolt.                | 16. Clevis pin      | 31. Stopper strap.         | 46. Clevis pin.                  |
| 2. Washer.              | 17. Washer.         | 32. Spacer.                | 47. Shock absorber.              |
| 3. Cap.                 | 18. Cotter pin.     | 33. Nut.                   | 48. Washer.                      |
| 4. Grease fitting.      | 19. Clevis pin.     | 34. Suspension arm.        | 49. Idler.                       |
| 5. Circlip.             | 20. Adjustment cam. | 35. Sliding support.       | 50. Front arm support (outside). |
| 6. Ball bearing.        | 21. Spring bushing. | 36. Pad retaining screw.   | 51. Spacer.                      |
| 7. Idler wheel.         | 22. Spring.         | 37. Sliding pad.           | 52. Front arm support (inside).  |
| 8. Spacer tube (short). | 23. Pop rivet.      | 38. Runner.                | 53. Spacer.                      |
| 9. Sliding block.       | 24. Stop bonding.   | 39. Slider shoe.           | 54. Through bolt (long).         |
| 10. Adjustment plate.   | 25. Cross shaft.    | 40. Roll pin.              | 55. Screw.                       |
| 11. Adjuster bolt.      | 26. Washer          | 41. Through bolt (short).  | 56. Nut.                         |
| 12. Jam nut.            | 27. Lock washer.    | 42. Rivet.                 | 57. Front cross support.         |
| 13. Spacer tube (long). | 28. Bolt.           | 43. Reinforcement bracket. | 58. Spacer tube                  |
| 14. Rear axle.          | 29. Bolt.           | 44. Rear cross support.    | 59. Idler wheel                  |
| 15. Rivet.              | 30. Washer.         | 45. Bushing.               | 60. Cross Shaft                  |

## SECTION 01

### SUB-SECTION 02 (SLIDE SUSPENSION)

#### REMOVAL

Release track tension by loosening adjuster bolts located on inner side of rear idler wheels.

Position the adjustment cams at the lowest elevation, detach front stopper strap then apply downward pressure on the seat and disconnect the shock absorber.

Remove the four (4) bolts securing suspension to frame. Lift rear of vehicle then withdraw suspension ass'y from track area.

*Note: To prevent cross shaft from turning within the suspension arm, wedge the blade of a small screwdriver between the shaft and suspension arm.*

#### DISASSEMBLY & ASSEMBLY

Clean all traces of plastic from threads. Prior to assembly, apply a light coat of "Loctite" thread locking compound on threads.

④ Center wheel grease fitting is angled at 45°.

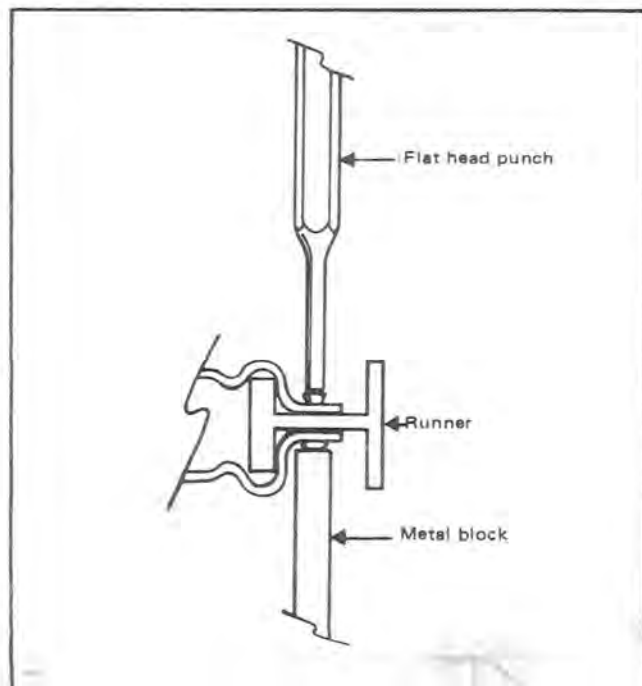
⑥ Bearing must be installed with shield facing the inside of idler wheel.

*Note: Center ball bearing on rear axle has a slightly larger inside diameter, i.e.: .999" instead of .984".*

⑨ At assembly, sliding block must be installed with the wide section of the offset facing up.

⑩ ⑮ ⑤② To remove rivet securing adjustment plate or front arm supports, cut rivet head with a chisel.

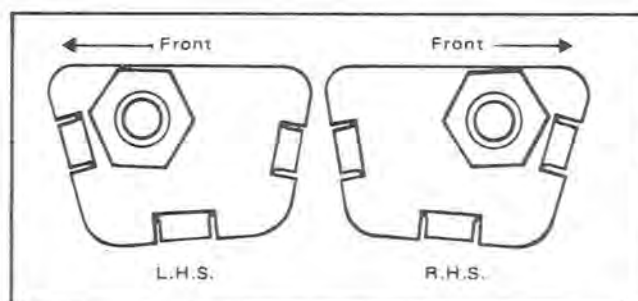
At assembly, rest rivet head on a suitable metal block and hold ass'y firmly. Using a flat head punch and hammer secure rivet as illustrated.



⑮ Rear arm clevis pin length is 1 5/8", front arm clevis pin length, 1 13/16".

⑮ At assembly, discard used cotter pin and install a new one.

⑳ Adjustment cam must be installed so that hexagonal projection on cam is located on upper front corner, as illustrated.



㉔ Prior to assembly, identify front and rear springs. Front spring diameter is 3/8", rear spring diameter is 13/32".

㉔ To remove rivet, use a 7/32" dia. drill.

㉔ Illustrated is front suspension arm. Same part layout applies to rear suspension arm.

㉔ Sliding support must be installed with offset toward rear.

㉔ ㉔ ㉔ ㉔ ㉔ To replace worn slider shoe, remove nut and bolt securing front of shoe to runner; also remove front and rear cross support. Slide shoe out of runner.

㉔ ㉔ To remove rivet, use a 3/16" dia. drill. At assembly, secure reinforcement bracket to runner with two (2) 10-32 X 1/2" bolts, and nuts.

㉔ The outside front arm support must be installed with idler wheel shaft located toward rear.

#### INSTALLATION

Lift the rear of vehicle off the ground. Detach front stopper strap and shock absorber.

Place suspension within track and align front arm of suspension with front holes of frame and secure using bolts, lock washers and flat washers. Torque to 28-35 ft/lb.

Raise the rear section of the suspension and track into the tunnel and align rear arm with rear holes in frame. Secure to frame using bolts, lock washers and flat washers. Torque to 28-35 ft/lb.

Reposition vehicle on the ground. Position the adjuster blocks at the lowest elevation then apply downward pressure on the seat and connect the shock absorber. Attach front stopper strap.

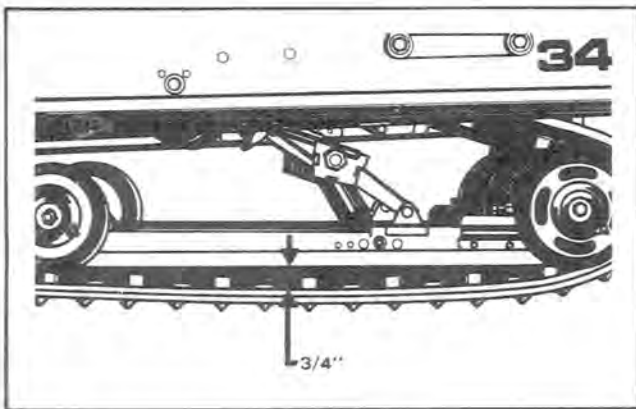
*Note: There are four installation positions for the stopper strap. Standard position (2nd hole) provides maximum traction and steering efficiency for almost every snow condition. However, for very special purposes or snow condition, it may become necessary to alter this setting. Lengthening the strap (1st hole) has the same effect as shifting the weight toward rear of vehicle; as a result, traction is*

increased but steering efficiency is decreased. Inversely, by shortening the strap length (3rd or 4th hole), traction is decreased while steering efficiency and effort are increased.

## ADJUSTMENT

### Track Tension

Lift rear of vehicle and support it off the ground. Allow slide to extend normally. A gap of 3/4" should exist between slider shoe and bottom inside of track.



To adjust tension, loosen or tighten adjuster bolts located on inner side of rear idler wheels.

*Note: Track tension, track alignment and ride adjustment are three (3) interrelated adjustments. The measurement given for ride adjustment is initial. When ride adjustment is finalized for surface condition and driver suitability, it may be necessary to readjust track tension and alignment to specifications.*

### Track Alignment

After track tension has been corrected start the engine and accelerate slightly so that track turns slowly. Check that track is well centered and turns evenly. To correct, stop the engine then loosen the lock nut and tighten the adjuster

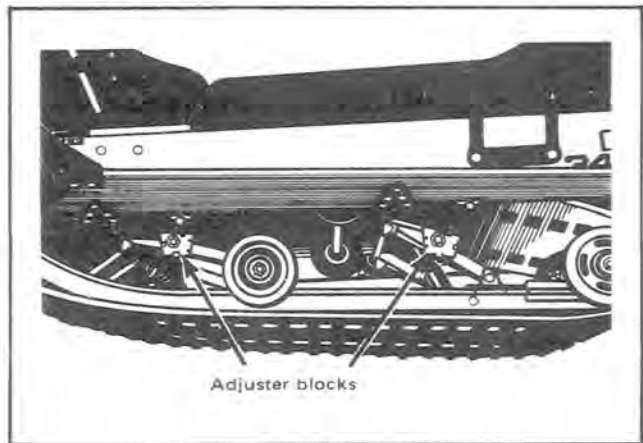
bolt on side where track is closest to the frame. Tighten lock nut and recheck alignment.

**Warning:** Before checking track alignment, ensure that the track is free of all particles which could be thrown out while track is rotating. Keep hands, feet and clothing clear of track.

### Ride Adjustment

The front adjuster blocks are used for snow condition, and the rear, for driver's weight.

The front adjuster blocks should be positioned at the lowest elevation for deep snow conditions. A higher elevation is preferred when negotiating icy snow. The rear adjuster blocks should be adjusted until a distance of 5 1/2" - 6 1/2" is obtained between rear of footrest and ground when the customer is seated on the vehicle. (A spark plug wrench is an ideal tool).

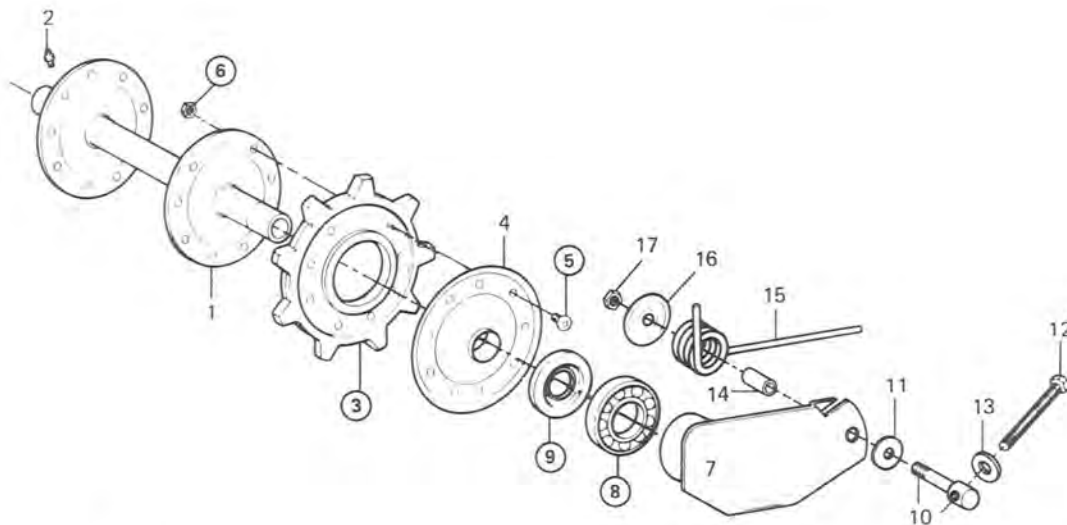


**Caution:** Always turn left side adjuster blocks in a clockwise direction, the right side blocks in a counter-clockwise direction. Left and right adjuster blocks of each adjustment must always be set at the same elevation. Verify track tension and alignment.

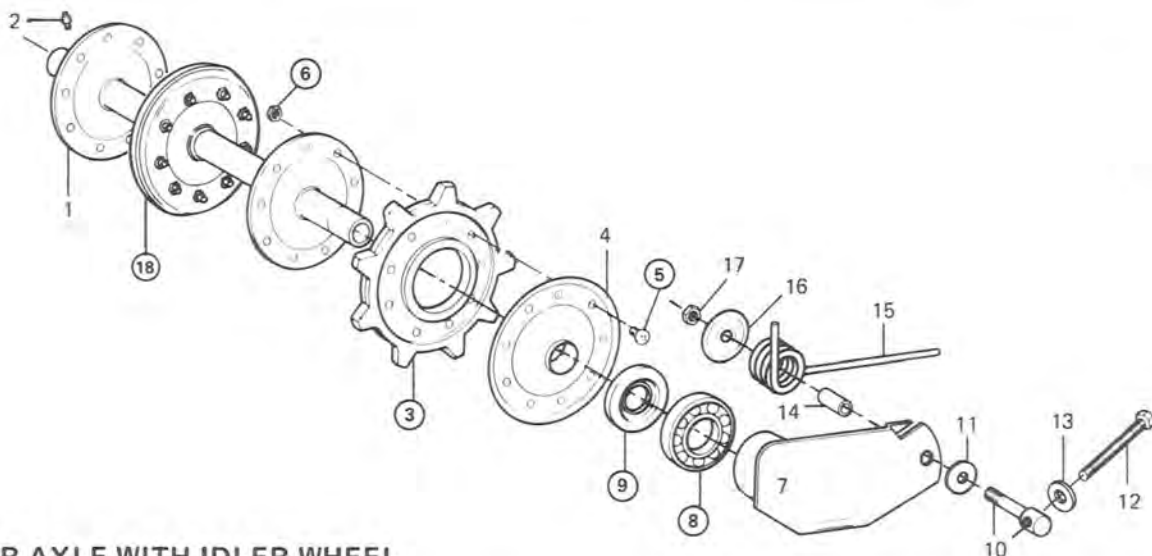




REAR AXLE



REAR AXLE



REAR AXLE WITH IDLER WHEEL

- |                   |                     |                       |
|-------------------|---------------------|-----------------------|
| 1. Rear axle      | 7. Link plate       | 13. Washer            |
| 2. Grease fitting | 8. Bearing          | 14. Sleeve            |
| 3. Sprocket       | 9. Oil seal         | 15. Link plate spring |
| 4. Mobile flange  | 10. Eye bolt        | 16. Retainer washer   |
| 5. Bolt (flange)  | 11. Hardener washer | 17. Nut               |
| 6. Nut (flange)   | 12. Adjuster bolt   | 18. Idler wheel       |

## SECTION 01

### SUB-SECTION 03 (REAR AXLE)

#### REMOVAL

Lift and block rear of vehicle off the ground.

Remove the link plate spring lock nuts and retainer washers.

Using link plate spring lever (See Tool Section), unlock link plate springs.

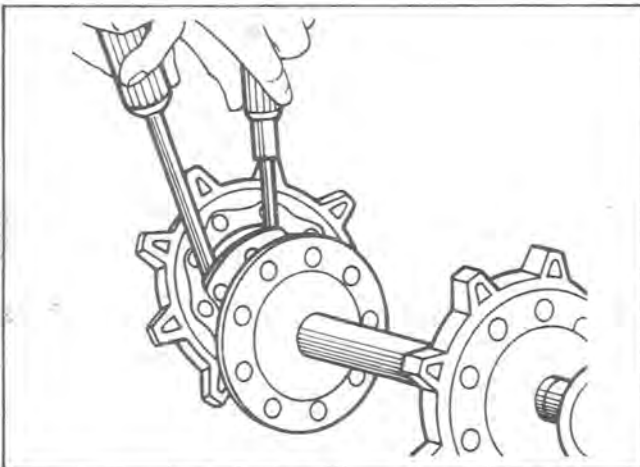
Remove track adjuster bolts, eye bolts, hardener washers and adjuster sleeves.

Withdraw rear axle from vehicle.

#### DISASSEMBLY & ASSEMBLY

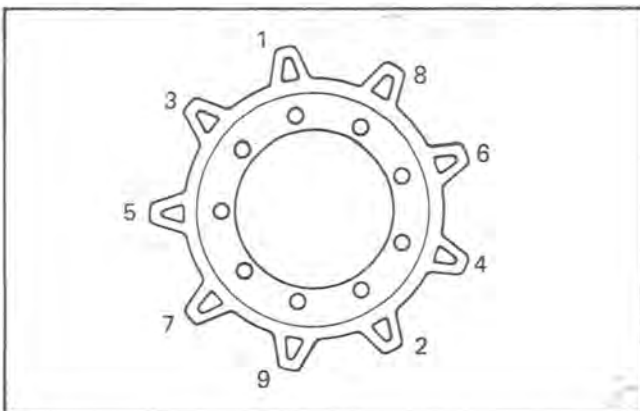
③ ⑬ Idler wheels and sprockets are factory riveted. When separation is necessary, remove rivets securing idler with a 1/4" dia. bit.

To remove sprocket or idler wheel, apply liquid soap or petroleum jelly on sprocket bead and flange then with two (2) screwdrivers (round bars), pass the sprocket over flange. Reverse change-over procedure to install sprocket or idler wheel.



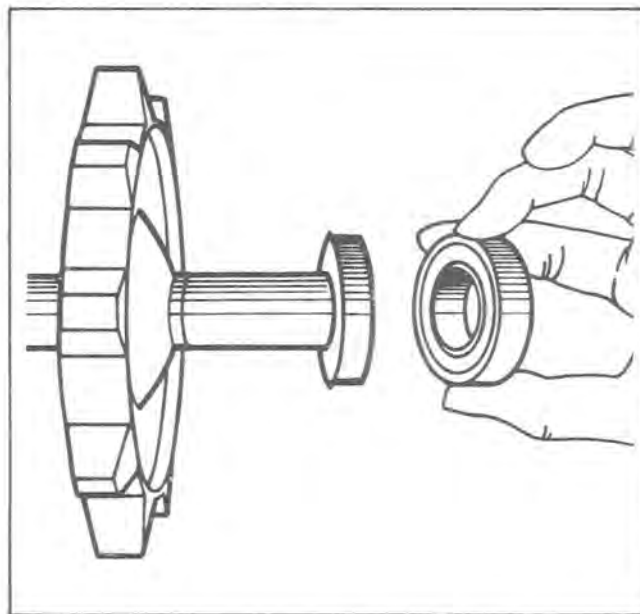
Secure idler wheel and flanges using bolts and nuts tightened in the following sequence to 25-35 in./lbs.

⑤ ⑥ Tightening torques for sprockets are, 25 - 35 in./lbs. for narrow sprockets.



⑧ Always pull or push the bearing by inner race.

⑨ When assembling, always position a new seal. When inserting seals into link plate, seal lip must sit correctly in groove of link plate. After lubricating the rear axle, ensure that seals remain in position.



#### INSTALLATION

With rear of vehicle off the ground, position the rear axle within the track.

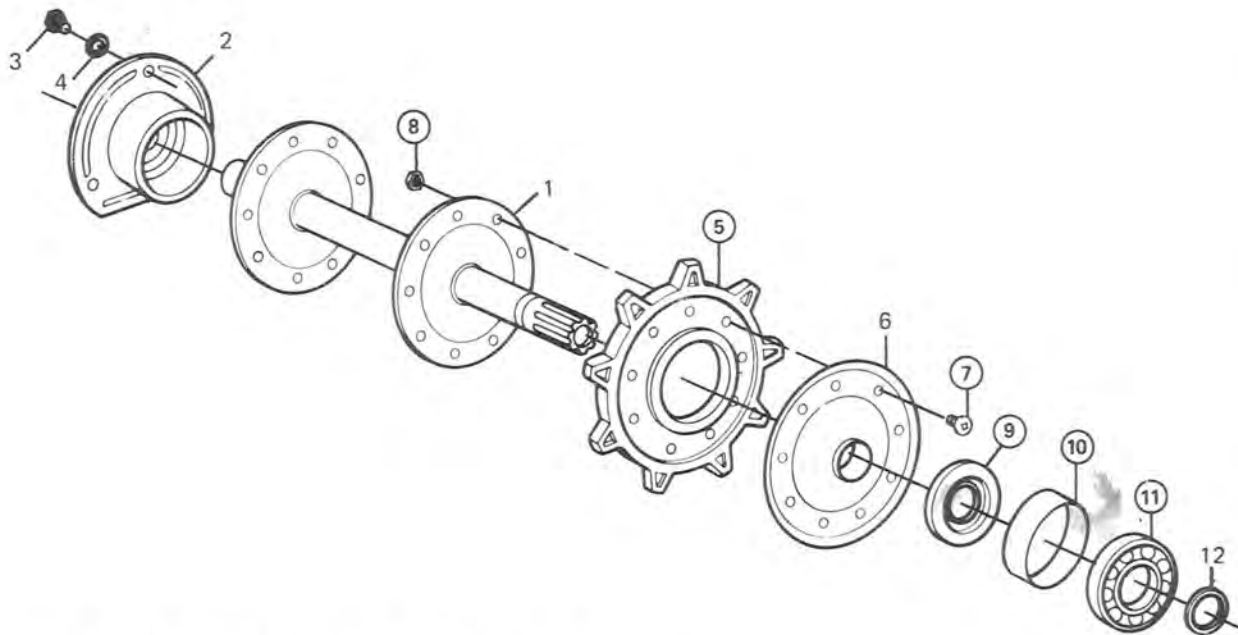
Install sleeves, hardener washers and eye bolts.

Partially screw-in the track adjuster bolts.

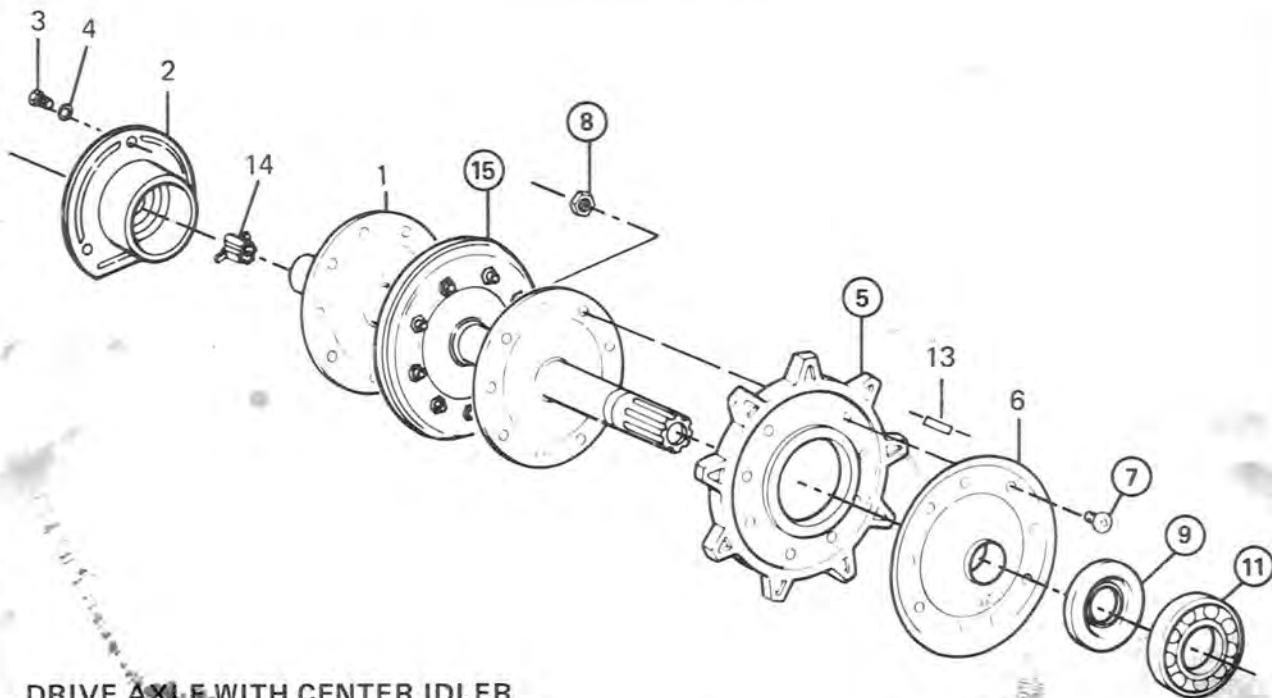
Hook the link plate springs. If applicable, hook springs into middle position of 3 position anchors.

Install retainer washers and partially tighten the link plate spring lock nuts.

Carry out track tension and alignment.

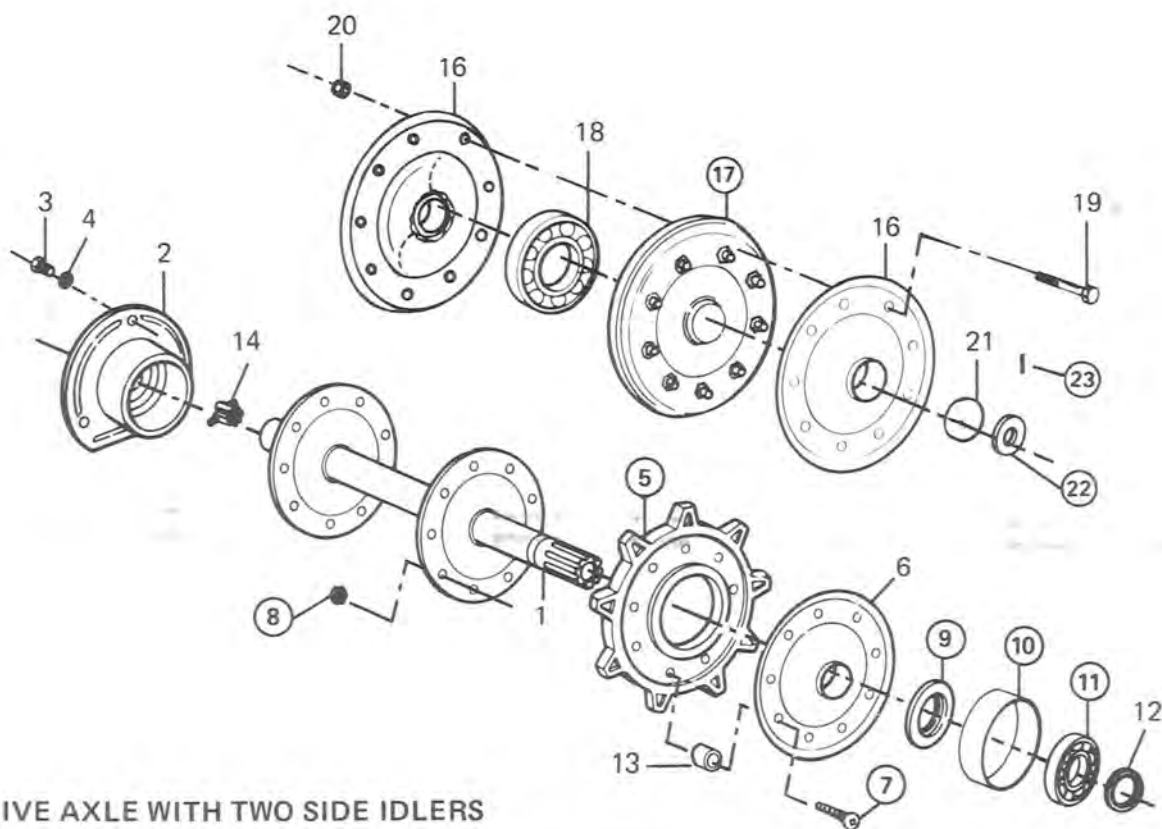


DRIVE AXLE WITH NARROW SPROCKETS

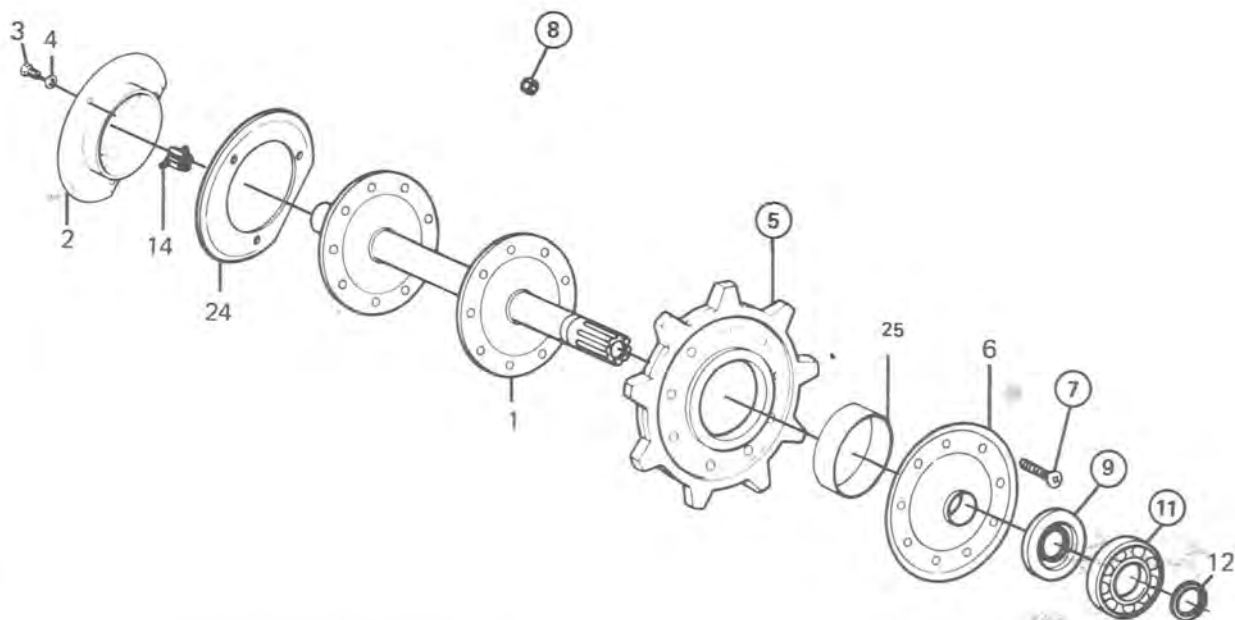


DRIVE AXLE WITH CENTER IDLER

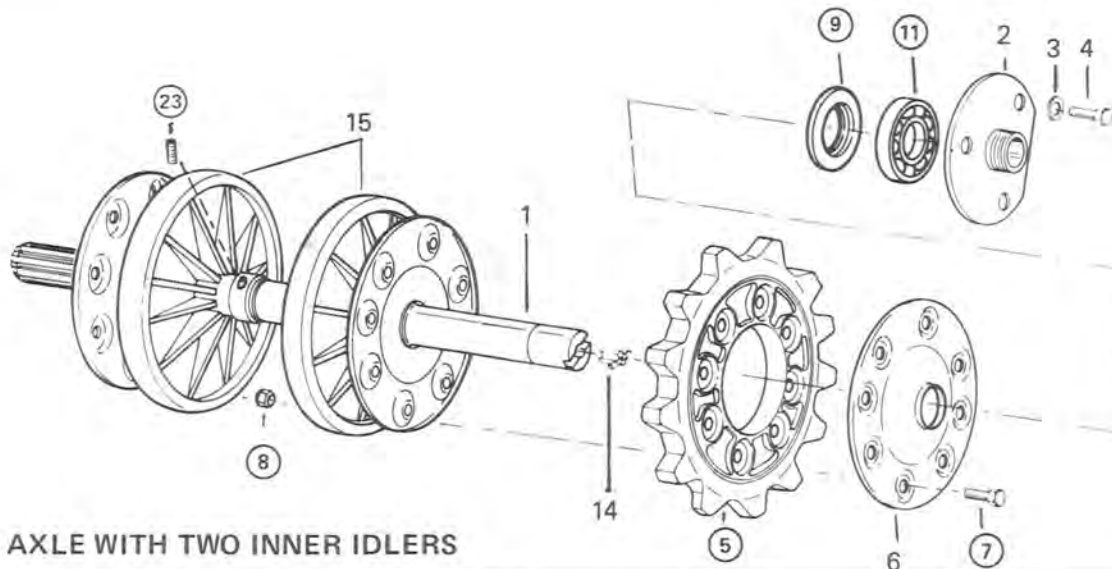
SECTION 01  
SUB-SECTION 04 (DRIVE AXLE)



DRIVE AXLE WITH TWO SIDE IDLERS



DRIVE AXLE WITH WIDE SPROCKETS



DRIVE AXLE WITH TWO INNER IDLERS

- |                                      |                          |                       |
|--------------------------------------|--------------------------|-----------------------|
| 1. Drive axle                        | 8. Nut (sprocket)        | 17. Idler wheel       |
| 2. End bearing housing               | 9. Oil seal              | 18. Bearing (idler)   |
| 3. Screw (end bearing housing)       | 10. Spacer               | 19. Screw (idler)     |
| 4. Lock washer (end bearing housing) | 11. Bearing (drive axle) | 20. Nut (idler)       |
| 5. Sprocket                          | 12. Shim                 | 21. "O" ring          |
| 6. Flange (sprocket)                 | 13. Bushing              | 22. Collar            |
| 7. Bolt (sprocket)                   | 14. Speedo drive insert  | 23. Allen screw       |
|                                      | 15. Idler                | 24. Retainer ring     |
|                                      | 16. Flange (idler)       | 25. Spacer (sprocket) |

## REMOVAL

Drain oil from chaincase or gearbox.

Release drive chain tension.

On models equipped with a spacer between chaincase and frame; remove the chaincase.

Raise and block rear of vehicle off ground.

Remove suspension.

Pry oil seals from chaincase and end bearing housing.

Remove end bearing housing.

*Note: If applicable, remove battery and its seat. If vehicle is equipped with a speedometer, remove angle drive unit and coupling cable.*

Remove the cotter pin and shim from chaincase side.

Release drive sprocket teeth from track notches, at the same time, pulling the drive axle towards the end bearing housing side of frame. (This action will disengage the axle

splines from the lower chaincase sprocket).

Remove drive axle from vehicle. If applicable, pull out shim located between bearing and lower chaincase sprocket.

## DISASSEMBLY & ASSEMBLY

⑪ Always pull or push bearing by inner race.

The bearing on the splined side of axle must be pushed until it is seated on bearing stop. The end housing bearing must be flush with end of drive axle. Each bearing must have it's shield facing the sprocket.

⑩ Applicable on twin cylinder, fan cooled engines with aluminum chaincase.

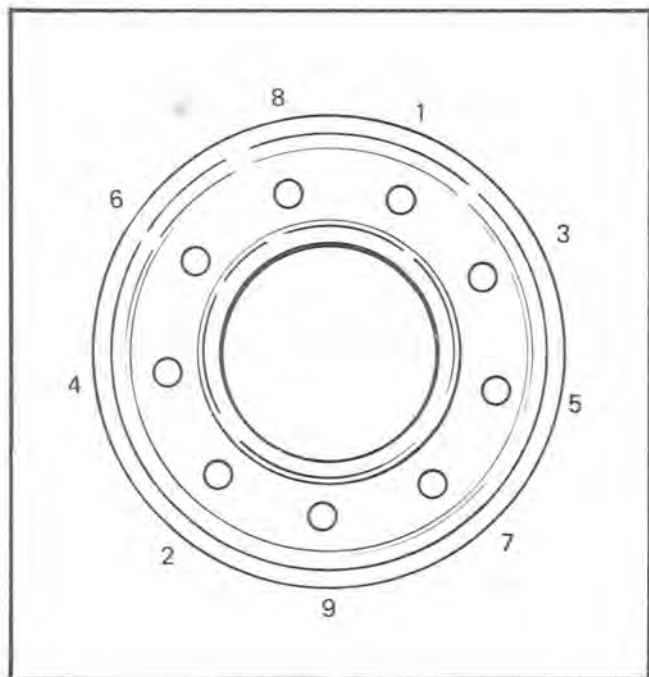
⑨ When assembling drive axle, always position a new oil seal on each end of axle. The seal lip must face sprocket.

⑮ ⑰ Idler wheels are factory riveted. When separation is necessary, remove rivets securing idler by using a 1/4" dia. bit. Secure idler wheel and flanges using bolts and nuts tightened in the following sequence to 25-35 in/lbs.



## SECTION 01

### SUB-SECTION 04 (DRIVE AXLE)

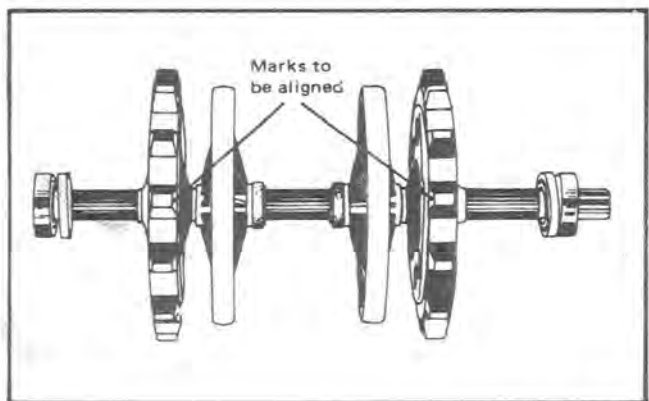


To remove center idler wheel tire, apply liquid soap or petroleum jelly on idler bead and flange then with two screwdrivers (round bars), pass the idler wheel tire over flange. Reverse change-over procedure to install idler wheel tire.

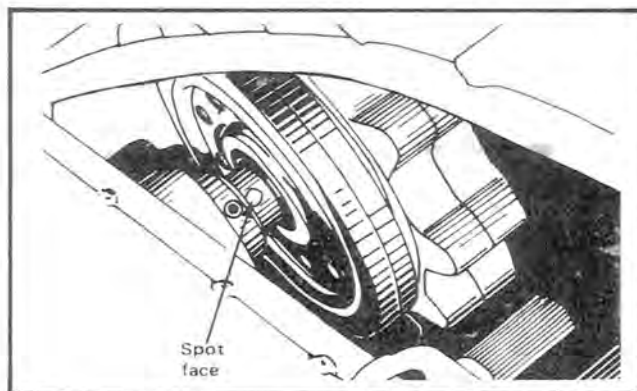
⑦ ⑧ Tightening torques for sprockets are; 25-35 in/lbs for narrow sprockets, and 50-65 in/lbs for wide sprockets.

⑤ Before securing sprockets and flanges, place axle assembly on a even surface and check alignment of sprocket teeth.

*Note: On some models sprocket teeth must be synchronized, make sure that aligning dots are in line.*



②③ The locking collar Allen screw must sit into the spot face of the axle. On spare parts, if the spot face is absent, use a 15 / 64" dia. bit and drill to a depth of 5 / 64". Spot face location is 5 / 16" from bearing idler.



## INSTALLATION

If the drive axle to be installed is a new component and the vehicle is equipped with a speedometer, a speedometer drive insert must be installed into the axle end. Ensure that insert is flush with end of axle.

Install end bearing housing.

For vehicles equipped with speedometer, install coupling cable and angle drive unit.

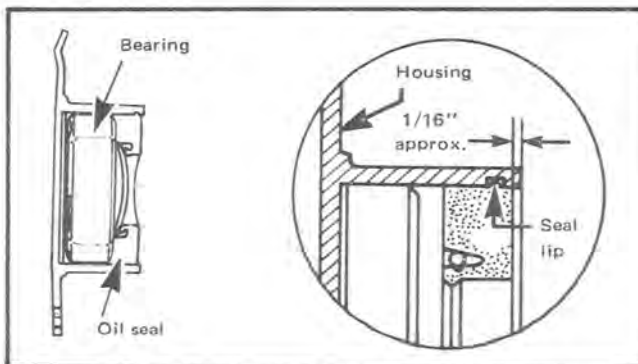
If applicable, install chaincase assembly.

Place a shim on chaincase side of axle and secure with a new cotter pin. (Not applicable on models equipped with gearbox).

On electric models, if applicable, install seat, battery and cover.

Install oil seal making sure that a gap of approximately 1/16" exists between end of bearing housing and each oil seal.

*Note: On twin cylinders, fan cooled engines with aluminum chaincase, push bearing spacer into chaincase.*



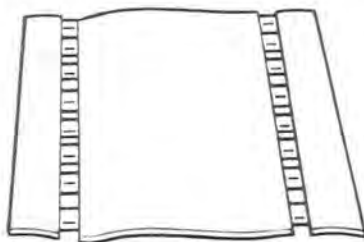
Replenish chaincase with oil, and check chain tension and pulley alignment.

Install suspension.

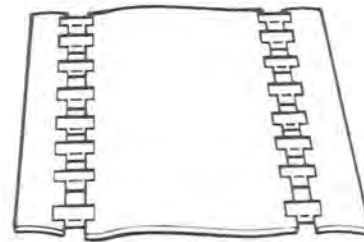
Apply track tension and carry out track alignment procedure.

TRACK

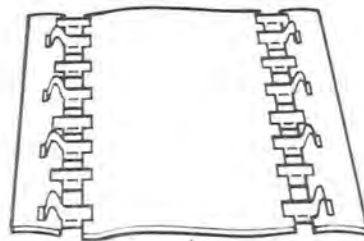
CLEAT AND GUIDE ARRANGEMENT



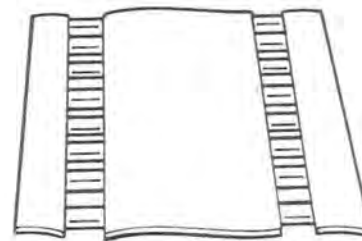
1. *Narrow insert*



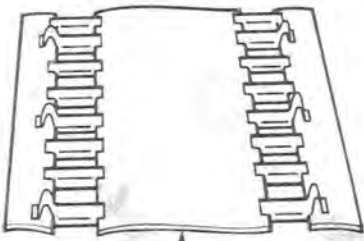
2. *Narrow insert with shoulder*



3. *Narrow guide with shoulder*



4. *Wide insert (large track hole)*



5. *Wide guide (large track hole)*

REMOVAL

Raise and block rear of vehicle off the ground.  
Remove suspension system.  
Remove rear axle.  
Remove drive axle and withdraw the track from beneath the vehicle.

INSPECTION

Visually inspect track for cuts and abnormal wear.  
Inspect track for broken rods. If excessive damage is

evident and rods are broken, replace track.

Inspect track for damaged or missing inserts. Replace damaged insert(s).

TRACK INSERT INSTALLATION

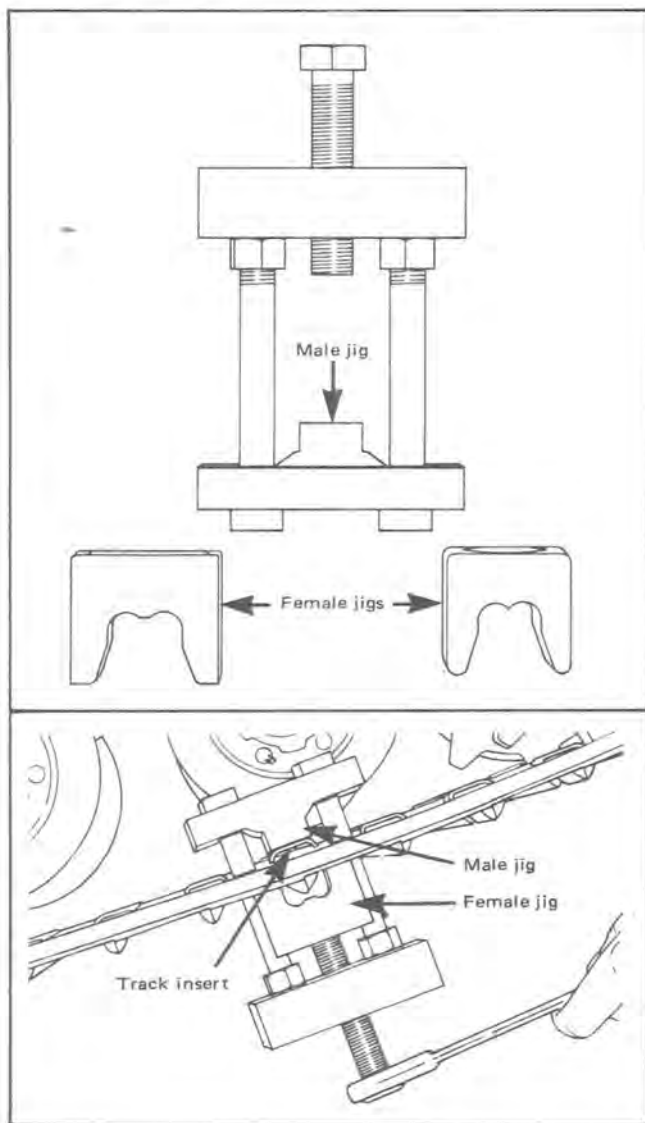
Tilt vehicle on its side to expose the track notches then place insert into position.

Place the track insert installer (See Tool Section) into track notches and position male jig on top of track insert.

Tighten installer bolt until track insert is locked in place.

## SECTION 01

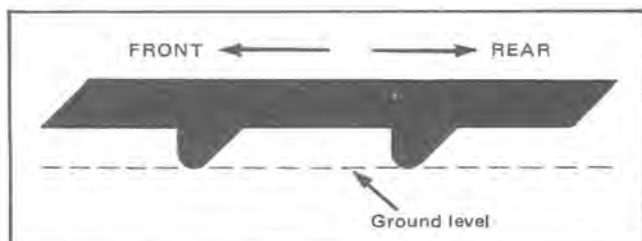
### SUB-SECTION 05 (TRACK)



#### INSTALLATION

Raise and block rear of vehicle off the ground. Position track beneath the vehicle frame tunnel.

*Note: When installing the track, ensure the right angle of the bearing surface of the track rib is facing the front of vehicle.*



Install drive axle.

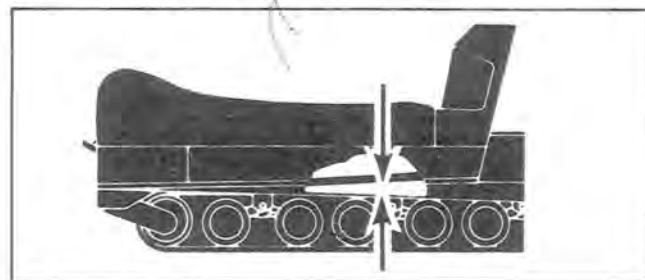
If applicable, install rear axle. Install suspension system. Carry out track tension and alignment procedure.

#### TRACK TENSION & ALIGNMENT (BOGIE WHEEL)

Track tension and alignment are inter-related. Do not adjust one without checking the other. Track tension procedure must be carried out prior to track alignment.

##### Tension

With rear of vehicle blocked off the ground, check the track tension at middle set of bogie wheels as indicated in the Technical Data (Section 08).



If applicable, ensure link plate springs are in the middle position of the 3 position slotted anchors.

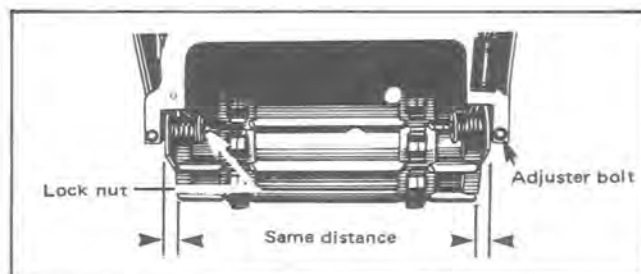
To correct track tension, loosen link plate spring lock nuts on inner side of link plate springs. Turn adjuster bolts clockwise to tighten track or counter-clockwise to slacken. Tighten link plate spring lock nuts.

##### Alignment

With rear of vehicle supported off the ground, start engine and allow the track to rotate **slowly**.

Check if track is well centered and turns evenly on rear sprockets. Distance between edge of track and link plate must be equal on both sides. (If applicable, ensure link plate springs are in the middle position of the 3 position slotted anchors).

**Warning:** Before checking track alignment, ensure that the track is free of all particles which could be thrown out while track is rotating. Keep hands, feet, tools and clothing clear of track.



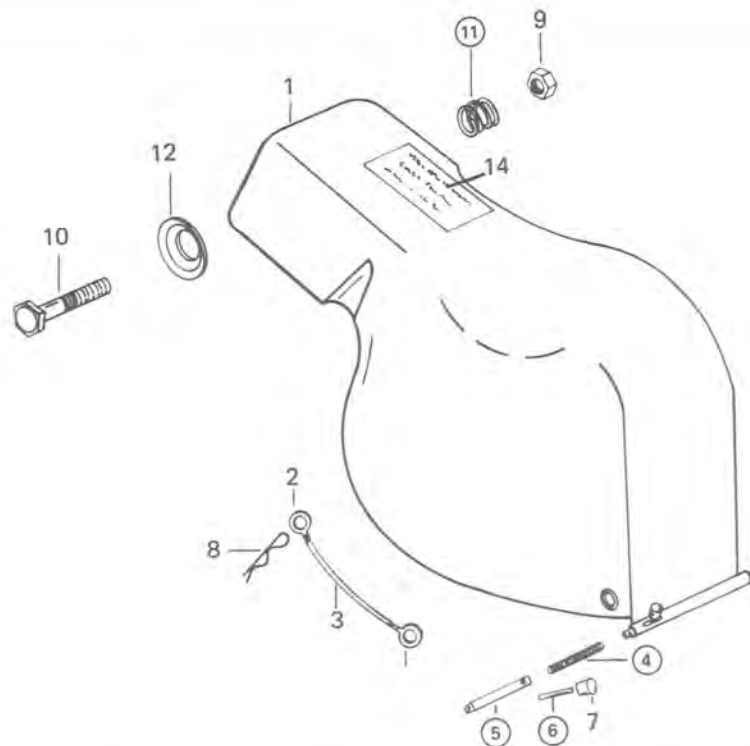
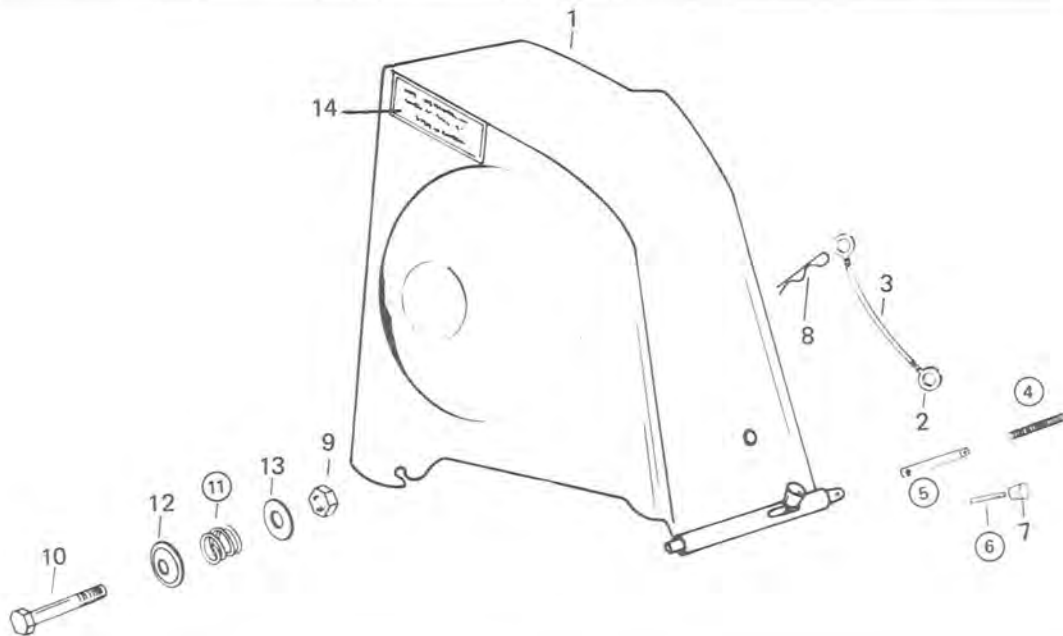
Rotate track slowly and recheck alignment and tension.

To correct alignment, loosen link plate spring lock nut on side where track is closest to the link plate.

Turn track adjuster bolt on same side, clockwise until track re-aligns.

Tighten link plate spring lock nut.

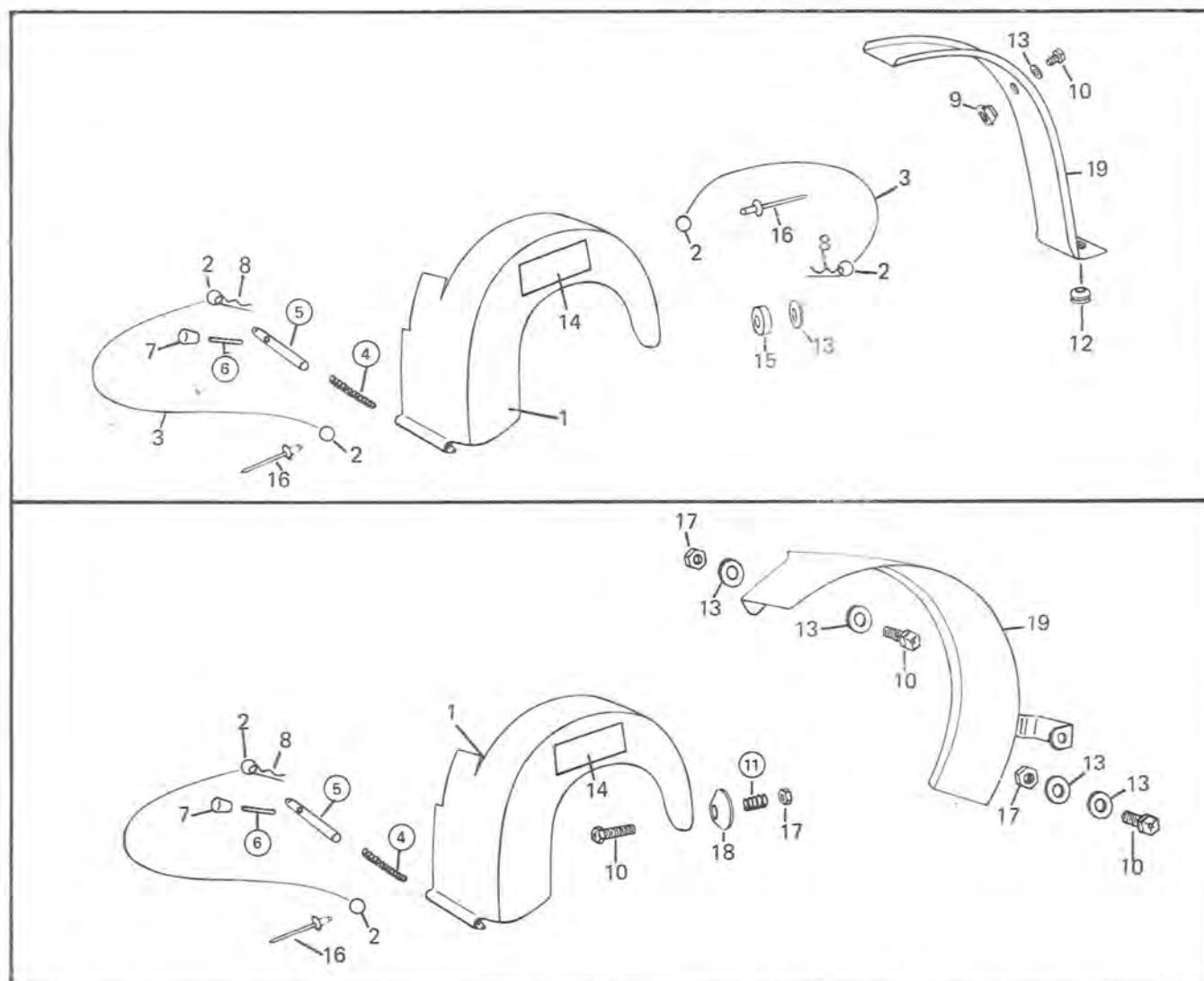
PULLEY GUARD



- |                 |                    |                     |                        |
|-----------------|--------------------|---------------------|------------------------|
| 1. Pulley guard | 5. Pin             | 9. Nut              | 13. Flat washer        |
| 2. Open barrel  | 6. Spirol pin      | 10. Bolt            | 14. Pulley guard label |
| 3. Wire         | 7. Cap             | 11. Spring          |                        |
| 4. Spring (pin) | 8. Hair pin cotter | 12. Retainer washer |                        |

## SECTION 02

### SUB-SECTION 01 (PULLEY GUARD)



- |                 |                    |             |                        |                         |
|-----------------|--------------------|-------------|------------------------|-------------------------|
| 1. Pulley guard | 5. Pin             | 9. Clip nut | 13. Flat washer        | 17. Nut                 |
| 2. Open barrel  | 6. Spirol pin      | 10. Bolt    | 14. Pulley guard label | 18. Retainer washer     |
| 3. Wire         | 7. Cap             | 11. Spring  | 15. Rubber washer      | 19. Driven pulley guard |
| 4. Spring (pin) | 8. Hair pin cotter | 12. Grommet | 16. Rivet              |                         |

#### REMOVAL

Pull out hair pin cotter and pull on spring to disengage pin from frame bracket. Disengage guard from front bracket.

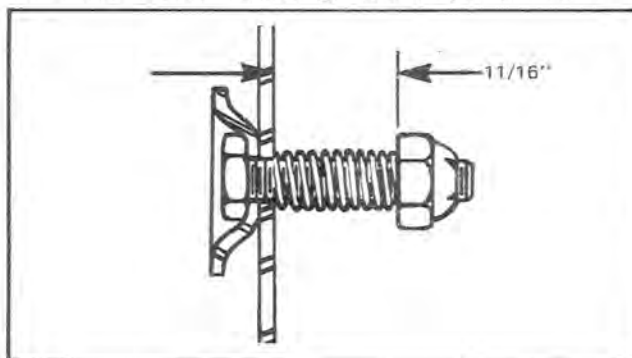
*Note: If necessary to remove driven pulley guard, remove bolts and nuts securing it to frame.*

**Warning:** Never start engine until pulley guard is well installed.

#### INSPECTION

- ⑤ ⑥ Check condition of coil pin. If damaged, replace.
- ④ The length of uncompressed pin spring should not be less than 1 7/8".

⑪ An uncompressed front guard spring should not be less than 13/16". When assembling, adjust length to 11/16".





## INSTALLATION

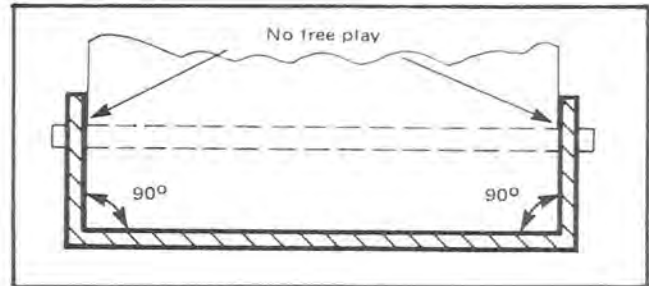
Prior to installation, ensure that pulley guard and frame bracket are 90° with frame.

**Warning:** No lateral free-play should exist between pulley guard and frame bracket.

Slide pulley guard into bracket.

Pull on lower spring bolt, engage pin into frame bracket and install hair pin cotter.

*Note: If driven pulley guard has been removed, secure it to frame using bolts and nuts.*





DRIVE BELT

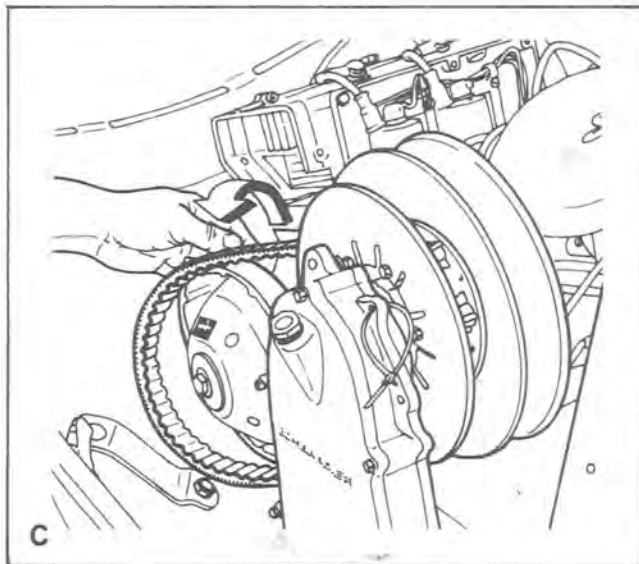
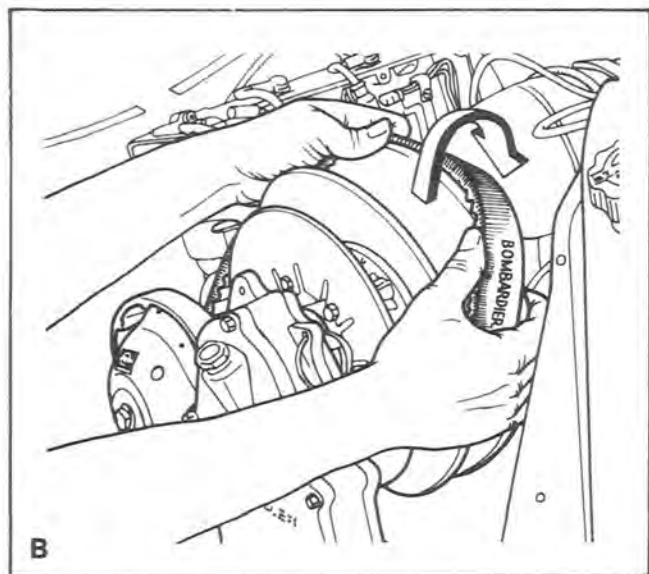
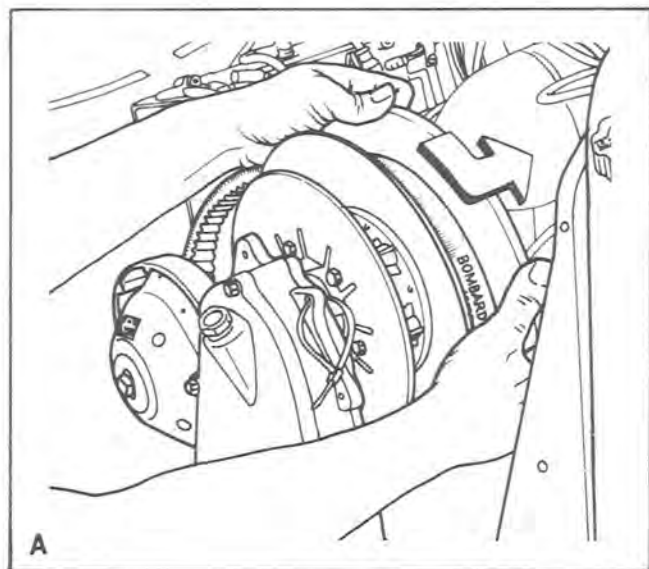
REMOVAL & INSTALLATION

When removing a drive belt, always mark the rotation direction. Reinstall in same direction.

Drive Belt Removal

Tilt cab and remove pulley guard. Open driven pulley by twisting and pushing the sliding half. Hold in open position then slip slackened belt over top edge of pulley. Slip belt from drive pulley.

**Warning:** Never start or run engine without drive belt installed.



TENSION ADJUSTMENT

Due to a difference in drive belt circumference, drive belt tension must be adjusted to obtain maximum vehicle performance.

*Note:* Drive belt width must not be less than 1 1/16".

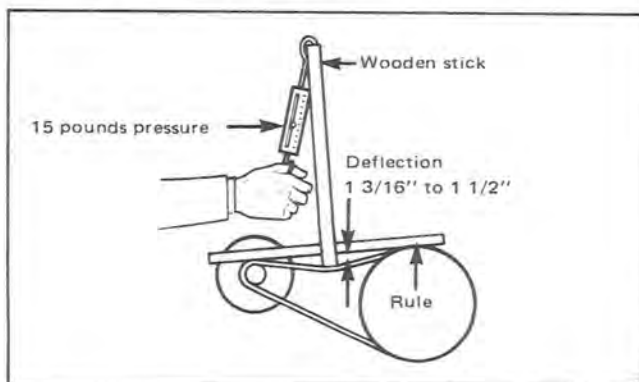
Adjust belt tension as follows:

Tilt cab and remove pulley guard.

Position a reference rule on drive belt.

Using a wooden stick and fish scale, apply a 15 pounds pressure on drive belt.

Deflection must be between 1 3/16" and 1 1/2": To correct, decrease or increase distance between pulleys.



**SECTION 02**  
**SUB-SECTION 02 (DRIVE BELT)**

**TROUBLE SHOOTING**

**1. Uneven belt wear on one side only.**



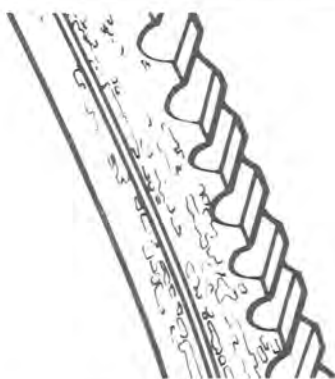
**CAUSE**

- a) Loose engine mount.
- b) Pulley misalignment.
- c) Rough or scratched pulley surfaces.

**REMEDY**

- a) Tighten engine mount nuts equally.
- b) Align pulleys.
- c) Repair or replace pulley half.

**2. Belt glazed excessively or has baked appearance.**



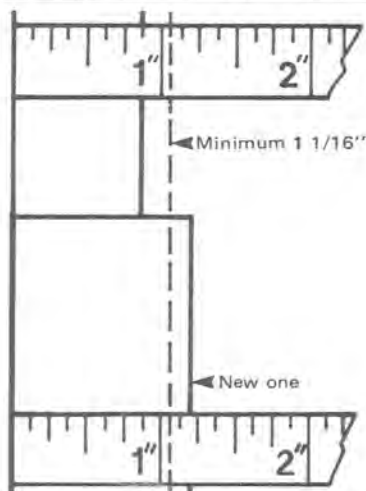
**CAUSE**

- Excessive slippage caused by:
- a) Insufficient pressure on belt sides.
  - b) Rusted drive or driven pulley shafts.
  - c) Oil on pulley surfaces.
  - d) Incorrect centrifugal governor.

**REMEDY**

- a) Check drive pulley for worn or missing flyweights/rollers.
- b) Clean shaft with steel wool and lubricate with low temperature grease.
- c) Clean pulley surfaces with fine emery cloth and clean cloth.
- d) Install correct governor.

**3. Belt worn excessively in top width.**



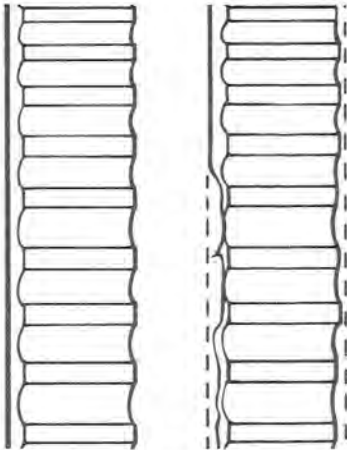
**CAUSE**

- a) Excessive slippage due to irregular outward actuation movement of drive pulley.
- b) Rough or scratched pulley surfaces.
- c) Improper belt angle.
- d) Considerable use.

**REMEDY**

- a) Carry out inspection.
- b) Repair or replace pulley.
- c) Using unspecified type of belt. Replace belt with correct Bombardier belt.
- d) Replace belt if less than 1 1/16" wide.

**4. Belt worn narrow in one section.**



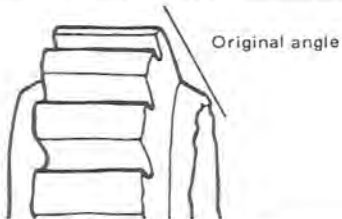
**CAUSE**

- Excessive slippage in drive pulley caused by:
- a) Frozen or too tight track.
  - b) Drive pulley not functioning properly.
  - c) Engine idle speed too high.
  - d) Incorrect belt length.
  - e) Incorrect pulley distance.

**REMEDY**

- a) Liberate track from ice or check track tension and alignment.
- b) Repair or replace drive pulley.
- c) Reduce engine RPM.
- d) Using unspecified type of belt. Replace belt with correct Bombardier belt.
- e) Readjust to specifications.

**5. Belt sides worn concave.**



**CAUSE**

- a) Rough or scratched pulley surfaces.
- b) Unspecified type of belt.

**REMEDY**

- a) Repair or replace.
- b) Replace belt with correct Bombardier belt.

**6. Belt disintegration.**



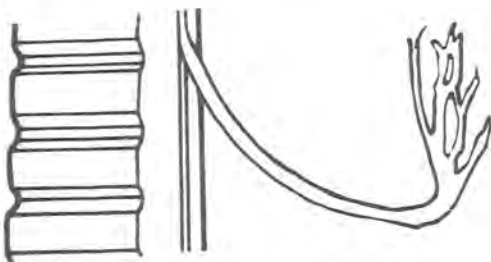
**CAUSE**

- a) Excessive belt speed.
- b) Oil on pulley surfaces.
- c) Incorrect gear ratio.

**REMEDY**

- a) Using unspecified type of belt. Replace belt with proper type of belt.
- b) Clean pulley surfaces with fine emery cloth and clean cloth.
- c) Install specified sprocket (correct gear ratio).

**7. Belt edge cord breakage.**



**CAUSE**

- a) Pulley misalignment.

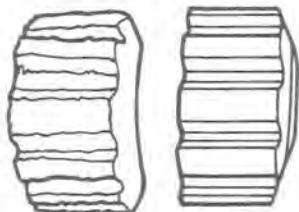
**REMEDY**

- a) Align pulleys.



**SECTION 02**  
**SUB-SECTION 02 (DRIVE BELT)**

**8. Flex cracks between cogs.**



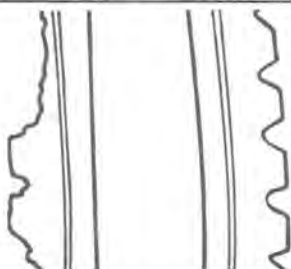
**CAUSE**

- a) Considerable use, belt wearing out.

**REMEDY**

- a) Replace belt.

**9. Sheared cogs, compression section fractured or torn.**



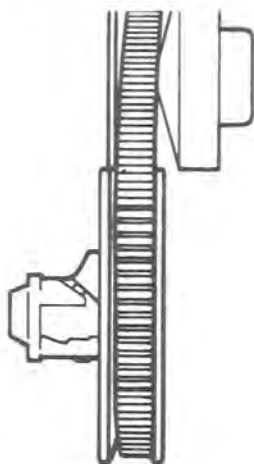
**CAUSE**

- a) Improper belt installation.
- b) Belt rubbing stationary object on pulleys.
- c) Violent engagement of drive pulley.

**REMEDY**

- a) Refer to installation.
- b) Check drive components.
- c) Grease, replace spring or drive pulley.

**10. Belt "Flip-Over" at high speed.**



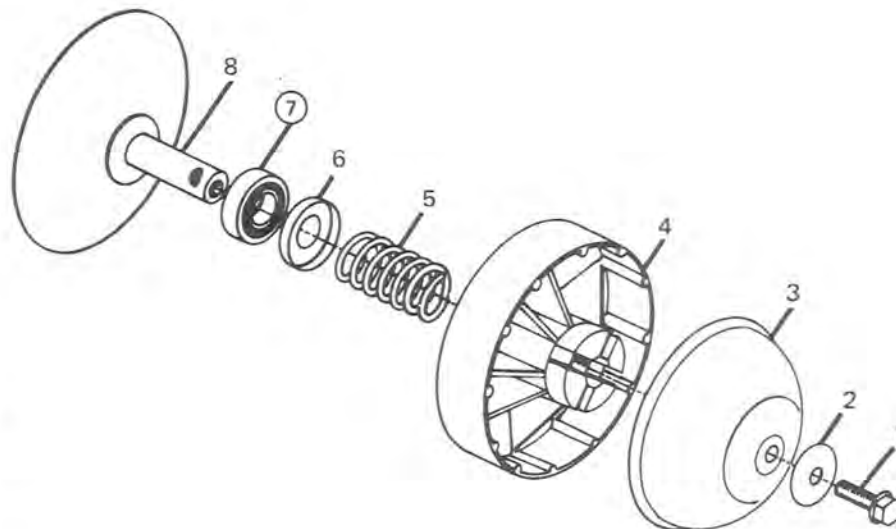
**CAUSE**

- a) Pulley misalignment.
- b) Belt excessive speed.
- c) Incorrect sprocket ratio.

**REMEDY**

- a) Align pulleys.
- b) Using unspecified type of belt. Replace belt with correct Bombardier belt.
- c) Install specified sprocket (correct gear ratio).

PRESSURE LEVER TYPE



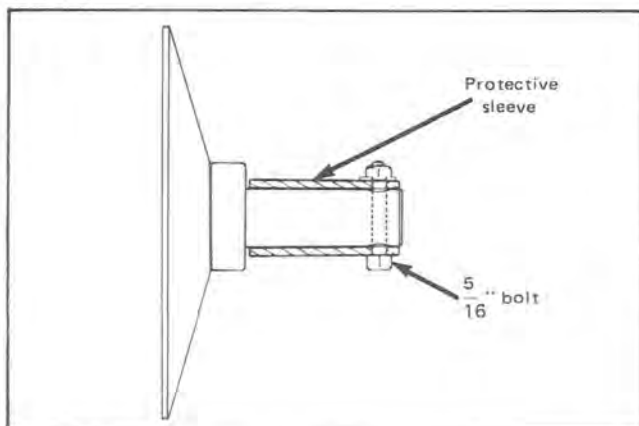
1. Retaining bolt
2. Washer
3. Governor
4. Sliding half
5. Spring
6. Spring seat
7. Bearing
8. Fixed half

## REMOVAL

Remove spark plug(s) and bring P.T.O. piston  $3/4''$  to  $1''$  B.T.D.C. Insert a length of rewind starter rope through P.T.O. spark plug hole, then rotate engine crankshaft counter-clockwise until piston bears against rope.

Remove governor retaining bolt, governor, sliding half, spring and spring seat from fixed half.

*Note: To remove fixed pulley half, slide a length of steel pipe over shaft. Attach using a  $5/16''$  nut and bolt, as illustrated. The fixed half can then be removed with a pipe wrench.*



## DISASSEMBLY & ASSEMBLY

⑦ Bearing is replaceable. Removal and installation is carried out using a standard puller and pusher.

## CLEANING & INSPECTION

Clean fixed pulley half shaft and pulley inner faces with fine steel wool and a clean cloth.

Check contact surfaces of sliding half hub and pressure levers for excessive wear. Replace as necessary.

Check pressure lever attachment into governor cup. If excessive play is evident, the governor cup assembly must be replaced.

## INSTALLATION

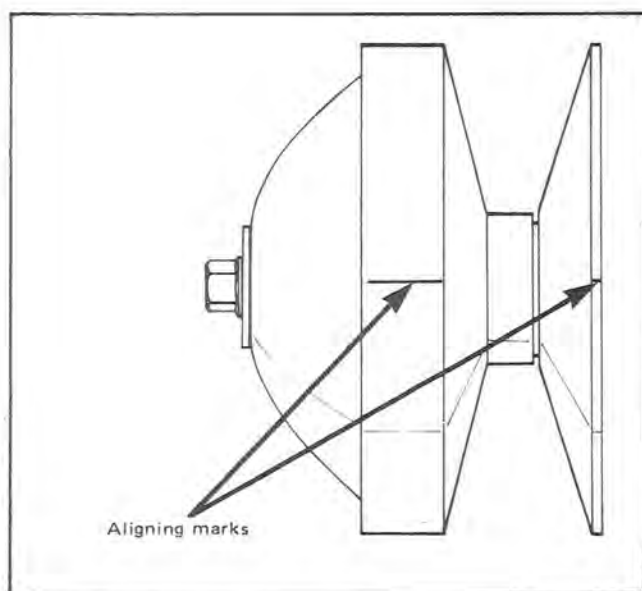
Block P.T.O. piston  $3/4''$  to  $1''$  A.T.D.C. as explained in removal procedure.

Lubricate crankshaft threads and install fixed pulley half.

Install spring seat, spring and sliding half on shaft. Make sure that pulley halves marks are aligned.

Pack inside of pulley shaft with "High Performance Clutch Lubricant." Apply a light coat of same lubricant to pressure levers.

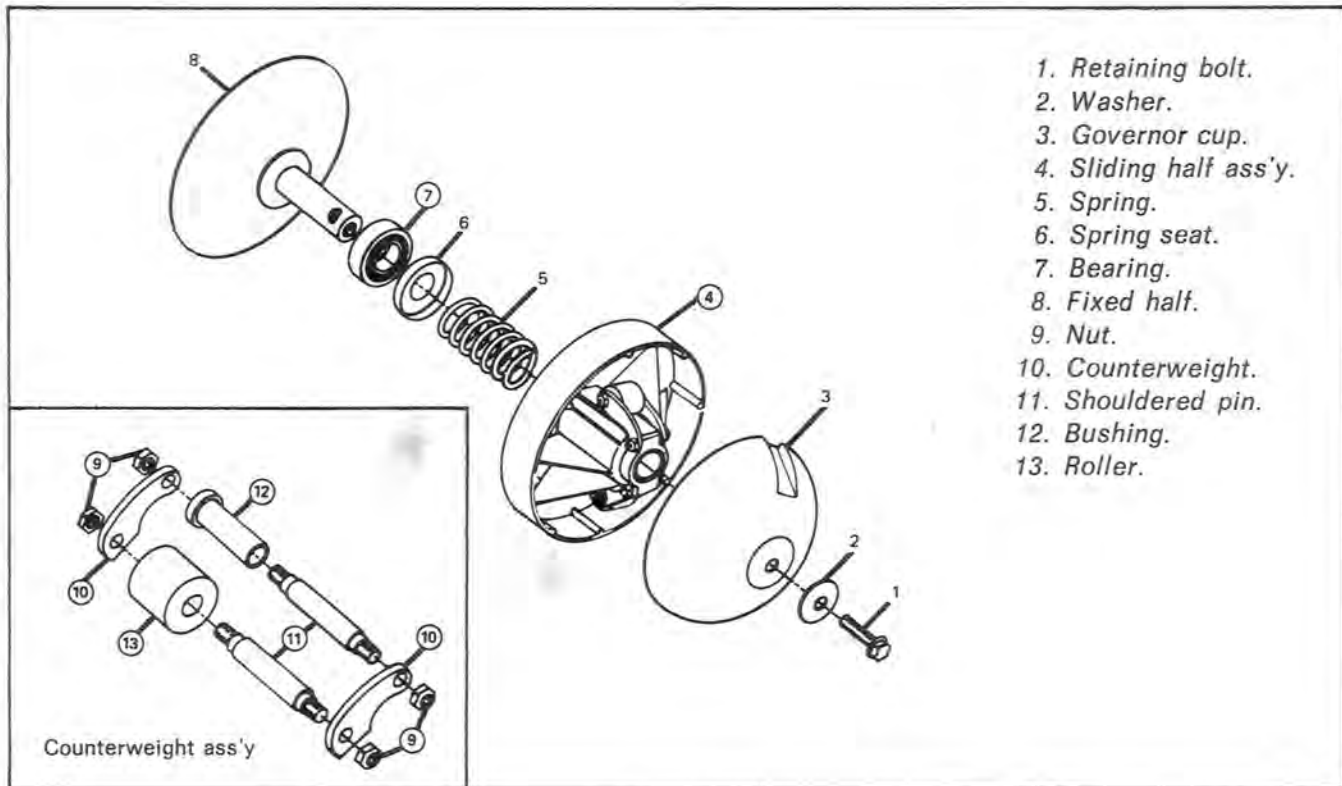
**SECTION 02**  
**SUB-SECTION 03 (DRIVE PULLEY)**



Lubricate threads of retaining bolt with light machine oil. Install governor cup, washer and retaining bolt. Torque retaining bolt to 37-54 ft-lbs. Remove rope from cylinder, install spark plug(s).

SECTION 02  
SUB-SECTION 03 (DRIVE PULLEY)

ROLLER ROUND SHAFT TYPE

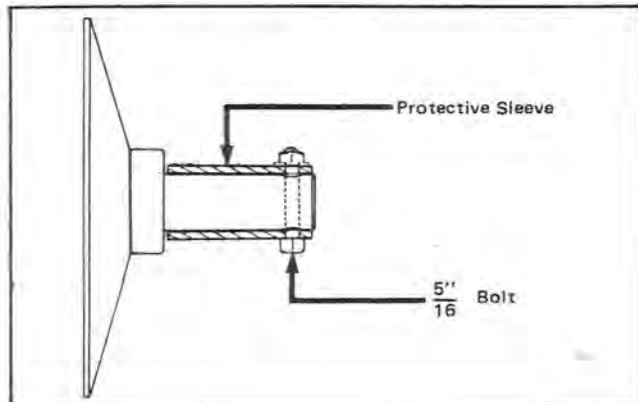


REMOVAL

Remove spark plug(s) and bring P.T.O. piston  $\frac{3}{4}$ " to  $1\frac{1}{4}$ " B.T.D.C. Insert a length of rewind starter rope through P.T.O. spark plug hole and rotate drive pulley counter-clockwise until piston bears against rope. Remove governor retaining bolt.

**Warning:** Spring pressure can force assembly apart therefore, it is imperative that the governor cup be held firmly during governor retaining bolt removal.

If necessary to remove fixed half, slide a length of steel pipe over shaft. Attach using a  $\frac{5}{16}$ " nut and bolt, as illustrated. The fixed half can then be removed with a pipe wrench.



DISASSEMBLY & ASSEMBLY

⑦ Bearing is replaceable and can be removed and installed with a standard puller and pusher.

④ Sliding half is available only as a complete unit, (bushing, counterweight, etc.), however, a counterweight replacement kit is available.

⑨ ⑩ ⑪ ⑫ ⑬ These components are available only in a matched replacement kit. If part replacement becomes necessary, all components within kit must be used.

⑫ Correct installation position for bushing is as illustrated in exploded view.

⑨ Torque nut to  $9-11\frac{1}{2}$  ft.-lbs.

**Caution:** Do not disassemble counterweight unless replacement is necessary. Shouldered pin and nut retaining qualities will alter if tightened more than once.

CLEANING

Clean pulley faces and shaft with fine steel wool and dry cloth. Clean sliding half bushing with clean dry cloth.

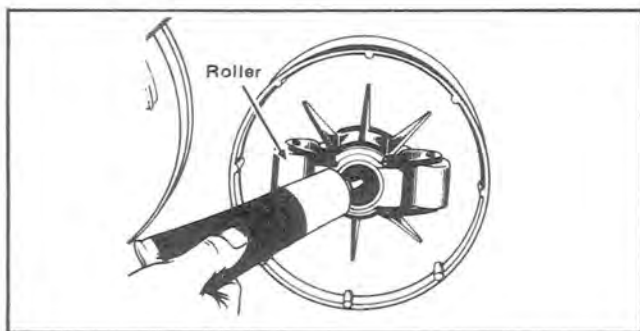
INSTALLATION

Lock crankshaft in position by blocking P.T.O. piston at A.T.D.C. position as explained in removal procedure.

Install fixed half on crankshaft extension then position

**SECTION 02**  
**SUB-SECTION 03 (DRIVE PULLEY)**

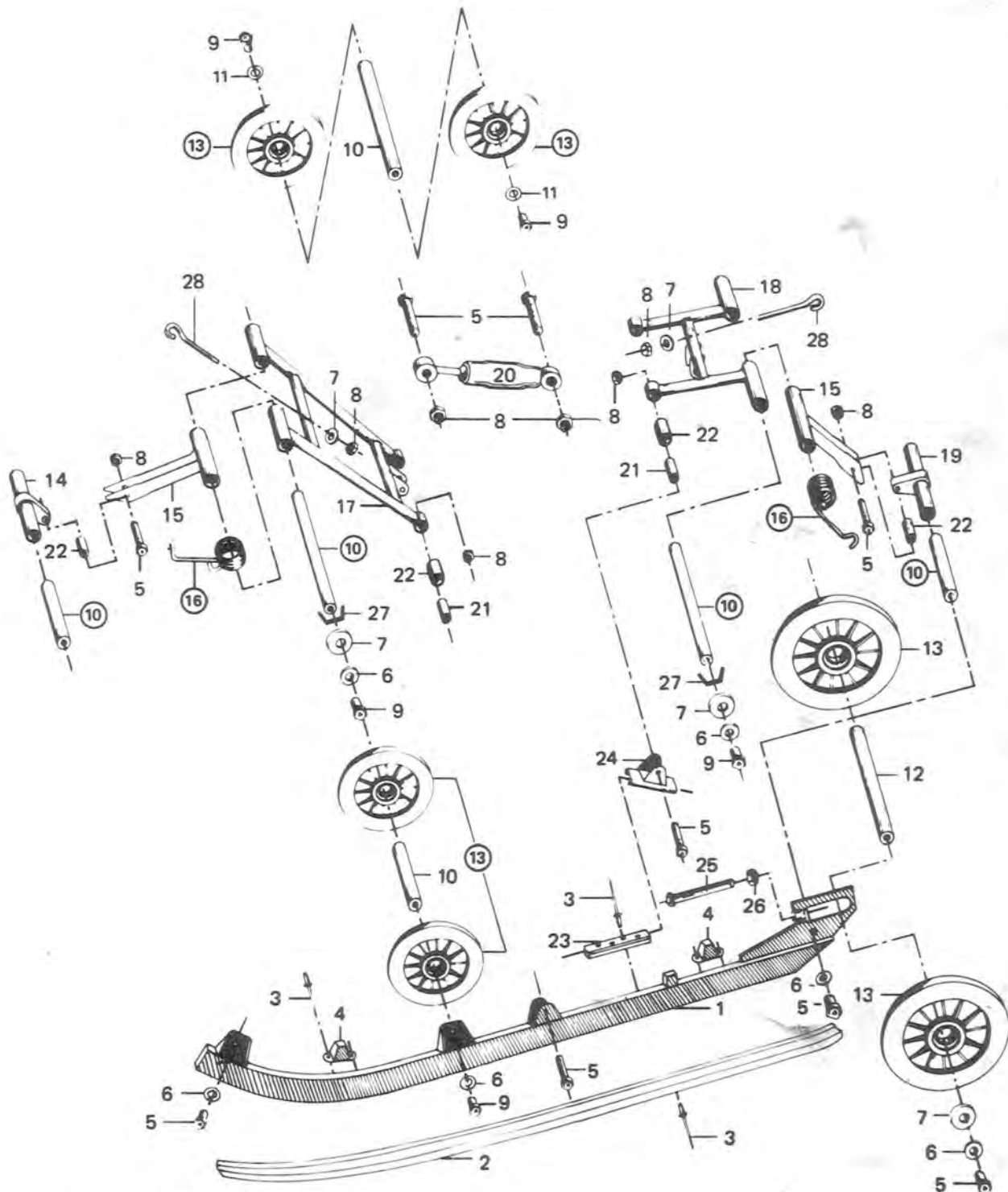
spring seat, spring and sliding half on fixed half shaft. Pack inside of pulley shaft with High Performance Drive Pulley Lubricant.



Lubricate threads of retaining bolt with light machine oil. Install governor cup and retaining bolt. Torque bolt to 37-54 ft.-lbs.



SLIDE SUSPENSION – HIGH PERFORMANCE



HIGH PERFORMANCE

## SECTION 01

### SUB-SECTION 02 (SLIDE SUSPENSION)

#### HIGH PERFORMANCE

- |                 |                          |                   |                               |
|-----------------|--------------------------|-------------------|-------------------------------|
| 1. Runner       | 8. Nut                   | 15. Arm support   | 22. Bushing                   |
| 2. Slider shoe  | 9. Bolt (cross shaft)    | 16. Spring        | 23. Sliding pad               |
| 3. Rivet        | 10. Cross shaft          | 17. Front arm     | 24. Slider                    |
| 4. Stop bonding | 11. Flat washer          | 18. Rear arm      | 25. Adjuster bolt (rear axle) |
| 5. Bolt         | 12. Rear axle            | 19. Rear tube     | 26. Adjuster nut (rear axle)  |
| 6. Lock washer  | 13. Idler wheel assembly | 20. Shock         | 27. Cup                       |
| 7. Flat washer  | 14. Front tube           | 21. Spacer sleeve | 28. Spring adjuster bolt      |

#### REMOVAL

Lift the rear of vehicle off the ground.

Release track tension by loosening adjuster bolts located on inner side of rear idler wheels. Release spring tension (front and rear) by loosening nuts on spring adjuster bolts.

Remove upper idler wheel assembly.

Withdraw slide suspension assembly from track area.

#### DISASSEMBLY & ASSEMBLY

*Note: Prior to assembly apply thread locking compound or equivalent on all bolts and nuts.*

- ⑩ Clean and then lubricate cross shafts before installation.
- ⑪ Install large coil dia. springs on rear arm, smaller coil dia. springs on front arm.
- ⑫ After removing bolt and spacer, use a puller to remove idler wheel from cross shaft.

#### INSTALLATION

Lift the rear of vehicle off the ground.

Align front arm with front holes of frame and secure using bolts, lock washers and flat washers. Torque to 28-35 ft/lbs.

*Note: Make sure to place cross shaft cups (27) over cross shafts before attempting to align front and rear arm frame holes.*

Raise the rear section of suspension and track into the frame tunnel and align rear arm with rear holes in frame. Secure to frame using bolts, lock washers and flat washers. Torque to 28-35 ft/lbs.

Install upper idler wheel assembly and torque to 28-33 ft/lbs.

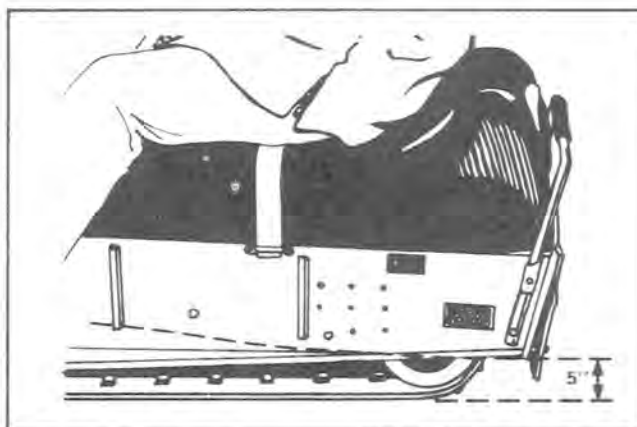
#### SUSPENSION ADJUSTMENT (RIDE)

The front springs are used for snow conditions, the rear springs for driver's weight.

The front springs should be adjusted for low tension in deep snow conditions and high tension on icy snow.

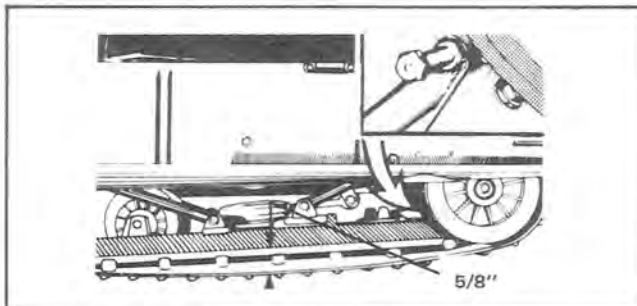
High tension has the effect of shifting the weight toward rear of vehicle and as result, reducing the weight on the skis. Inversely with low tension traction is decreased while steering efficiency and effort are increased.

The rear springs should be adjusted when driver is seated on vehicle. Correct adjustment is a distance of 5" between rear of footrest and the ground.



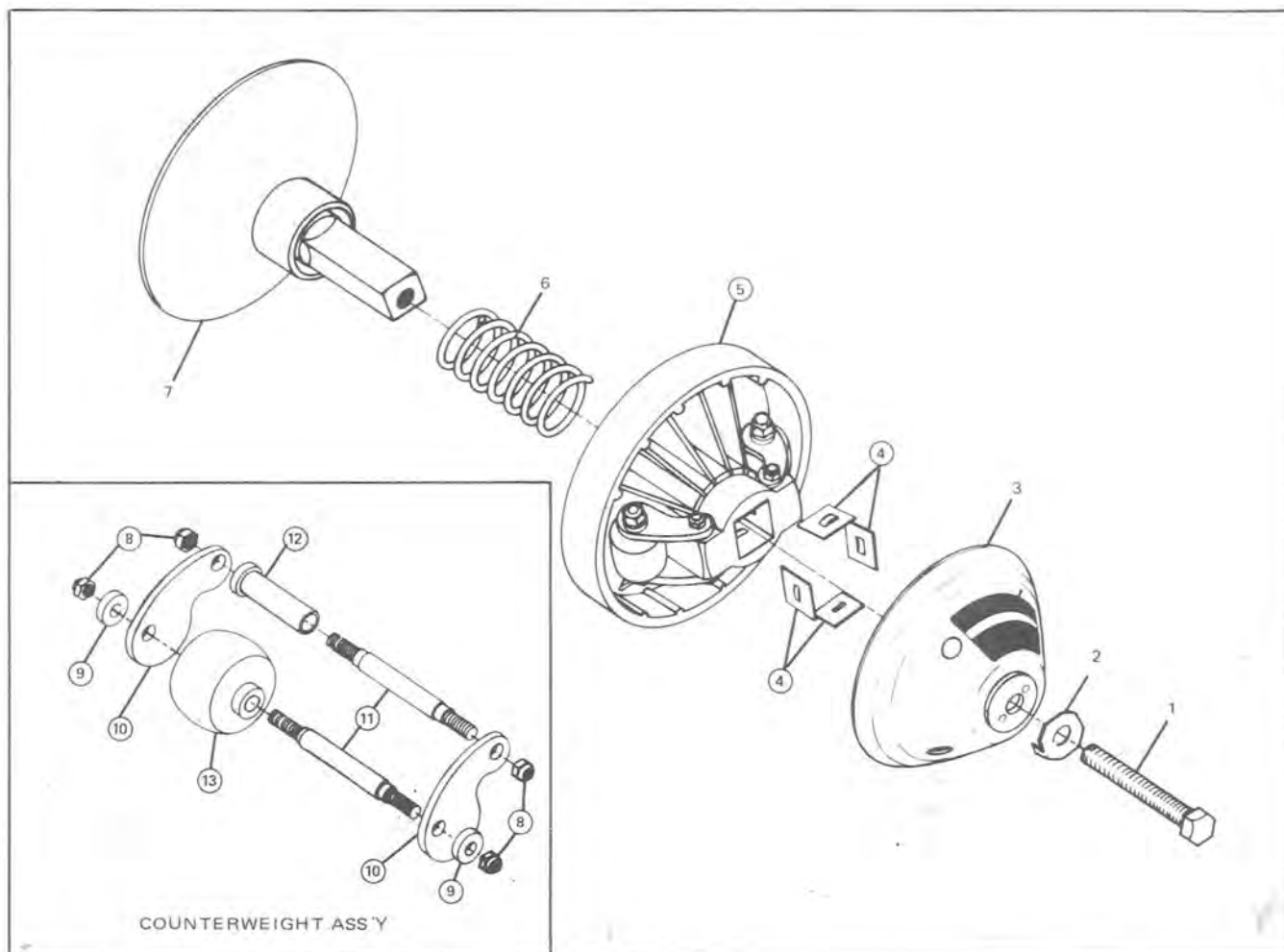
#### TRACK TENSION ALIGNMENT

Lift rear of vehicle and support it off the ground. Allow slide to extend normally. A gap of 5/8" should exist between slider shoe and bottom inside of track.



If track tension is too loose, the track will have a tendency to thump. If too tight, it will result in power loss and excessive stresses on suspension components that may eventually cause drive axle failure. Adjust to correct tension by loosening lock nut of adjuster bolts (located on inner side of rear idler wheels). Turn clockwise to increase tension and counter-clockwise to decrease tension (adjust both sides equally). Tighten lock nuts.

ROLLER SQUARE SHAFT TYPE



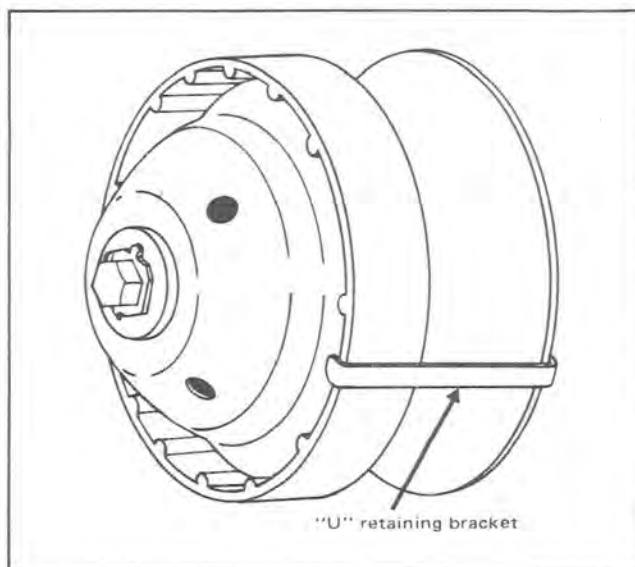
1. Retaining bolt
2. Tab washer
3. Governor cup
4. Wear pad
5. Sliding half ass'y
6. Spring
7. Fixed half

8. Stop nut
- \*9. Additional weight
10. Counterweight
11. Shouldered pin
12. Bushing
13. Roller

\* Large displacement engine only

REMOVAL

Remove spark plugs and bring P.T.O. piston approximately  $\frac{3}{4}$ " B.T.D.C. Insert a length of rewind starter rope through P.T.O. spark plug hole, then rotate drive pulley counter-clockwise until piston bears against rope. Install "U" clamp over pulley halves. Open tab lock and remove retaining bolt. (See Special Tools).



## SECTION 02

### SUB-SECTION 03 (DRIVE PULLEY)

Push and turn drive pulley to disengage "U" clamp then carefully remove sliding half.

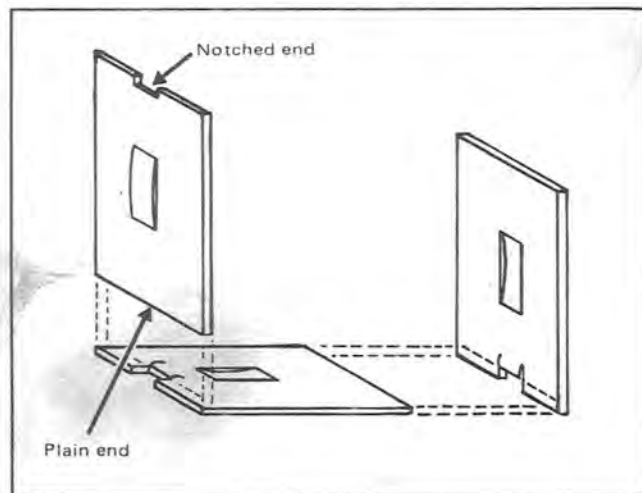
**Warning:** Spring pressure can force assembly apart therefore, it is imperative that the governor cup be held firmly during sliding half removal.

If it is necessary to remove fixed half, use a 1 1/8" open-end wrench on the square section, closely held against hub.

#### DISASSEMBLY & ASSEMBLY

④ Visually inspect wear pads. If bronze backing shows through gray Teflon lining, pad must be replaced.

To remove worn pads, pry using a screwdriver blade. At assembly, position new pads into hub so that plain end of pad sits over adjoining pad notched end, as illustrated.



⑤ Sliding half is available only as a complete unit, (rollers, counterweight, etc.), however, a counterweight replacement kit is available.

⑧ ⑨ ⑩ ⑪ ⑫ ⑬ These components are available only as a matched replacement kit. If part replacement is necessary, all components within kit must be used.

Torque nut (8) to 9-11 1/2 ft./lbs.

**Caution:** Do not disassemble counterweight unless replacement is necessary. Shouldered pin and nut retaining qualities will alter if tightened more than once.

#### CLEANING

Clean pulley faces and shaft with fine steel wool and a clean cloth.

Clean wear pad using only a clean cloth.

#### INSTALLATION

Lock crankshaft in position by blocking piston at A.T.D.C. position, as explained in removal procedure.

Install fixed half on crankshaft extension then position spring and sliding pulley half on fixed half shaft. Install "U" clamp to hold sliding half in position.

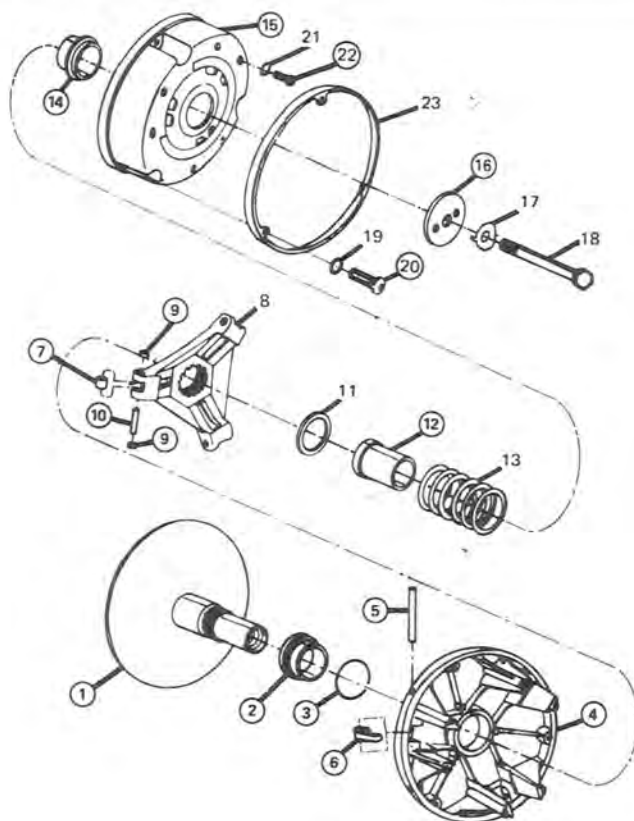
Install governor cup making sure that the shaft end rests in governor cup searing. Install tab lock.

Lubricate threads of retaining bolt with light machine oil. Install and torque bolt to 83-92 ft./lbs. Loosen retaining bolt then retorque to specification, bend unused side of tab lock over bolt head.

*Note: Never bend tab lock more than once, either side.*



HIGH PERFORMANCE TYPE



1. Fixed half.
2. Sliding half bushing.
3. Retaining ring.
4. Sliding half.
5. Counterweight axle.
6. Counterweight.
7. Roller.
8. Governor.
9. Glider.
10. Roller axle.
11. Washer.
12. Sleeve.
13. Spring.
14. Governor guard bushing.
15. Governor guard.
16. Washer.
17. Tab washer.
18. Retaining bolt.
19. Star washer.
20. Retaining screw (lower).
21. Star washer.
22. Retaining screw (upper).
23. Safety ring.

## REMOVAL

To remove drive pulley it is first necessary to raise engine from frame. Support engine by inserting a wooden block between engine mount and cross support of frame.

Remove spark plug and bring P.T.O. piston approximately  $\frac{3}{4}$ " B.T.D.C. Insert a length of rewind starter rope through P.T.O. spark plug hole, then rotate drive pulley counter-clockwise until piston bears against rope. Remove drive pulley retaining bolt.

Remove rope from cylinder and rotate crankshaft until P.T.O. piston is approx.  $\frac{3}{4}$ " A.T.D.C. re-insert rope then rotate drive pulley clockwise until piston bears against "cushioning".

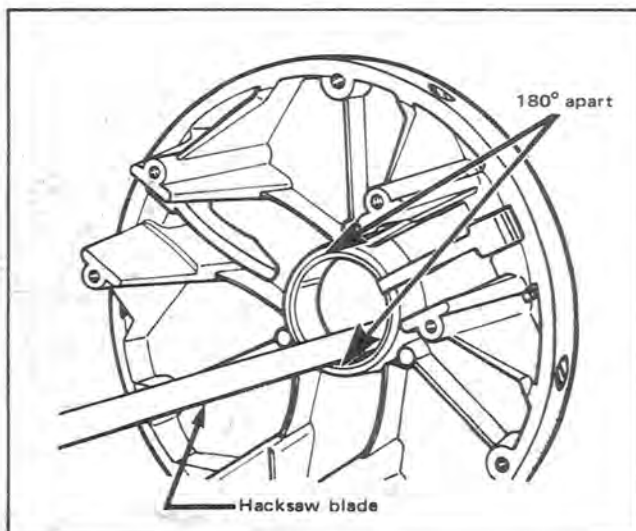
Insert special puller through pulley hub and tighten. While applying pressure, tap the puller head to release drive pulley from crankshaft. (See Special Tools).

## DISASSEMBLY & ASSEMBLY

**Warning:** Spring pressure can force assembly apart, therefore, it is imperative that the governor cup be held firmly during screw removal.

② ③ ④ To remove worn bushing, use a hacksaw blade. Make two (2) cuts (180° apart). Remove bushing and discard retaining ring.

**Caution:** Cut through bushing material only.



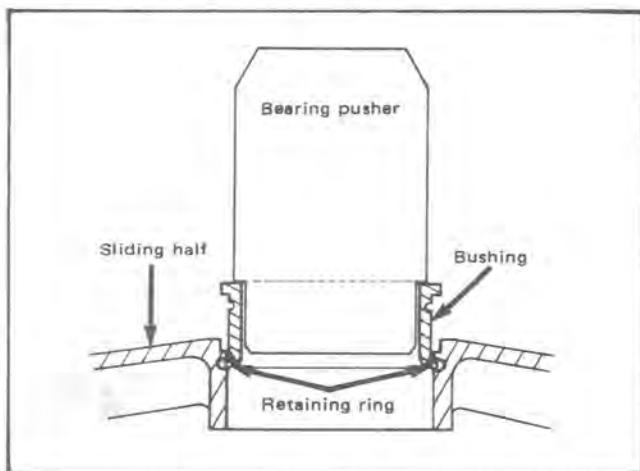
## SECTION 02

### SUB-SECTION 03 (DRIVE PULLEY)

Prior to installation, inspect bushing seat for burrs. Repair only damaged area, otherwise bushing pressfit characteristic will be altered.

Install new retaining ring into sliding half groove. Position new bushing and bushing pusher over sliding half hub. (See Special Tools).

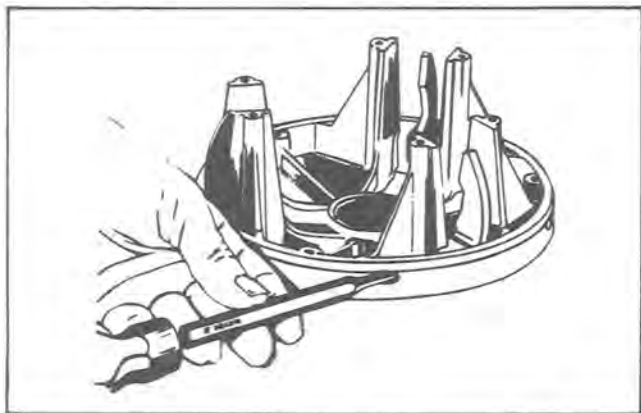
Drive bushing into hub while at same time, holding retaining ring inside pulley groove using a suitable pointed tool. After properly locating spring into its groove, continue insertion until bushing sits squarely on its seat.



*Note: Sliding half bushing and governor guard bushings are available as a matched set. Never replace one without replacing the other.*

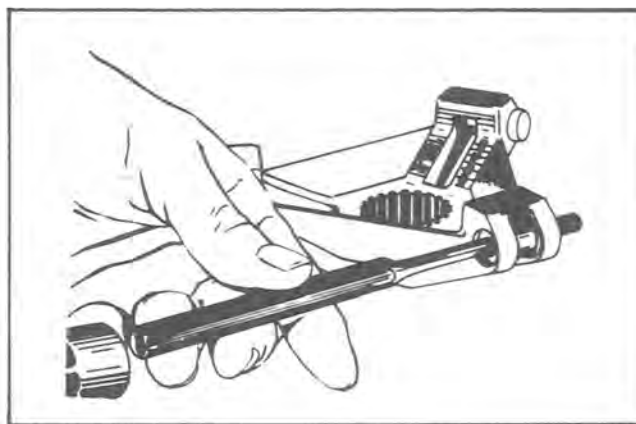
⑤ ⑥ Use a drive punch to push axles from or into counterweights.

During assembly, apply a coat of "High Performance Drive Pulley Lubricant" over contact face of counterweights.



*Note: If counterweight replacement is necessary, all three counterweights must be replaced. Failure to do so will affect performance.*

⑦ ⑨ ⑩ Rollers can be removed by first removing gliders with a pair of pliers then using a drive punch to remove axle. Worn gliders should be replaced when axle end is visible. At assembly, apply a light coat of "High Performance Drive Pulley Lubricant" over rollers.



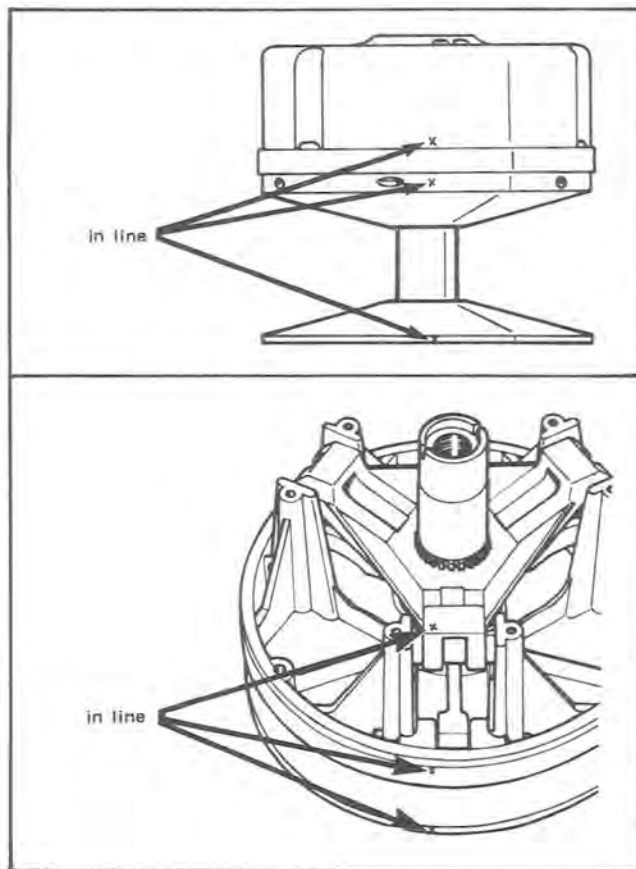
*Note: If roller replacement is indicated, always replace all three rollers.*

⑫ At assembly, apply a light coat of "High Performance Drive Pulley Lubricant" over sleeve surface.

⑮ To remove or install governor guard bushing use a suitable pusher and hammer.

⑮ At assembly, make sure the two retaining washer holes align with the slot of fixed half end.

① ④ ⑧ ⑮ Balance marks are stamped on fixed half, sliding half, governor and governor guard. At assembly, these components must be installed with the marks in line.





- ②① ②② At assembly, apply a light coat of "Loctite Lock'n Seal" over threads of nine (9) retaining screws.

Torque the three (3) lower screws to 50-65 in.-lbs. Torque the six (6) upper screws to 30-35 in.-lbs.

**Caution:** Use only specified sealing, "Loctite Lock'n Seal" (TL-242), its adhesive properties conform to our requirements as well as allow easy future removal of screws. It should also be noted that to correctly remove a Loctite sealed screw, it is necessary to slightly tap on head of screwdriver to break "Loctite" seal. The screw can then be removed. This procedure will eliminate the possibility of screw breakage.

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## CLEANING

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- ② ①④ To clean bushings use fine steel wool and a clean dry cloth.

**Caution:** Bushing material is oil impregnated therefore, avoid soaking in solvent.

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## INSTALLATION

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Prior to installation clean crankshaft taper with fine steel wool soaked in acetone. Dry using a clean, dry cloth.

Lock crankshaft in position by blocking piston at A.T.D.C. as explained in removal procedure.

Install drive pulley ass'y on engine then torque governor bolt to 58-68 ft.-lbs.

Remove rope from cylinder and reinstall spark plugs.

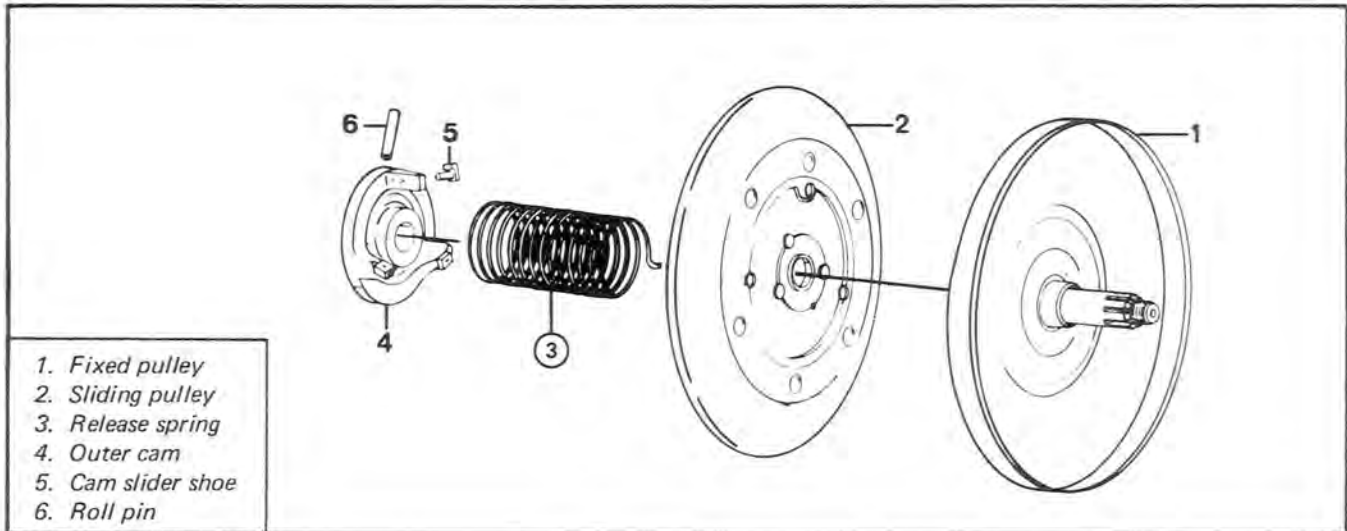
Raise and block rear of vehicle off the ground. Start engine and repeatedly apply throttle and brake.

Stop engine and re-torque governor bolt. Bend unused side of locking tab over bolt head.

*Note: Never bend tab lock more than once, either side.*



DRIVEN PULLEY, TYPE 1



## REMOVAL

Remove pulley guard, drive belt and muffler.  
Slacken steering column bolts.  
Release chain tension. Remove cotter pin and nut securing pulley drive shaft to chaincase.

*Note: On vehicle equipped with steel chaincase, attach chain to frame to prevent it falling inside of chaincase.*

Pull driven pulley toward engine and remove from vehicle.

## DISASSEMBLY & ASSEMBLY

③ In order to measure driven pulley spring tension, pulley halves must be separated. To do this, insert length of 1/8" dia. rod between the halves. Check tension using a fish scale positioned 90° with pulley axle.

(Refer to Technical Data for correct spring tension).

To correct spring tension, either relocate spring end in sliding pulley half or gradually rotate outer cam.

## INSTALLATION

With drive chain tension release, hold upper sprocket and chain in position then insert assembled driven pulley shaft through chaincase and sprocket.

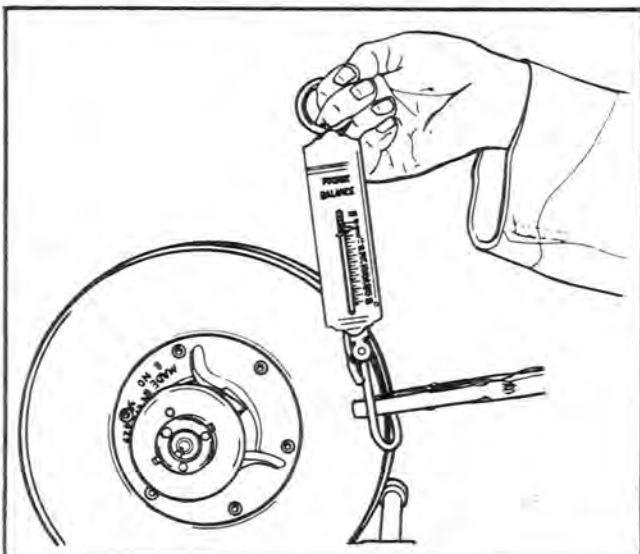
Install spring washer and castellated nut.

Tighten castellated nut fully then back off nut 1/6 of a turn. Lock in position with cotter pin. (It is imperative that nut is backed off or damage may occur due to a burnt or seized bearing).

Apply chain tension.

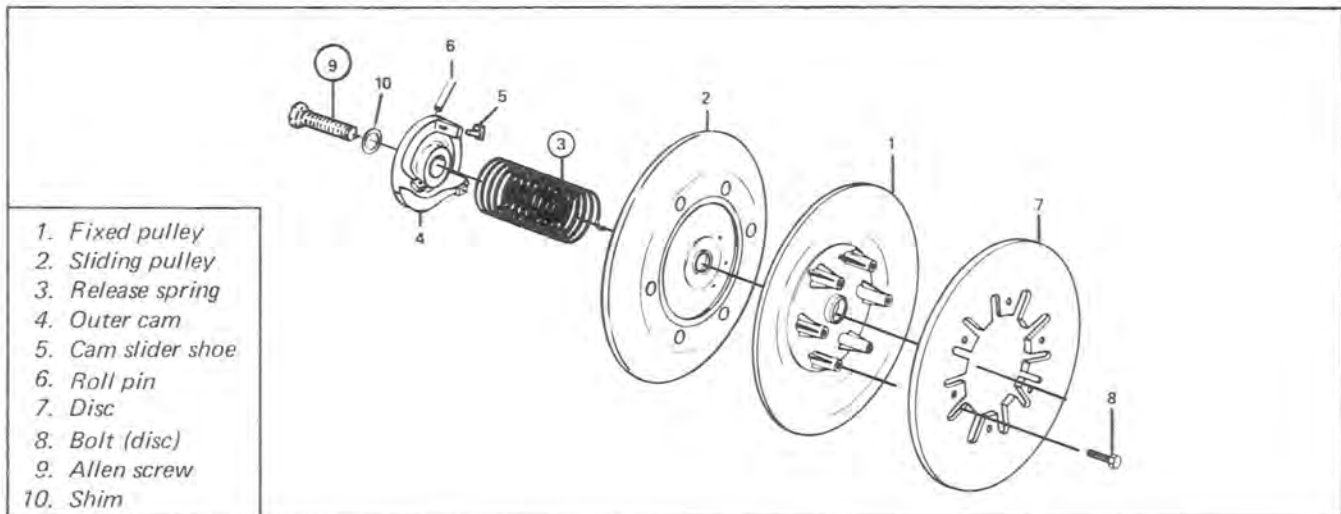
Install muffler and tighten steering column bolts.

Install drive belt and pulley guard.





DRIVEN PULLEY, TYPE 2



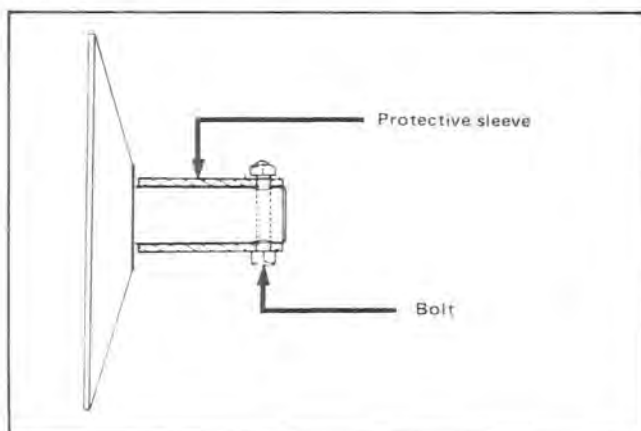
## REMOVAL

Remove pulley guard, drive belt and brake assembly.  
Remove steering column, battery, and muffler.

Drain chaincase oil and pry drive axle oil seal from chaincase side. Slacken chaincase 1/2 inch from frame.  
Support driven pulley shaft using a wooden block then drive roll pin from outer cam on driven pulley shaft. Remove outer cam, spring and sliding pulley.

Remove Allen screw (L.H.S. thread) securing driven pulley shaft to transmission drive shaft.  
Unscrew fixed half from transmission shaft.

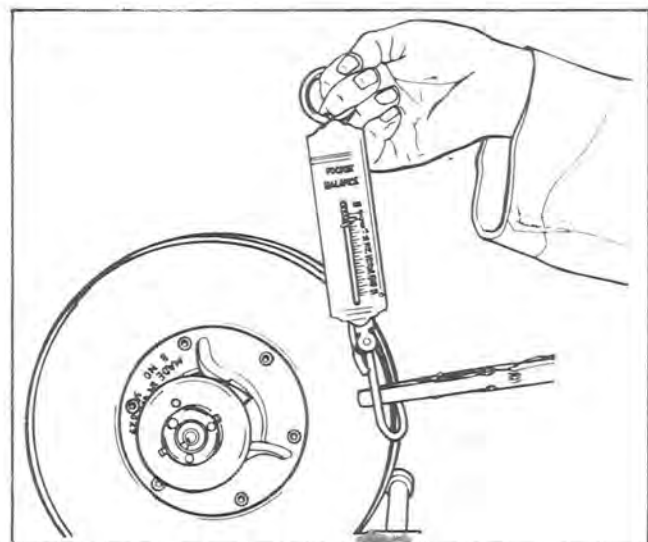
*Note: If fixed half is difficult to remove, slide a length of steel pipe over shaft. Attach with bolt and nut as illustrated; the fixed half can then be removed using a pipe wrench.*



## DISASSEMBLY & ASSEMBLY

③ In order to measure driven pulley spring tension, the

pulley halves must be separated. To do this, insert a length of 1/8" dia. rod between the two halves. Check tension using a fish scale positioned 90° with pulley axle.  
(Refer to Technical Data for correct spring tension).



To correct spring tension either relocate spring end in sliding pulley half, or gradually rotate outer cam.

## INSTALLATION

Screw fixed half pulley shaft onto transmission shaft. Install Allen screw ⑨ and torque to 18-23 ft/lbs. Install sliding pulley, spring, outer cam and roll pin. Proceed with spring adjustment.

Install chaincase and oil seal. Replenish chaincase oil. Proceed with pulley alignment.

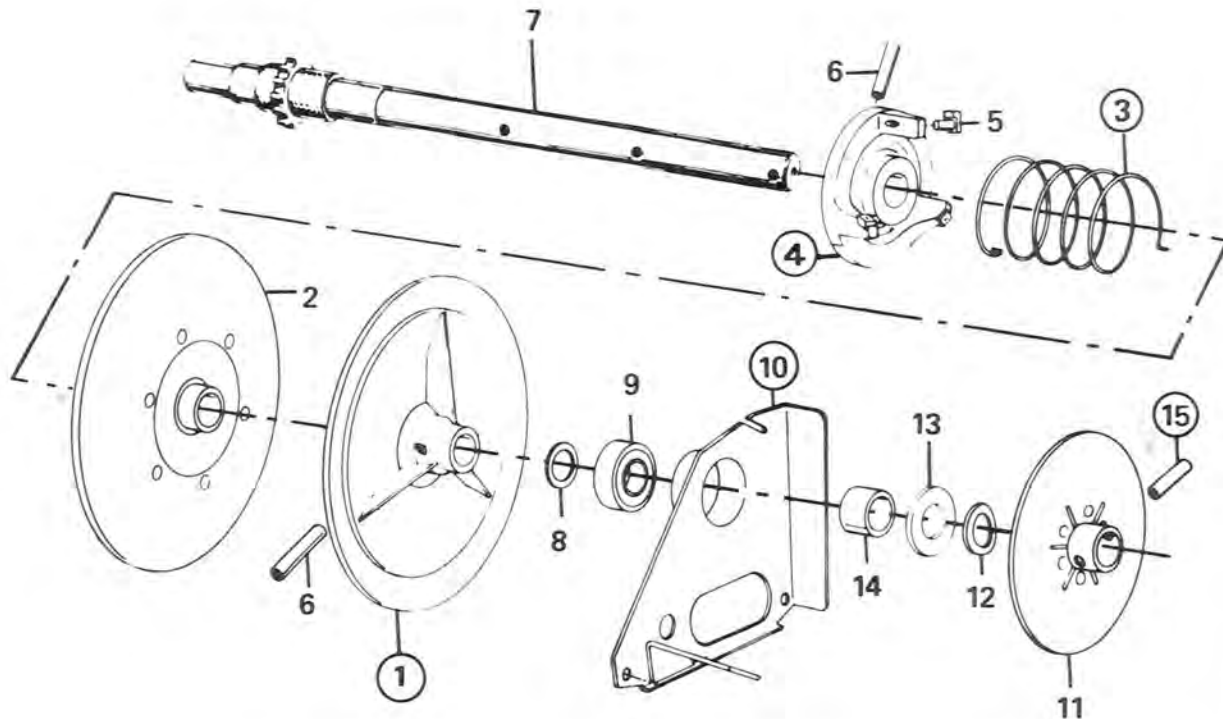
Install steering column, muffler and battery.

Install drive belt, brake assembly and pulley guard.





DRIVEN PULLEY, TYPE 3



1. Fixed pulley  
2. Sliding pulley  
3. Release spring  
4. Outer cam

5. Cam slider shoe  
6. Roll pin  
7. Drive shaft  
(transmission)

8. Spacer  
9. Bearing  
10. Support  
11. Disc

12. Spring washer  
13. Shim  
14. Spacer  
15. Roll pin

## REMOVAL

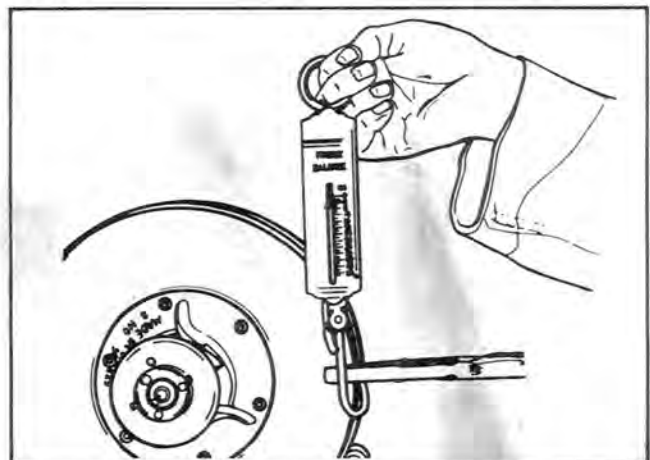
Remove pulley guard and drive belt.  
Remove disc brake assembly.  
Position a wooden block under the drive shaft then using a hammer and a pin punch, remove roll pin (15) locking disc in position. Tap on inner side of brake and bracket assembly (10) to disengage it from bearing.  
Remove muffler from engine.  
Remove lower bracket of steering column attached to the gearbox. Slacken upper bracket of steering column. Disconnect transmission rod from gearbox.  
Remove gearbox upper housing.  
Release chain tension then separate chain at connecting link.  
Withdraw driven pulley.

## DISASSEMBLY & ASSEMBLY

①④ If necessary heat hub of fixed pulley and outer cam

to facilitate removal.

③ Check tension using a fish scale positioned 90° with pulley axle. (Refer to Technical Data) for correct spring tension.



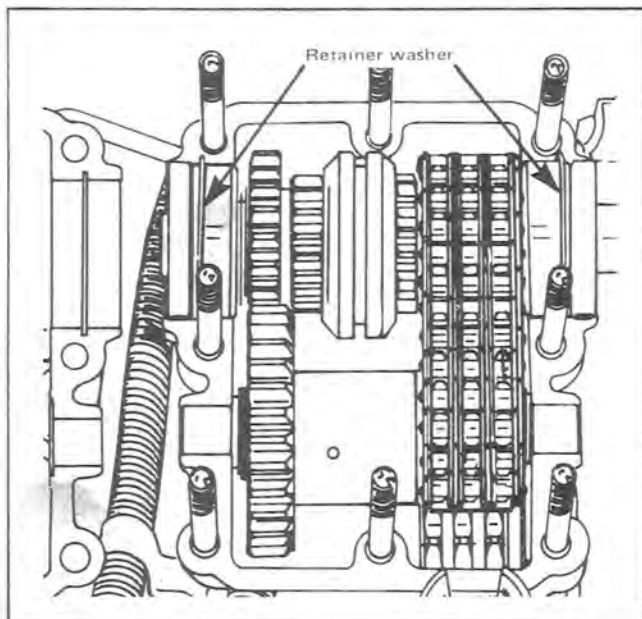
## SECTION 02

### SUB-SECTION 04 (DRIVEN PULLEY)

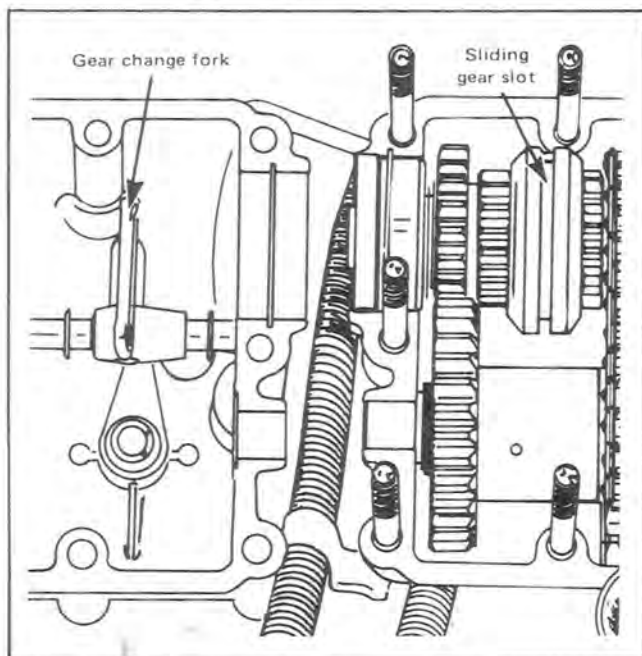
To correct spring tension either relocate spring end in sliding pulley half, or gradually rotate outer cam.

#### INSTALLATION

Position drive shaft of assembled driven pulley so that retainer washers align with slots of gearbox casing.

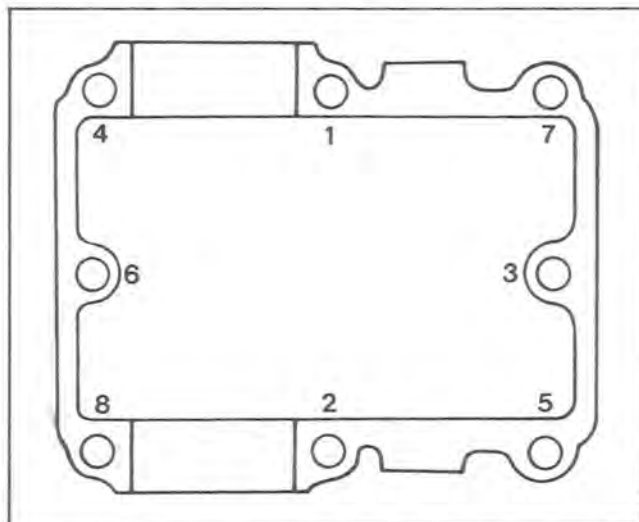


Connect drive chain using a double connecting link.  
The locking clip should be installed on opposite side of driven pulley.  
Position gear change fork in gearbox cover so that it aligns with slot of sliding gear in gear housing.



Apply a thin coat of "Loctite crankcase sealant", or equivalent, on contact surface of gearbox casing.

Install gearbox cover and secure with eight nuts. Torque nuts to 20 ft/lbs. in the following sequence:

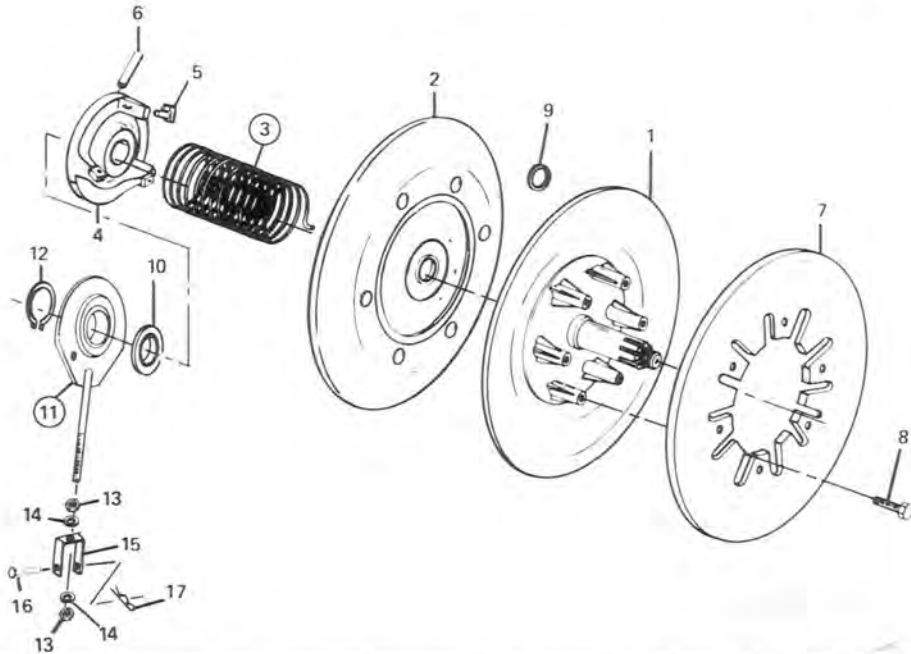


Install gearbox rod.  
Install steering column.

The distance between the upper retainer plate (steering column) and the gearbox bracket must be 15 1/2" inches.  
Install drive belt and muffler.  
Install brake assembly and bracket. Install roll pin securing disc to shaft.  
Adjust chain tension. Check gearbox oil level.  
Install pulley guard.

DRIVEN PULLEY, TYPE 4

1. Fixed pulley
2. Sliding pulley
3. Release spring
4. Outer cam
5. Cam slider shoe
6. Roll pin
7. Disc
8. Bolt (disc)
9. Spacer (pulley)
10. Spacer (support)
11. Support
12. Snap ring
13. Nut
14. Flat washer
15. Bracket
16. Clevis pin
17. Hair pin cotter

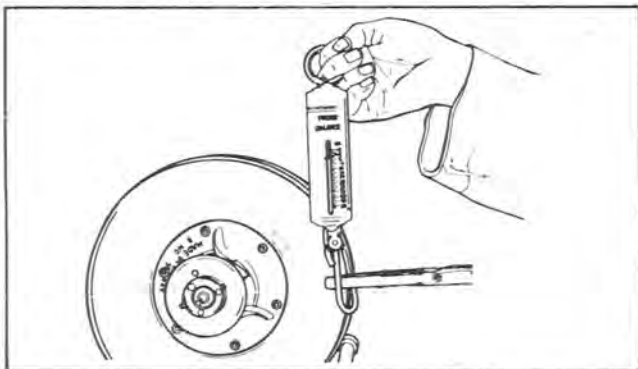


REMOVAL

Remove pulley guard and drive belt.  
Detach driven pulley support from upper column bracket.  
Remove brake assembly and tool box.  
Remove chaincase cover.  
Remove air silencer box and carburetor.  
Release chain tension then remove cotter pin and castellated nut securing driven pulley to chaincase. Pull out driven pulley assembly.

DISASSEMBLY & ASSEMBLY

③ In order to measure driven pulley spring tension, the pulley halves must be separated. To do this, insert a length of 1/8" dia. rod between the halves. Check tension using a fish scale positioned 90° with pulley axle. (Refer to Technical Data for correct spring tension).



To correct spring tension either relocate spring end in sliding pulley half, or gradually rotate outer cam.

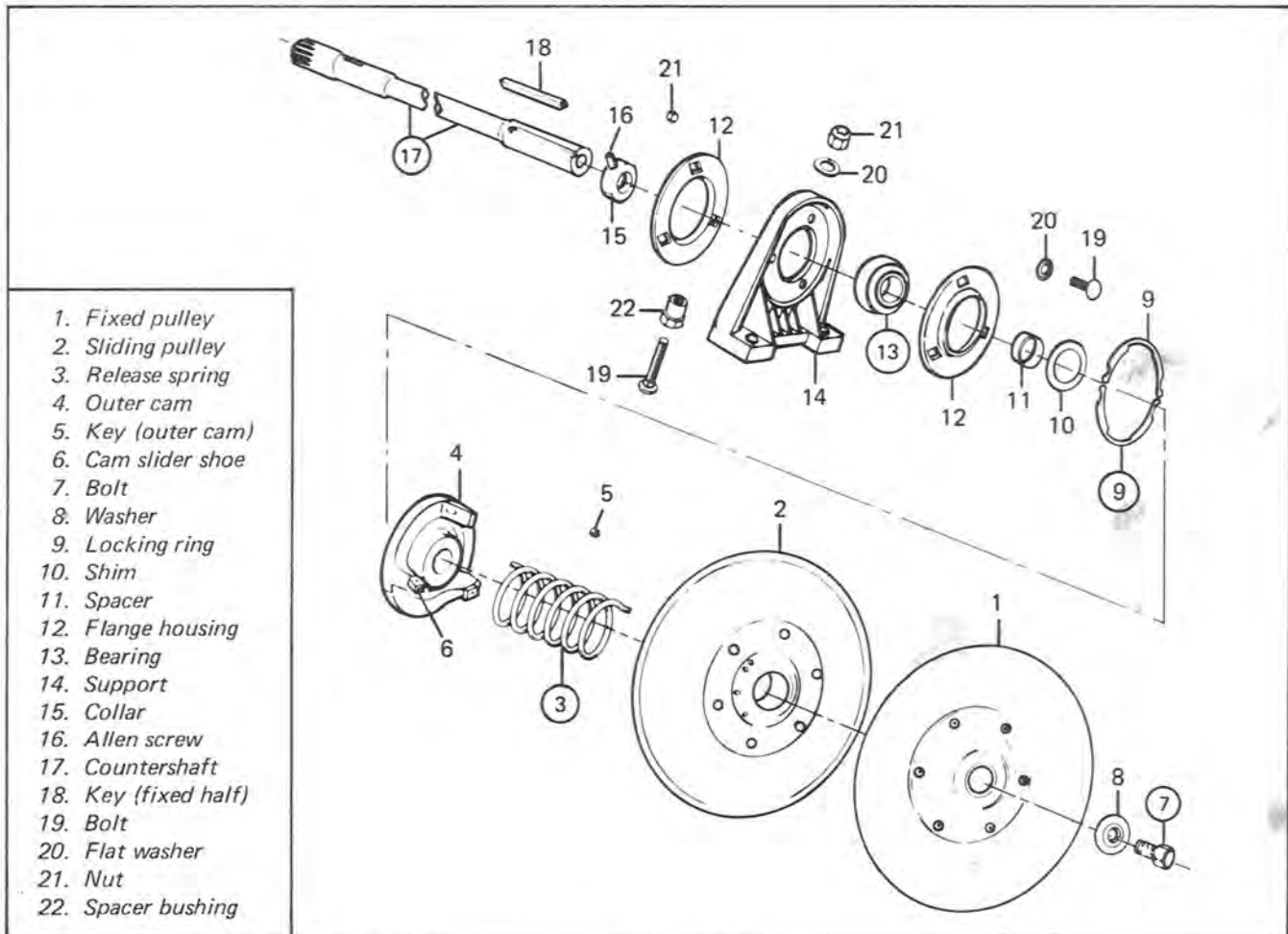
⑪ To remove driven pulley support it may be necessary to use a puller.

INSTALLATION

Install driven pulley assembly and secure it to chaincase with the castellated nut and cotter pin. Apply chain tension. Position chaincase cover and replenish chaincase oil. Install disc brake assembly and tool box.  
Install carburetor and air silencer box.  
Connect driven pulley support to steering upper column.  
Install drive belt and pulley guard.



DRIVEN PULLEY, TYPE 5



REMOVAL

Remove pulley guard and drive belt.  
Remove bolt (7), shim and pulley assembly.

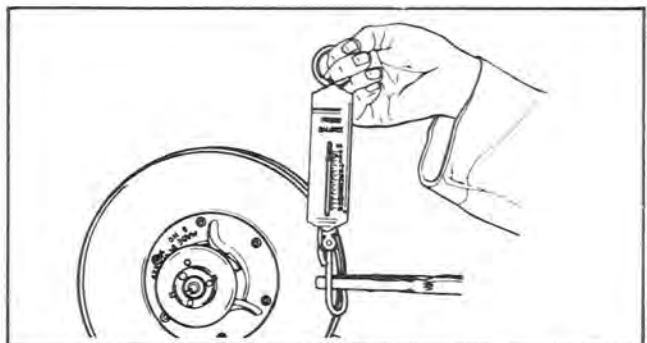
DISASSEMBLY & ASSEMBLY

(9) To remove locking ring halves first press on outer cam then using a screwdriver, remove ring halves.

(13) If bearing needs replacement, remove three (3) bolts securing flanges. Remove outer flange. Unbolt and raise support from frame. Using puller, remove bearing.

(17) Countershaft can be removed by first removing upper sprocket of chaincase then sliding out shaft. Maximum deflection of shaft is .003 inch.

(3) In order to measure driven pulley spring tension the pulley halves must be separated. To do this, insert a length of 1/8" dia. rod between the halves. Check tension using a fish scale positioned 90° with pulley axle.  
(Refer to Technical Data for correct spring tension).



To correct spring tension either relocate spring end in sliding pulley half, or gradually rotate outer cam.

INSTALLATION

Install the pulley components in the following sequence: outer cam key, outer cam, spring, sliding pulley, fixed half key, fixed half, washer and bolt (7). Torqued to 25 ft/lbs. Install drive belt and pulley guard.





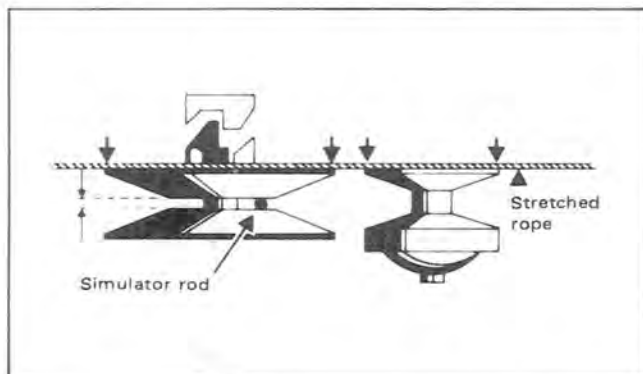
## PULLEY ALIGNMENT

Remove pulley guard and drive belt. Check tightness of engine mount nuts. Nuts must be torqued to 22-30 ft/lb.

### OFFSET ADJUSTMENT

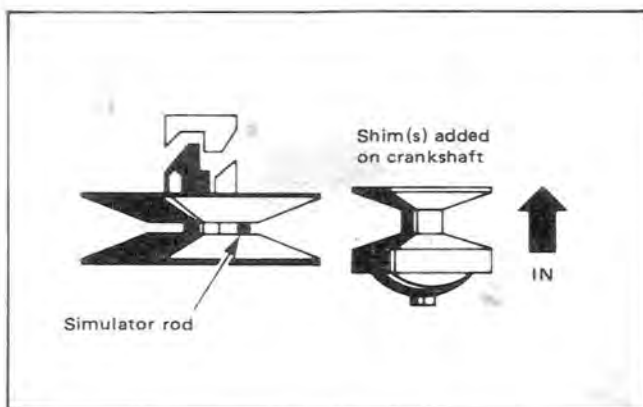
#### Fixed Type Driven Pulley

Insert correct diameter simulator rod between driven pulley halves. (See Technical Data). Using a rope, check that drive and driven pulley inner halves are in line.



If drive pulley is too far in, remove drive pulley and add shim(s) on crankshaft.

**Caution:** Never use more than 5 shims on crankshaft.

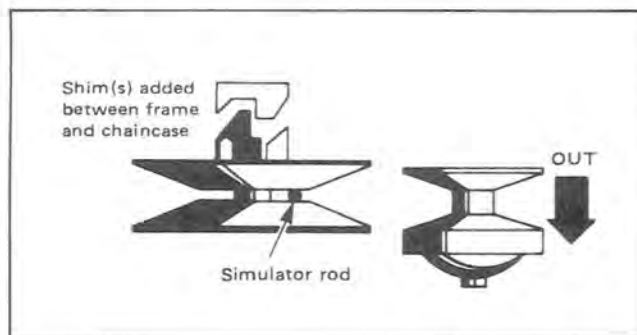


**Warning:** Always torque drive pulley bolt within specifications. (See Technical Data).

If drive pulley is too far out, twin track models excepted; add shim(s) between frame and chaincase.

On twin track models, check tightness of gear box attaching bolts. If necessary remove shim(s) from crankshaft.

*Note: On vehicles equipped with aluminum chaincase always use full length shims.*



#### Floating Type Driven Pulley

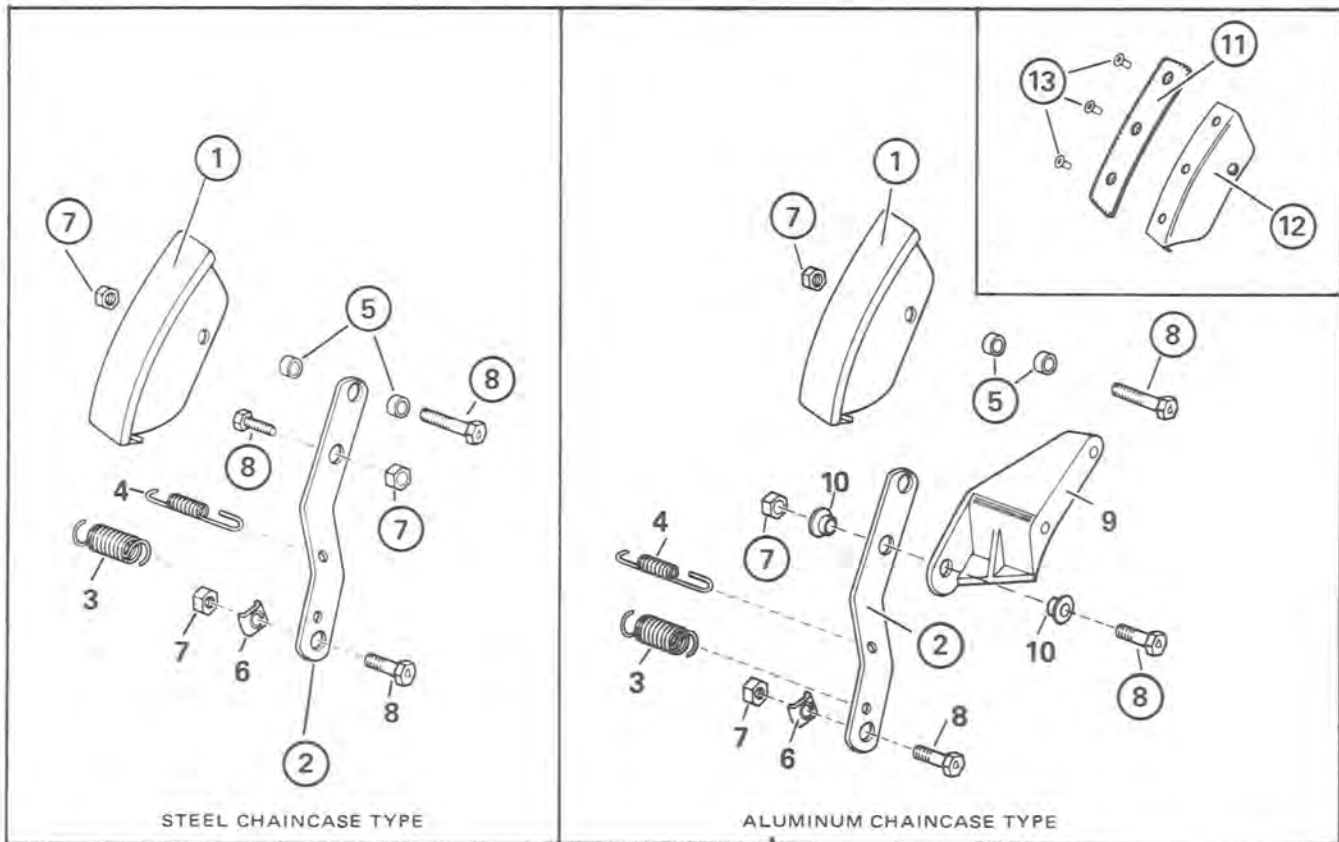
During operation, the driven pulley slides on its' shaft and automatically aligns itself at all speeds. To retain free-floating efficiency, apply anti-seize lubricant on shaft. Torque driven pulley retaining bolt to 25 ft/lb.

### DISTANCE ADJUSTMENT

Slacken chaincase and reposition. (See Technical Data). Install drive belt and pulley guard.



DRUM BRAKE



- |                               |                         |
|-------------------------------|-------------------------|
| 1. Brake shoe.                | 8. Bolt                 |
| 2. Brake lever.               | 9. Brake lever bracket. |
| 3. Brake lever spring.        | 10. Brass bushing.      |
| 4. Brake light switch spring. | 11. Lining.             |
| 5. Spacer.                    | 12. Shoe.               |
| 6. Cable lock.                | 13. Rivet               |
| 7. Nut.                       |                         |

### DISASSEMBLY & ASSEMBLY

① ⑤ ⑦ ⑧ At assembly, torque brake shoe retainer nut to 25-35 in/lbs. Shoe must pivot easily under light pressure.

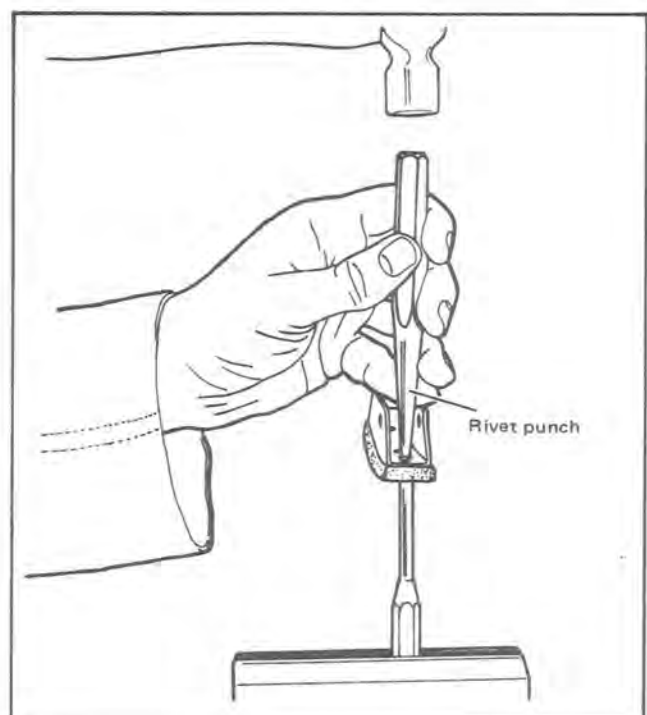
② ⑦ ⑧ When attaching brake lever ass'y to chaincase bracket, tighten nut until lever pivots freely and all side play is eliminated.

⑪ ⑫ ⑬ Certain models have riveted linings. Rivet heads must be below lining surface. If worn, remove rivets using a 11/64" dia. bit.

To secure new lining to shoe, use a flat head punch and a rivet punch, (See Tool Section) as illustrated.

*Note:* Lubricate all moving metal parts of brake with light machine oil.

**Warning:** Avoid getting oil on brake shoe.



## INSPECTION

① Check brake lining for wear. If necessary, replace brake shoe ass'y.

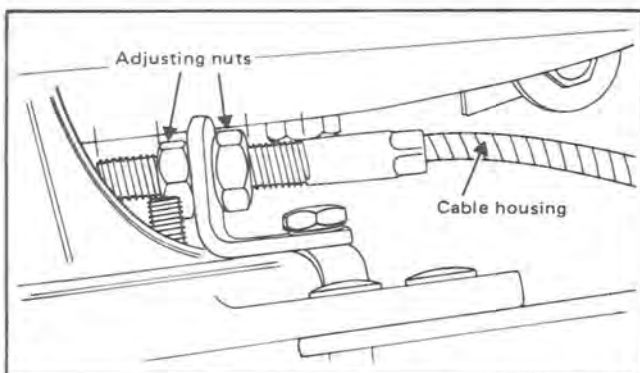
*Note: If oil traces are found on lining or drum, check chaincase oil seal for correct installation position or damage. Replace as needed. Wipe oil from pulley and replace brake shoe ass'y.*

## INSTALLATION & ADJUSTMENT

Connect brake cable to brake lever and adjust so that brake applies fully when lever is one (1) inch from handlebar grip.

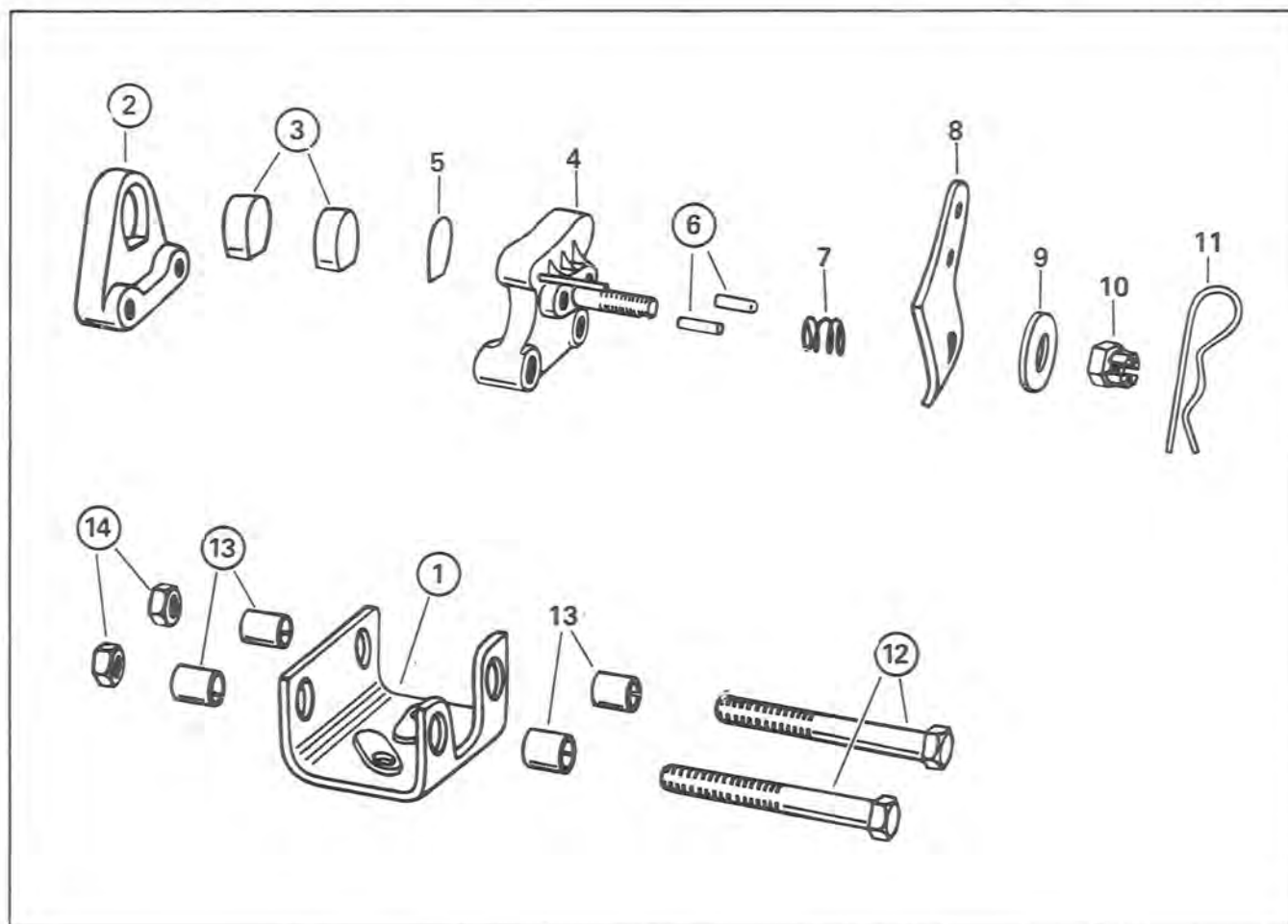
*Note: Prior to cable installation, make sure cable housing adjusting nuts are located half way on adjuster threads.*

If a final adjustment is indicated, use housing adjusting nuts.



Check brake light operation. If necessary, loosen brake light switch lock nuts and adjust.

DISC BRAKE - REGULAR TYPE



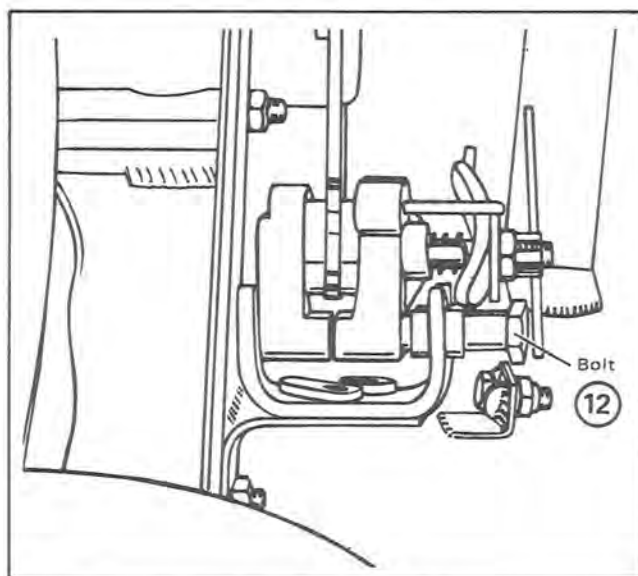
- |                       |                     |
|-----------------------|---------------------|
| 1. "U" bracket        | 8. Brake lever.     |
| 2. Carrier.           | 9. Washer           |
| 3. Pad                | 10. Castellated nut |
| 4. Carrier (cam side) | 11. Train pin       |
| 5. Back-up plate      | 12. Bolt            |
| 6. Push pin           | 13. Spacers         |
| 7. Spring             | 14. Nut             |

## REMOVAL

Disconnect brake light switch spring, wiring connector and brake cable.

Remove bolts securing brake unit "U" bracket to support.

(12) (13) (14) Remove nuts and back spacers. Pull on bolts to provide clearance then pull ass'y from vehicle.



## DISASSEMBLY & ASSEMBLY

③ Check brake pad thickness. If less than 3/16" thick, replace pad.

② Factory new unit incorporates a bonded pad. If pad protrusion is less than 1/16", replace. If pad has become loose, measure pad thickness. Replace as necessary.

*Note: At assembly it is not necessary to glue pad to carrier. However, make sure that all traces of worn pad/glue are removed, otherwise a "spongy" brake will occur.*

⑥ At assembly, install push pins with round end facing outward.

## INSTALLATION & ADJUSTMENT

Slide ass'y over disc and secure to brake support.

⑭ Torque nuts to 25 ft./lbs.

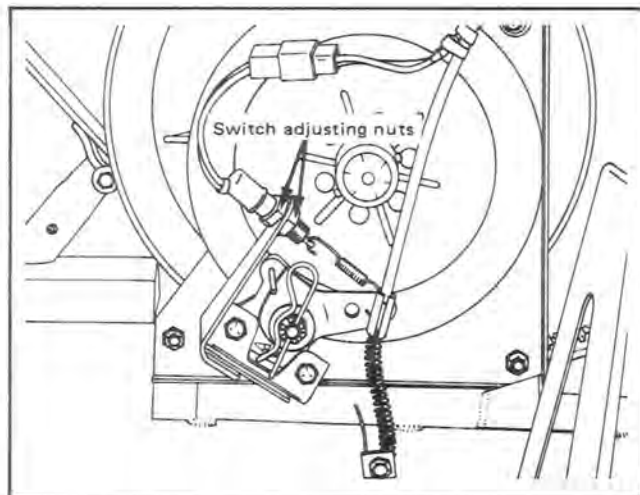
Install brake cable on brake lever. Do not tighten. Manoeuvre cable and lever until the push pins are seated directly in the deepest section of the brake lever cam. Lock cable in position.

Tighten castellated nut until a disc/pad friction is felt. Back off nut slightly and install hair pin.

*Note: Brake should be fully applied when lever is 1" from handlebar. Readjust if necessary.*

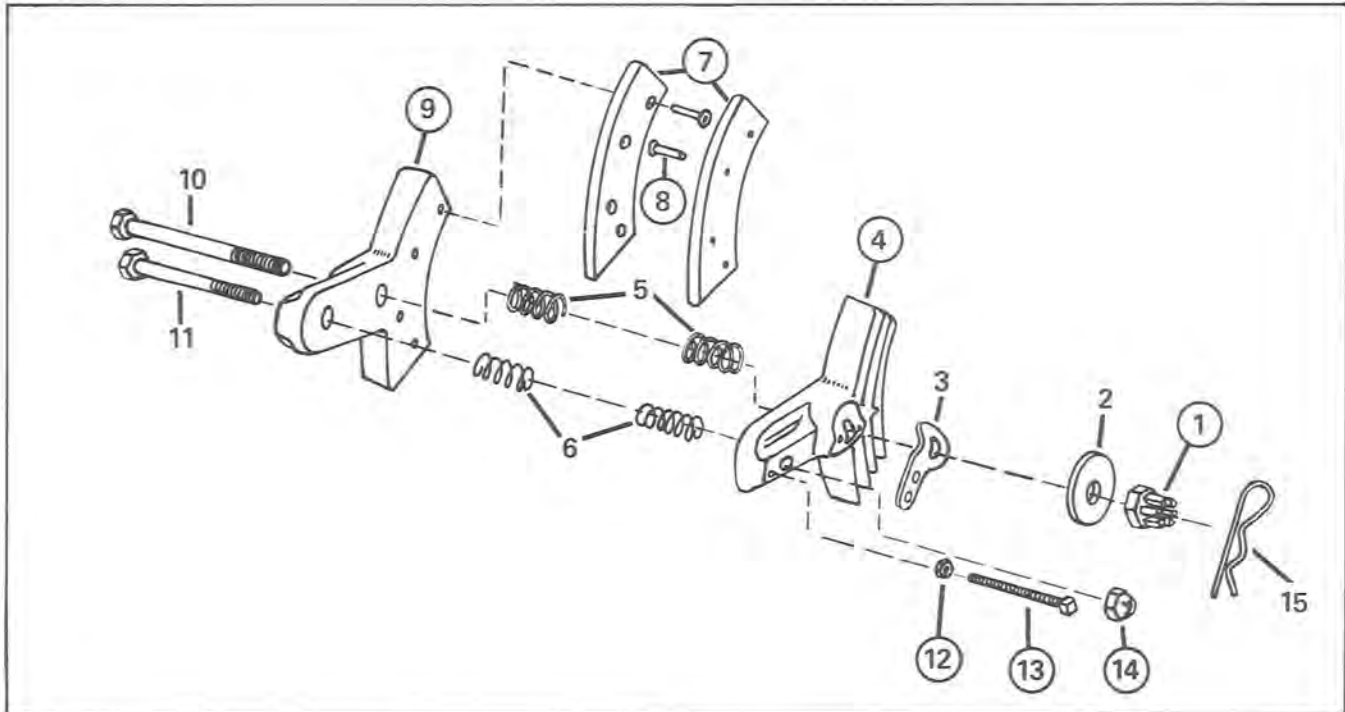
Connect wiring connector and hook brake switch spring to brake lever.

Check brake light operation. To adjust, use brake light switch adjusting nuts.





DISC BRAKE - HEAVY DUTY TYPE



1. Castellated nut.
2. Washer.
3. Brake lever.
4. Casting (cam side).
5. Spring.
6. Spring.
7. Pad.
8. Rivet.

9. Casting (carrier side).
10. Screw.
11. Screw.
12. Jam nut.
13. Adjusting screw.
14. Nut.
15. Hair pin.

DISASSEMBLY & ASSEMBLY

④ ⑦ ⑧ ⑨ Rivet head must be embedded below surface of lining. Replace worn lining.

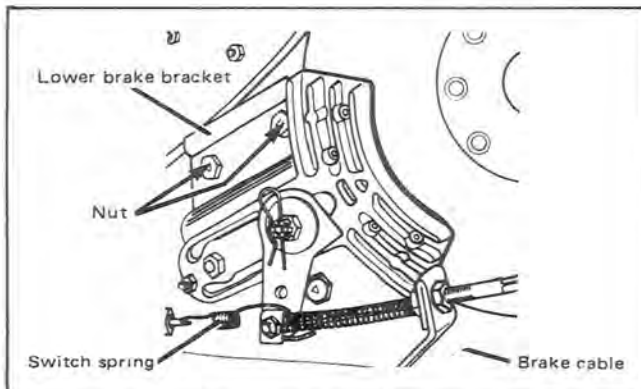
To remove rivets securing lining, use a 11/64" dia. drill.

To secure new lining on casting, rest rivet head on a flat punch, then secure other end with a rivet punch (See Tool Section).

REMOVAL

Disconnect brake cable from brake lever and unhook light switch spring.

Remove nuts and bolts securing brake ass'y to brake bracket then withdraw ass'y from vehicle.



INSTALLATION & ADJUSTMENT

Install all components on brake bracket as illustrated in exploded view. Do not tighten nuts (1) (14) and adjusting screw (13).

Slide ass'y over disc and secure to lower brake bracket.

Tighten castellated nut (1) until a disc/pad friction is felt. At same time, screw in adjusting screw (13) so that pads are parallel and apply even pressure on disc. Lock adjusting screw with jam nut (12).

Back off nut (1) slightly and install hair pin.

Tighten nut (14), then back off (1) one turn.

Attach brake cable to brake lever. Do not secure. Manoeuvre cable and lever until ball bearings are seated directly in the deepest section of the brake lever cam. Lock cable in position.

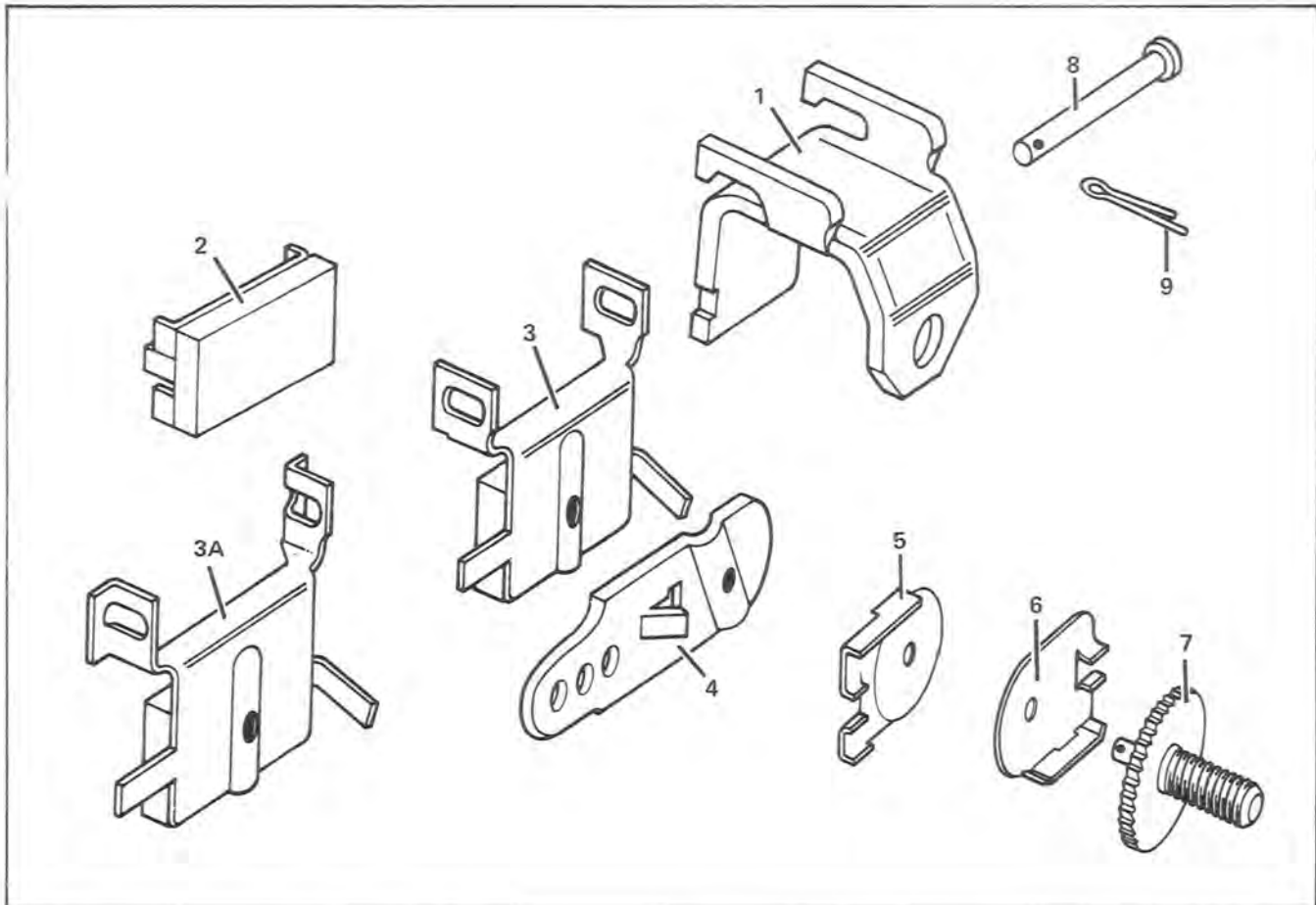
*Note: Brake must fully apply before lever is 1" from handlebar.*

Connect brake light switch spring and check brake light operation. To adjust, use brake light switch adjusting nuts.





SELF-ADJUSTING BRAKE



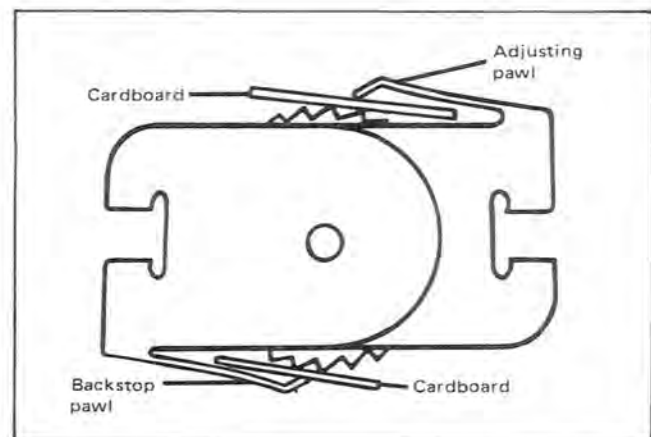
- |   |                    |
|---|--------------------|
| 1. Brake housing.                         | 5. Adjusting pawl. |
| 2. Replaceable pad.                       | 6. Backstop pawl.  |
| 3. Sliding pad.                           | 7. Ratchet wheel.  |
| 3A. Sliding pad,<br>(floating disc type). | 8. Retaining pin.  |
| 4. Brake lever.                           | 9. Cotter pin.     |

## REMOVAL

Disconnect brake light switch junction block. Disconnect brake cable. Remove cable housing lock nut and pull out housing. Remove nuts and bolts securing brake ass'y and withdraw complete ass'y.

## DISASSEMBLY

1. Remove cotter pin and retaining pin from brake housing. Discard cotter pin. Unhook brake lever spring.
2. Position strips of thin, stiff cardboard between pawls and ratchet wheel. Turn wheel until it rests against stop nut.



3. Disengage the backstop pawl from the sliding pad tab and remove sliding pad.
4. Disengage adjusting pawl from brake lever tab and remove lever.
5. Remove adjusting pawl, backstop pawl and brake pad. Unscrew adjusting screw.

## SECTION 2

### SUB-SECTION 06 (BRAKE)

*Note: A factory new unit incorporates a bonded pad. If pad is more than 1/8" thick, do not attempt removal of pad or adjusting screw.*

#### CLEANING & INSPECTION

Measure the thickness of sliding pad. If less than 1/8" thick, replace sliding pad ass'y.

Measure thickness of housing pad. If less than 1/8" thick, replace pad.

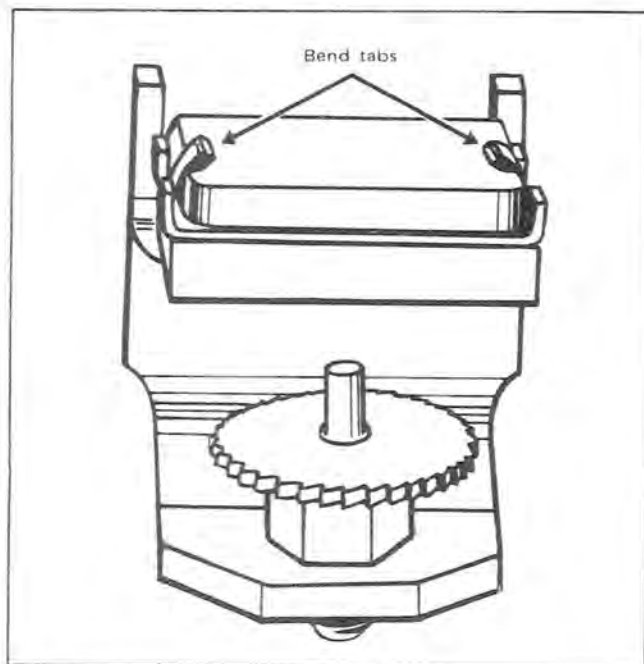
*Note: On bonded type pad, scrape and file away all trace of worn pad.*

**Caution:** Surface should be flat and clean otherwise a "spongy" brake will occur.

#### ASSEMBLY

Apply a light coat of graphite base lubricant over the full length of the adjusting screw threads then re-install.

Position brake pad on housing and lightly clamp assembly in a vise. Bend the center tab at each end.



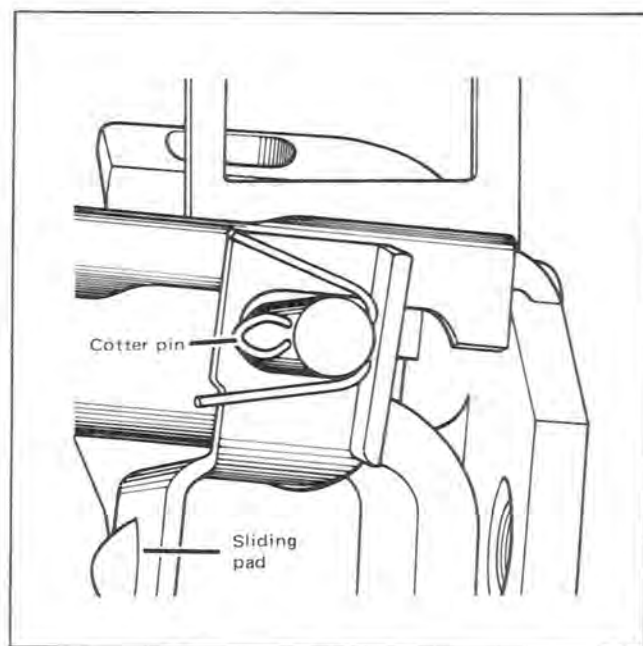
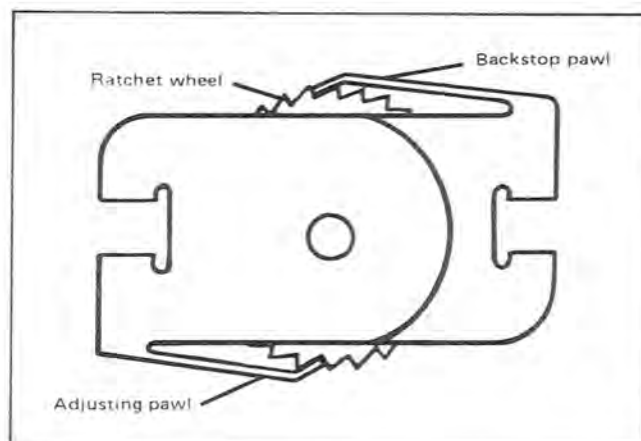
Apply a light coat of low temp. grease on the mating surfaces of the pawls. Install pawls on ratchet wheel as illustrated.

Position brake lever on adjusting screw stud so that brake lever tab engages in the slot of the adjusting pawl.

Apply a generous coat of low-temp. grease on the cam recess of the brake lever. Install the sliding pad assembly over the adjusting screw stud so that sliding pad tab engages with the slot of the backstop pawl.

Install brake mechanism retaining pin and secure with a new cotter pin.

*Note: On T'NT F.A. models, install cotter pin as illustrated.*



#### INSTALLATION AND ADJUSTMENT

— Prior to brake installation, check that pawls are correctly seated and that they apply pressure on ratchet wheel.  
— Rotate ratchet wheel a few turns, then install brake ass'y on vehicle.

— For the following adjustment the brake lever spring must be disconnected and the switch tab rotated so it doesn't contact brake light switch.

— Depress brake lever **lightly** until all free-play is taken. The distance (D) between brake lever and brake switch bracket is neutral position. Measure and record distance.

— Secure brake cable housing to brake bracket. Make sure adjusting nuts are located half way on housing threads.

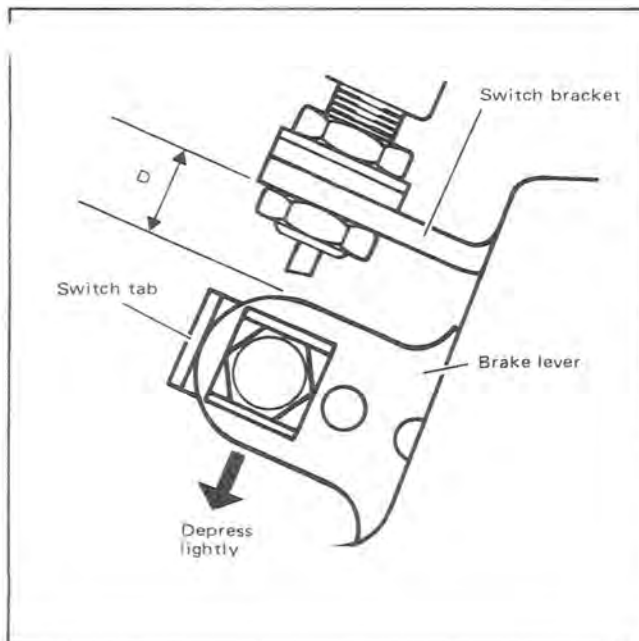
— Attach and fasten brake cable to brake lever at **neutral position (D)**.

— Hook brake lever spring to brake lever. Recheck neutral position and if necessary, readjust with cable housing

adjustment nuts. Connect brake switch light connector.  
(hook brake light switch spring, if applicable).

— Apply brake repeatedly until ratchet click is no longer heard. Brake lever must fully apply **before** brake lever is 1/2" from handlebar grip. If brake does not fully apply, cause should be immediately investigated.

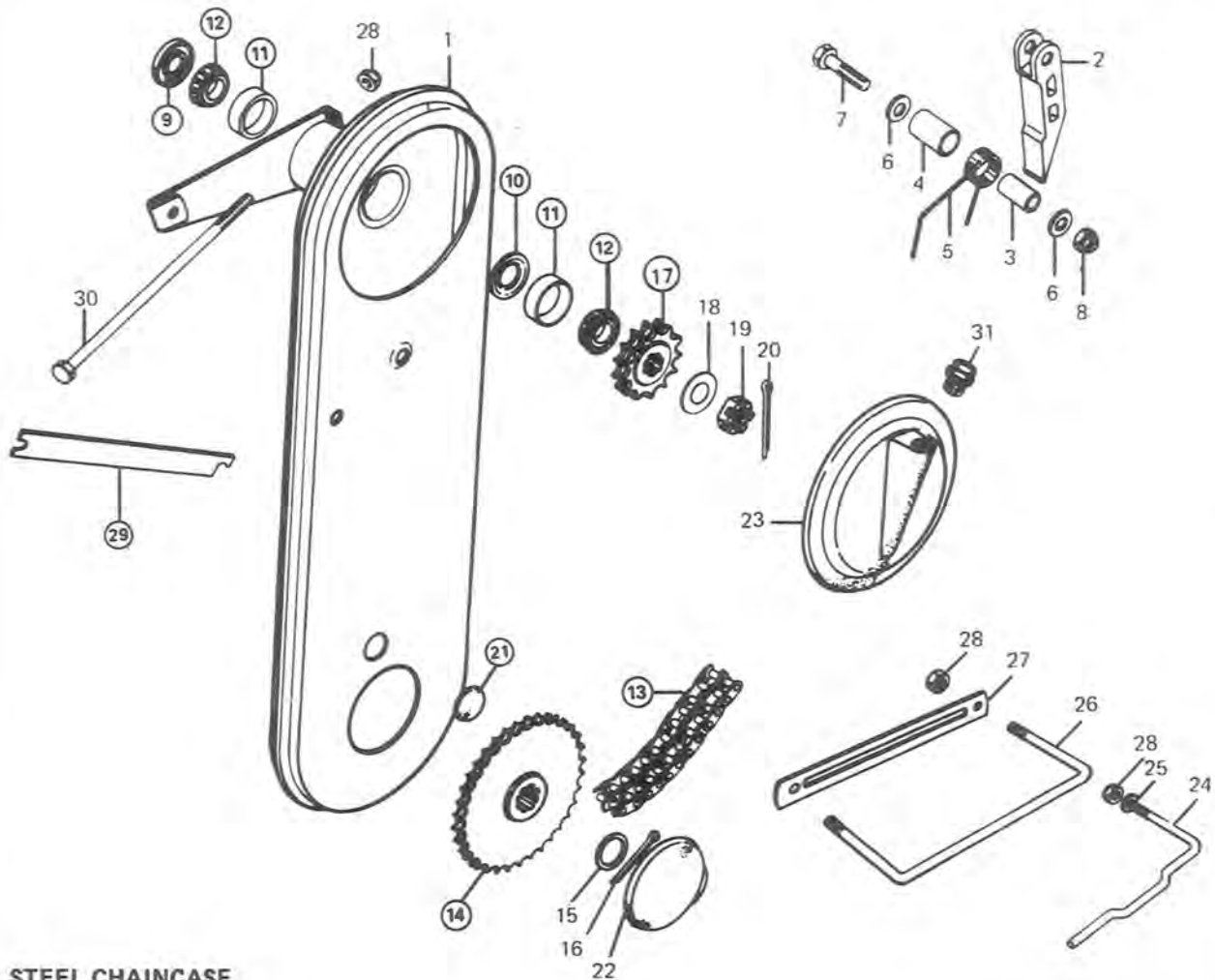
— Check brake light operation. To adjust, use brake switch adjusting nuts.







CHAINCASE



STEEL CHAINCASE

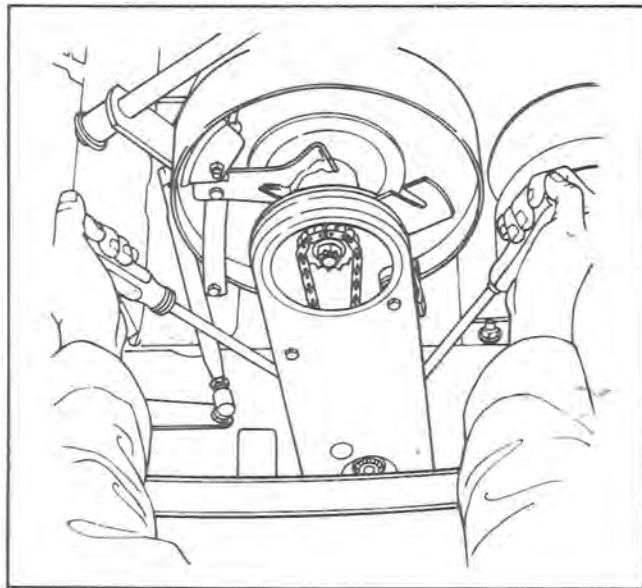
- |                      |                       |                      |                   |
|----------------------|-----------------------|----------------------|-------------------|
| 1. Chaincase         | 9. Oil seal           | 17. Sprocket         | 25. Washer        |
| 2. Chain tensioner   | 10. Oil retainer ring | 18. Spring washer    | 26. "U" clamp     |
| 3. Bushing           | 11. Bearing cup       | 19. Castellated nut  | 27. Spacer plate  |
| 4. Spacer            | 12. Cone bearing      | 20. Cotter pin       | 28. Nut           |
| 5. Spring            | 13. Chain             | 21. Chaincase plug   | 29. Shim          |
| 6. Fiber washer      | 14. Sprocket          | 22. Access plug      | 30. Screw         |
| 7. Screw (tensioner) | 15. Spacer (sprocket) | 23. Inspection cover | (hinge rod)       |
| 8. Nut (tensioner)   | 16. Cotter pin        | 24. Bracket          | 31. Breather plug |

## SECTION 02

### SUB-SECTION 07 (CHAINCASE)

#### REMOVAL

Remove pulley guard, drive belt and inspection cover.  
Release chain tension.  
Release track tension.  
Pry oil seal from chaincase and drain oil.  
Disconnect brake cable.  
Pry out lower access plug. Remove cotter pin and spacer.  
Remove nut on hinge rod at chaincase bracket.  
From the inner side of frame, remove the nut securing chaincase lower bracket. Remove bracket.  
Remove nuts, washers and "U" clamp holding the chaincase to the frame.  
Remove chaincase shim(s) if applicable. Move chaincase towards drive pulley to disengage hinge rod.  
Remove drive axle.  
Using two (2) large screwdrivers inserted between chaincase and frame, pry complete assembly from vehicle.

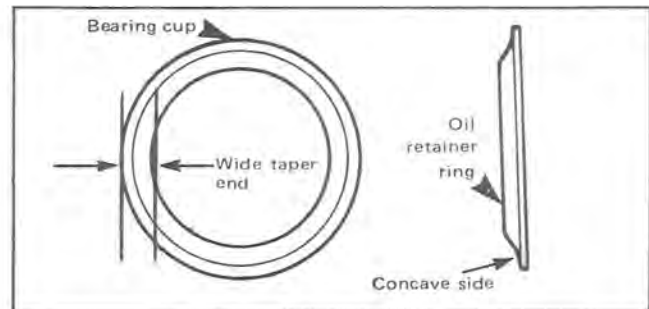


#### INSPECTION

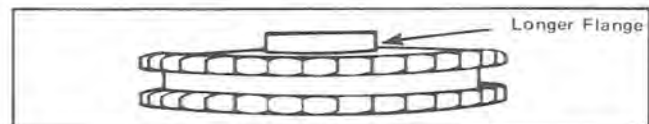
Visually inspect chain for cracked, damaged or missing link rollers. Inspect for defective bearing cones(12), bearing cups(11) and oil retainer ring(10). Inspect sprockets for damage, wear.

#### DISASSEMBLY & ASSEMBLY

- (10) Position oil retainer ring as illustrated in exploded view.
- (11) Sit bearing cup in chaincase aperture. Cup must be seated so that wide taper is facing oil retainer ring.



- (9) Using an appropriate pusher, press oil seal into chaincase hub. Oil seal must sit flush with case hub edge.
- (14) (17) Place lower sprocket with longer flange toward track side of chaincase. (For proper sprocket and chain use, see Technical Data.)

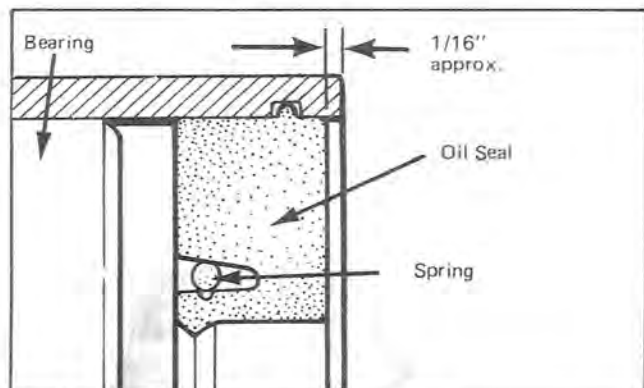


#### INSTALLATION

Position assembled chaincase and driven pulley in location. Install drive axle. (Ensure that spacer has remained on axle). Install spacer and cotter pin to secure lower sprocket to axle. Install lower access plug. Install hinge rod, lower bracket, "U" clamp and previously removed aligning shim(s)(29).

Install oil seal into chaincase flange.

*Note: A gap of approximately 1/16" should exist between the end chaincase flange and oil seal.*



Proceed with pulley alignment.

Apply chain tension.

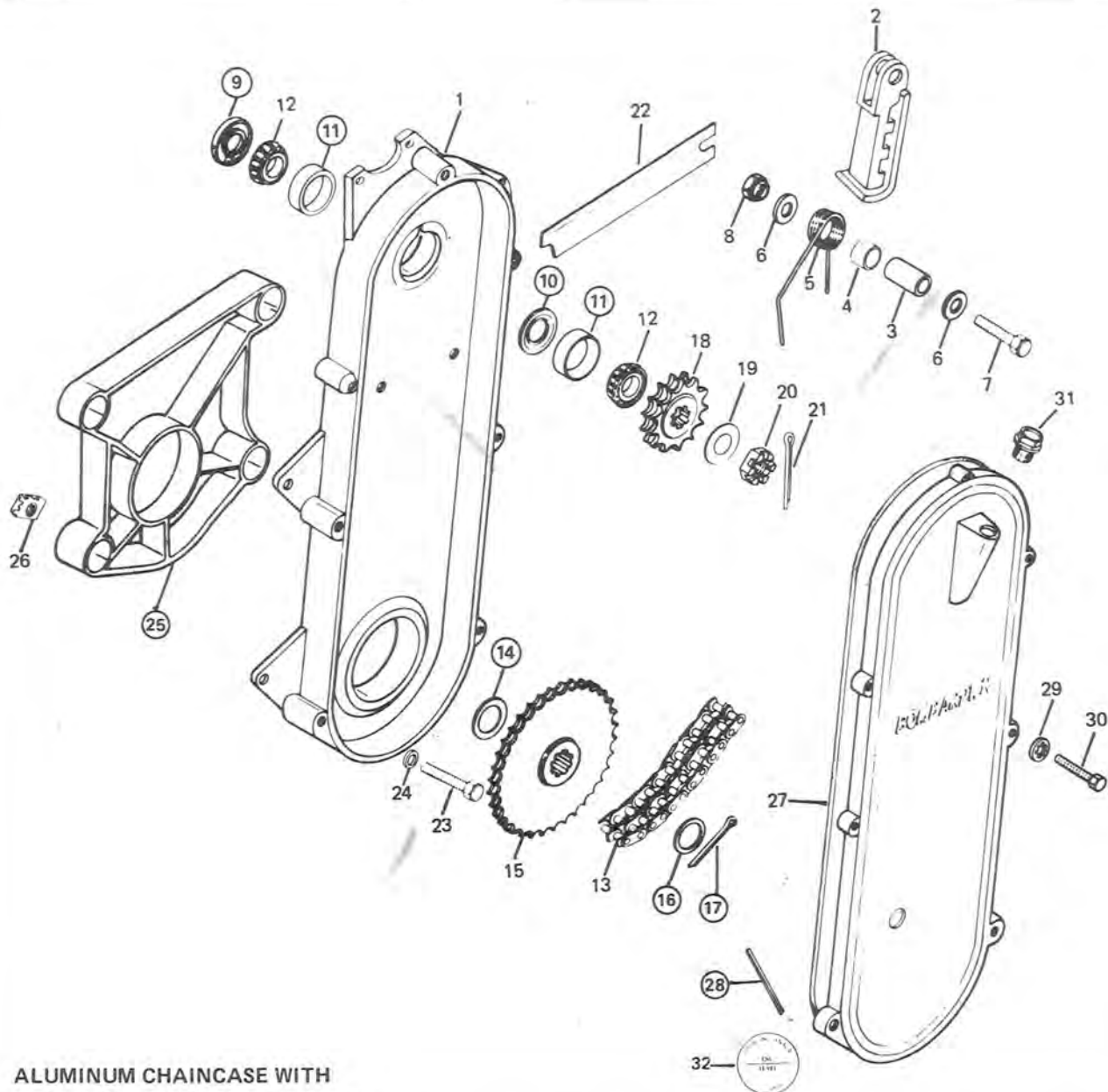
Pour Ski-Doo chaincase oil into chaincase until flush with chain case plug(21).

Connect and adjust brake.

Apply track tension.

Install drive belt and pulley guard.

CHAINCASE



ALUMINUM CHAINCASE WITH  
AUTOMATIC CHAIN TENSIONER

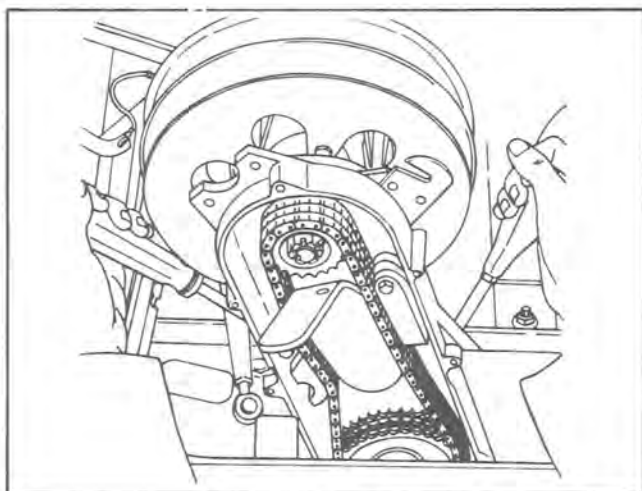
- |                    |                       |                     |  |
|--------------------|-----------------------|---------------------|--|
| 1. Chaincase       | 9. Oil seal           | 17. Cotter pin      | 25. Spacer                                 |
| 2. Chain tensioner | 10. Oil retainer ring | 18. Sprocket        | 26. Clip nut                               |
| 3. Bushing         | 11. Bearing cup       | 19. Shaft washer    | 27. Chaincase cover                        |
| 4. Spacer          | 12. Bearing cone      | 20. Castellated nut | 28. "O" ring                               |
| 5. Spring          | 13. Chain             | 21. Cotter pin      | 29. Washer                                 |
| 6. Washer (fiber)  | 14. Spacer            | 22. Shim            | 30. Screw                                  |
| 7. Screw           | 15. Sprocket          | 23. Screw           | 31. Breather plug                          |
| 8. Nut             | 16. Spacer            | 24. Washer          | 32. Oil level indicator, or chaincase plug |

## SECTION 02

### SUB-SECTION 07 (CHAINCASE)

#### REMOVAL

Remove pulley guard and drive belt.  
Release track tension. Pry oil seal from chaincase.  
Unbolt brake assembly.  
Remove chaincase cover and drain oil.  
Release chain tension then remove cotter pin locking lower sprocket. Remove spacer.  
Remove bolts securing chaincase to frame. Remove aligning shim(s) (22) then using two (2) large screwdrivers inserted between chaincase and frame, pry complete assembly from vehicle.



#### INSPECTION

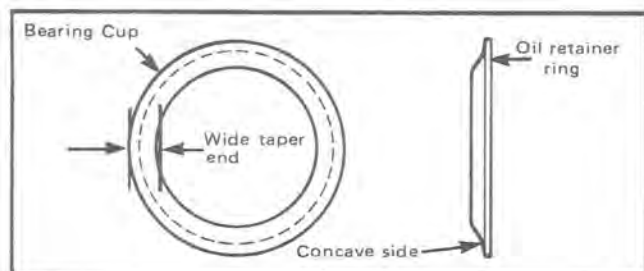
Visually inspect chain for cracked, damaged or missing link rollers. Inspect for defective cone bearing, bearing cups and oil retainer ring. Inspect sprockets for damage or wear.

#### DISASSEMBLY & ASSEMBLY

(10) (11) To remove bearing cup and oil retainer ring from casing, first heat chaincase to 250° F. To install, heat chaincase to 250° F then install oil retainer ring.

Position oil retainer ring with concave side of ring seated on shoulder within the chaincase.

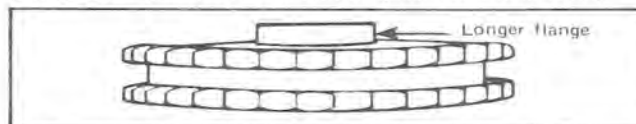
Install bearing cups with wide taper end towards inside of chaincase.



(9) Using an appropriate pusher, press oil seal into chaincase hub. Oil seal must fit flush with case hub edge.

(13) (15) Position lower sprocket with longer flange facing inside of case.

(For proper sprocket and chain use, see Technical Data).



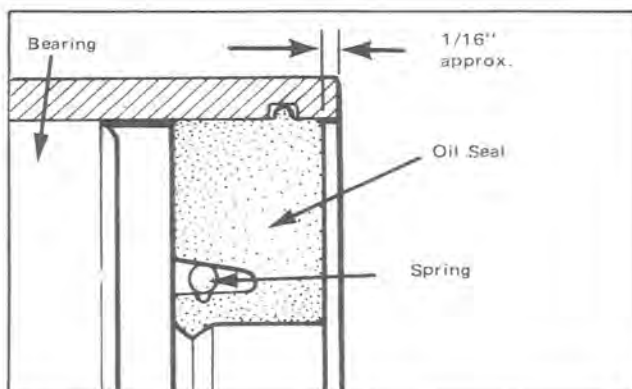
#### INSTALLATION

Prior to installation, ensure that the spacer (14) has remained on drive axle and also, that chaincase frame spacer (25) is in position.

Position assembled chaincase.

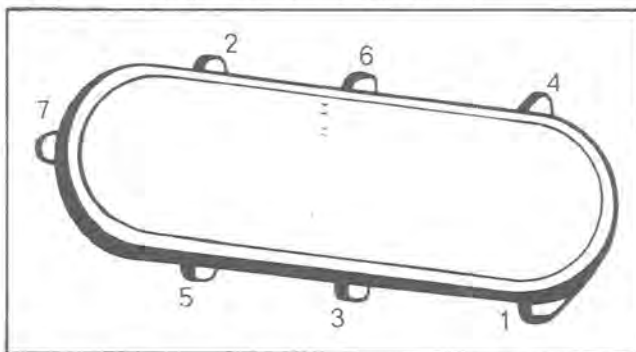
Install spacer (16) and a new cotter pin (17) to secure lower sprocket to axle.

Proceed with pulley alignment. Secure chaincase to frame. Install chaincase flange oil seal. A gap of approximately 1/16" should exist between the end of chaincase flange and oil seal.



Apply chain tension.

Install chaincase cover with a new "O" ring (28). Torque cover bolts to 5 ft/lb, in the following sequence.

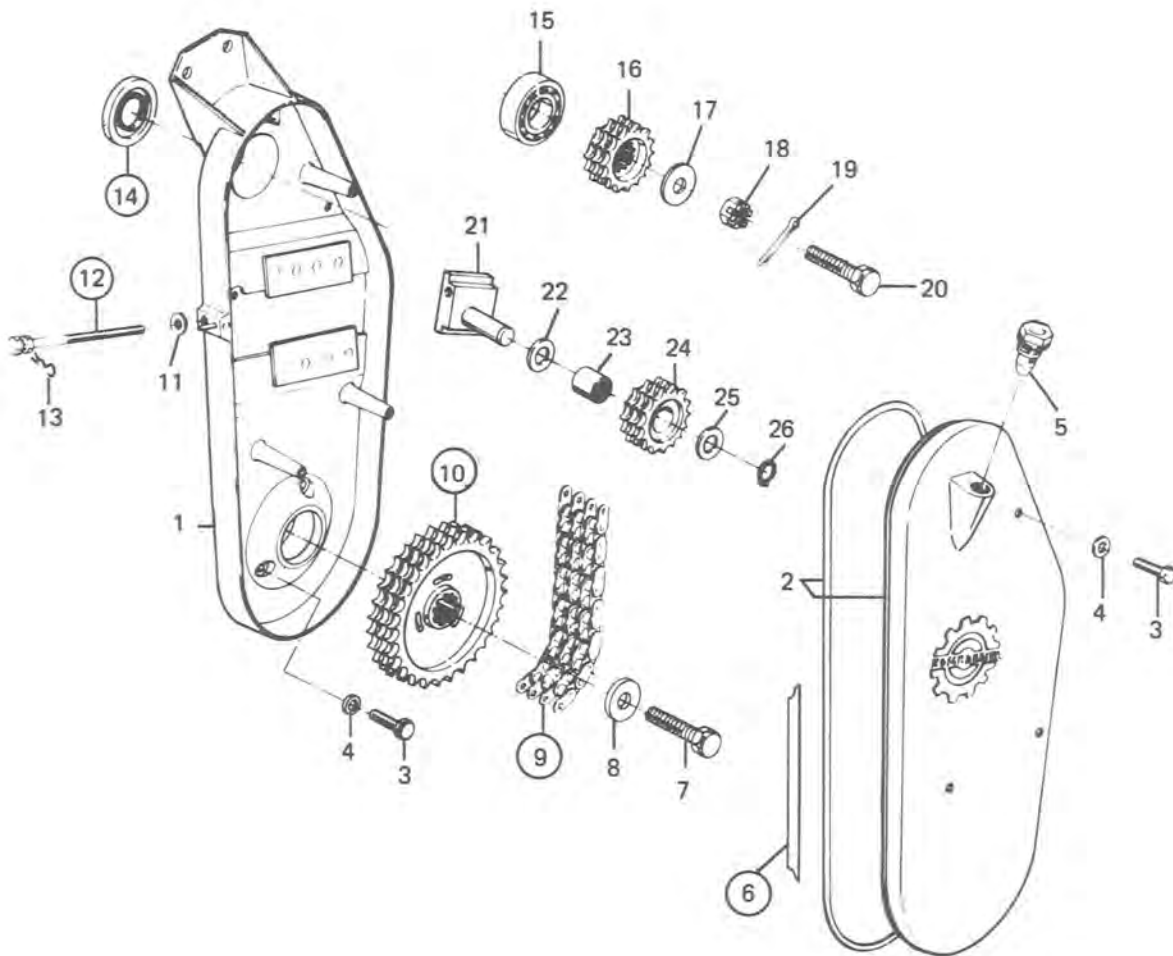


Pour Ski-Doo chaincase oil into chaincase until flush with indicator level, or plug.

Install brake assembly, drive belt and pulley guard.

Apply track tension.

CHAINCASE



ALUMINUM CHAINCASE WITH ADJUSTABLE CHAIN TENSIONER

- |                     |                    |                      |
|---------------------|--------------------|----------------------|
| 1. Chaincase        | 10. Sprocket       | 18. Castellated nut  |
| 2. Cover            | 11. Washer         | 19. Cotter pin       |
| 3. Screw            | (tensioner)        | 20. Screw            |
| 4. Washer           | 12. Tensioner bolt | 21. Sliding block    |
| 5. Breather Plug    | 13. Cowling clip   | 22. Washer           |
| 6. "O" ring         | 14. Oil seal       | 23. Bearing          |
| 7. Screw (sprocket) | 15. Bearing        | 24. Sprocket (idler) |
| 8. Washer           | 16. Sprocket       | 25. Washer           |
| 9. Chain            | 17. Washer         | 26. Circlip          |



## SECTION 02

### SUB-SECTION 07 (CHAINCASE)

#### REMOVAL

Remove muffler, rewind starter guide and disc brake assembly.

Remove chaincase cover and drive axle oil seal, (chaincase side).

Release track tension.

Release chain tension.

Remove upper and lower sprockets.

Remove bolt securing chaincase to frame. Remove chaincase.

#### INSPECTION

Visually inspect chain for cracked, damaged or missing link rollers.

Inspect for defective bearing.

Inspect sprockets for damage or wear.

#### DISASSEMBLY & ASSEMBLY

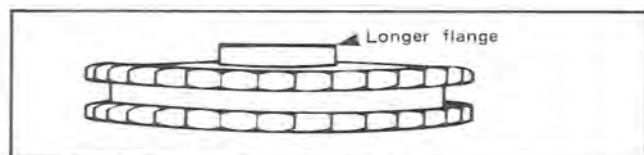
⑭ Oil seal must be pushed in until flush with chaincase hub edge.

⑨ ⑩ For proper sprocket and chain use, see Technical Data.

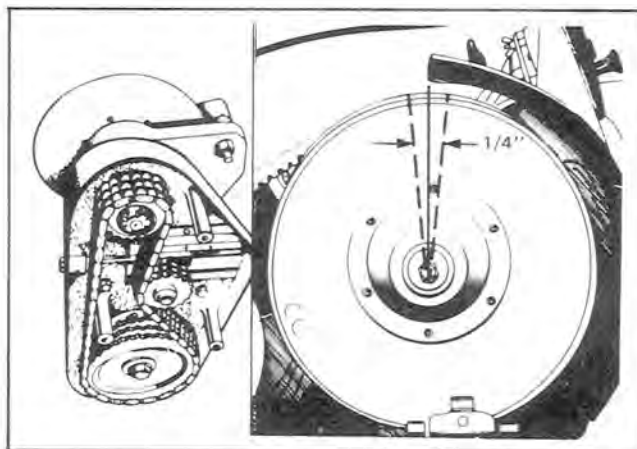
#### INSTALLATION

Position chaincase and secure it to frame.

Position upper and lower sprockets and chain. Secure sprockets. Ensure longer flange of lower sprocket faces inside of case. Install drive axle oil seal.



Adjust chain tension. (Correct chain tension is 1/4" at left side of chain in chaincase. To correct, unlock tensioner bolt ⑫ then turn bolt clockwise or counter-clockwise).



Position chaincase cover with a new "O" ring ⑥. (Ensure "O" ring sits correctly into its groove). Bolts securing cover must be torqued to 5 ft/lbs.

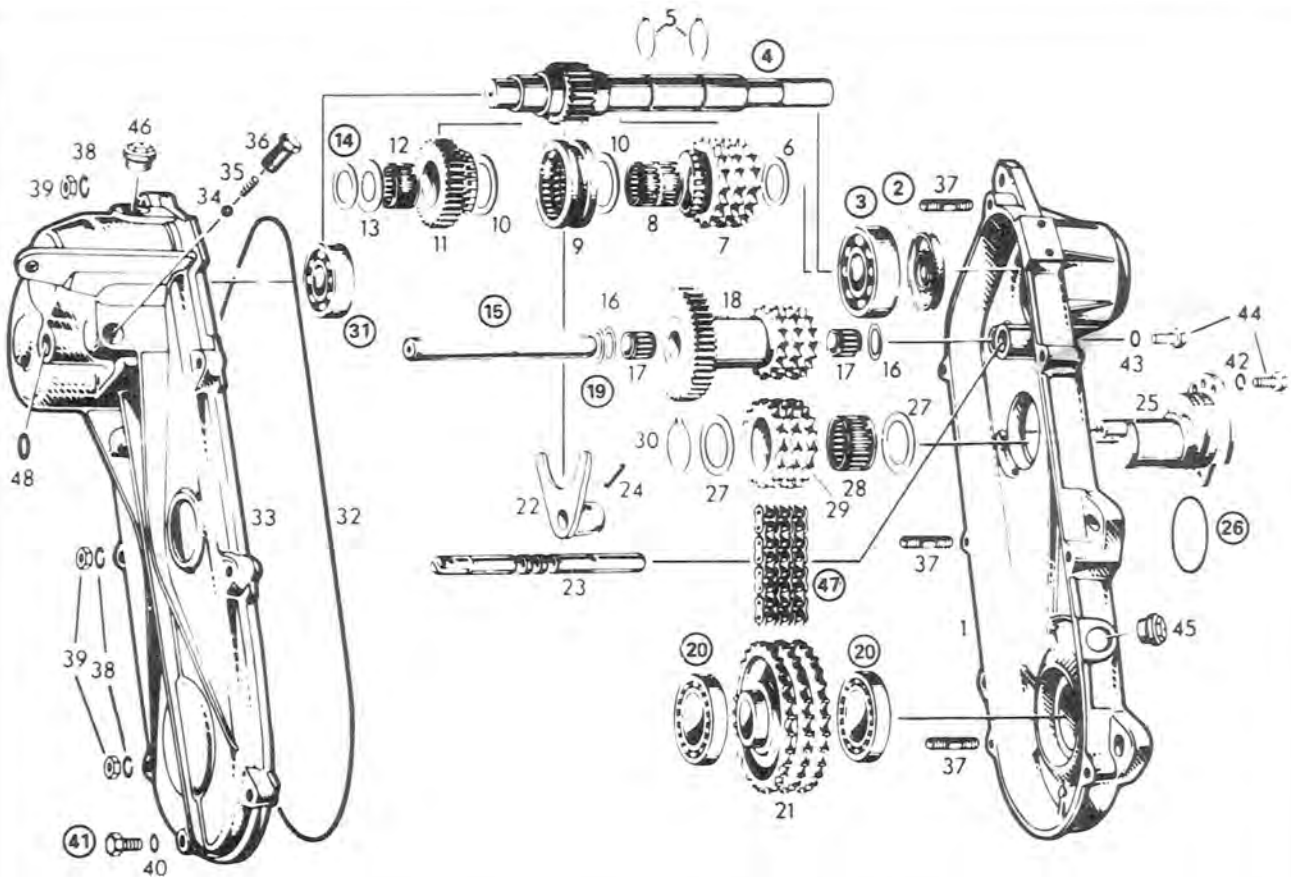
Pour 6 ounces of Ski-Doo chaincase oil into chaincase.

Apply track tension.

Install disc brake assembly, rewind starter guide and muffler.



CHAINCASE-GEARBOX



(FORWARD, NEUTRAL, REVERSE)

- |                           |                           |                             |
|---------------------------|---------------------------|-----------------------------|
| 1. Housing                | 17. Needle bearing        | 33. Cover housing           |
| 2. Oil seal               | 18. Layshaft gear ass'y   | 34. Ball                    |
| 3. Ball bearing           | 19. Shim (.3 to 1 mm)     | 35. Spring                  |
| 4. Drive shaft            | 20. Ball bearing          | 36. Plug                    |
| 5. Circlip                | 21. Sprocket 33T          | 37. Stud                    |
| 6. Shim (1 mm)            | 22. Gear change fork      | 38. Lock washer             |
| 7. Shift sprocket 19T     | 23. Gear change rod       | 39. Hex nut                 |
| 8. Needle bearing         | 24. Helical pin           | 40. Sealing ring            |
| 9. Gear shift sleeve      | 25. Tensioner axle ass'y  | 41. Drain plug (hex. screw) |
| 10. Washer (30.2 mm dia.) | 26. "O" ring (tensioner)  | 42. Lock washer             |
| 11. Shift sprocket 22T    | 27. Washer (32.2 mm dia.) | 43. Washer                  |
| 12. Needle bearing        | 28. Needle bearing        | 44. Hex. screw              |
| 13. Shim (20.5 mm)        | 29. Tensioner sprocket    | 45. Plug                    |
| 14. Shim (.15 to .8 mm)   | 30. Circlip               | 46. Breather                |
| 15. Lay axle              | 31. Ball bearing          | 47. Chain                   |
| 16. Washer (16.3 mm dia.) | 32. Sealing ring          | 48. "O" ring                |

## SECTION 02

### SUB-SECTION 08 (GEARBOX)

#### REMOVAL

Drain gear box oil. See exploded view, item ④.

Remove pulley guard, drive belt and brake assembly.

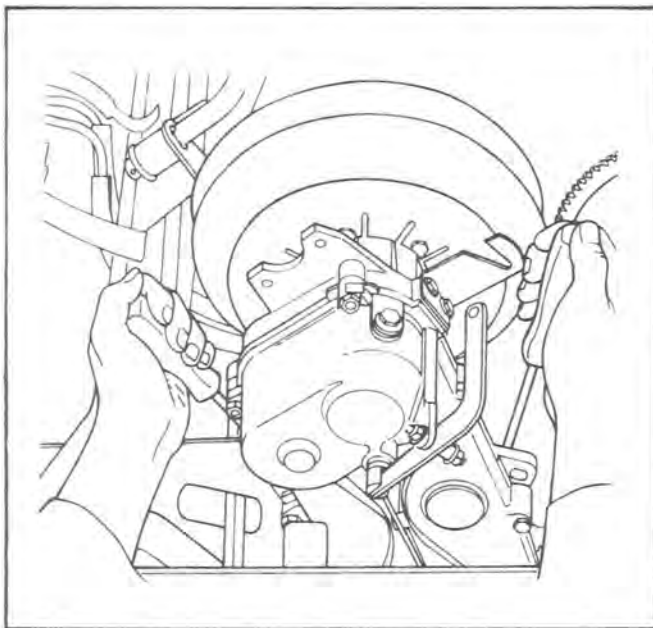
Remove shifter rod.

Release track tension.

Pry drive axle oil seal from gearbox.

Release chain tension.

Remove bolts securing gearbox to frame then using two (2) large screwdrivers inserted between frame and gearbox, pry gearbox from vehicle.



#### INSPECTION

Check general condition of chain. Visually inspect drive chain for cracked, damaged or missing link rollers. Inspect security of riveted heads of link pins.

Visually inspect oil seals for cuts or other damage.

Inspect sprockets and gears for damage, worn teeth, or spline distortion.

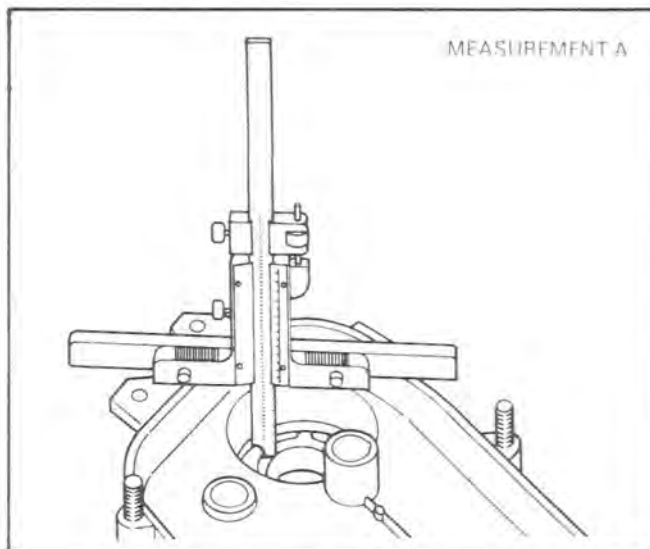
Inspect general condition of bearings (pitted or missing roller bearings, freedom of movement and radial free play).

Inspect drive shaft ④ for deflection, worn or twisted splines.

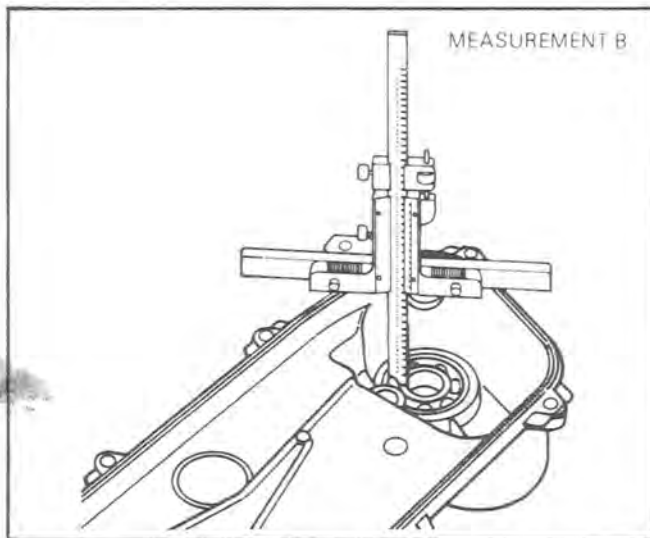
#### DISASSEMBLY & ASSEMBLY

##### ④ ⑭ Drive shaft free-play:

a) Measure inside cavity of right hand side housing, equals (A).



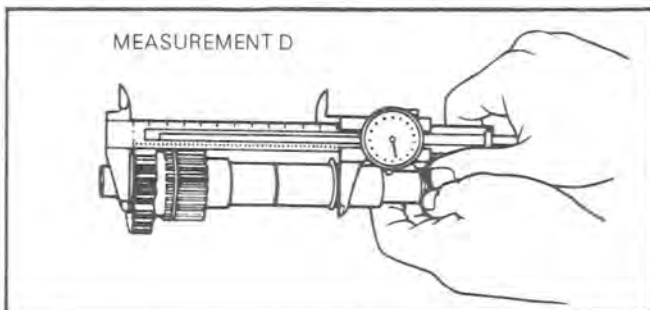
b) Measure inside cavity of left hand side housing, equals (B).



c) Add A plus B, equals C. (Total measurement)

d) Position washer ⑩, sprocket ⑪, needle bearing ⑫, shim ⑬ and circlip ⑤ on the drive shaft.

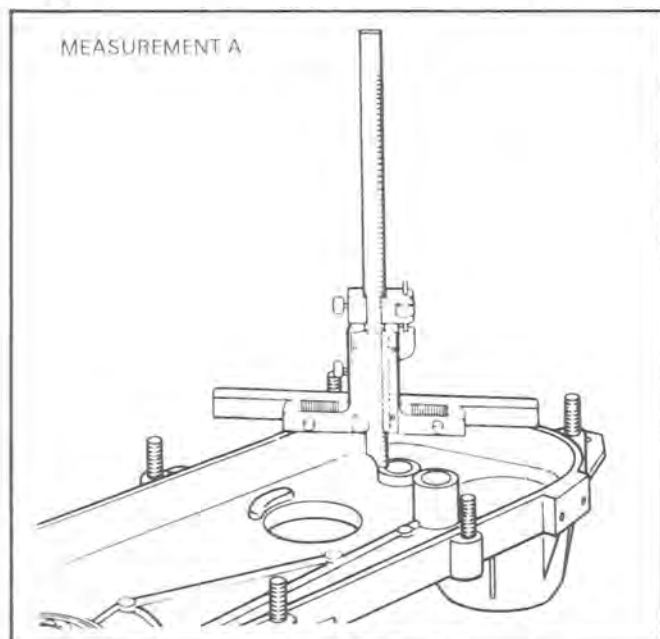
e) Measure distance between the shim ⑬, and the circlip ⑤ installed on drive shaft, equals (D).



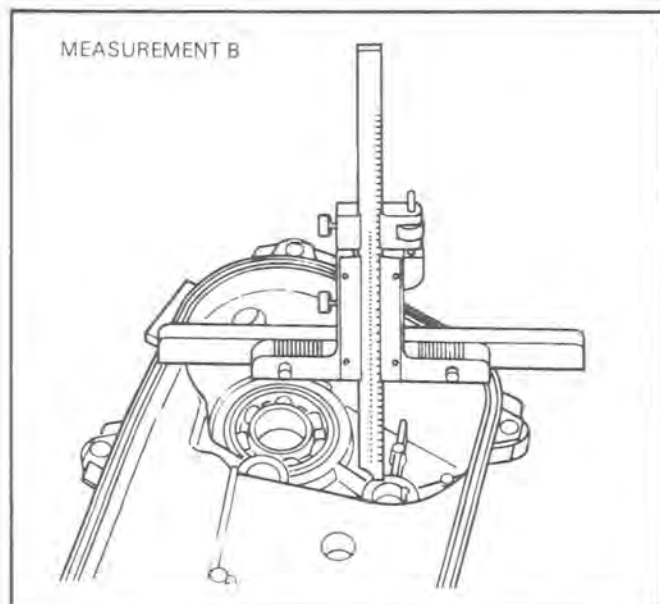
- f) Subtract C minus D, equals E (Total free-play on drive shaft).
- g) The final free-play, (F), must be between .008 inch and .016 inch.
- h) To obtain this, subtract F from E equals G. (Thickness of shims ⑭ to be added on drive shaft).

**⑮⑲ Lay axle free-play:**

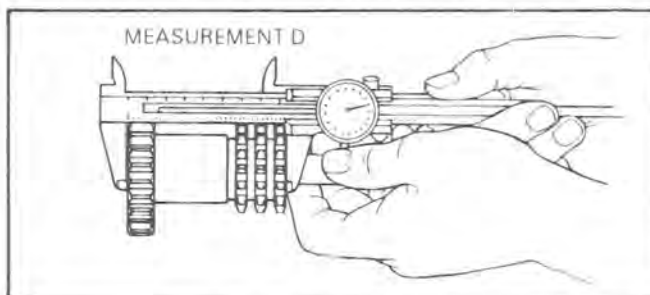
- a) Measure inside cavity of right hand housing, equals (A)



- b) Measure inside cavity of left hand side housing, equals (B)



- c) Add A plus B, equals C (Total measurement).
- d) Position washer ⑮, needle bearing ⑰, layshaft gear ass'y ⑱, needle bearing ⑰ and washer ⑮ on lay axle.
- e) Measure length of assembly, equals (D)



- f) Subtract C minus D, equals E. (Total free-play on lay axle).
- g) The final free-play, (F), must be between .008 inch and .016 inch.
- h) To obtain this, subtract F from E equals G (Thickness of shims ⑲ to be added on layshaft gear ass'y).

- ③②③① To remove bearing, heat housing with a torch to 350° F.

**CAUTION:** When heating housing, make sure that it is placed evenly on a flat surface. Also, use the torch in a rotary motion. If not observed, case could warp.

- ② To remove oil seal, push from outside to inside. Always reposition a new oil seal.

- ②⑥ Always reposition a new "O" ring.

- ④⑦ For correct chain, see Technical Data.

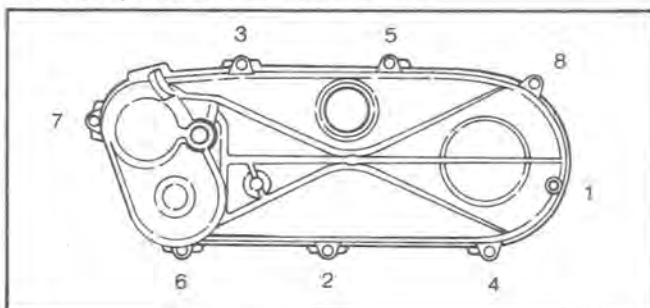
**INSTALLATION**

Prior to installing gearbox on vehicle, ensure that spacer has remained on drive axle.

Place gearbox in position ensuring that drive axle is correctly engaged into lower sprocket.

Install previously removed aligning shim(s). Secure gearbox to frame. Proceed with pulley alignment.

Apply a light coat of grease over a new sealing strip. Position strip and secure cover with washers and nuts. Cross-torque cover nuts to 15 ft / lbs.



**SECTION 02**  
**SUB-SECTION 08 (GEARBOX)**

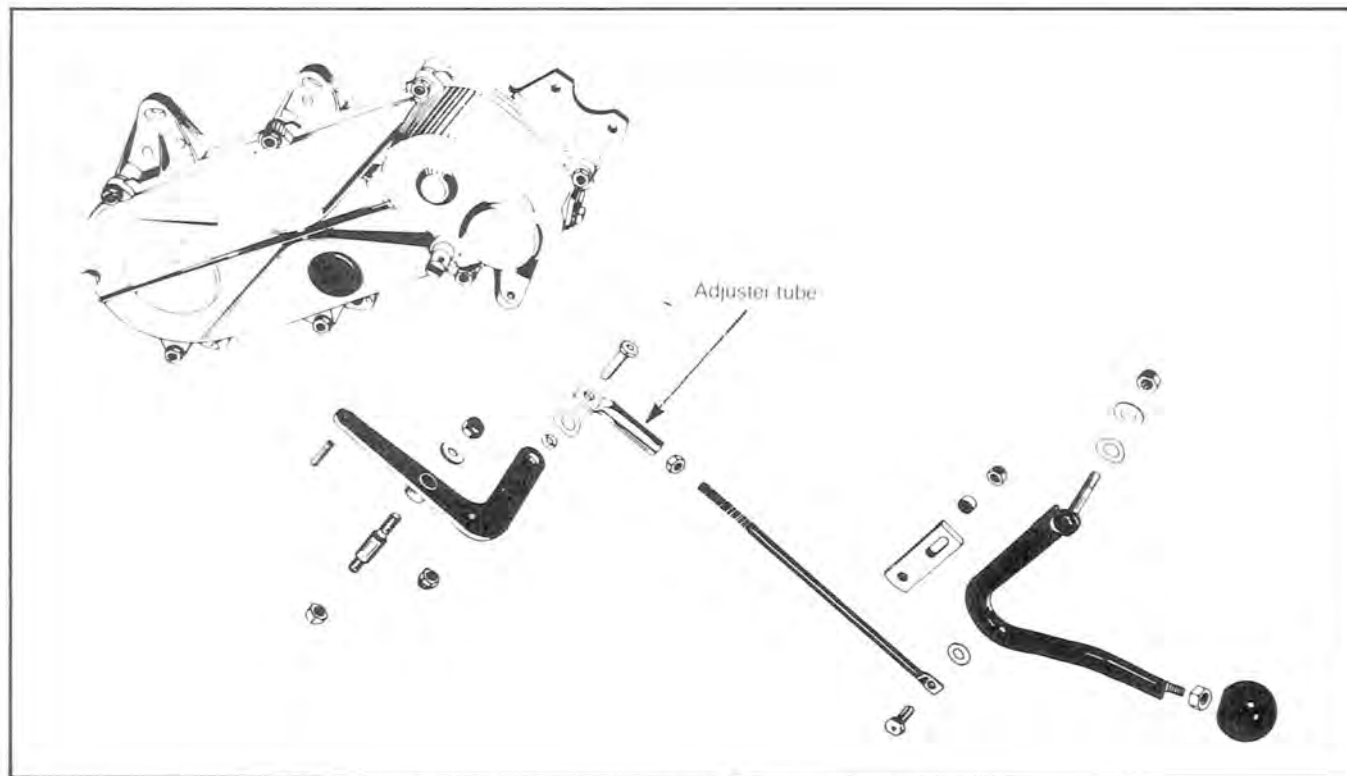
Proceed with drive chain adjustment. Free-play on chain must be  $\frac{1}{4}$ ". Lock tensioner with capscrew.

Install drain and inspection plugs.

Pour 10 ozs of Ski-Doo chaincase oil into gearbox.

Attach shifter rod and brake assembly

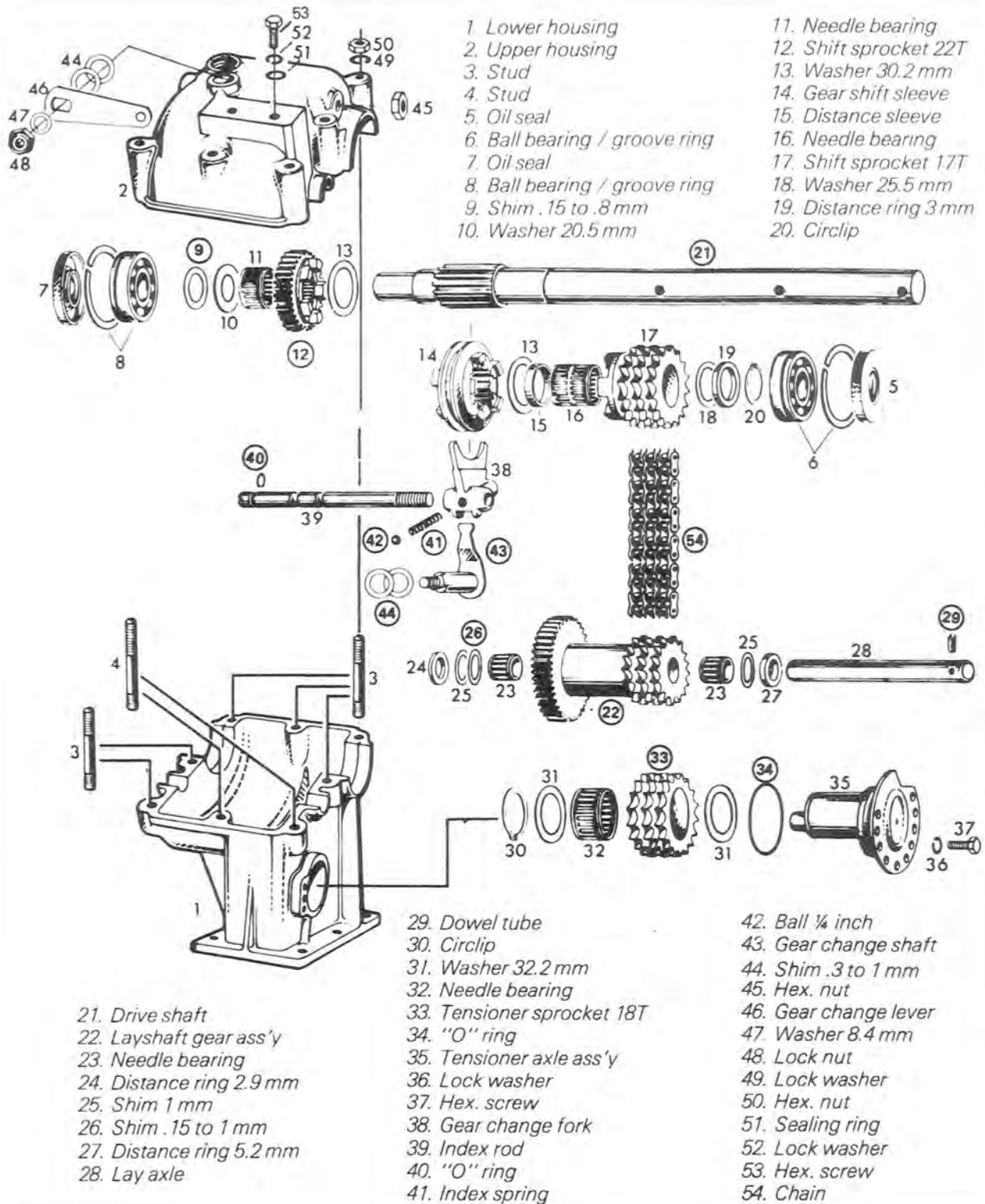
The travel of the index rod is adjusted by turning adjuster tube.



Install drive belt and pulley guard.

Apply track tension.

GEARBOX (FORWARD, REVERSE)





## SECTION 02

### SUB-SECTION 08 (GEARBOX)

#### REMOVAL

Remove pulley guard and drive belt.

Remove seat backs then remove plates to access to engine compartment.

Remove engine from vehicle.

Remove brake assembly and bracket of driven pulley.

Remove transmission shifter rod.

Release track tension. Remove rear axles and bogie wheel sets.

Remove end bearing housings.

Remove gear box tensioner.

Remove drive axles then pull back gearbox assembly and remove the two (2) tensioners from between the track tunnels.

Remove gearbox, chain and lower sprocket from vehicle.

#### INSPECTION

Check general condition of chain linkage. Visually inspect drive chain for cracked, damaged or missing link rollers. Inspect security of riveted heads of link pins.

Visually inspect oil seals for cuts or damage.

Inspect sprockets and gears for damage, worn teeth, or spline distortion.

Inspect general condition of bearings (pitted or missing roller bearings, freedom of movement and radial free-play).

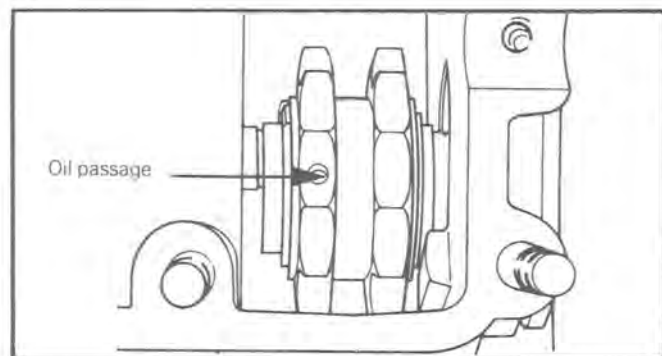
Inspect drive shaft for deflection, worn or twisted splines.

#### DISASSEMBLY & ASSEMBLY

**(41)(42)** The gear change fork incorporates a spring loaded ball. Ensure that spring and ball do not fly out during removal of index rod.

**(29)** Do not remove the dowel tube from layshaft unless damaged and replacement is necessary.

**(34)(33)** When assembling, always position a new "O" ring into appropriate groove of tensioner axle. The sprocket oil passage must be positioned as shown in the following figure.



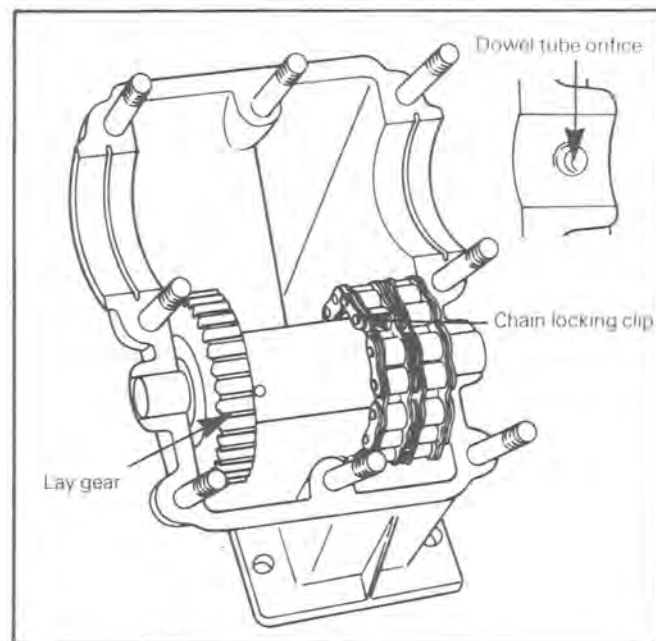
#### **(22)(26)** Layshaft gear free-play:

**NOTE:** If the dowel tube has been removed from the lay axle, install tube into axle using a soft faced hammer.

- Slide the distance ring **(27)**, shim **(25)**, needle bearing **(23)**, lay gear assembly **(22)**, needle bearing **(23)**, shims **(26)(25)** and distance ring **(24)** on layshaft.
- Place the assembled lay gear into the lower housing.
- Using a feeler gauge, check end play between assembled layshaft and walls of lower housing. End play must be between .006 and .012 inch. If end play is not within tolerance, remove or add shims **(26)**.

**(54)** Drive chain must be positioned on lay gear sprocket with the locking clip facing the lay gear **(22)**.

(For correct chain, See Technical Data).



#### **(21)(9)** Drive shaft free-play:

Install assembled drive shaft into lower housing then using a feeler gauge, check total free-play between components installed on the drive shaft side of sprocket **(12)**.

Free-play must not exceed .006 to .012 inch. If free-play is not within tolerance, shim **(9)** to correct tolerance.

#### **(43)(44)** Gear change shaft free-play:

Install gear change shaft on upper housing then on outside of housing, position shim **(44)**, gear change lever **(46)**, washer **(47)** and nut **(48)**. Torque to 17 ft / lbs.

Using a feeler gauge, check that free-play of gear change shaft is within tolerance of 0.006 to 0.012 inch. If free-play is not within tolerance, record discrepancy. Remove nut **(48)**, washer **(47)**, gear change lever **(46)**, shim **(44)**, and gear change shaft **(43)**.

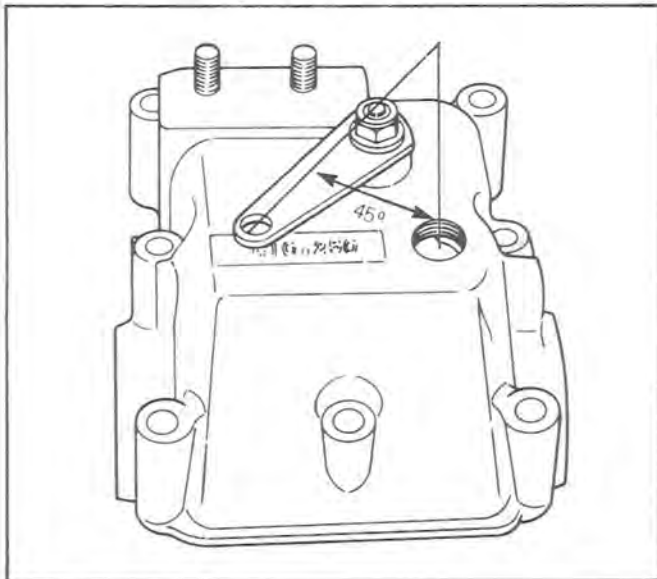


Divide discrepancy by two and install that amount of shim ④④ on gear change shaft ④③. Install shaft into upper housing.

Install standard shim and balance of shims ④④ on gear change shaft.

Install gear change lever ④⑤ on shouldered end of change shaft so that lever and vent plug hole form a 45 degree angle.

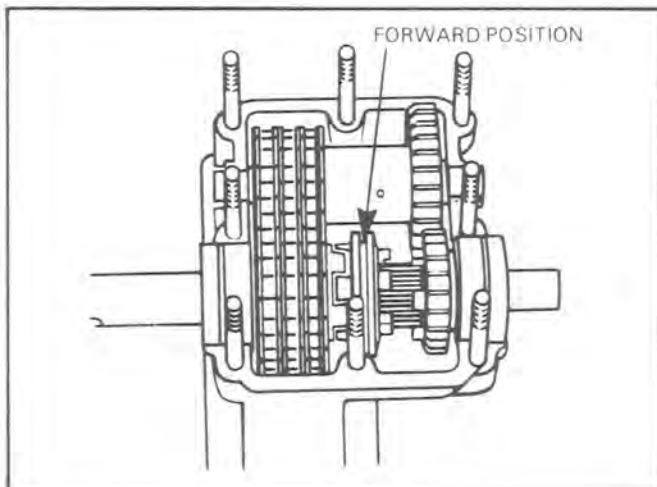
Install washer ④⑦ and nut ④⑧. Torque to 17 ft / lb.



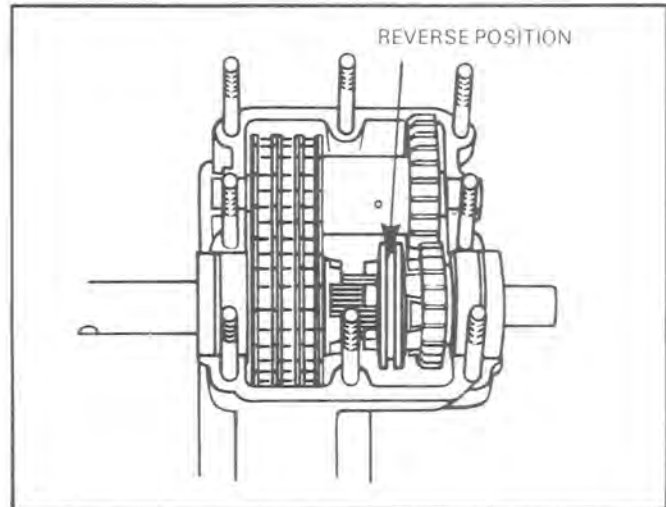
④⑨ When assembling gearbox, always position a new "O" ring on index rod.

## INSTALLATION

Prior to installation, with the gearbox removed, adjust gearbox to obtain correct engagement. At "forward" position, sleeve must be as shown.

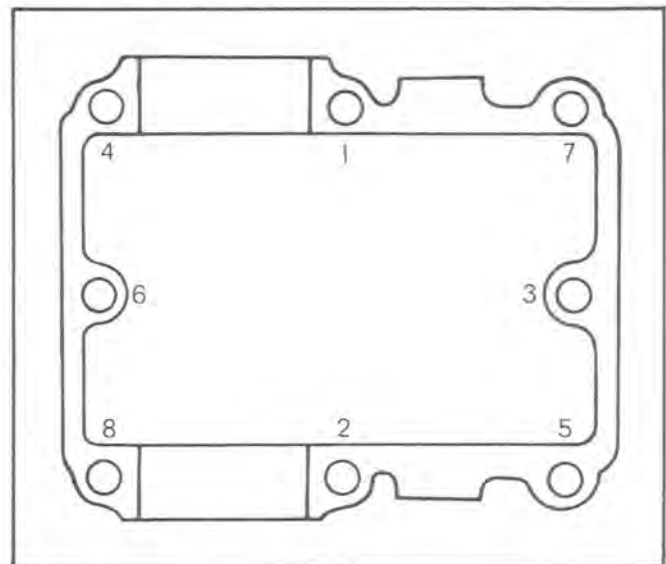


At "reverse" position, sleeve must be as shown.



If any of these positions are unobtainable, use a screwdriver to turn index rod ③⑨ and obtain proper meshing of teeth. Recheck sleeve engagement after adjusting index rod.

Install the upper and lower housings of gearbox together using "Loctite Crankcase Sealant" or equivalent. Torque nuts in the following sequence to 21 ft / lbs.



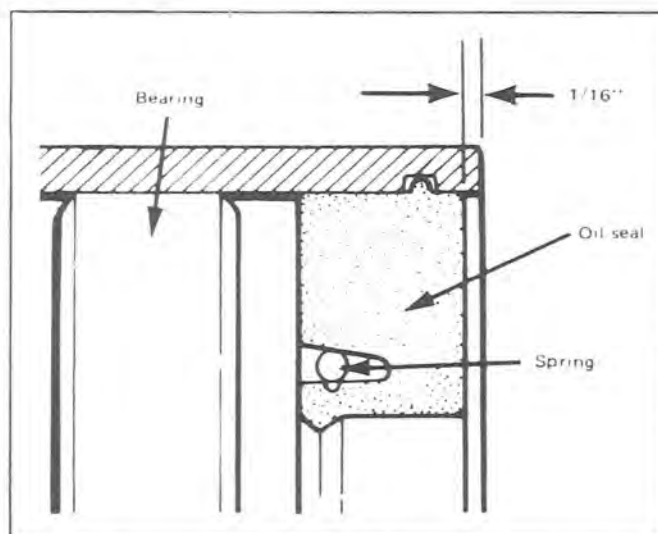
Position gasket of gearbox on frame studs.

Place lower sprocket in drive chain and push it forward between the track tunnels. Insert splined end of drive axles into lower gearbox sprocket.

Press each end bearing housing into frame and over drive axle bearing. Secure housings to frame. Install oil seals.

NOTE: A gap of approximately 1 / 16" should exist between the end of bearing housing and oil seal.

SECTION 02  
SUB-SECTION 08 (GEARBOX)



Install the two (2) tensioners between the track tunnels.  
Secure gearbox to frame. Torque nuts to 16 ft / lbs.

Install transmission shifter rod and brake and bracket of driven pulley.

Apply chain tension by rotating tensioner axle (35) to obtain ¼ inch maximum chain free-play.

Fill gearbox with 16 ounces of Ski-Doo chaincase oil.

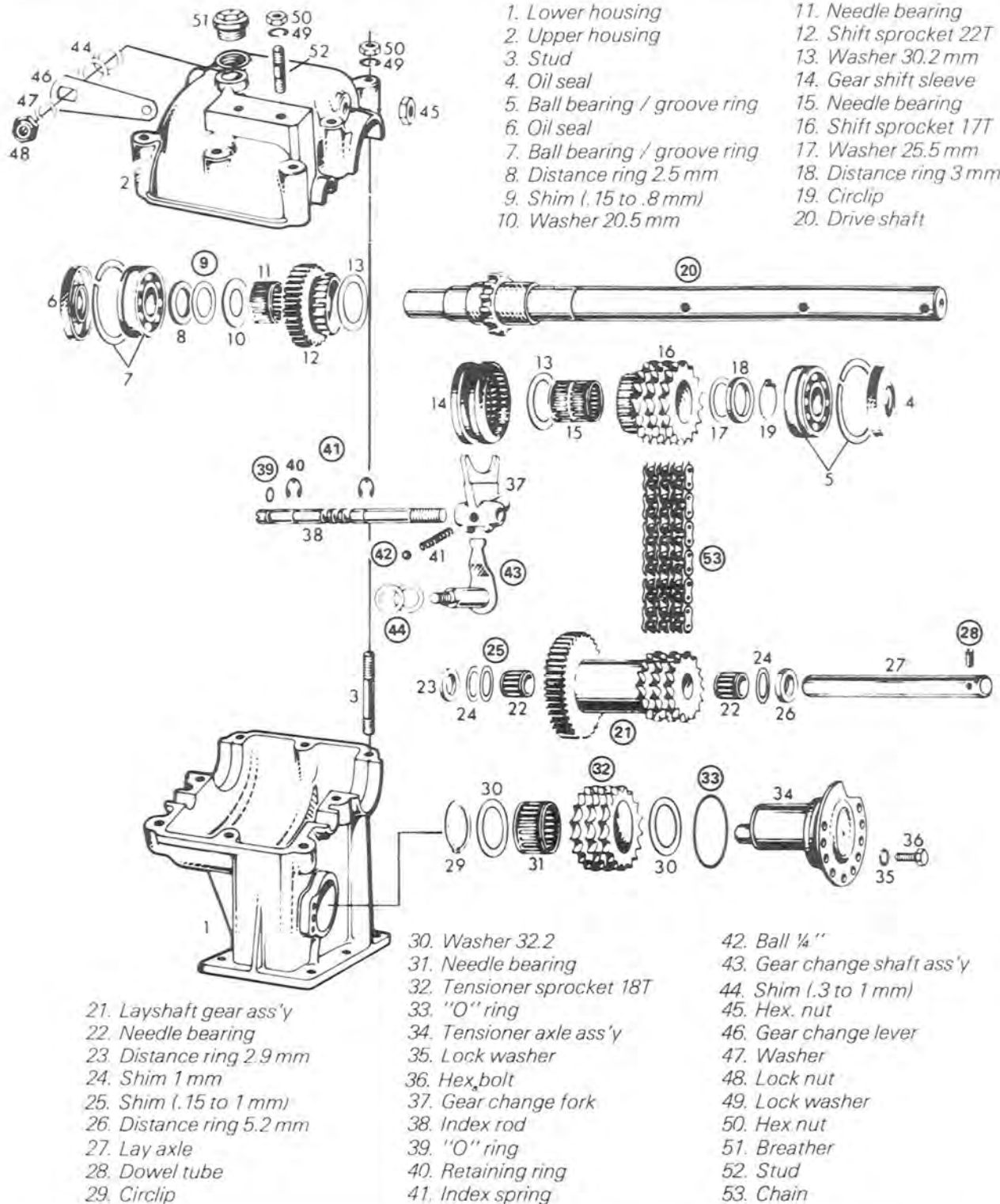
Install engine and carry out pulley alignment.

Install rear axles and bogie wheel sets. Proceed with track tension and alignment.

Install drive belt and pulley guard.

Install plates and seat backs.

GEARBOX (FORWARD, NEUTRAL, REVERSE)



## REMOVAL

Remove cab, pulley guard, drive belt and muffler from vehicle.

Remove brake assembly and transmission rod, (shifter).

Remove steering lower bracket from the gearbox. Slacken upper bracket.

Release chain tension.

Release track tension by unlocking link plate springs. Insert a pry bar between structural members of center bogie wheel sets and pry sets upward to reversed installation position. Reverse front then rear bogie wheel sets. Remove rear axles.

Remove oil seals from end bearing housings and center frame.

Remove end bearing housings. (Pry out housings with two (2) screwdrivers inserted between housing and frame).

Release drive axle sprocket teeth from track notches while at the same time, pulling the drive axle towards end bearing side of frame. (This action will disengage the axle splines from the lower sprocket of the gearbox). Allow drive axles to remain within the tracks.

Remove gearbox and gasket from frame.

## INSPECTION

Check general condition of chain linkage. Visually inspect drive chain for cracked, damaged or missing link rollers. Inspect security of riveted heads of link pins.

Visually inspect oil seals for cuts or damage.

Inspect sprockets and gears for damage, worn teeth, or spline distortion.

Inspect general condition of bearings (pitted or missing roller bearings, freedom of movement and radial free-play).

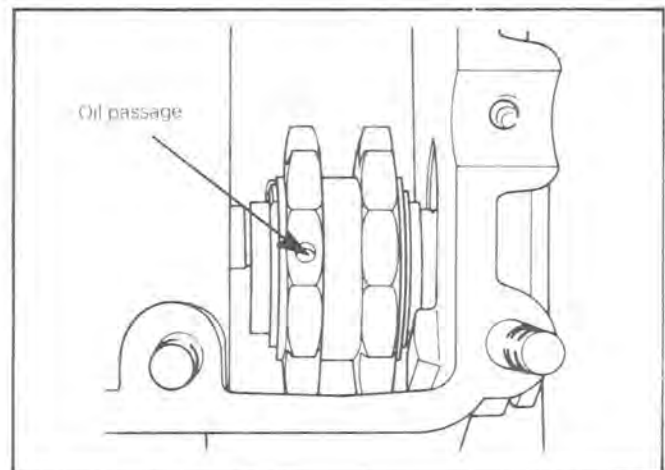
Inspect drive shaft for deflection, worn or twisted splines.

## DISASSEMBLY & ASSEMBLY

④①④② The gear change fork incorporates a spring loaded ball. Ensure that spring and ball do not fly out during removal of index rod.

②⑧ Do not remove the dowel tube from layshaft unless damaged and replacement is necessary.

③②③③ When assembling, always position a **new** "O" ring into appropriate groove of tensioner axle. The sprocket oil passage must be positioned as shown in following figure.



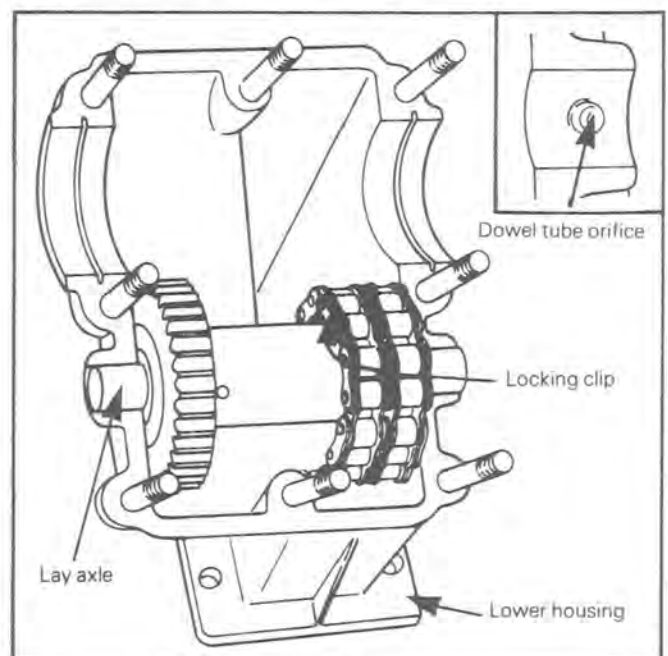
### ②①②⑤ Layshaft gear free-play:

NOTE: If the the dowel tube has been removed from the lay axle, install the tube into axle using a soft faced hammer.

- Slide the distance ring ②⑥, shim ②④, needle bearing ②②, lay gear assembly ②①, needle bearing ②②, shims ②⑤ ②④ and distance ring ②③ on layshaft.
- Place the lay gear into the lower housing.
- Using a feeler gauge, check end play between assembled layshaft and walls of lower housing. End play must be between .006 and .012 inch. If end play is not within tolerance, remove or add shims ②⑤.

⑤③ Drive chain must be positioned on lay gear sprocket with the locking clip facing the lay gear.

(For correct chain, see Technical Data).



**(20) (9) Drive shaft free-play:**

Install assembled drive shaft into lower housing then using a feeler gauge, check total free play between components installed on the drive shaft side of sprocket (12).

Free play must not exceed .006 to .012 inch. If free play is not within tolerance, shim (9) to correct tolerance.

**(43) (44) Gear change shaft free-play:**

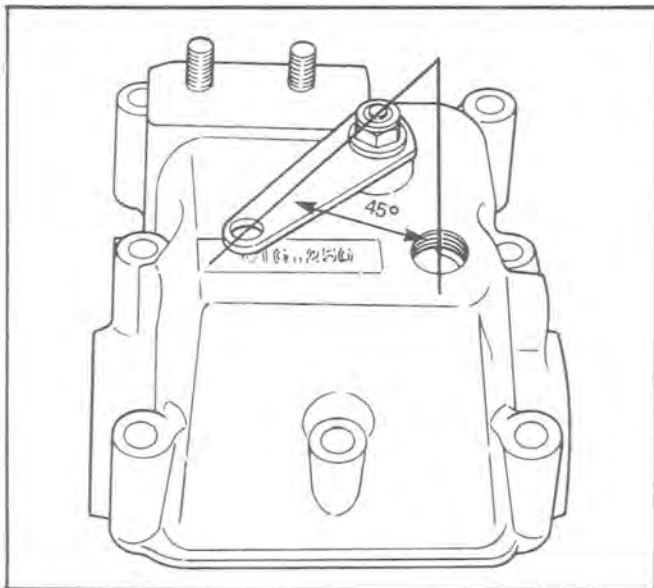
Install gear change shaft on upper housing then on outside of housing, position shim (44), gear change lever (46), washer (47) and nut (48). Torque to 17 ft / lbs.

Using a feeler gauge, check that free play of gear change shaft is within tolerance of 0.006 to 0.012 inch. If free play is not within tolerance, record discrepancy. Remove nut (48), washer (47), gear change lever (46), shim (44), and gear change shaft (43).

Divide discrepancy by two and install that amount of shim (44) on gear change shaft. Install shaft into upper housing. Install standard shim and balance of shims (44) on gear change shaft.

Install gear change lever (46) on shouldered end of change shaft so that lever and vent plug hole form a 45 degree angle.

Install washer (47) and nut (48). Torque to 17 ft / lbs.



**(39)** When assembling gearbox, always position a new "O" ring on index rod.

**INSTALLATION**

Prior to installation, temporarily assemble upper and lower housing.

Position gasket on frame studs.

Place lower sprocket in drive chain.

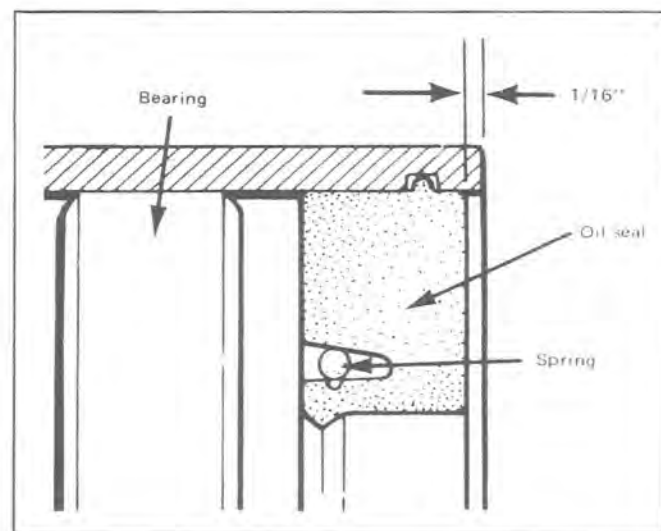
Secure gearbox to frame. Torque nuts to 16 ft / lbs.

From the left side of vehicle, place the drive axle within the track. Push the end bearing side of axle through the orifice in left side of frame. Push the splined end of axle into gearbox lower sprocket. Install opposite drive axle.

Press each end bearing housing into frame and over axle bearing. Secure housings to frame.

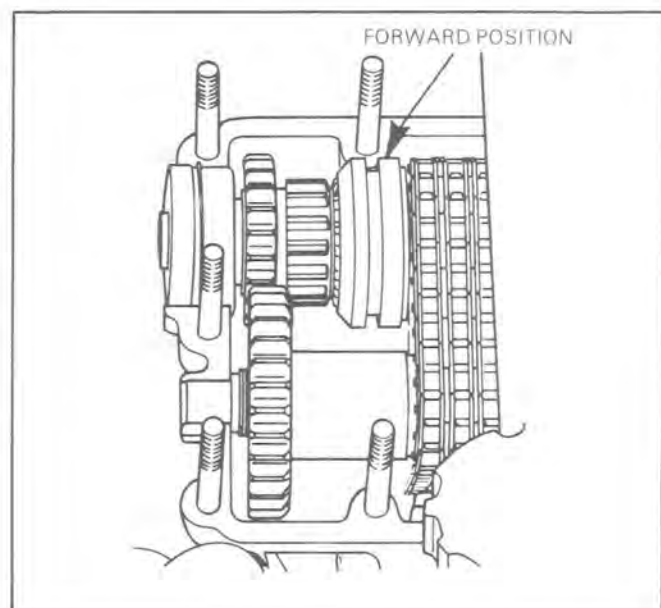
Install oil seals.

**NOTE:** A gap of approximately 1/16 inch should exist between the end of bearing housing and the oil seal.



Install rear axles and bogie wheel sets to their original position.

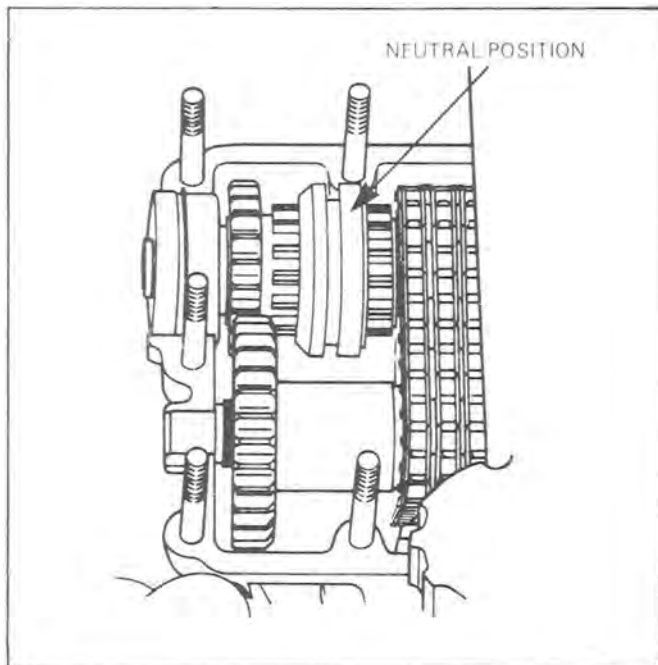
Adjust gearbox to obtain correct engagement: at "FORWARD" position, sleeve must be position as shown;



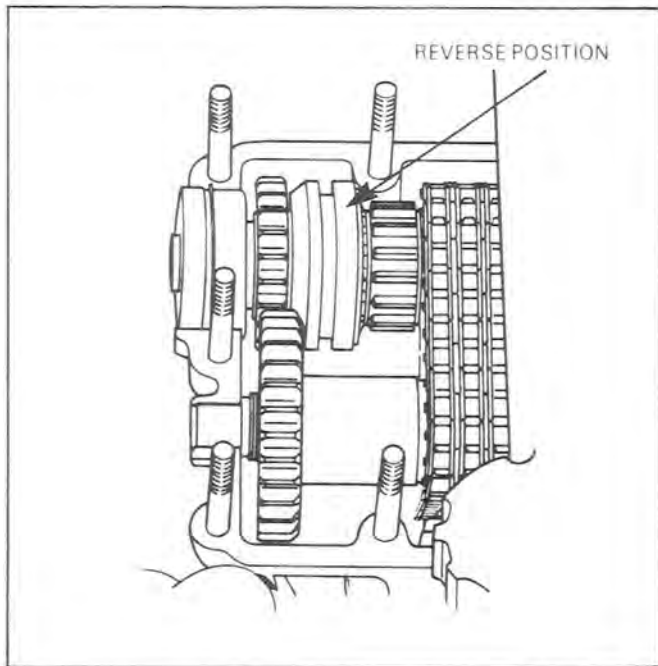


SECTION 02  
SUB-SECTION 08 (GEARBOX)

At "NEUTRAL" position, sleeve must be as shown,

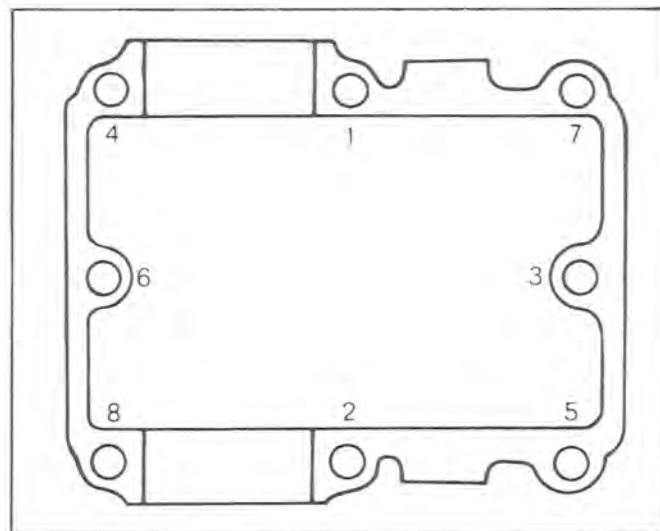


At "REVERSE" position, sleeve must be as shown,



If any of these positions are unobtainable, use a screwdriver to turn index rod ③⑧ and obtain proper meshing of teeth. Recheck sleeve engagement after adjusting index rod.

Install the upper and lower housings of gearbox together using "Loctite Crankcase Sealant" or equivalent. Torque nuts in the following sequence to 21 ft / lbs.



Connect transmission rod to gearbox lever ④⑤

Install steering column. (The distance between upper retainer plate and gearbox bracket must be 15½ inches).

Rotate the tensioner axle ③④ to obtain ¼ inch maximum drive chain free play.

Fill gearbox with 16 ounces of Ski-Doo chaincase oil.

Install muffler, drive belt and brake assembly. Proceed with pulley alignment.

Proceed with track tension and alignment.

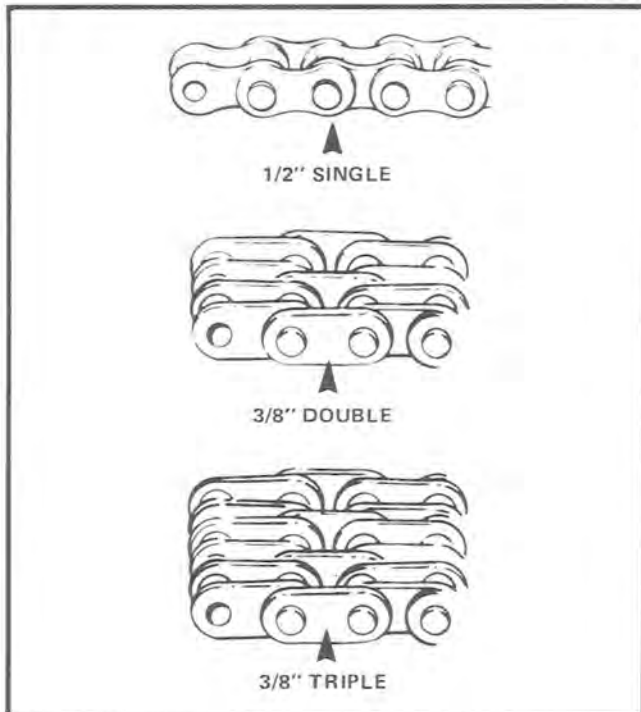
Install pulley guard and cab.



DRIVE CHAIN

GENERAL

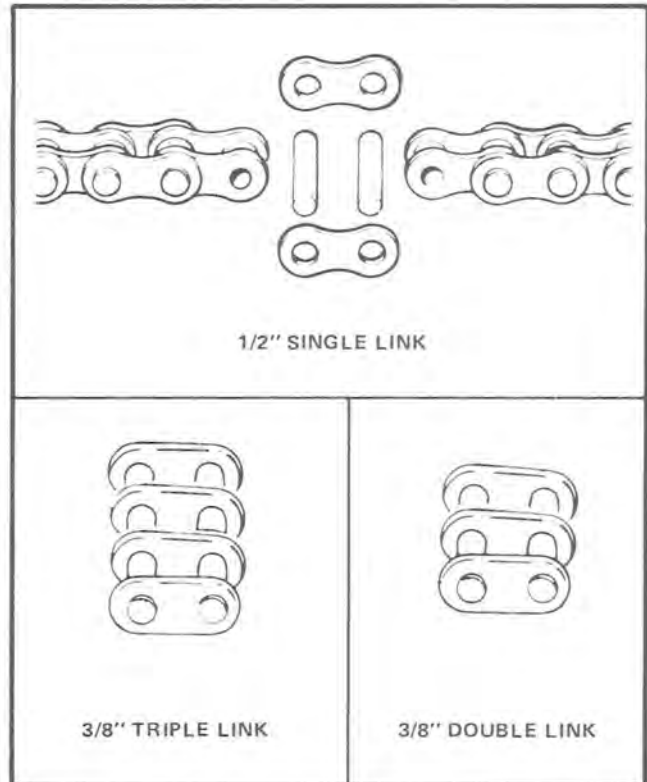
There are three (3) types of the Bombardier drive chains; a single 1/2 inch pitch, a double 3/8 inch pitch, and a triple 3/8 inch pitch.



There are two (2) variations of chains: detachable and endless.

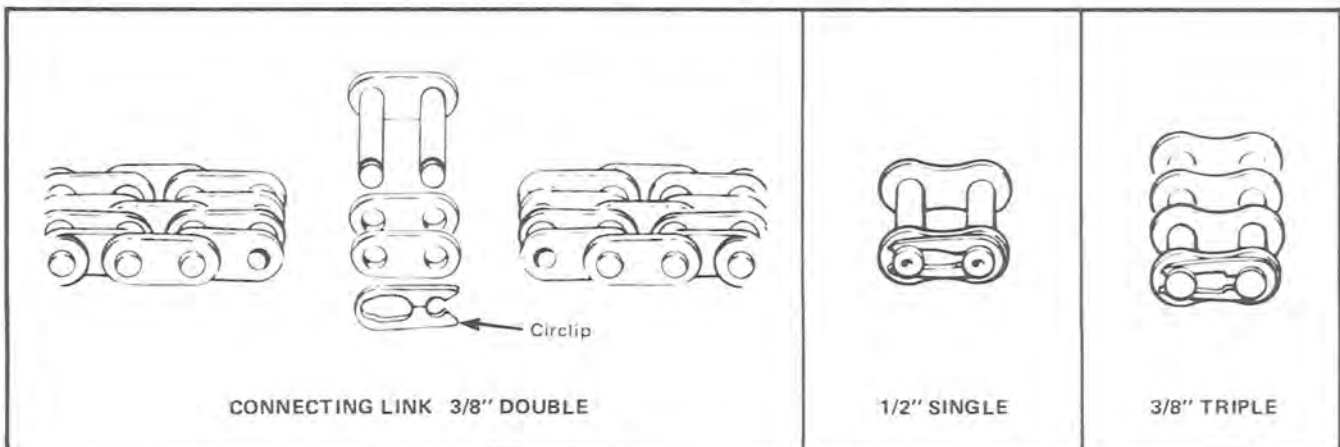
CHAIN SEPARATION

When separating an endless chain, always use a chain bearing pin extractor. Also, make sure to remove one complete link.

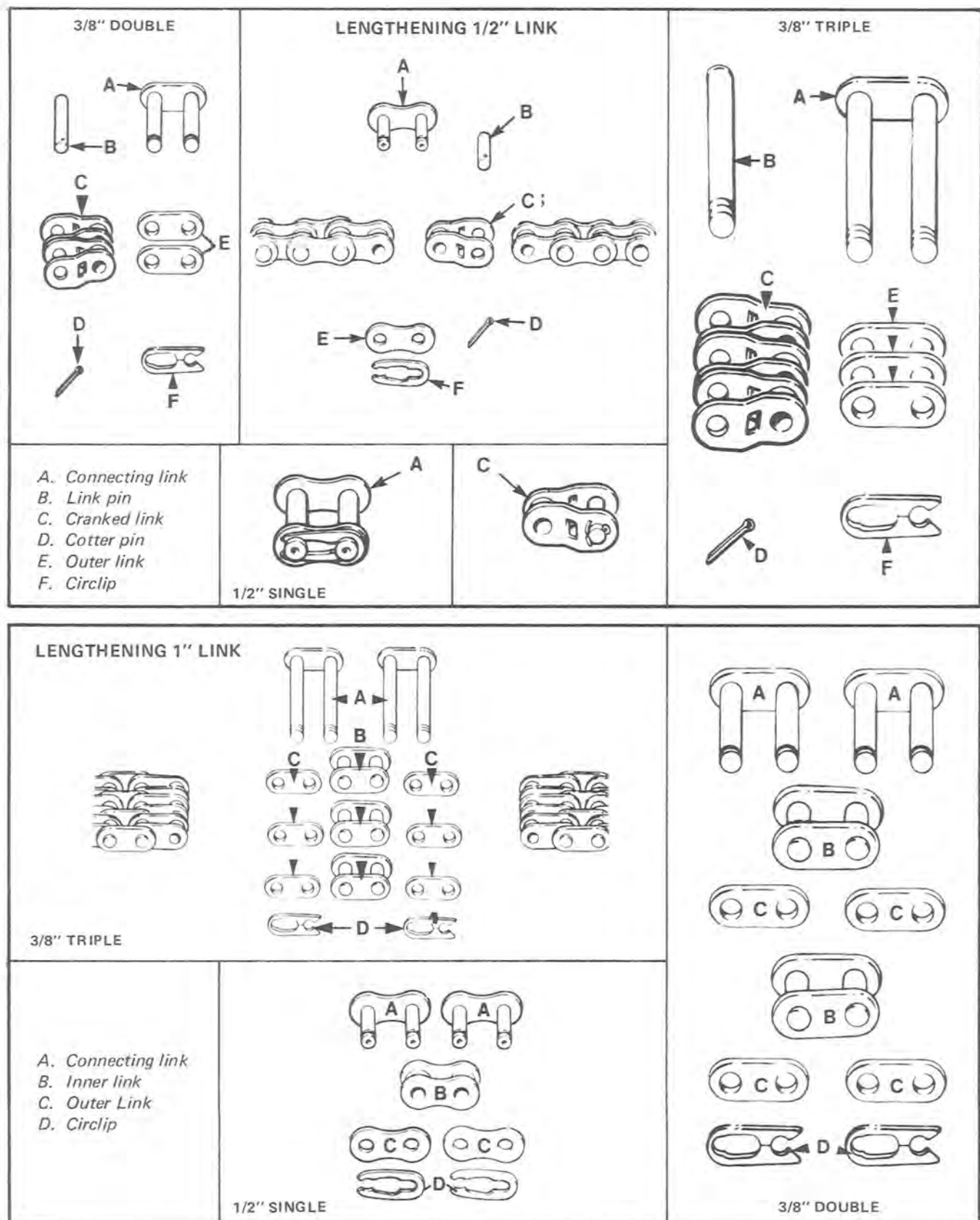


CHAIN ATTACHMENT

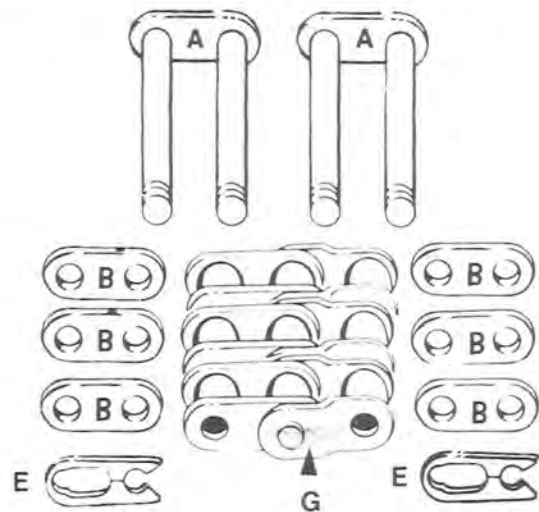
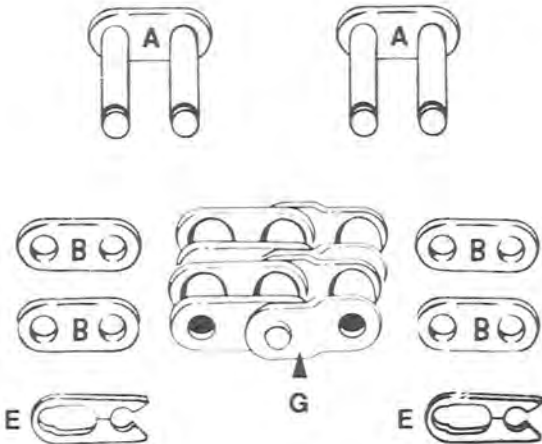
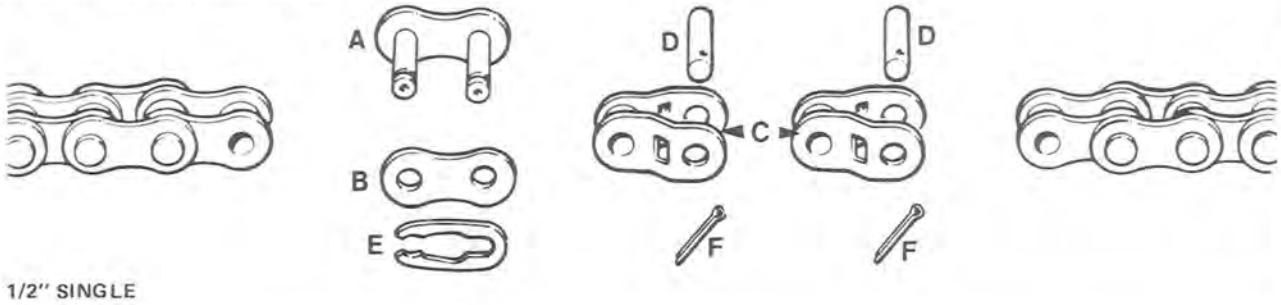
When joining chain ends, the open end of the circlip must be on opposite side of chain rotation. The circlip should also be facing the outer side of chaincase.



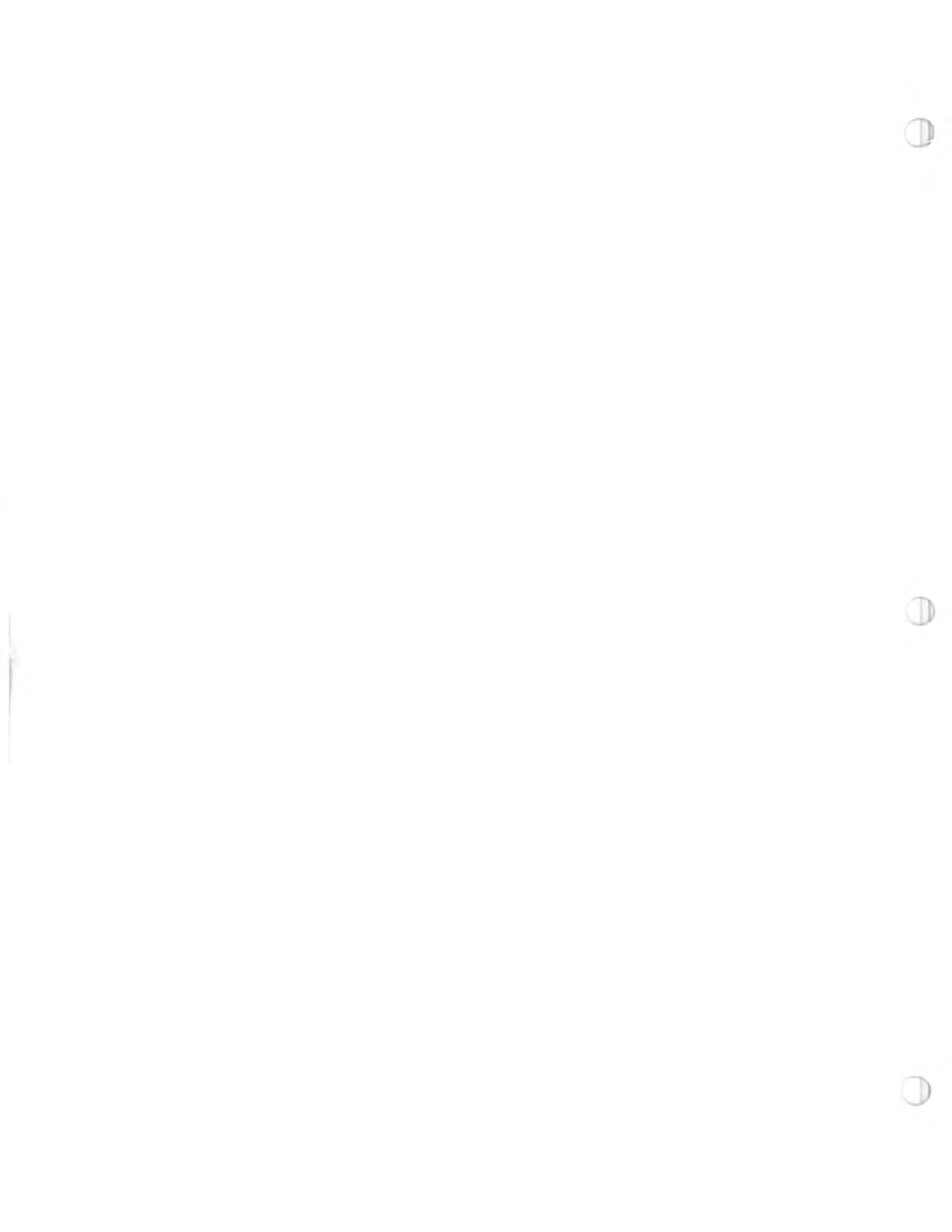
**SECTION 02**  
**SUB-SECTION 09 (DRIVE CHAIN)**

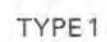


LENGTHENING 1 1/2" LINK

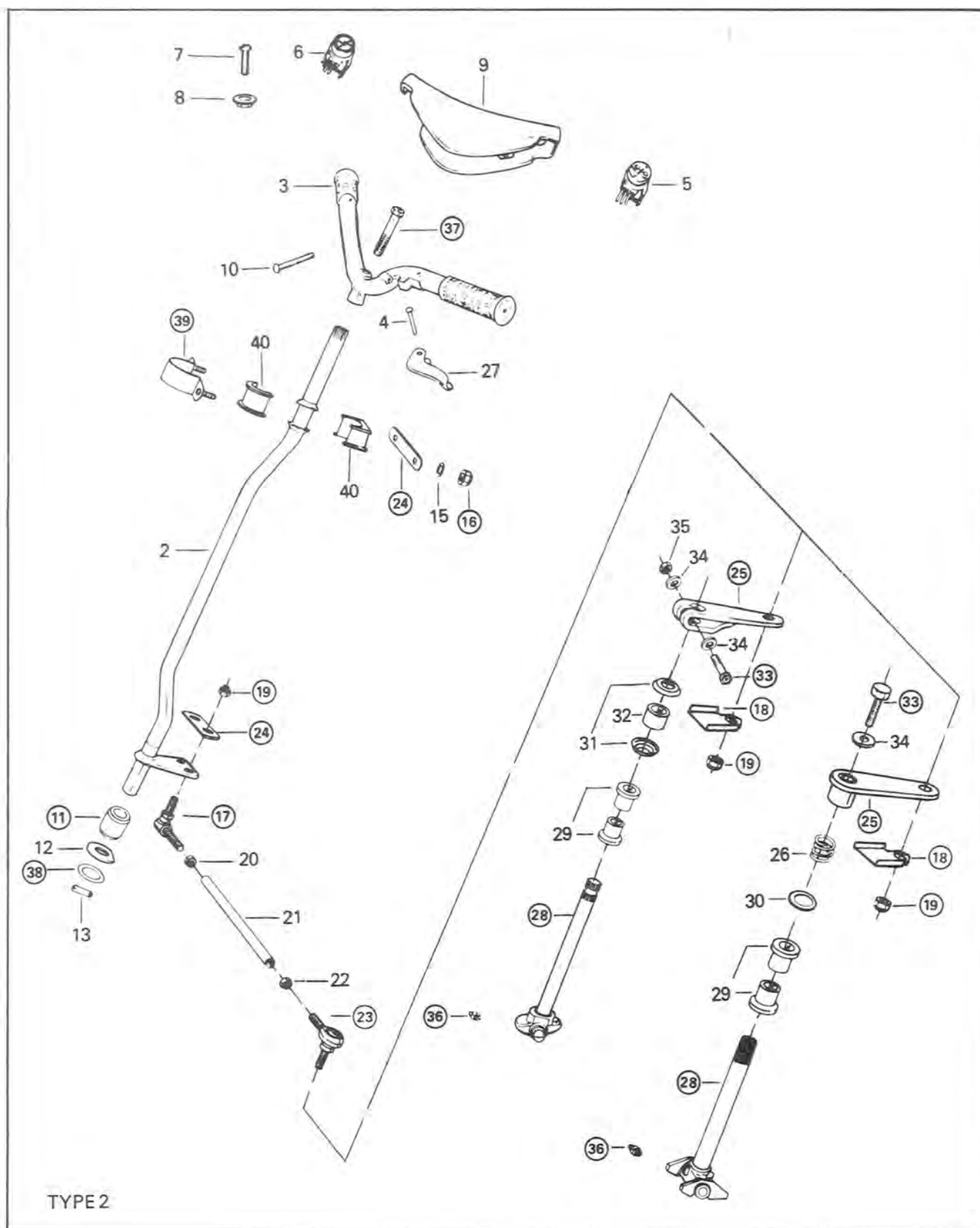


- A. Connecting link
- B. Outer link
- C. Cranked link
- D. Link pin
- E. Circlip
- F. Cotter pin
- G. Double cranked link

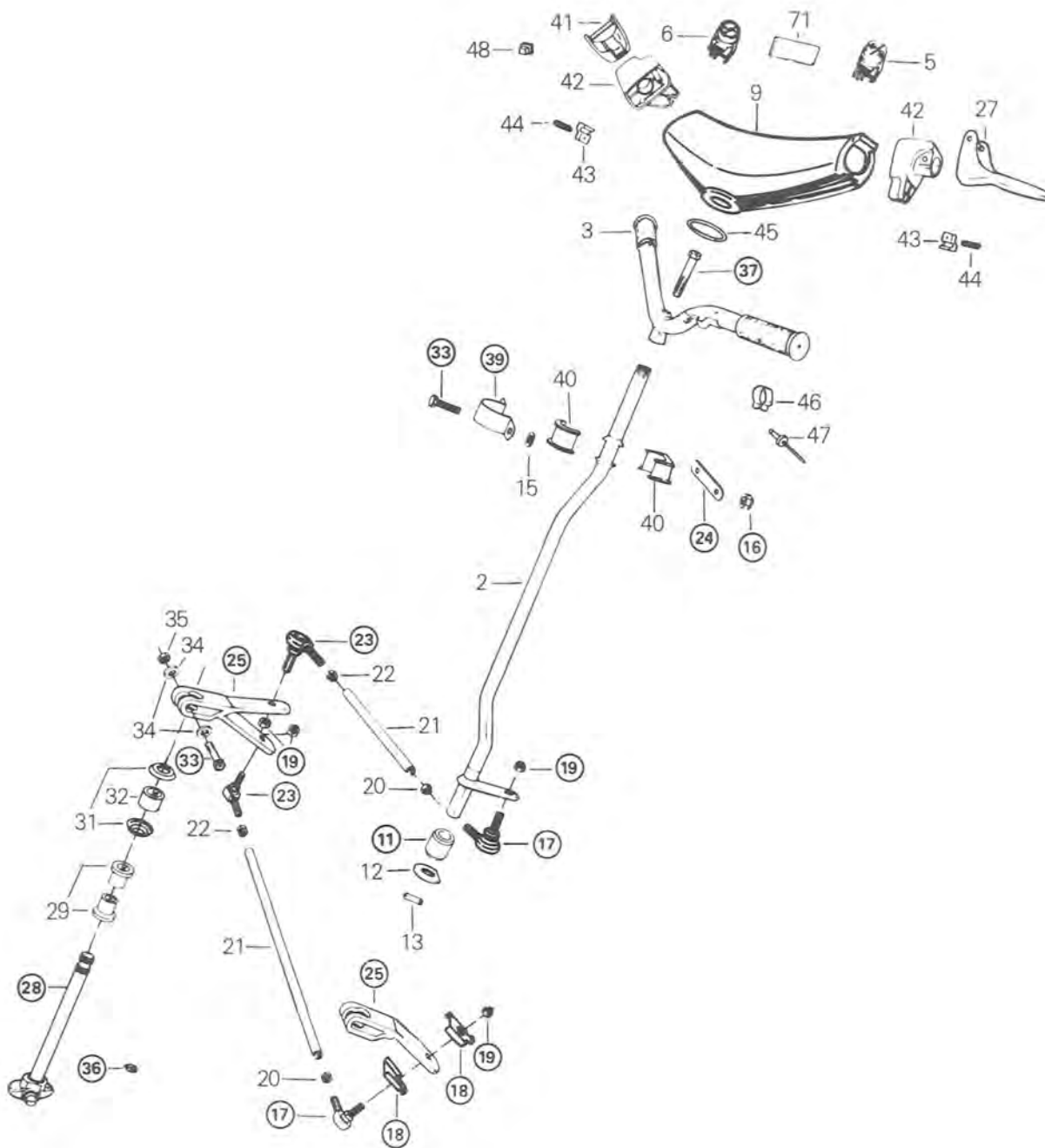




SECTION 03  
SUB-SECTION 01 (STEERING SYSTEM)

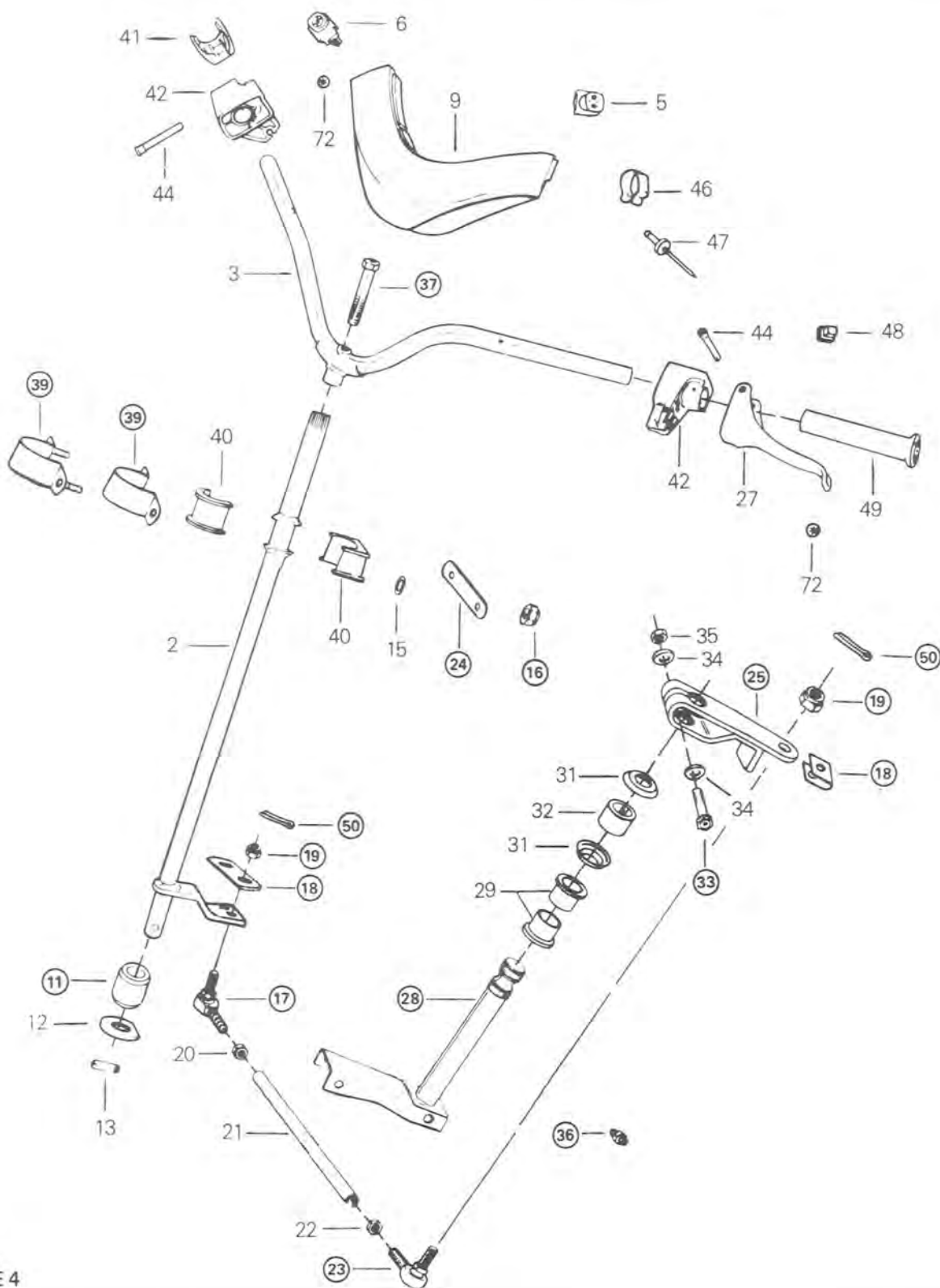






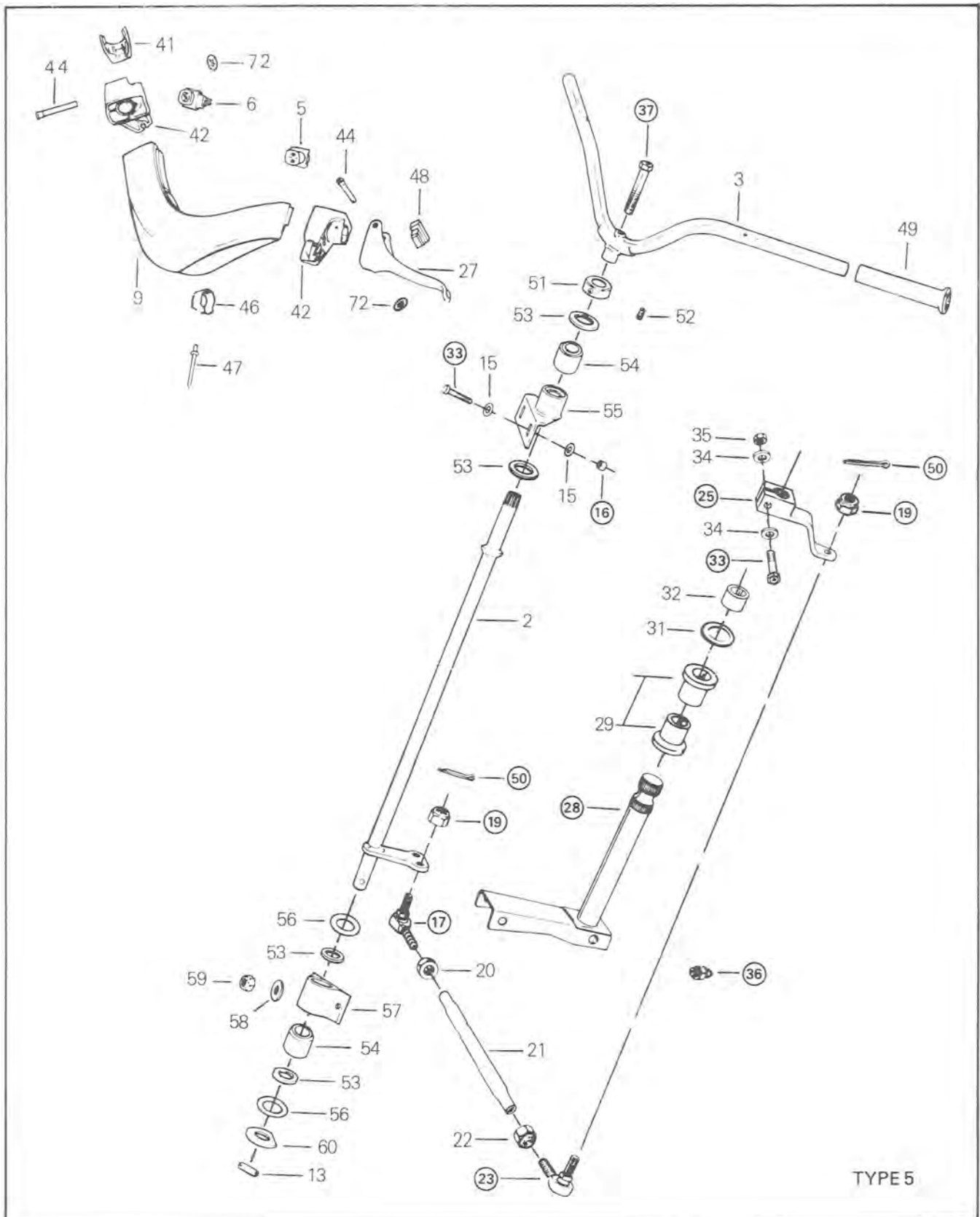
### TYPE 3

SECTION 03  
SUB-SECTION 01 (STEERING SYSTEM)

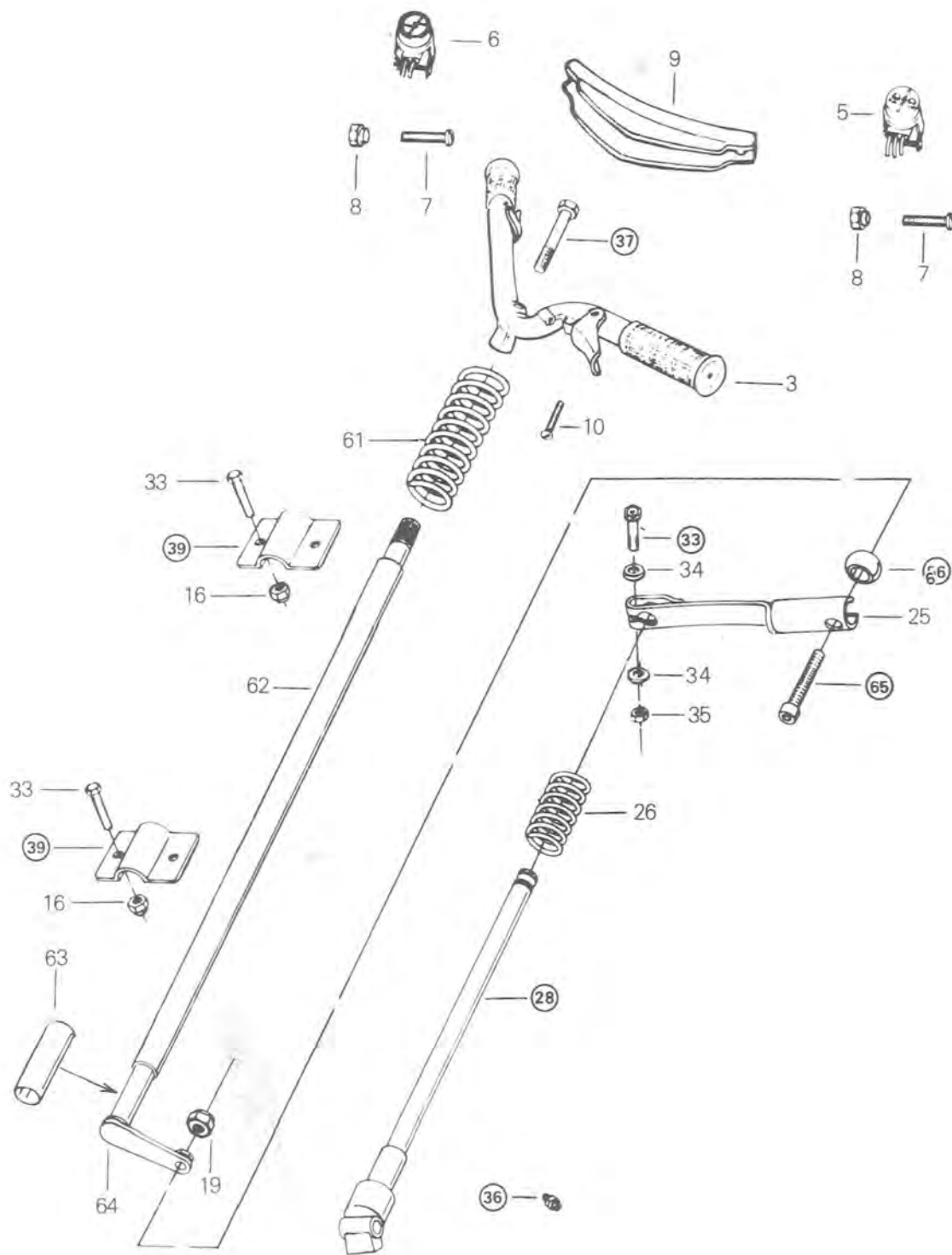


TYPE 4

SECTION 03  
SUB-SECTION 01 (STEERING SYSTEM)

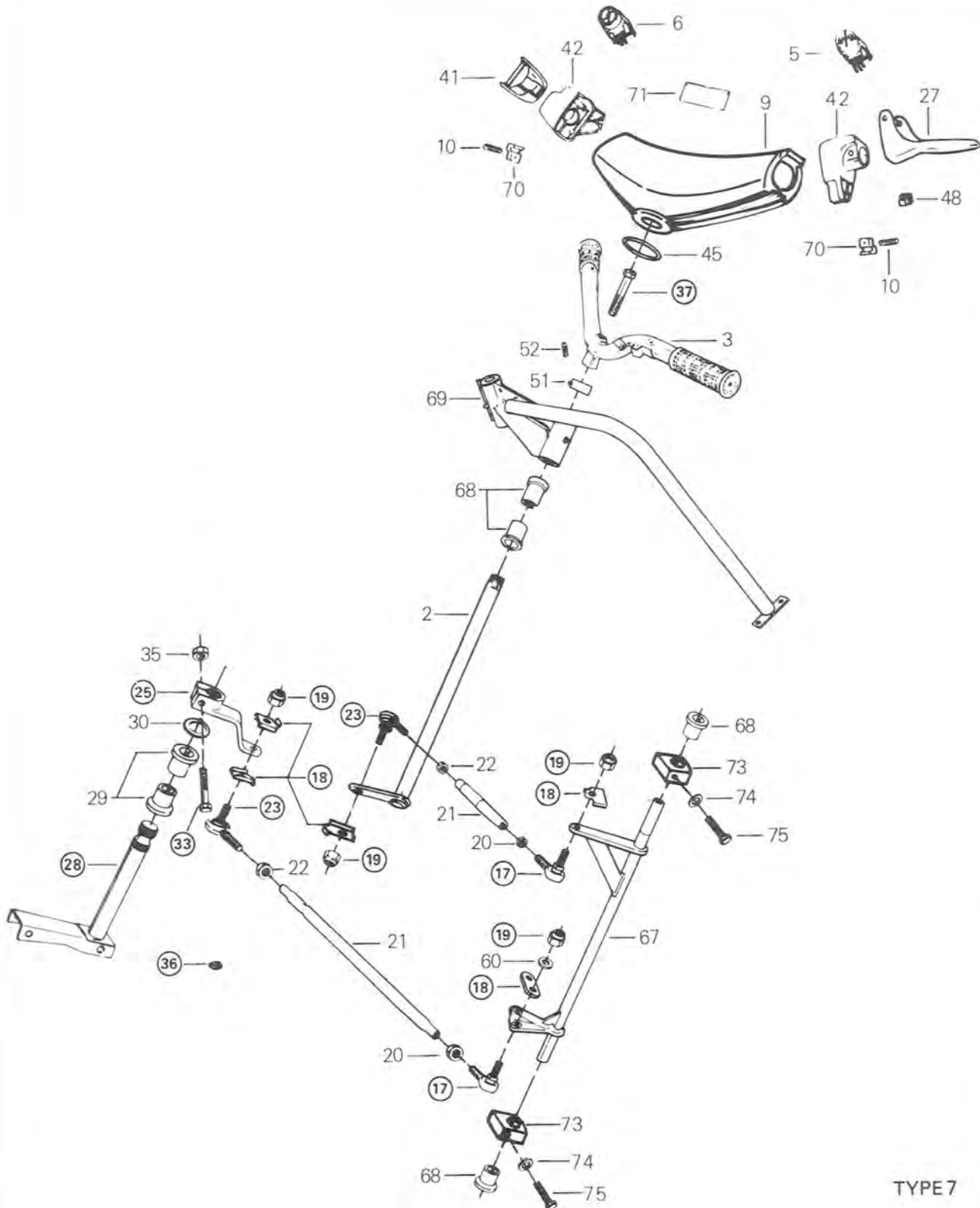


SECTION 03  
SUB-SECTION 01 (STEERING SYSTEM)



TYPE 6

SECTION 03  
SUB-SECTION 01 (STEERING SYSTEM)



TYPE 7

## SECTION 03

### SUB-SECTION 01 (STEERING SYSTEM)

1. Handlebar	20. Jam nut LH	39. Retainer bracket	58. Washer
2. Main tube	21. Tie rod	40. Rubber bushing	59. Nut
3. Handle	22. Jam nut RH	41. Throttle handle	60. Washer
4. Rivet	23. Tie rod end	42. Housing	61. Spring
5. Dimmer switch	24. Tab lock	43. End cap	62. Steering column
6. Cut-out button	25. Steering arm	44. Pin	63. Bushing
7. Bolt	26. Spring	45. Retaining ring	64. Steering shaft
8. Nut	27. Brake handle	46. Clip	65. Capscrew
9. Steering padding	28. Ski leg	47. Rivet	66. Ball bushing
10. Screw	29. Bushing	48. Retainer (stop plug)	67. Column shaft
11. Steering bushing	30. Shim	49. Grip	68. Steering bushing
12. Washer	31. Washer	50. Cotter pin	69. Upper column
13. Spirol pin	32. Rubber spacer	51. Collar	70. End cap
14. "U" clamp	33. Bolt	52. Allen screw	71. Crest
15. Washer	34. Washer	53. Rubber washer	72. Push nut
16. Nut	35. Nut	54. Bushing	73. Block
17. Tie rod end	36. Grease fitting	55. Bar bracket	74. Washer
18. Tab lock	37. Bolt	56. Shim	75. Bolt
19. Nut	38. Shim	57. Steering bushing bracket	

### DISASSEMBLY & ASSEMBLY

⑪ Do not remove steering bushing from vehicle unless damaged and replacement is necessary.

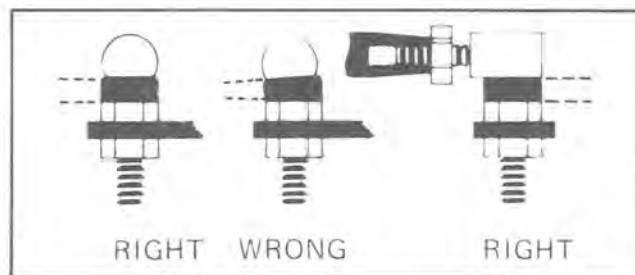
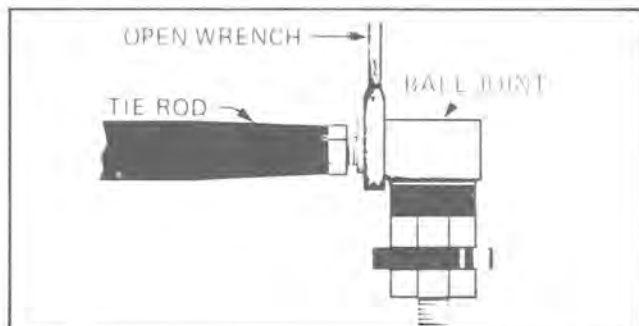
⑳ Steering column free-play can be adjusted by inserting .025 inch shim(s) as required.

㉑ On type 6 system, the distance from upper edge of lower retainer plate to lower edge of upper column bracket should be approximately 15 1/2 inches. For torque specifications see Technical Data.

㉒ ㉓ Inspect ball joints for wear or looseness, if excessive, replace.

*Note: The tie rod end attached to the steering column incorporates left hand threads while the tie rod end attached to the steering arm has right hand threads. Screw the longer threaded end of tie rod end into the tie rod, ensuring that half of the total number of threads are inserted into the tie rod.*

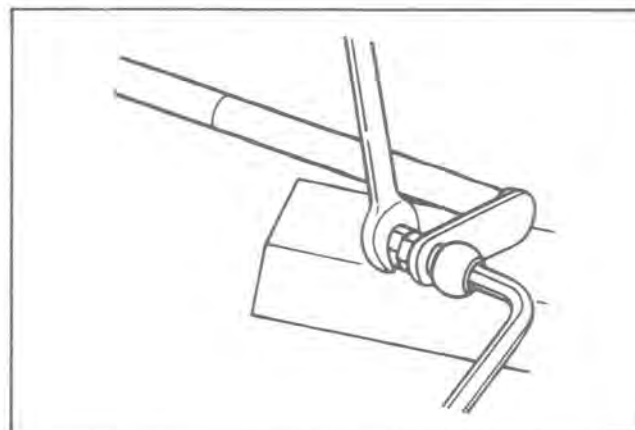
The cut-off section of the joint must run parallel with the horizontal line of the steering arm when assembled on vehicle. The joint should be restrained when tightening tie rod end lock nut. For torque specifications see Technical Data.



㉔ ㉕ ㉖ When assembling steering components, always position new tab locks and cotter pins.

㉗ The steering arm angles should be equal on both sides when skis are parallel with vehicle.

㉘ ㉙ Affix the ball bushing to steering shaft using appropriate Allen head bolt. Tighten bolt until there is approximately 1/4 inch free-play existing between ball bushing and steering shaft.





## SECTION 03

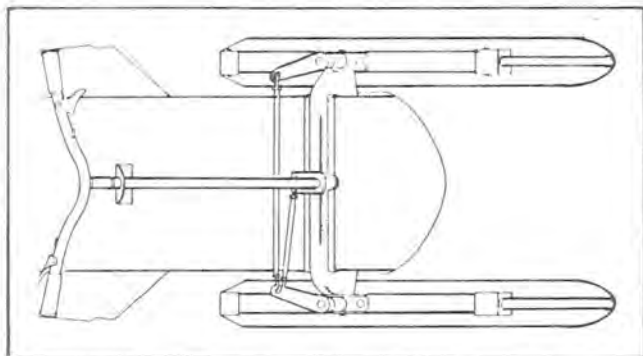
### SUB-SECTION 01 (STEERING SYSTEM)

②⑧ Grease ski leg at the grease fitting ③⑥.

①⑥ ①⑨ ③③ ③⑦ For torque specifications, see Technical Data.

#### STEERING ADJUSTMENT (SKIS)

##### TYPE 1-3



Skis should have a toe out of  $1/8''$ . To check, measure distance between each skis at front and rear of leaf springs. The front distance should be  $1/8''$  more than the rear when the handlebar is horizontal. If adjustment is required:

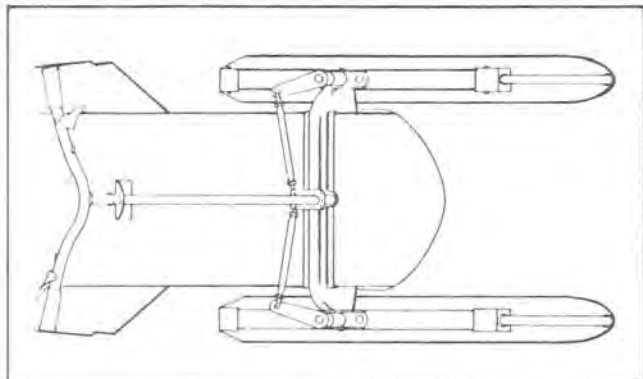
Loosen the jam nuts locking the longer tie rod in place. Turn tie rod manually until alignment is correct. Tighten jam nuts firmly.

**Important:** Close front of skis manually to take all slack from steering mechanism.

Check that handlebar is horizontal. To correct, loosen smaller tie rod jam nuts.

Turn tie rod manually until handlebar is horizontal. Tighten jam nuts firmly.

##### TYPE 2-4-5



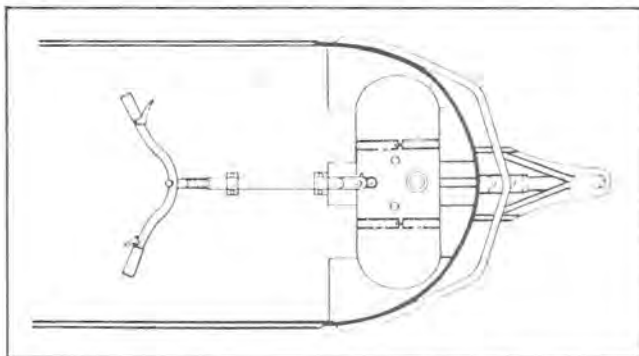
Skis should have a toe out of  $1/8''$ . To check, measure distance between each skis at front and rear of leaf springs. The front distance should be  $1/8''$  more than the rear when the handlebar is horizontal. If adjustment is required:

Loosen the tie rod jam nuts. Turn one or both tie rods manually until alignment is correct.

**Important:** Close front of skis manually to take all slack from steering mechanism.

Tighten the jam nuts firmly.

##### TYPE 6



When assembling steering arm ②⑤ and ski ②⑧, the handlebar must be horizontal with the ski parallel with vehicle.

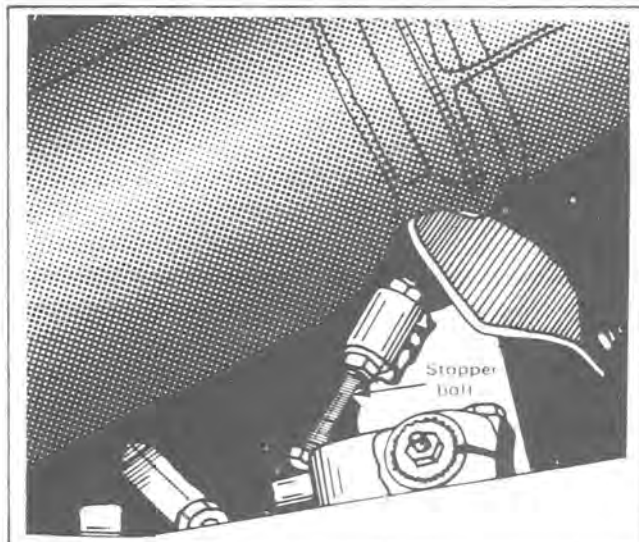
##### TYPE 7

Similar to type 2, except for handlebar position. Handlebar must be horizontal. To correct, turn smaller tie rod manually.

#### STEERING TRAVEL ADJUSTMENT (if applicable)

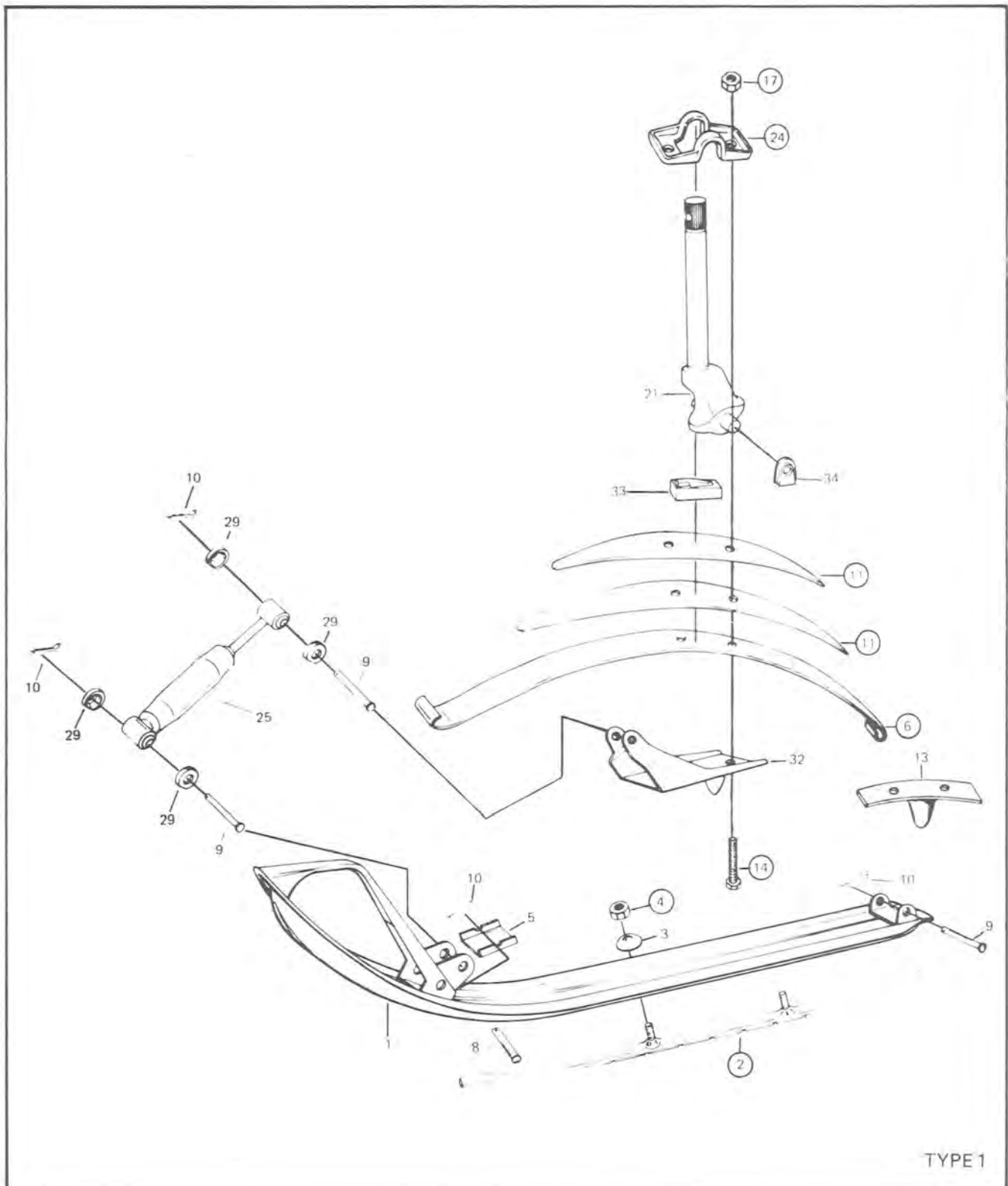
Turn handlebar fully right until a gap of  $1/8''$  exists between the lower nut of the left ball joint and the bottom plate.

Adjust stopper bolt on right side of reinforcing cross member so that it touches right steering arm. Repeat procedure for left stopper.

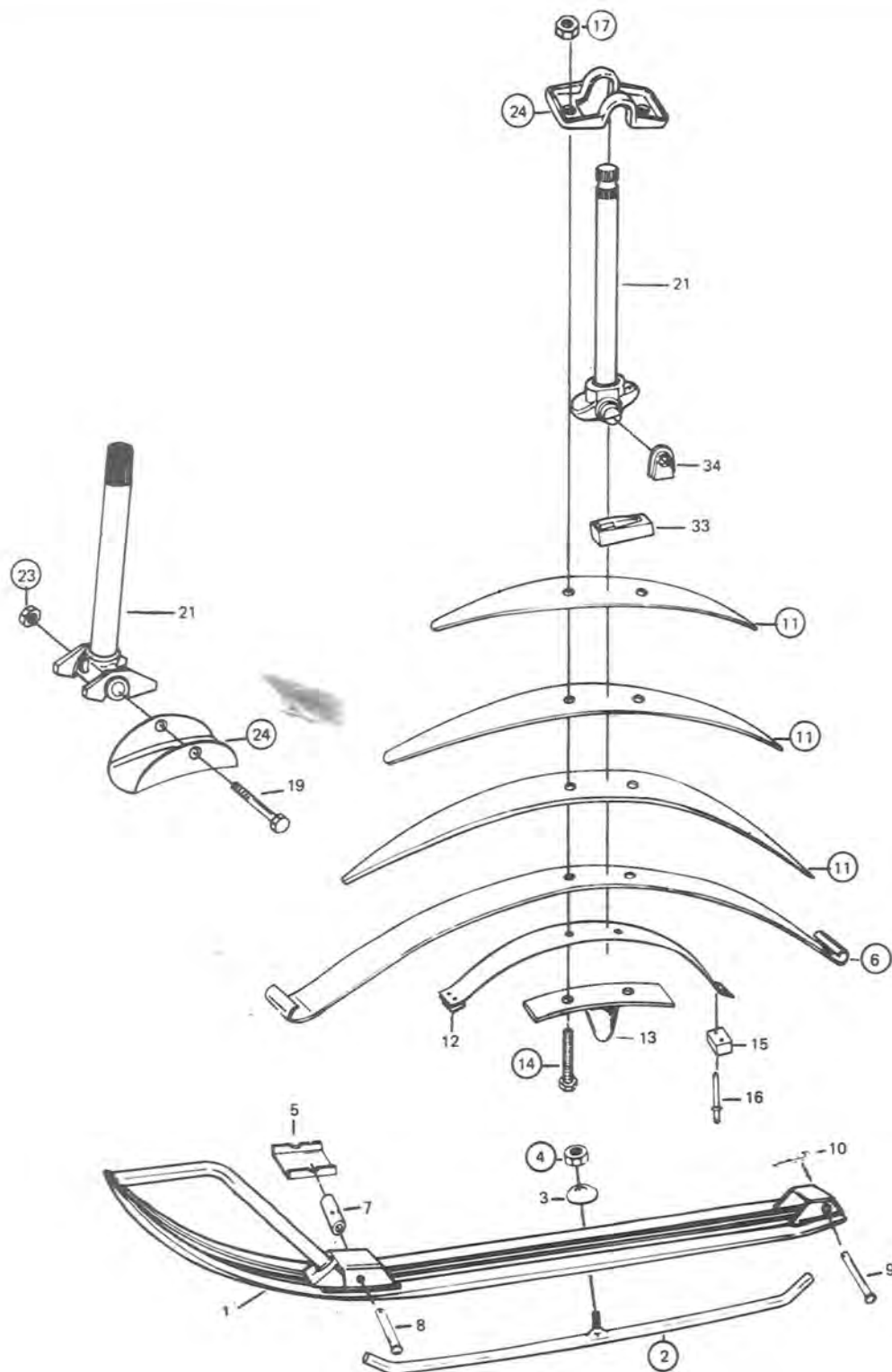




SKI SYSTEM

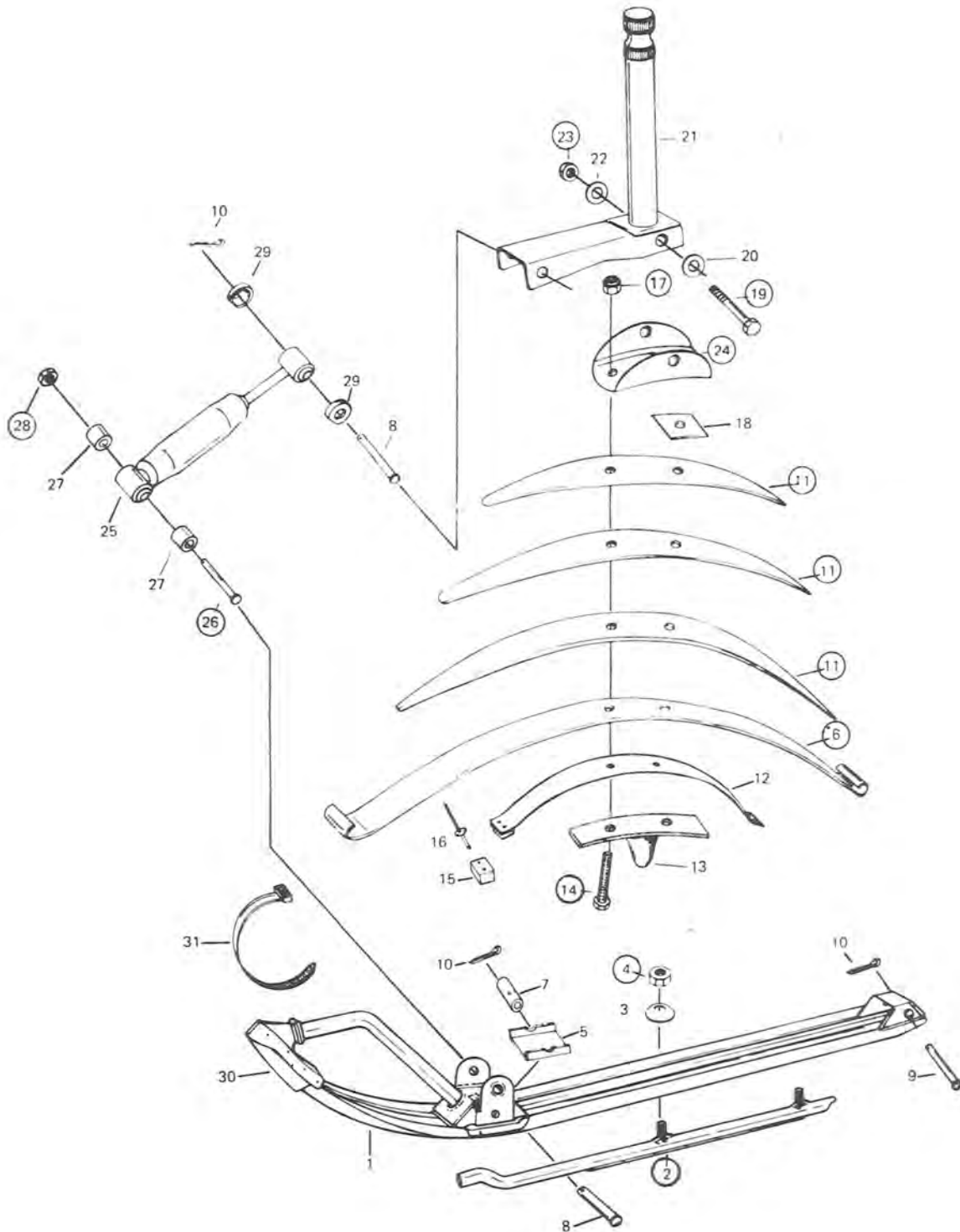


SECTION 03  
SUB-SECTION 02 (SKI SYSTEM)



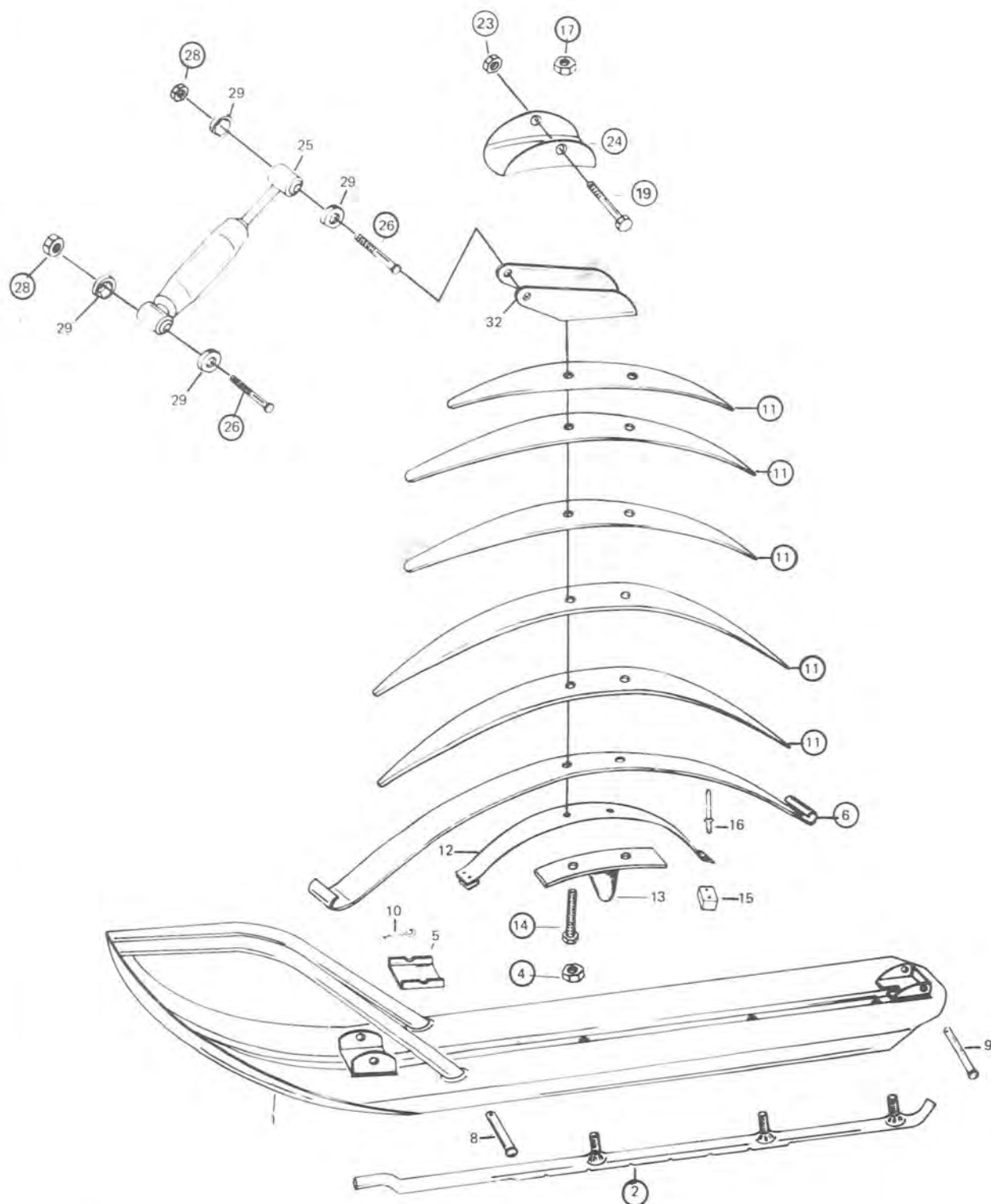
TYPE 2

SECTION 03  
SUB-SECTION 02 (SKI SYSTEM)



TYPE 3

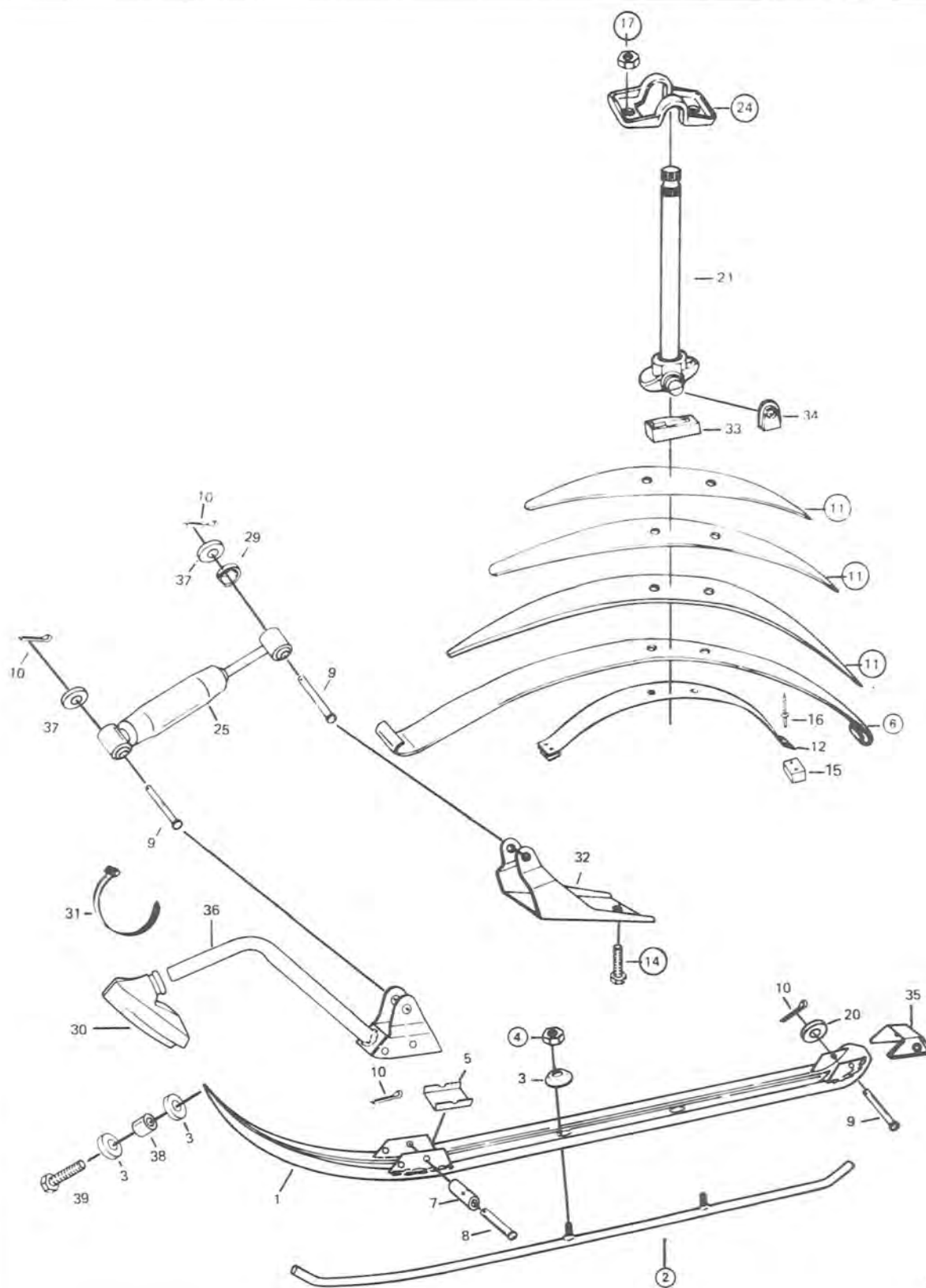
SECTION 03  
SUB-SECTION 02 (SKI SYSTEM)



TYPE 4

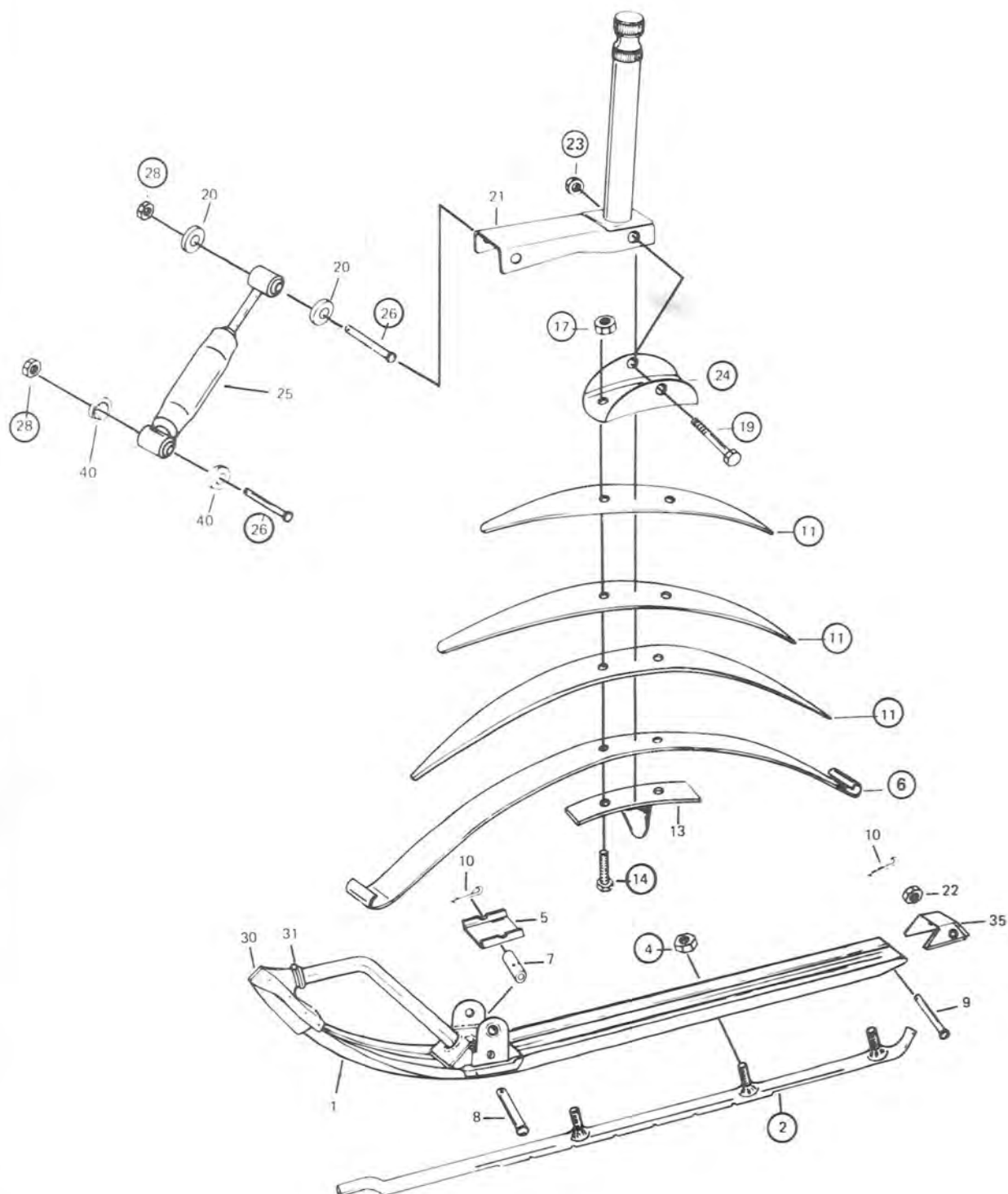


SECTION 03  
SUB-SECTION 02 (SKI SYSTEM)



TYPE 5

SECTION 03  
SUB-SECTION 02 (SKI SYSTEM)



TYPE 6

- |                           |                        |
|---------------------------|------------------------|
| 1. Ski                    | 21. Ski leg            |
| 2. Runner shoe            | 22. Washer             |
| 3. Cup                    | 23. Nut                |
| 4. Nut                    | 24. Spring coupler     |
| 5. Spring slider cushion  | 25. Shock              |
| 6. Main leaf spring       | 26. Bolt               |
| 7. Bushing                | 27. Spacer             |
| 8. Retainer pin           | 28. Nut                |
| 9. Retainer pin           | 29. Bushing            |
| 10. Cotter pin            | 30. Ski tip            |
| 11. Auxiliary leaf spring | 31. Tie rap            |
| 12. Overload leaf spring  | 32. Shock bracket      |
| 13. Rebound leaf          | 33. Stabilizer         |
| 14. Screw                 | 34. Bushing            |
| 15. Cushion               | 35. Rear cap protector |
| 16. Rivet                 | 36. Retainer bracket   |
| 17. Nut                   | 37. Spacer             |
| 18. Spacer plate          | 38. Rubber absorber    |
| 19. Bolt                  | 39. Screw              |
| 20. Washer                | 40. Spacer             |

#### DISASSEMBLY & ASSEMBLY

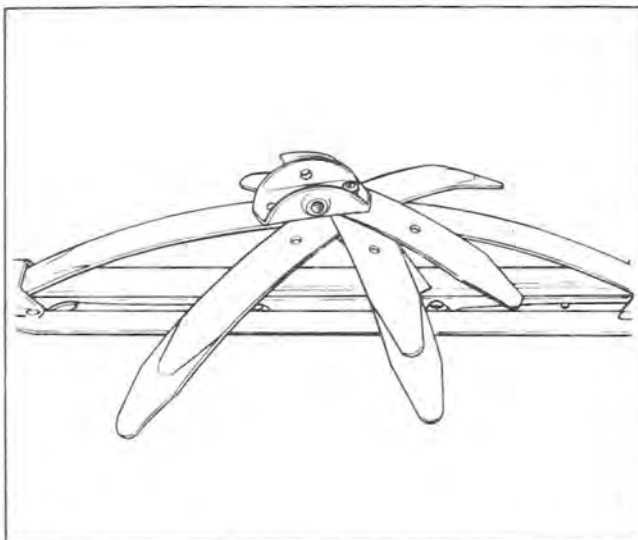
② Warning: Observe extreme caution while prying or removing steel runner shoes from ski slots as the shoes are under tension. Check that ski runner shoes are not worn more than half of their original thickness.

⑥ ⑪ ②④ When disassembling spring coupler from leaf spring be careful of the spring tension.

When assembling leaf springs, cross the leaf springs and temporarily insert one (1) nut and bolt then position the springs leaf parallel to each other and install remaining bolt and nut. Tighten fully.

⑭ ⑰ ⑲ ⑲ ④ For proper torque see Technical Data.

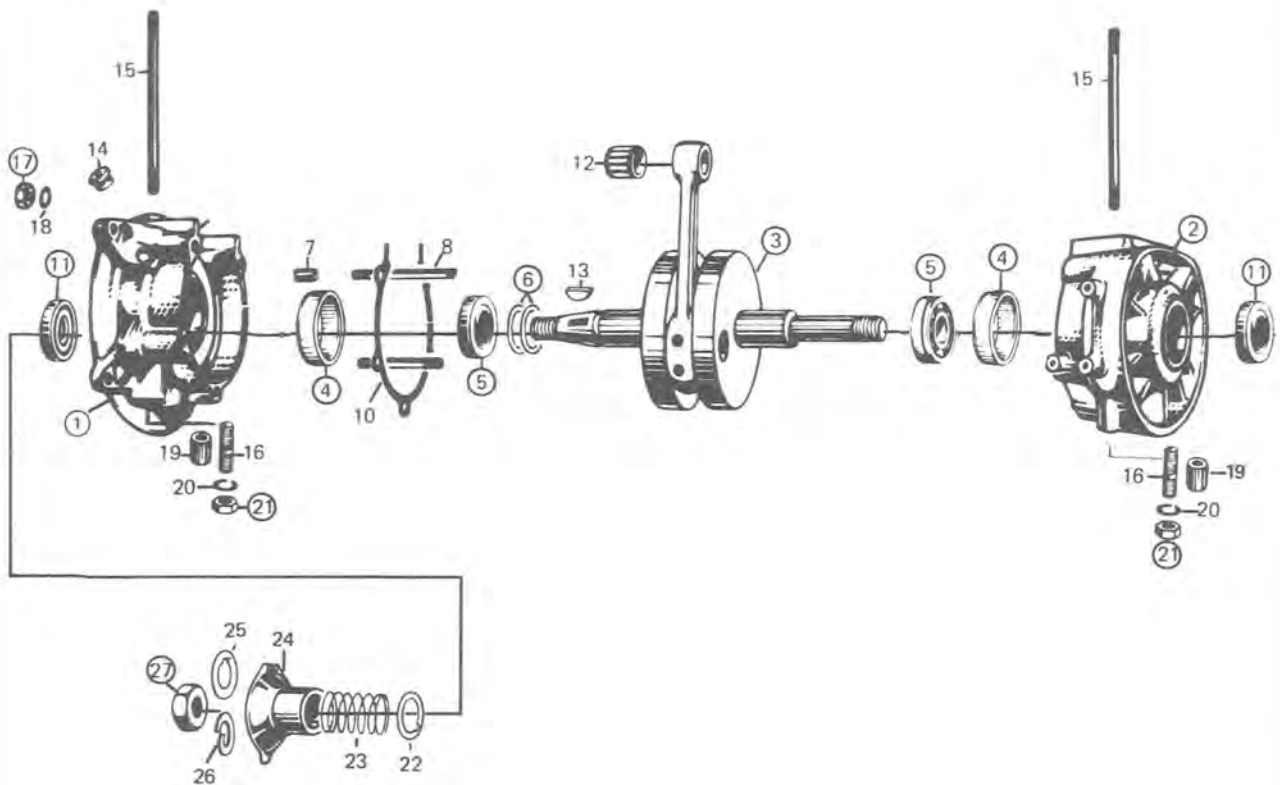
⑰ ⑲ Tighten ski coupler bolt. Move ski by hand to check that it pivots easily on ski leg. Torque locking nut to 40 ft/lb.





247, 302 ENGINE TYPE

BOTTOM END

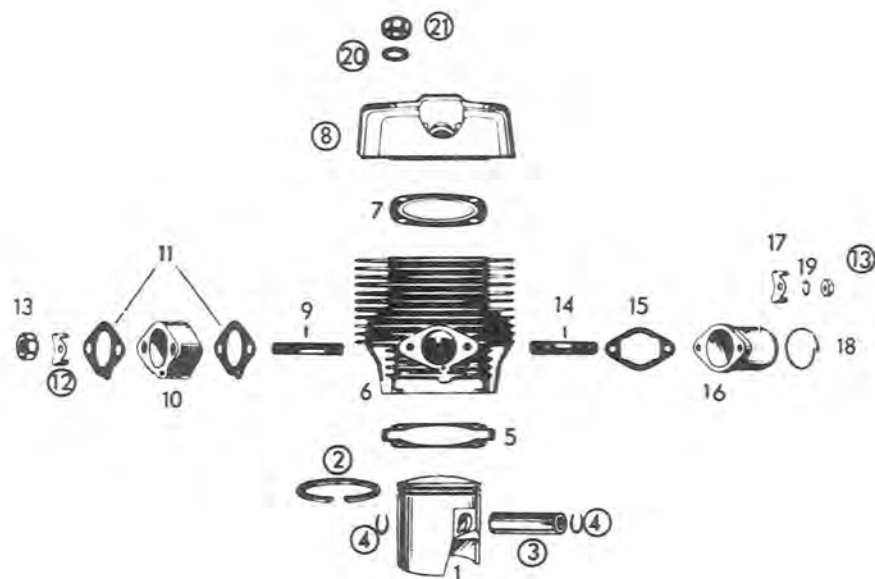


1. Crankcase half (mag side).
2. Crankcase half (PTO side).
3. Crankshaft
4. Polyamid ring
5. Ball bearing
6. Shim
7. Dowel tube (2)
8. Crankcase stud (2-long)
9. Crankcase stud (3-short)
10. Crankcase gasket
11. Oil seal
12. Needle bearing
13. Woodruff key
14. Cable grommet

15. Cylinder stud (4)
16. Stud (4)
17. Nut (5)
18. Lock washer (5)
19. Distance sleeve (4)
20. Lock washer (4)
21. Nut (4)
22. Washer
23. Spring
24. Breaker point cam
25. Tab washer (manual start only)
26. Lock washer (Elect. start only)
27. Magneto retaining nut

SECTION 04  
SUB-SECTION 01 (ONE CYLINDER ENGINE)

TOP END



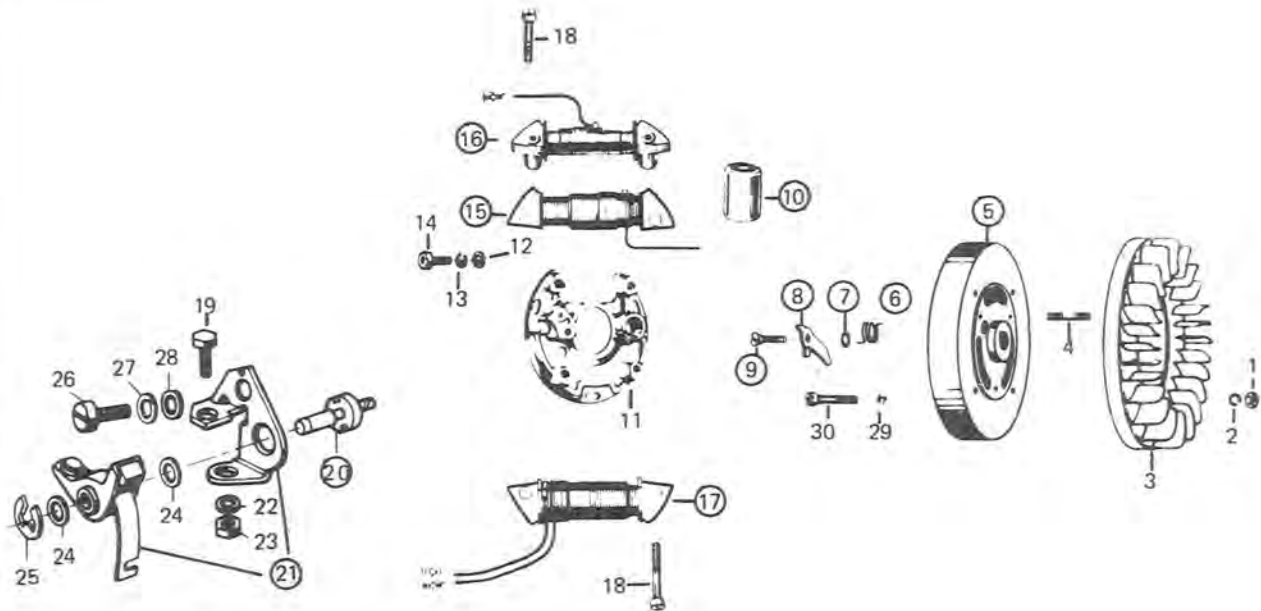
1. Piston
2. Rectangular ring (2)
3. Gudgeon pin
4. Circlip
5. Cylinder / crankcase gasket
6. Cylinder
7. Cylinder head gasket
8. Cylinder head
9. Carburetor stud (2)
10. Isolating flange
11. Flange gasket

12. Tab lock
13. Nut (4)
14. Exhaust stud (2)
15. Exhaust gasket
- \*16. Exhaust socket
- \*17. Spring bracket
- \*18. Asbestos string
19. Lock washer (2)
20. Washer (4)
21. Cylinder head nut (4)

\*302 Engine type only.



# MAGNETO



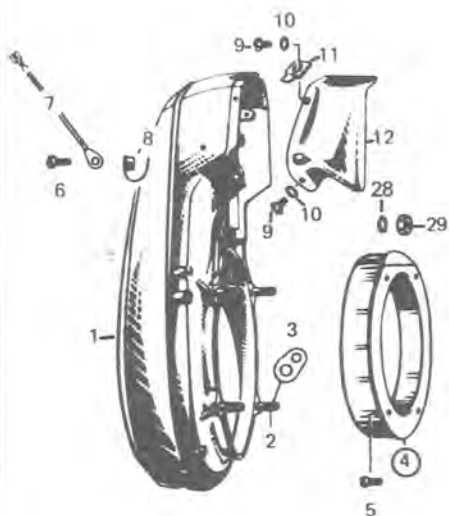
1. Fan retaining nut (4)
2. Lock washer (4)
- \*3. Fan (manual start only)
4. Starting pulley stud (3)
- \*5. Magneto housing (manual start only)
6. Spring
7. Washer (247 type only)
8. Centrifugal lever
9. Bearing screw
10. Capacitor
11. Armature plate
12. Flat washer (3)
13. Lock washer (3)
14. Allen screw (3)
15. Ignition generator coil

16. Brake light coil (23 W)
17. Lighting coil (75 W)
18. Coil retaining screw (4)
19. Bolt
20. Pivot pin
21. Breaker point set
22. Lock washer
23. Nut
24. Washer
25. Retaining clip
26. Screw
27. Lock washer
28. Flat washer
29. Lock washer (4)
30. Allen screw (4)

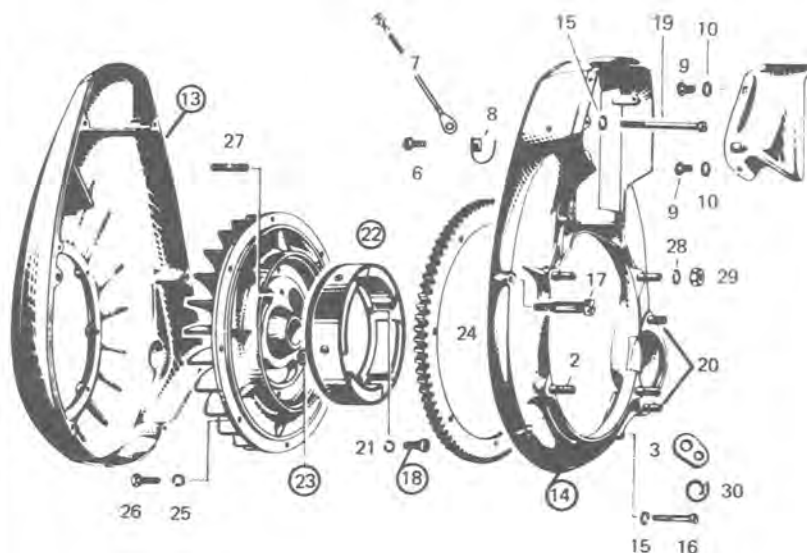
\*Refer to Cooling system for electric start model.

SECTION 04  
SUB-SECTION 01(ONE CYLINDER ENGINE)

COOLING SYSTEM



MANUAL START ENGINE



ELECTRIC START ENGINE

1. Fan cowl ass'y
2. Fan cowl stud (4)
3. Spring bracket
4. Labyrinth ring (manual start only)
5. Screw (4)
6. Screw
7. Ground cable
8. Cable clamp
9. Flat head screw
10. Spring washer
11. Connector
12. Air deflector
13. Fan cowl cover
14. Fan cowl
15. Lock washer

16. Cylindrical head screw (2)
17. Dowel screw (2)
18. Allen screw (4)
19. Cylindrical head screw (long)
20. Starter stud
21. Lock washer (4)
22. Magneto ring
23. Fan ass'y
24. Starter ring gear
25. Lock washer (8)
26. Hex. cap screw (8)
27. Starting pulley stud (3)
28. Lock washer (4)
29. Nut (4)
30. Spring retainer

## REMOVAL

Remove or disconnect the following then lift engine from vehicle.

### Center mounted engine

- Drive belt.
- Muffler.
- Choke knob.
- Decompressor (if applicable).
- Throttle cable.
- Fuel lines.
- Electrical connector.

**CAUTION:** On electric start model, disconnect negative cable (ground) from battery post before disconnecting other wires.

- Separate steering column support at upper column.
- Engine mount nuts.

## DISASSEMBLY & ASSEMBLY

### General

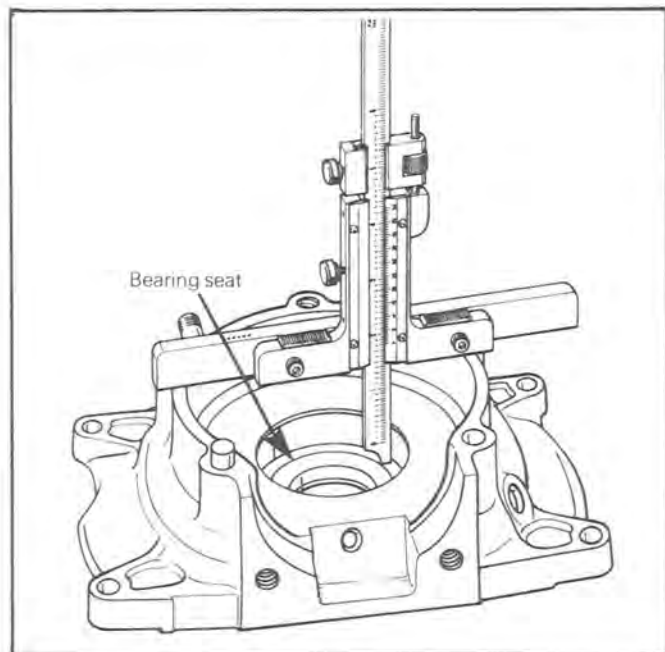
Refer to Technical Data Section for component fitted tolerance and wear limit. If necessary, refer to Drive Pulley Section to remove drive pulley.

### Bottom End

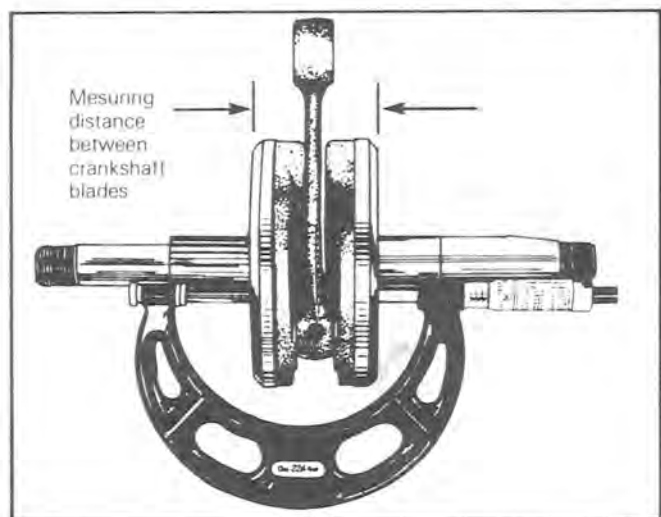
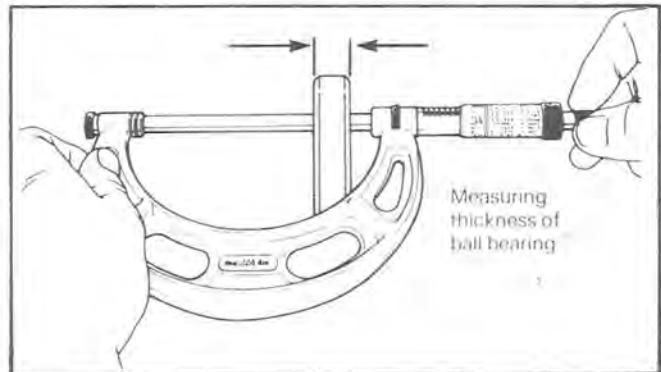
①② When disassembling / assembling crankcase halves, do not heat the crankcase. If heat is necessary, temperature must not exceed 130° F.

③⑥ Crankshaft end-play should be between .004" to .016". To determine necessary correction:

a) Measure crankcase. To do this first measure each half from mating surface to bottom of bearing seat. Add measurements of both halves then add .006" for gasket displacement. Equals A.



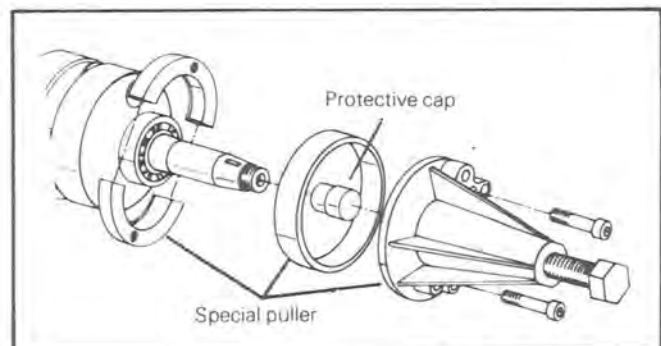
b) Measure thickness of each ball bearing. Measure distance between crankshaft blades. Add measurements. Total equals B.



c) Subtract measurement A from measurement B minus tolerance of .004" to .016". Total balance is distance to be shimmed. Shim(s) must be located between magneto side bearing and crankshaft blade.

NOTE: Crankshaft end-play is adjusted only when crankshaft and / or crankcase is replaced.

⑤ To remove bearing from crankshaft use a protective cap and special puller as illustrated. (See Tool Section).



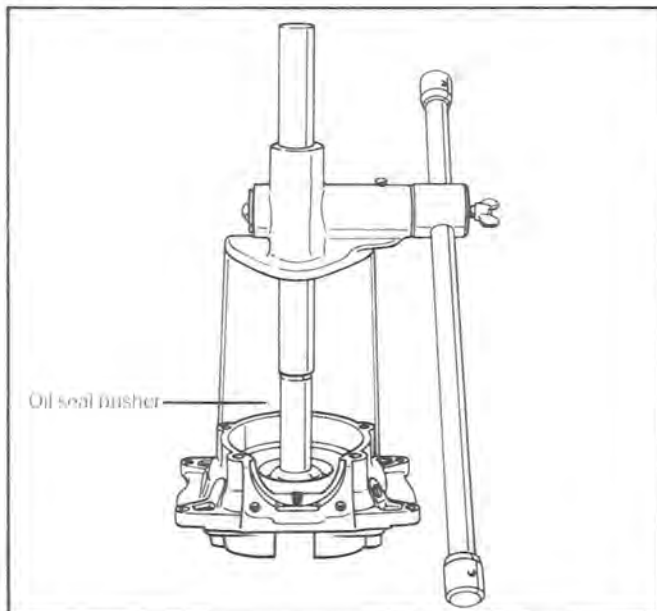
## SECTION 04

### SUB-SECTION 01 (ONE CYLINDER ENGINE)

○ **NOTE:** Prior to magneto side bearing installation, install required shim(s) on crankshaft extension.

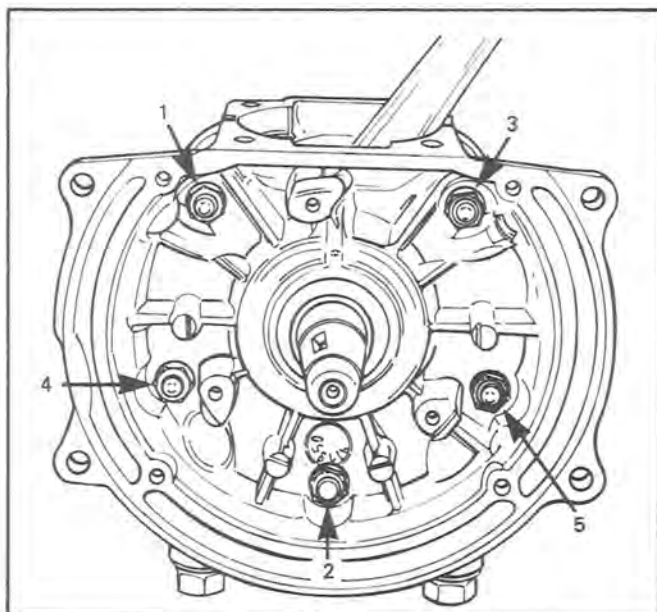
At assembly, place bearings into an oil container and heat the oil to 200° F. for 5 to 10 min. This will expand the bearings and permit them to slide easily on the shaft.

⑪ To remove or install new seal into crankcase use an appropriate oil seal pusher as illustrated. (See Tool Section)



Also, prior to crankcase adjoining, install a protector sleeve on each crankshaft extension to prevent oil seal damage. (See Tool Section).

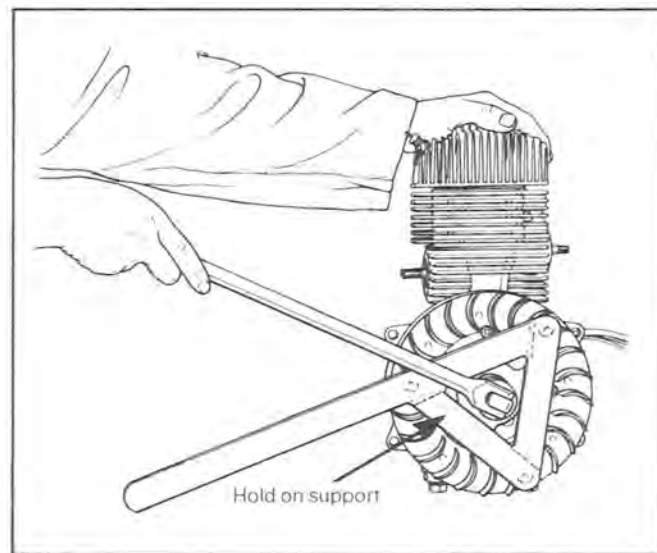
⑫ At assembly, torque to 16 ft-lbs. following illustrated sequence:



⑬ At assembly, torque to 23-29 ft-lbs.

⑭ To remove or install magneto retaining nut, lock crankshaft in position with special hold-on support. (See Tool Section).

At assembly, torque retaining nut to 50-58 ft-lbs

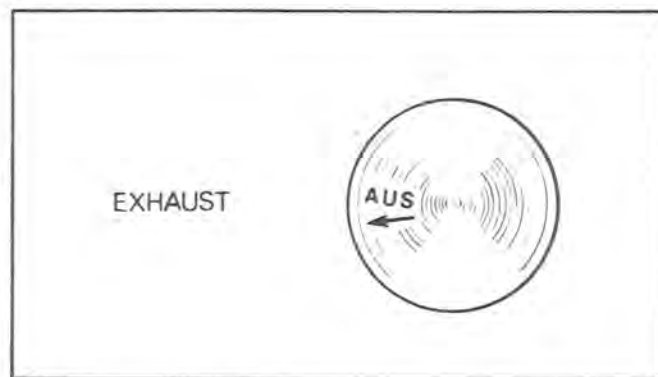


#### Top End

① ② ③ ④ Place a clean cloth over crankcase to prevent circlip from falling into crankcase. Use a pointed tool to remove circlips from piston.

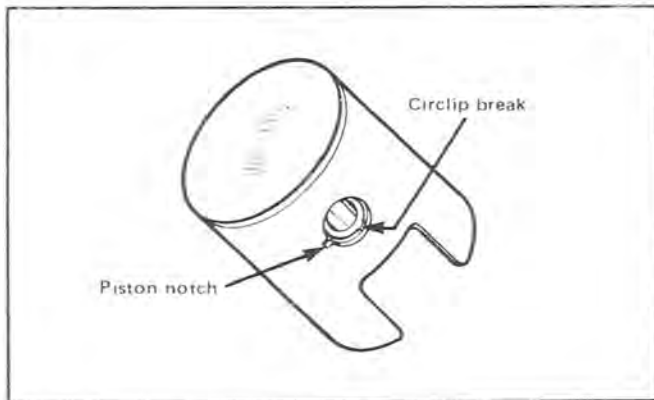
▼ **CAUTION:** When tapping out gudgeon pins, hold piston firmly in place to eliminate the possibilities of transmitting shock and pressure to the connecting rod.

At assembly, place the piston over the connecting rod with the letters "AUS", over an arrow on the piston dome, facing in direction of the exhaust port.



○ **NOTE:** Once the circlips are installed turn each circlip so the circlip break is not directly on piston notch. Remove any burrs on piston caused through circlip installation with very fine emery cloth.

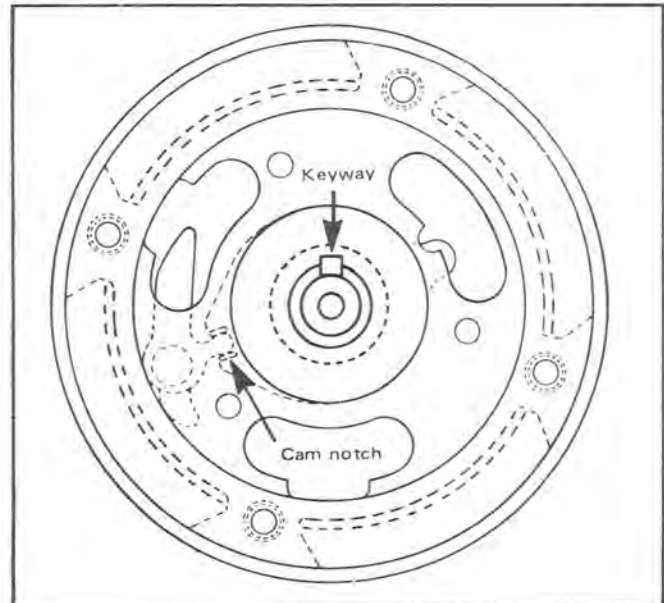




⑧ ②① Position cylinder head on cylinder with fins in line with crankshaft center line. Cross torque retaining nut to 14-16 ft-lbs.

⑫ Tab washer should be replaced if bent more than three (3) times. If in doubt, replace.

⑬ At assembly, torque to 14-16 ft-lbs.

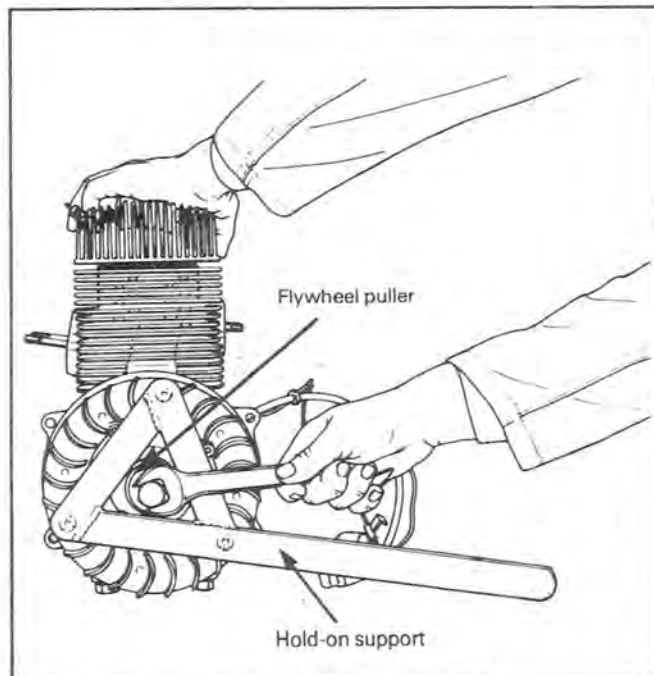


⑥ ⑦ ⑧ ⑨ At assembly, apply a small amount of grease into spring seating.

⑩ To replace a capacitor, it is first necessary to disconnect the two (2) black leads using a soldering iron. The capacitor can then be driven out of the armature plate using a suitable drift. To reinstall, inverse procedure.

⑮ ⑯ ⑰ Whenever a coil is replaced, the air gap (distance between magnet and armature end) must be adjusted.

To check air gap, insert a feeler gauge of correct thickness (0.25 mm / .010" - 0.39 mm / .015") between magnet and armature ends. If necessary to adjust, slacken retaining screws and relocate armature.



At assembly, position magneto on crankshaft with the keyway and the cam notch position as illustrated.



⑳ ㉑ When replacing breaker point set, apply a light coat of grease on pivot pin and rubbing block.

## SECTION 04

### SUB-SECTION 01 (ONE CYLINDER ENGINE)

Do not remove pivot pin unless replacement is needed.  
At assembly, apply Loctite "Lock'n Seal" on threads.

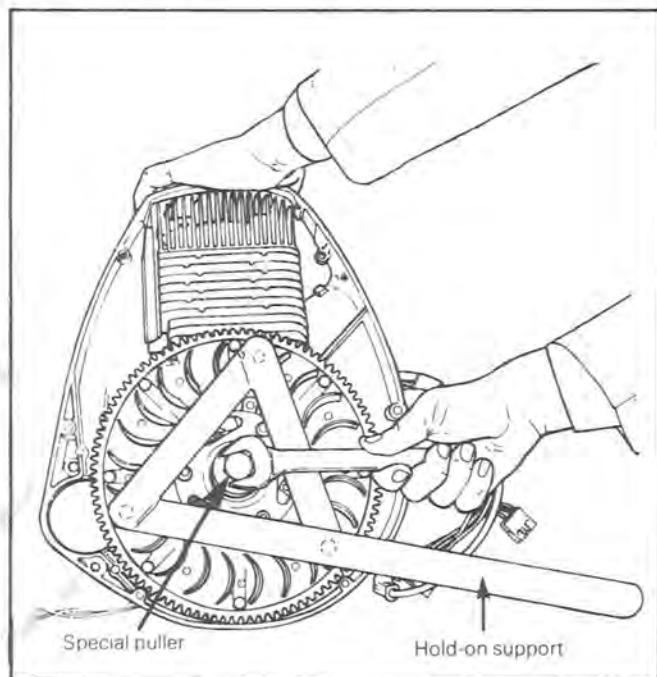
#### Cooling system

④ At assembly, position labyrinth ring with bevelled side on top.

⑬ ⑭ ⑳ ㉓ To remove fan cowl ass'y and / or magneto from electric start engine, it is first necessary to separate fan cowl cover from fan cowl.

To remove magneto ring / fan ass'y from engine, lock crankshaft in position with special hold-on support, remove magneto retaining nut, then install special puller onto hub (See Tool Section).

Tighten puller nut and at same time, tap on nut head with a hammer to release magneto from its taper. At assembly, torque retaining nut to 50-56 ft-lbs.



⑱ At assembly, apply Loctite "Lock'n Seal" on screws threads.

#### CLEANING

Discard all oil seals and gaskets.

Clean all metal components in a non-ferrous metal cleaner.

**CAUTION:** Clean armature using only a clean cloth.

Scrape off carbon formation from cylinder exhaust port, cylinder head and piston dome using a wooden spatula.

**NOTE:** The letter "AUS" over an arrow on the piston dome must be visible after cleaning.

Clean the piston ring grooves with a groove cleaner tool, or with a piece of broken ring.

#### INSTALLATION

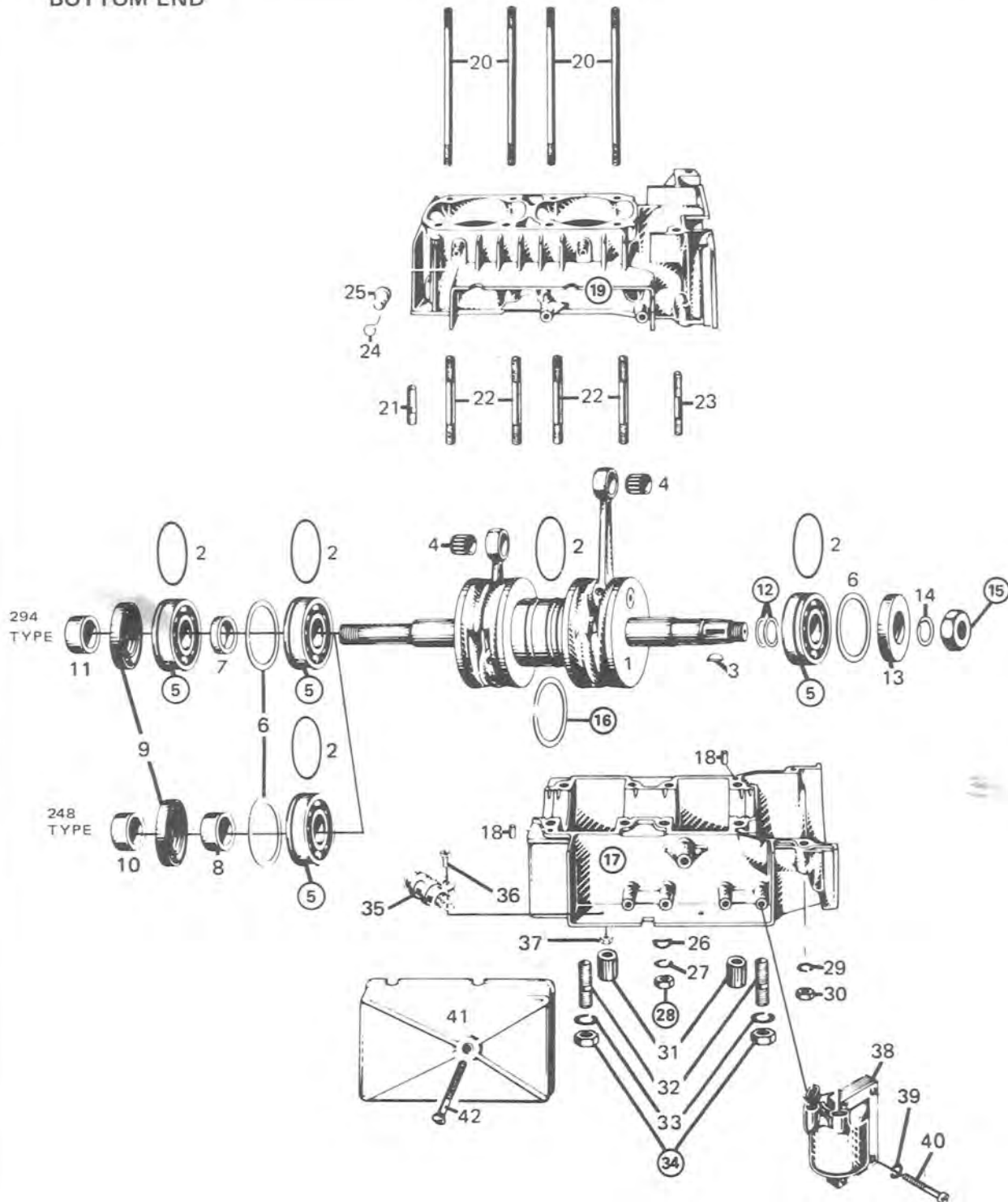
To install engine on vehicle, inverse removal procedure. However, pay attention to the following:

- Check ignition timing prior to installation in vehicle.
- Check tightness of engine mount nuts, and drive pulley bolt.
- After throttle cable installation, check carburetor maximum throttle opening.
- Check pulley alignment.



248, 294 ENGINE TYPE

BOTTOM END



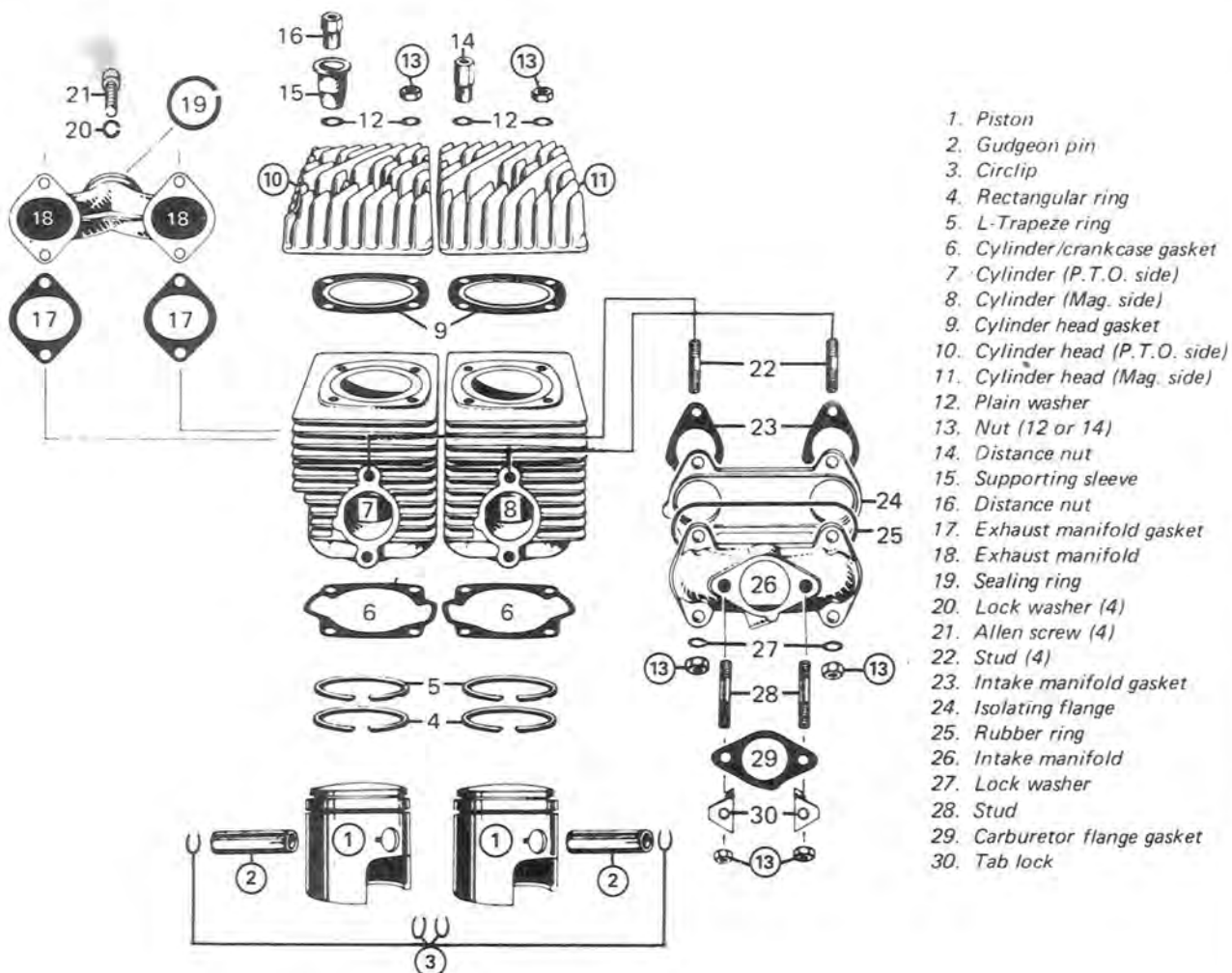
## SECTION 04

### SUB-SECTION 02 (TWO CYLINDER ENGINE)

#### BOTTOM END

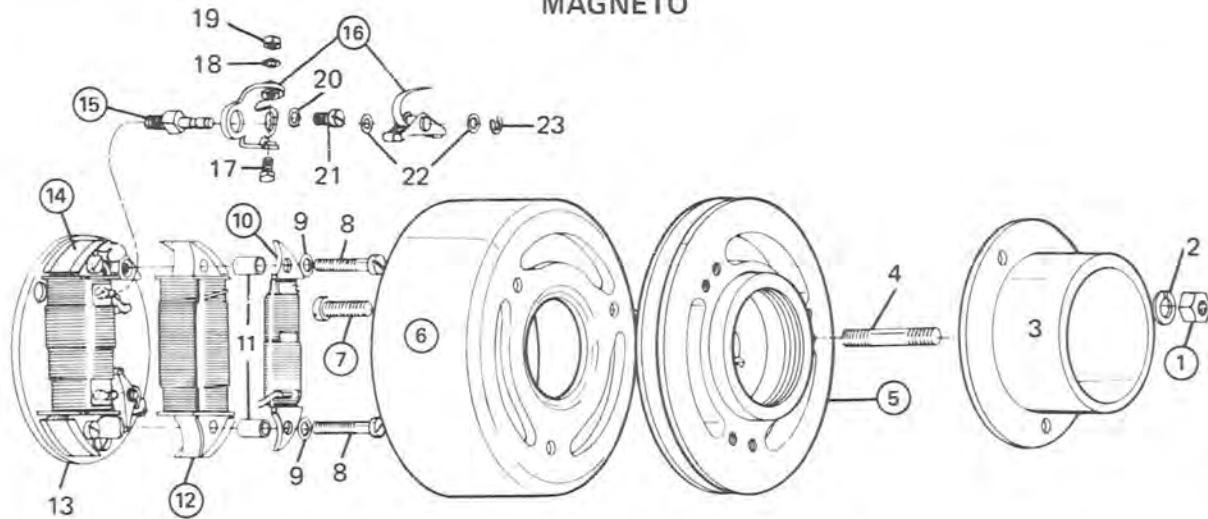
- |                                       |                                   |                               |
|---------------------------------------|-----------------------------------|-------------------------------|
| 1. Crankshaft                         | 15. Magneto retaining nut         | 29. Lock washer (2)           |
| 2. "O" ring (4 or 6)                  | 16. Labyrinth sealing ring        | 30. Nut (2)                   |
| 3. Woodruff key                       | 17. Crankcase lower half          | 31. Spacer (4, if applicable) |
| 4. Needle bearing                     | 18. Dowel pin                     | 32. Stud (4)                  |
| 5. Ball bearing (2 or 3)              | 19. Crankcase upper half          | 33. Lock washer (4)           |
| 6. Retaining disc                     | 20. Cylinder stud                 | 34. Nut (4)                   |
| 7. Distance sleeve (6 mm - .232")     | 21. Crankcase stud (294 only) (2) | 35. Capacitor (2)             |
| 8. Distance sleeve (12 mm - .0472")   | 22. Crankcase stud (8)            | 36. Screw (2)                 |
| 9. Oil seal (P.T.O.)                  | 23. Crankcase stud (2)            | 37. Nut (2)                   |
| 10. Distance sleeve (17.7 mm - .697") | 24. Clamp                         | 38. Ignition coil             |
| 11. Distance sleeve (9.7 mm - .382")  | 25. Cap                           | 39. Lock washer (6)           |
| 12. Shim(s)                           | 26. Spring washer (8 or 10)       | 40. Screw (6)                 |
| 13. Oil seal (Mag)                    | 27. Lock washer (8 or 10)         | 41. Ignition box cover        |
| 14. Lock washer                       | 28. Nut (8 or 10)                 | 42. Screw                     |

#### TOP END



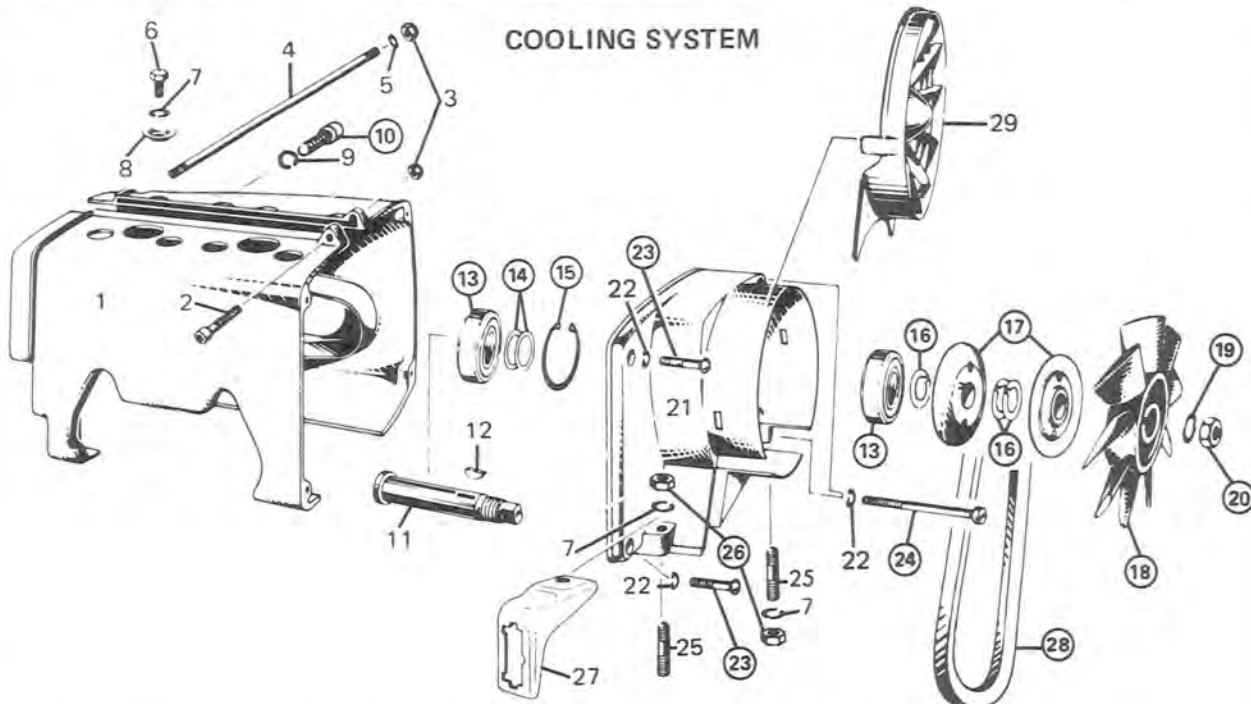
SECTION 04  
SUB-SECTION 02 (TWO CYLINDER ENGINE)

MAGNETO



- |                    |                      |                             |                       |                    |
|--------------------|----------------------|-----------------------------|-----------------------|--------------------|
| 1. Nut (3)         | 6. Magneto ring      | 11. Spacer                  | 15. Pivot pin         | 20. Washer         |
| 2. Lock washer (3) | 7. Screw (3)         | 12. Ignition generator coil | 16. Breaker point set | 21. Screw          |
| 3. Starting pulley | 8. Screw (4)         | 13. Armature plate          | 17. Bolt              | 22. Washer         |
| 4. Stud (3)        | 9. Spring washer (4) | 14. Lighting coil           | 18. Lock washer       | 23. Retaining clip |
| 5. Magneto housing | 10. Brake light coil |                             | 19. Nut               |                    |

COOLING SYSTEM



- |                         |                         |                        |                     |                            |
|-------------------------|-------------------------|------------------------|---------------------|----------------------------|
| 1. Cylinder cowl        | 7. Lock washer          | 13. Ball bearing       | 19. Lock washer     | 25. Stud                   |
| 2. Allen screw          | 8. Cowl retainer washer | 14. Shim (1 mm/.040")  | 20. Fan nut         | 26. Nut                    |
| 3. Elastic stop nut (3) | 9. Spring washer        | 15. Locking ring       | 21. Fan housing     | 27. Junction block bracket |
| 4. Stud (2)             | 10. Allen screw         | 16. Shim (as required) | 22. Lock washer (4) | 28. Fan belt               |
| 5. Washer (2)           | 11. Fan shaft           | 17. Pulley half        | 23. Screw           | 29. Fan cover              |
| 6. Bolt                 | 12. Woodruff key        | 18. Fan                | 24. Screw (2)       |                            |

## SECTION 04

### SUB-SECTION 02 (TWO CYLINDER ENGINE)

#### REMOVAL

Remove or disconnect the following, then lift engine from vehicle.

##### Front-mounted engine

- Drive belt
- Muffler
- Rewind starter
- Air silencer
- Choke cable
- Throttle cable
- Fuel lines at carburetor

*Note: Secure fuel lines to steering support so that the opened ends are higher than the fuel tank.*

- Electrical connector
- Engine mount nuts

##### Center mounted engine

- Drive belt
- Muffler
- Choke knob
- Throttle cable
- Fuel lines
- Electrical connectors
- Steering column support at upper column
- Engine mount nuts

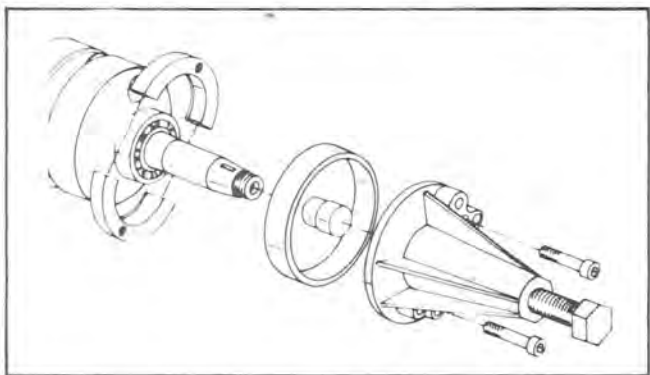
#### DISASSEMBLY & ASSEMBLY

If necessary, remove drive pulley as described in drive pulley section.

*Note: Refer to Technical Data Section for component fitted tolerance and wear limit.*

##### Bottom end

⑤ To remove bearing from crankshaft use a protective cap and special puller as illustrated. (See Tool Section).



*Note: Prior to magneto side bearing installation, determine crankshaft end-play and install required shim(s) on crankshaft extension.*

At assembly, place bearings into an oil container and heat the oil to 200° F. for 5 to 10 min. This will expand the bearings and permit them to slide easily on the shaft. Install bearings with groove outward.

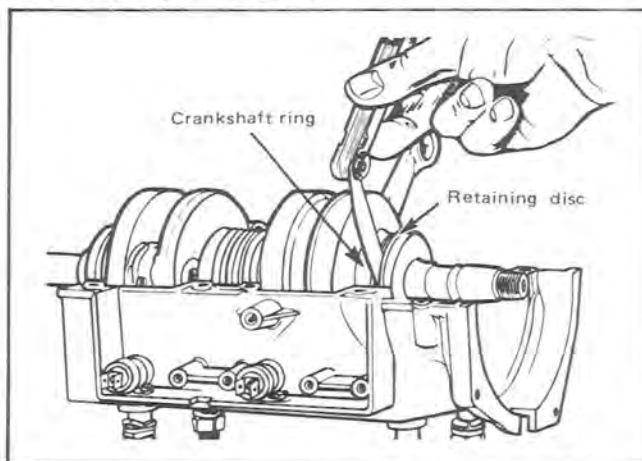
⑫ Crankshaft end-play is adjusted with a shim(s) located between crankshaft and magneto side bearing. To determine correct amount of shim, proceed as follows.

Remove magneto side bearing and existing shim(s). Slide the appropriate crankshaft ring and retaining disc onto the crankshaft. (See Tool Section).

Position crankshaft assembly into crankcase lower half, making sure that retaining discs are correctly seated into the grooves.

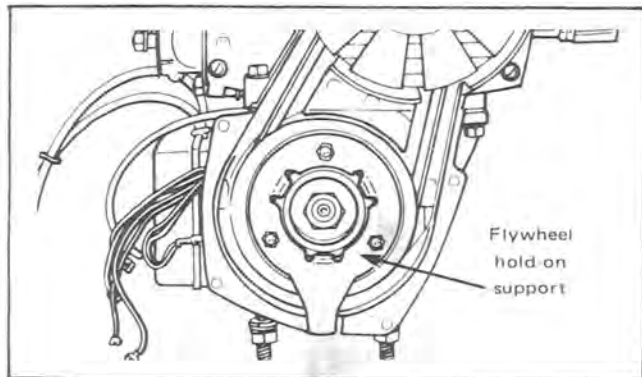
Gently tap crankshaft until P.T.O. side bearing bears against retaining disc.

Any free-play between the crankshaft ring and magneto side retaining disc, minus recommended end-play, is the distance to be covered by shim(s). Shims are available in thickness of 0.1 mm/.004", 0.2 mm/.008", 0.3 mm/.012", 0.5 mm/.020", 1 mm/.039".



*Note: Crankshaft end-play is adjusted only when crankshaft and/or crankcase is replaced.*

⑮ To remove or install magneto retaining nut, lock crankshaft in position with special hold-on support as illustrated. (See Tool Section).





## SECTION 04

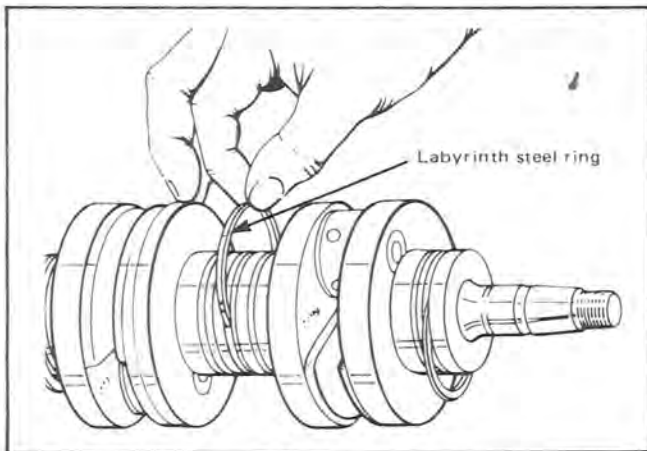
### SUB-SECTION 02 (TWO CYLINDER ENGINE)

At assembly torque retaining nut to 42-50 ft-lb.

⑮ To increase sealing between left and right crankcase halves, on engine equipped with an external labyrinth seal, a steel ring is available, (part no. 414-2072).

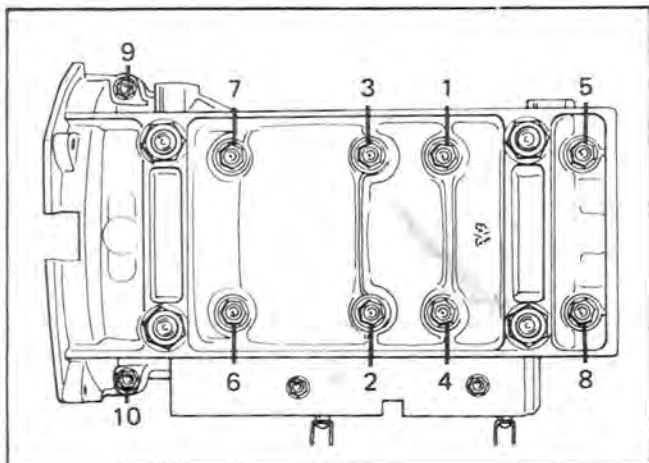
Prior to installation, the steel ring must be stretched open. To do this, slide the ring onto the neck of a soft drink bottle (2 1/2" outside diameter).

Install steel ring on crankshaft labyrinth as illustrated.



⑰ ⑲ ⑳ Crankcase halves are factory matched and therefore, are not interchangeable or available as single halves.

Prior to joining of crankcase halves, apply a light coat of "Loctite" crankcase sealant to mating surfaces of bottom half. Position spring washers, lock washers and nuts on crankcase studs then torque nuts to 14-16 ft-lb following illustrated sequence.



*Note: Torque the two smaller nuts on magneto side to 9 ft-lb.*

②④ At assembly torque crankcase/support nut to 23-29 ft.-lb.

**Top end**

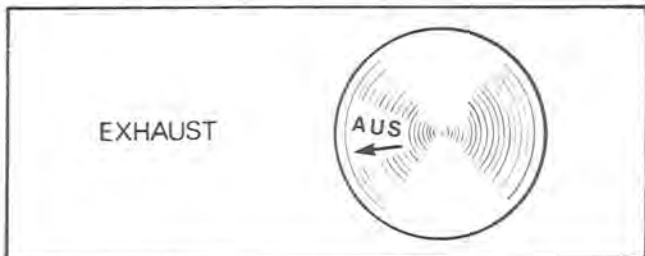
① ② ③ Place a clean cloth over crankcase to prevent circlip from falling into crankcase. Use a pointed tool to re-

move circlip from piston.

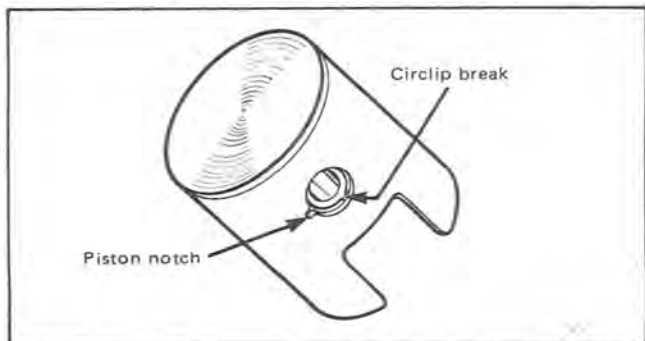
Drive the gudgeon pins in or out using a suitable drive punch and hammer.

**Caution:** When tapping gudgeon pin in or out of piston, hold piston firmly in place to eliminate the possibilities of transmitting shock and pressure to the connecting rod.

At assembly, place the pistons over the connecting rods with the letters "AUS", over an arrow on the piston dome, facing in direction of the exhaust port.



*Note: Once circlips are installed, turn each circlip so that the circlip break is not directly on piston notch. Remove any burrs on piston caused through circlip installation with very fine emery cloth.*



⑩ ⑪ To insure correct cylinder alignment, install and secure intake and exhaust manifolds on cylinder prior to cylinder head tightening. Cross torque cylinder head nuts to 14-16 ft-lb.

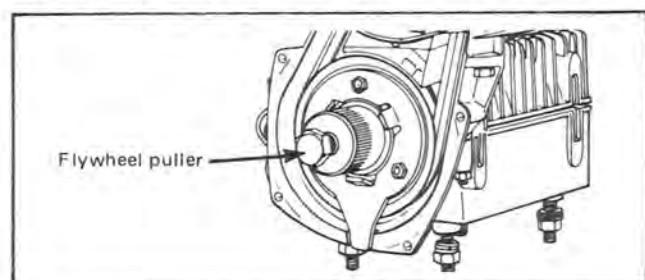
*Note: Torque each head individually.*

⑬ At assembly, torque to 14-16 ft-lb.

**Magneto**

① At assembly torque to 9 ft-lb.

⑤ ⑥ ⑦ With magneto retaining nut removed and hold-on



## SECTION 04

### SUB-SECTION 02 (TWO CYLINDER ENGINE)

support in place, install special puller onto hub. Tighten puller bolt and at same time, tap bolt head using a hammer to release magneto from its taper. (See Tool Section)

*Note: Do not separate magneto housing from magneto ring unless necessary. At assembly, apply Loctite, "Lock'n Seal" on magneto housing hub where magneto ring center bore sits.*

⑩ ⑫ ⑭ When a coil is replaced, the air gap between magnet and armature must be adjusted.

To check air gap insert a feeler of correct thickness (.025 mm/.010"-.039 mm/.015") between magnet and each armature end.



If necessary to adjust, slacken retaining screw and relocate coil.

⑮ Do not remove pivot pin unless replacement is needed. At assembly, apply Loctite "Lock'n Seal" on threads.

⑯ When replacing breaker point set, apply a light coat of grease on pivot pin and rubbing block. Recheck engine timing.

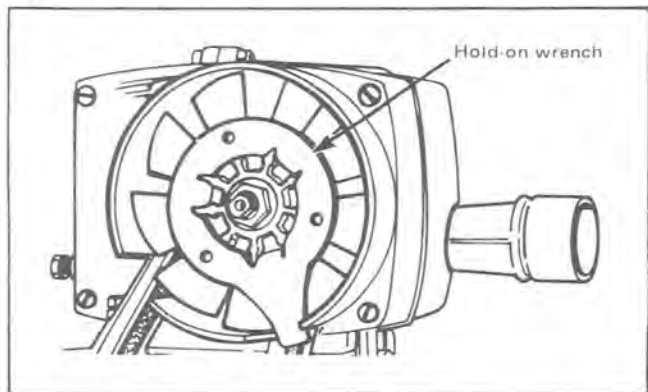
#### Cooling system

⑩ ②③ ②④ ②⑥ At assembly, apply Loctite "Lock'n Seal" on threads to prevent loosening through vibration.

*Note: To correctly remove a "Loctite" locked screw, it is necessary to slightly tap on head of screwdriver to break bond.*

⑬ ⑭ ⑮ To remove or install bearing, heat bearing housing to 140°-160°F.

⑯ ⑰ ⑱ ⑲ ⑲ ⑲ ⑲ ⑲ To remove or install fan retaining nut, lock fan in position with fan holder wrench. (See Tool Section).



At assembly, torque retaining nut to 42-50 ft-lb. Make sure that belt is not squeezed between pulley halves.

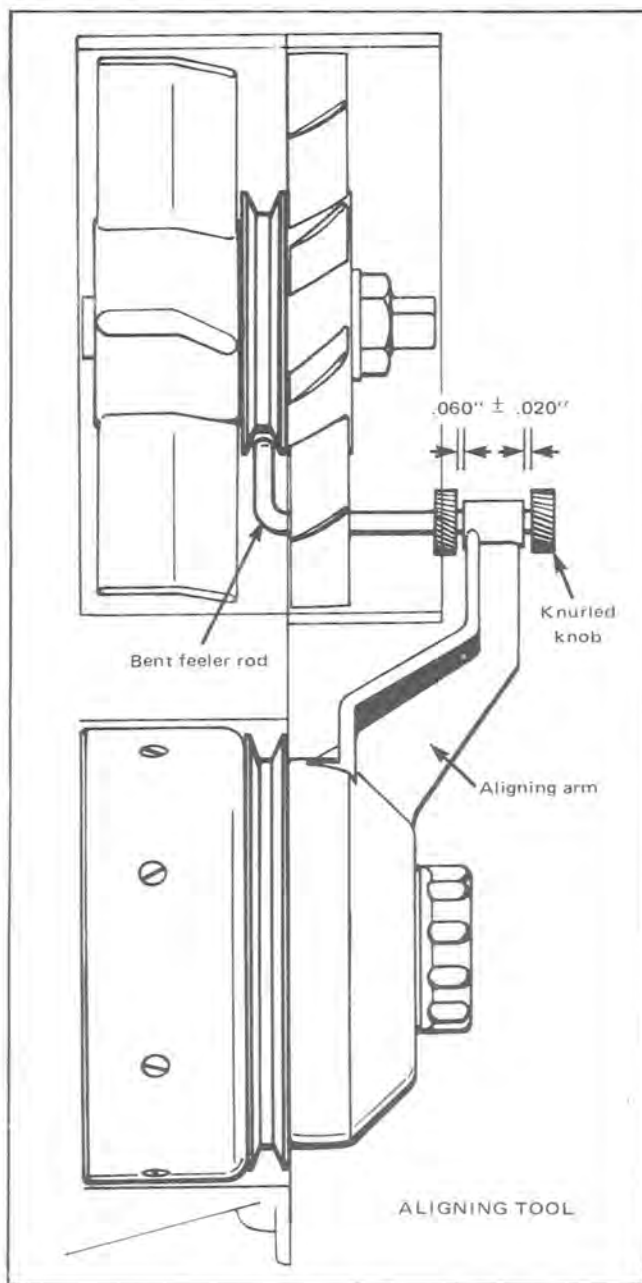
Correct fan belt free-play is 1/4". To adjust, add or remove shim(s) between inner and outer pulley halves. Excess shim(s) must be positioned between outer pulley half and fan.

#### Fan belt alignment

For reliable fan belt operation, the two fan belt pulleys must lie within .020" of either side of the pulley center line.

Prior to checking alignment, check fan belt free-play.

Position and secure aligning tool (See Tool Section) on magneto housing as illustrated.





Turn knurled knob to center bent feeler rod between pulley halves. Insert a .040" feeler gauge between tool arm and knurled knobs. If gauge fits between both sides of the arms, the setting lies within tolerance.

If clearance is smaller than .040" on one side, shim(s) must be added or removed between bearing and inner pulley half to bring both gaps within tolerance of .060"  $\pm$  .020".

Excess shim(s) should be stored between outer pulley half and fan.

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## CLEANING

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Discard all oil seals, gaskets and "O" rings.

Clean all metal components in a non-ferrous metal cleaner.

**Caution:** Clean armature with a clean cloth only.

Scrape carbon formation from cylinder exhaust ports, cylinder heads and piston domes.

*Note: The letter "AUS" over an arrow on the piston dome must be visible after cleaning.*

Clean the piston ring grooves with a groove cleaner tool, and/or a piece of broken ring.

Remove old sealant from mating surfaces of crankcase with a scraper blade.

**Caution:** Never use a sharp object to scrape away old sealant as score marks incurred are detrimental to crankcase sealing.

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## INSTALLATION

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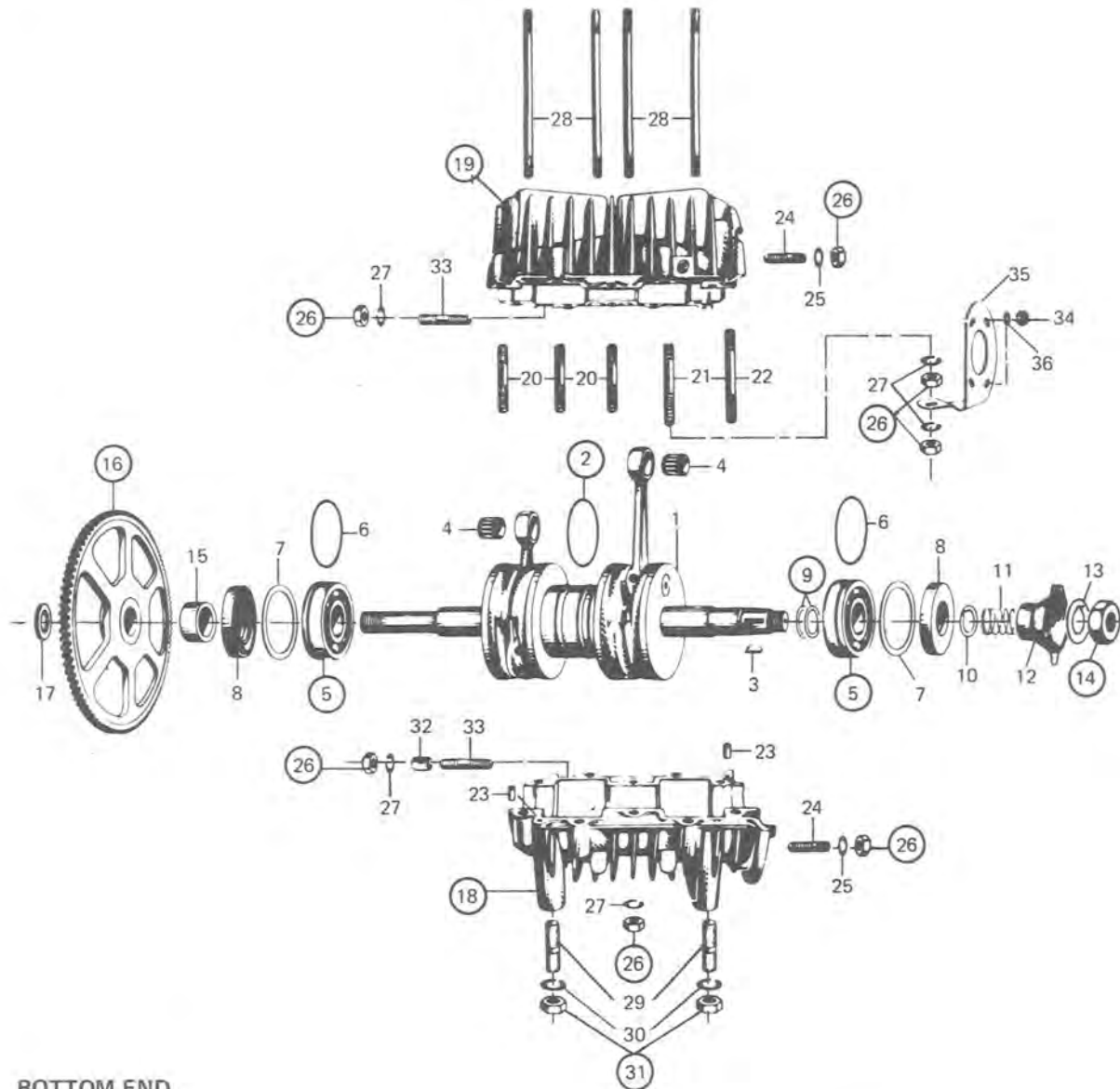
To install engine on vehicle, inverse removal procedure. However, pay attention to the following:

- Torque engine mount nuts to 18-23 ft-lb.
- After throttle cable installation, check carburetor maximum throttle opening.
- Check pulley alignment.
- Check ignition timing.



SECTION 04  
SUB-SECTION 02 (TWO CYLINDER ENGINE)

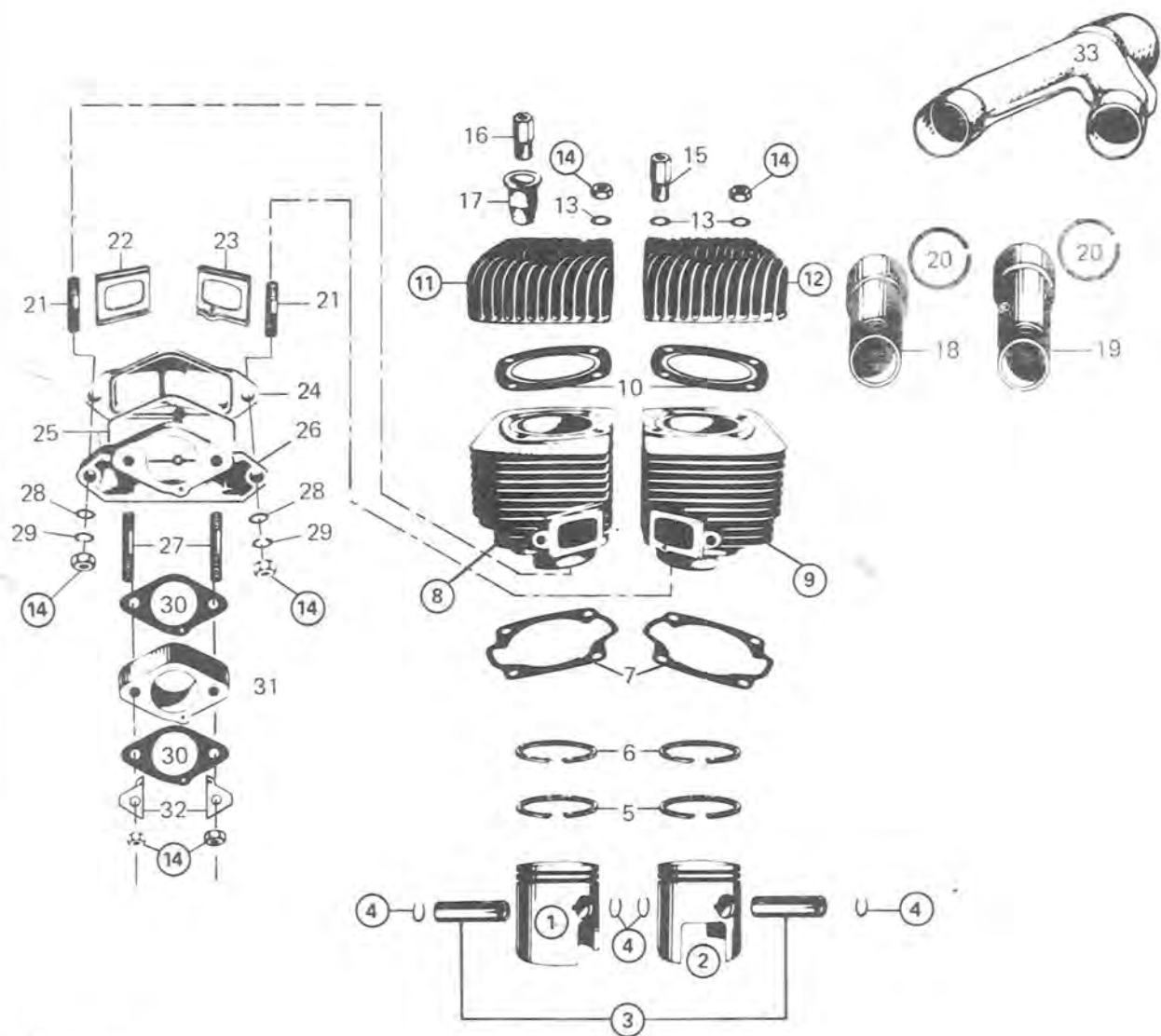
305, 338, 343, 401 ENGINE TYPE



BOTTOM END

- |                       |                           |                          |                                |
|-----------------------|---------------------------|--------------------------|--------------------------------|
| 1. Crankshaft         | 10. Washer                | 19. Upper crankcase half | 28. Cylinder head stud (8)     |
| 2. "O" ring (3)       | 11. Spring                | 20. Crankcase stud (7)   | 29. Crankcase/support stud (4) |
| 3. Woodruff Key       | 12. Breaker point cam     | 21. Crankcase stud       | 30. Lock washer (4)            |
| 4. Needle bearing     | 13. Tab washer            | 22. Crankcase stud (2)   | 31. Nut (4)                    |
| 5. Ball bearing       | 14. Magneto retaining nut | 23. Dowel pin            | 32. Dowel tube                 |
| 6. "O" ring           | 15. Distance sleeve       | 24. Stud (4)             | 33. Crankcase/starter stud     |
| 7. Retaining disc     | 16. Starter gear          | 25. Lock washer (4)      | 34. Nut (2)                    |
| 8. Oil seal           | 17. Washer (3 mm/0.118")  | 26. Nut (17)             | 35. Starter bracket            |
| 9. Shim (as required) | 18. Lower crankcase half  | 27. Lock washer (13)     | 36. Washer (2)                 |

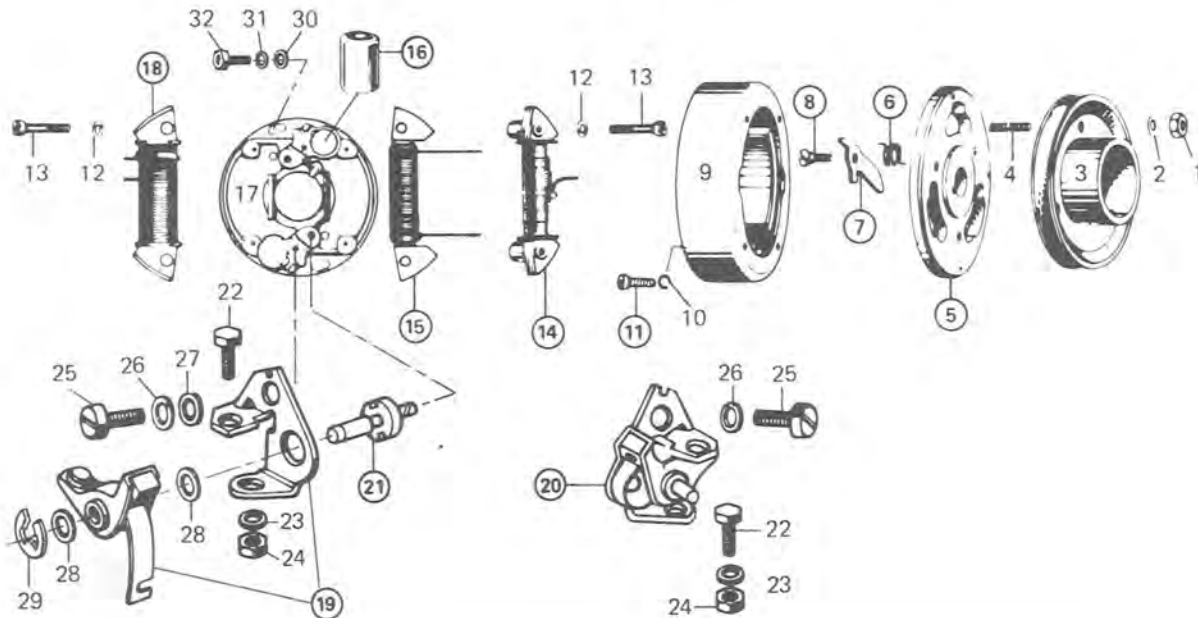
**SECTION 04**  
**SUB-SECTION 02 (TWO CYLINDER ENGINE)**



**TOP END**

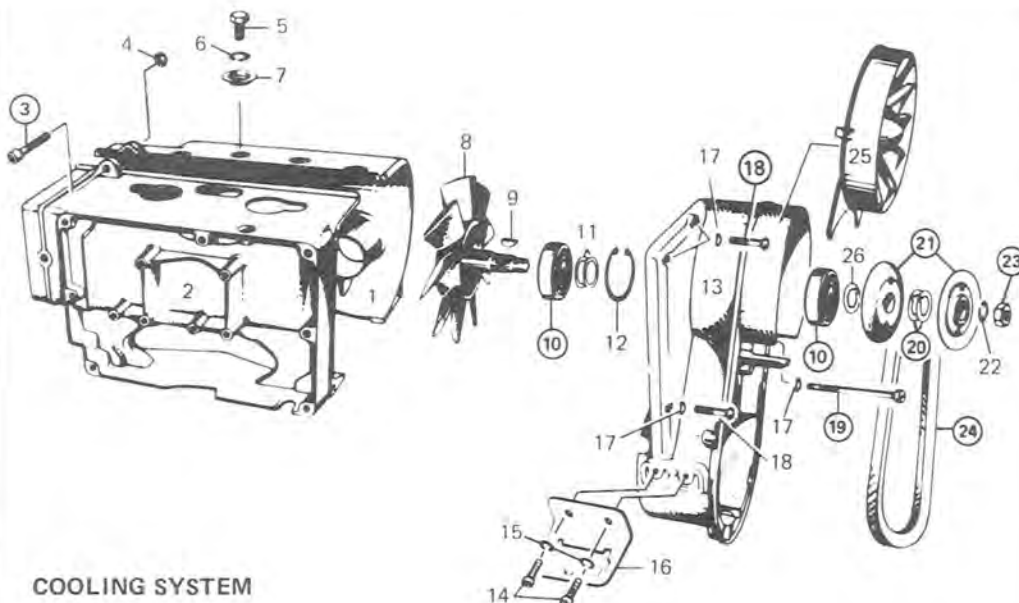
- |                                 |  |                                       |
|---------------------------------|--|---------------------------------------|
| 1. Piston (P.T.O. side)         | 12. Cylinder head (Mag. side)            | 23. Intake manifold gasket (Mag side) |
| 2. Piston (Mag. side)           | 13. Plain washer (7)                     | 24. Intake manifold                   |
| 3. Gudgeon pin                  | 14. Nut (10)                             | 25. Ring gasket                       |
| 4. Circlip                      | 15. Distance nut (long)                  | 26. Intake cover                      |
| 5. Rectangular ring             | 16. Distance nut (short)                 | 27. Carburetor stud                   |
| 6. "L" or rectangular ring      | 17. Support sleeve                       | 28. Plain washer                      |
| 7. Crankcase/cylinder gasket    | 18. Exhaust socket (P.T.O. side-short)   | 29. Lock washer                       |
| 8. Cylinder (P.T.O. side)       | 19. Exhaust socket (Mag. side-long)      | 30. Flange gasket                     |
| 9. Cylinder (Mag side)          | 20. Aluminium ring                       | 31. Isolating flange                  |
| 10. Cylinder head gasket        | 21. Intake manifold stud                 | 32. Tab washer                        |
| 11. Cylinder head (P.T.O. side) | 22. Intake manifold gasket (P.T.O. side) | 33. Exhaust manifold                  |

**SECTION 04**  
**SUB-SECTION 02 (TWO CYLINDER ENGINE)**



**MAGNETO**

- |                      |                              |                                 |                                      |                    |
|----------------------|------------------------------|---------------------------------|--------------------------------------|--------------------|
| 1. Nut (3)           | 8. Bearing screw             | 15. Ignition generator coil     | 20. Beaker point (unit construction) | 26. Lock washer    |
| 2. Lock washer (3)   | 9. Magneto ring              | 16. Capacitor (2)               | 21. Pivot pin                        | 27. Plain washer   |
| 3. Fan belt pulley   | 10. Lock washer (4)          | 17. Armature plate              | 22. Bolt                             | 28. Washer         |
| 4. Stud (3)          | 11. Allen screw (4)          | 18. Lighting coil (75W or 100W) | 23. Lock washer                      | 29. Retaining clip |
| 5. Magneto housing   | 12. Lock washer (4)          | 19. Breaker point set           | 24. Nut                              | 30. Washer (2)     |
| 6. Spring            | 13. Coil retaining screw (4) |                                 | 25. Screw                            | 31. Lock washer    |
| 7. Centrifugal lever | 14. Brake light coil (23W)   |                                 |                                      | 32. Allen screw    |



**COOLING SYSTEM**

- |                            |
|----------------------------|
| 1. Rear cylinder cowl      |
| 2. Front cylinder cowl     |
| 3. Allen screw (2)         |
| 4. Nut (2)                 |
| 5. Bolt                    |
| 6. Lock washer             |
| 7. Cowl cover              |
| 8. Fan                     |
| 9. Woodruff key            |
| 10. Ball bearing           |
| 11. Spacer (2)             |
| 12. Locking ring           |
| 13. Fan housing            |
| 14. Screw                  |
| 15. Lock washer            |
| 16. Junction block bracket |
| 17. Spring washer (4)      |
| 18. Flat head screw (3)    |
| 19. Screw                  |
| 20. Shim (5)               |
| 21. Pulley half            |
| 22. Lock washer            |
| 23. Nut                    |
| 24. Fan belt               |
| 25. Fan cover              |
| 26. Spacer                 |

## SECTION 04

### SUB-SECTION 02 (TWO CYLINDER ENGINE)

#### REMOVAL

Remove or disconnect the following then lift engine out of vehicle.

##### Front-mounted engine

- Drive belt
- Muffler
- Rewind starter
- Air silencer
- Choke cable
- Throttle cable
- Fuel lines at carburetor

*Note: Secure fuel line to steering support so that the opened ends are higher than the fuel tank.*

- Electrical connector

**Caution:** On electric start model, disconnect negative cable (ground) from battery post **before** disconnecting other wires.

- Engine mount nuts.

##### Center mounted engine

- Drive belt
- Muffler
- Choke knob
- Throttle cable
- Fuel lines
- Electrical connector

**Caution:** On electric start model, disconnect negative cable (ground) from battery post **before** disconnecting other wires.

- Separate steering column support at upper column
- Engine mount nuts.

#### DISASSEMBLY & ASSEMBLY

If necessary, remove drive pulley as described in drive pulley section.

*Note: Refer to Technical Data Section for component fitted tolerance and wear limit.*

##### Bottom End

- ② The center "O" ring/ball bearing combination may vary depending on production date of engine.

For correct assembly, refer to the following chart for identification.

Ball bearing Groove Depth	"O" Ring		
	Thickness	Outside Diameter	Part Number
.059" to .063"	.078"	2 5/16"	420 830 350
.047" to .051"	.070"	2 1/8"	420 830 355

- ⑤ To remove bearing from crankshaft, use a protective cap and special puller, as illustrated. (See Tool Section).

Prior to installation, place bearings into an oil container and heat the oil to 200 ° F. for 5 to 10 min. This will expand

bearing and ease installation.

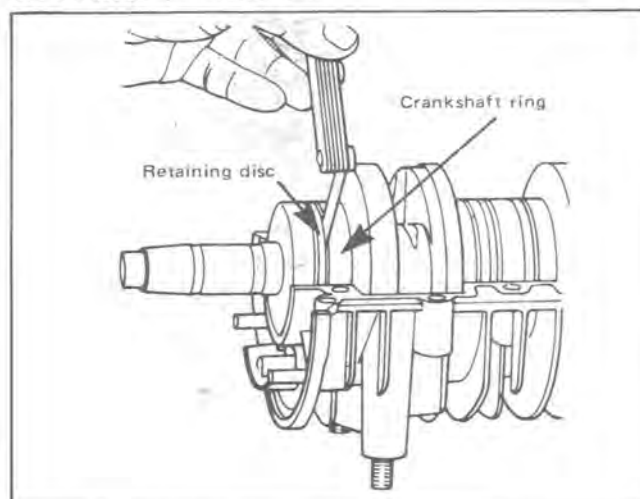
Install bearings with groove outward.

- ⑨ Crankshaft end-play is adjusted with shim(s) located between crankshaft and magneto side bearing. To determine correct amount of shim(s), proceed as follows. Remove magneto side bearing and existing shim(s). Slide the appropriate crankshaft ring and the retaining disc on the crankshaft. (See Tool Section).

Position crankshaft assembly into crankcase lower half. Make sure that retaining washers are correctly seated in the grooves.

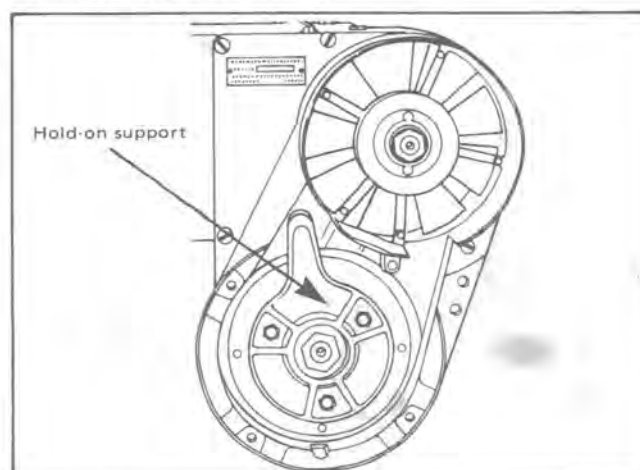
Gently tap crankshaft counterweight until P.T.O. side bearing bears against retaining disc.

Any free-play between the crankshaft ring and magneto side retaining disc minus recommended end-play is the distance to be covered by shim(s). Shims are available in thickness of 0.1 mm/.004", .02 mm/.008", 0.3 mm/.012", 0.5 mm/.020", 1 mm/.039".



*Note: Crankshaft end-play requires adjustment only when crankshaft and/or crankcase is replaced.*

- ⑭ To remove or install magneto retaining nut, lock crankshaft in position with special hold-on support as illustrated. (See Tool Section).

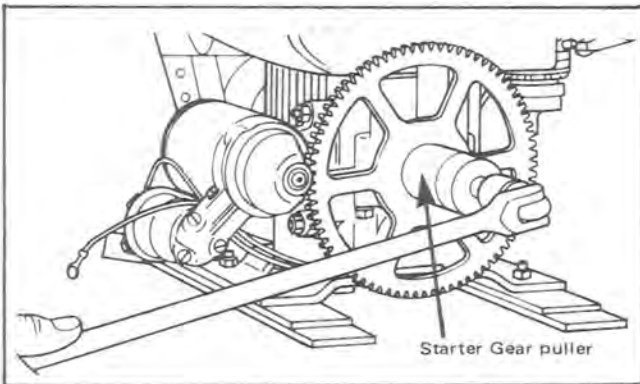




## SECTION 04 SUB-SECTION 02 (TWO CYLINDER ENGINE)

At assembly torque retaining nut to 50-58 ft-lbs.

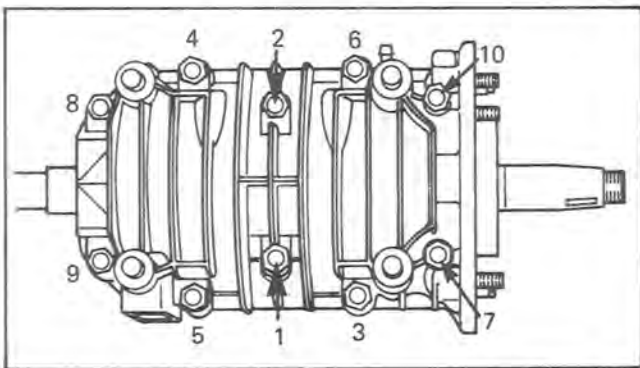
(16) To remove starter gear from crankshaft it may be necessary to use a special puller as illustrated. (See Special Tool).



At assembly, apply a light coat of anti-seize compound on crankshaft extension nearest starter gear.

(18) (19) Prior to joining of crankcase halves, apply a light coat of "Loctite" crankcase sealant to the mating surfaces of the bottom half.

Position spring washers and nuts on crankcase studs then torque nuts to 14-16 ft-lbs., following illustrated sequence.



(26) At assembly, torque to 14-16 ft-lbs.

(31) At assembly, torque crankcase/support nut to 23-29 ft-lbs.

### Top End

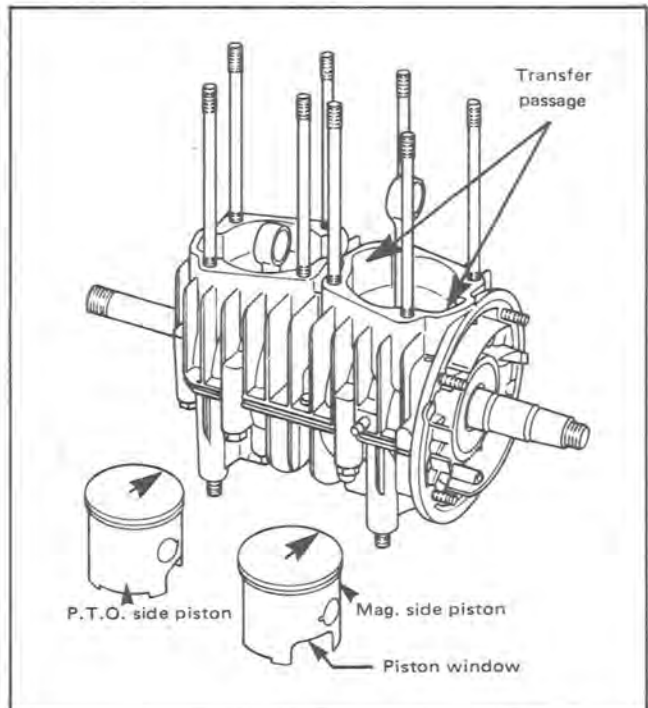
(1) (2) (3) (4) Place a clean cloth over crankcase to prevent circlip from falling into crankcase. Use a pointed tool to remove circlips from piston.

**Caution:** When tapping out gudgeon pins, hold piston firmly in place to eliminate the possibilities of transmitting shock and pressure to the connecting rod.

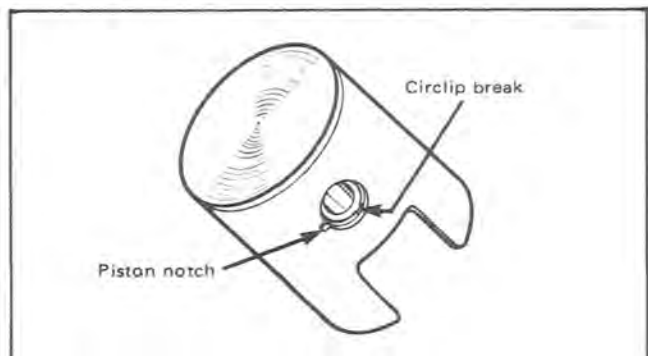
At assembly, place the pistons over the connecting rods with the letters "AUS", over an arrow on the piston dome, facing in direction of the exhaust port.



Also make sure that the piston window is aligned with the crankcase transfer passage when the gudgeon pin orifice is in-line with the connecting rod bore.



*Note: Once the circlips are installed turn each circlip so the circlip is not directly on piston notch. Remove any burrs on piston caused through circlip installation with very fine emery cloth.*



## SECTION 04

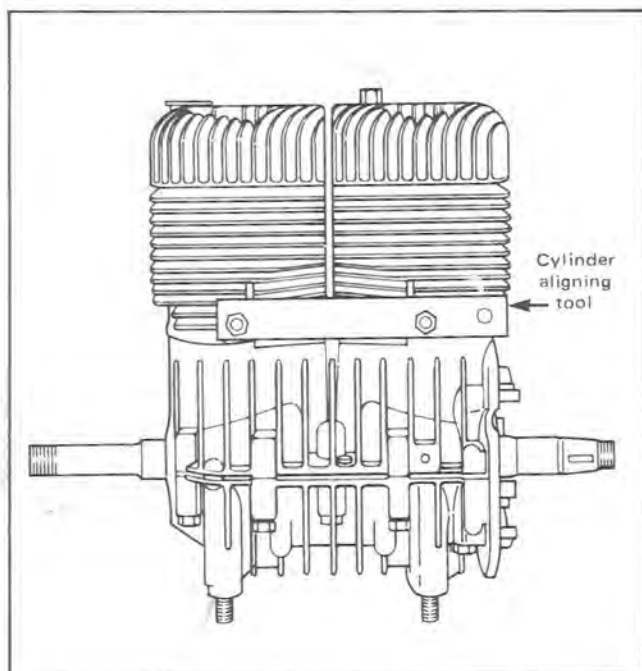
### SUB-SECTION 02 (TWO CYLINDER ENGINE)

⑧ ⑨ ⑩ ⑪ ⑫ When installing cylinder and or cylinder head, the cylinder aligning tool must be used to ensure sealing of intake manifold and cylinders. (See Tool Section). Install exhaust manifold on exhaust socket then install aligning bar and torque distance nut to 14-16 ft-lbs.

Cross torque cylinder head nut to 14-16 ft-lbs. Remove aligning bar and exhaust manifold.

*Note: Torque each cylinder head individually.*

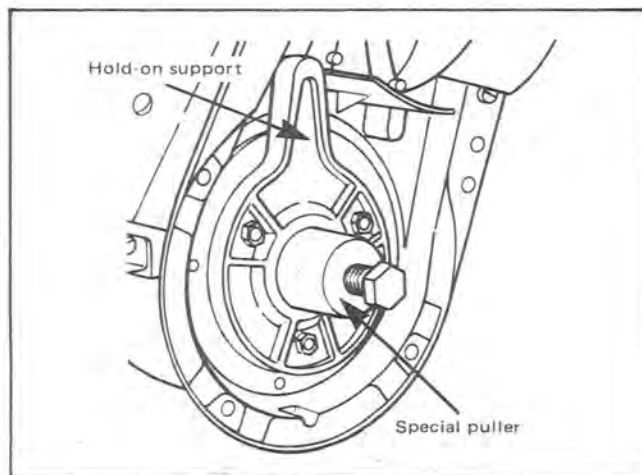
⑭ At assembly, torque to 14-16 ft-lbs.



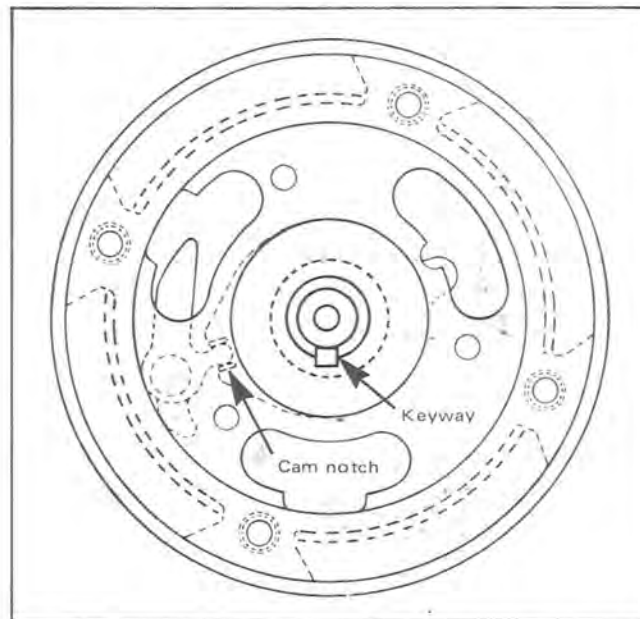
#### Magneto

⑤ With magneto retaining nut removed and hold-on support in place, install special puller onto hub.

Tighten puller nut and at same time, tap on nut head using a hammer to release magneto from its taper.



At assembly, position magneto on crankshaft with the keyway and the cam notch position as illustrated.



⑥ ⑦ ⑧ At assembly, apply a small amount of low temperature grease into spring seating.

⑪ At assembly, apply Loctite "Lock'n Seal" on retaining screw threads.

⑭ ⑮ ⑯ Whenever a coil is replaced, the air gap (distance between magnet and armature end) must be adjusted.

To check air gap, insert a feeler gauge of correct thickness (0.31 mm/.012"-0.45 mm/.018") between magnet and armature ends.

If necessary to adjust, slacken retaining screw and relocate armature.



## SECTION 04

### SUB-SECTION 02 (TWO CYLINDER ENGINE)

⑮ To replace a capacitor, it is first necessary to unsolder the two (2) black leads using a soldering iron. The capacitor can then be driven out of the armature plate using a suitable punch and hammer. To reinstall, inverse procedure.

⑲ ⑳ When replacing breaker point set, apply a **light** coat of grease on pivot pin and rubbing block.

Do not remove pivot pin unless replacement is needed. At assembly, apply Loctite "Lock'n Seal" on threads.

㉔ When replacing unit construction type breaker point, apply a small amount of grease on rubbing block.

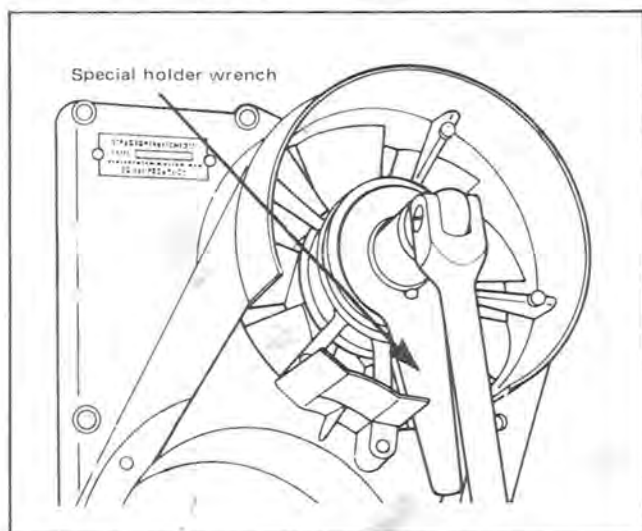
#### Cooling System

③ ⑮ ⑲ At assembly, apply a light coat of Loctite "Lock'n Seal" on threads. It should be noted that to correctly remove a Loctite locked screw, it is first necessary to slightly tap on head of screw to break Loctite bond.

The screw can then be removed. This will eliminate the possibility of screw breakage.

⑩ It is first necessary to heat bearing housing to 140° -160° F. To remove or install bearing.

㉔ ㉕ ㉖ ㉗ Lock fan pulley with special holder wrench to remove or install pulley retaining nut. (See Tool Section).



Shim(s) located between pulley halves are used to adjust fan belt free-play. Correct free-play is 1/4". If necessary to adjust, install or remove shim(s) between pulley halves. Install excess shim(s) between outer pulley half and washer.

#### CLEANING

Discard all oil seals, gaskets and "O" rings.

Clean all metal components in a non-ferrous metal cleaner.

**Caution:** Clean armature using only a clean cloth.

Scrape off carbon formation from cylinder exhaust ports, cylinder exhaust ports, cylinder heads and piston domes.

*Note: The letter "AUS" over an arrow on the piston dome must be visible after cleaning.*

Clean the piston ring grooves with a groove cleaner tool, or with a piece of broken ring.

Remove old sealant from mating surfaces with Bombardier "Sealant stripper".

**Caution:** Never use a sharp object to scrape away old sealant as score marks incurred are detrimental to crankcase sealing.

#### INSTALLATION

To install engine on vehicle, inverse removal procedure. However, pay attention to the following:

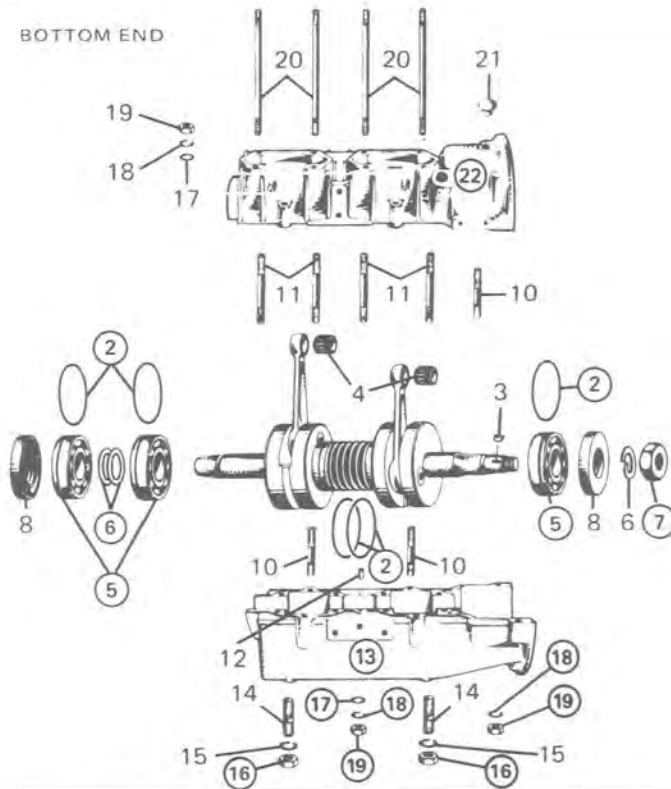
- Check ignition timing.
- Check tightness of engine mount nuts.
- After throttle cable installation, check carburetor maximum throttle opening.
- Check pulley alignment.



**SECTION 04**  
**SUB-SECTION 02 (TWO CYLINDER ENGINE)**

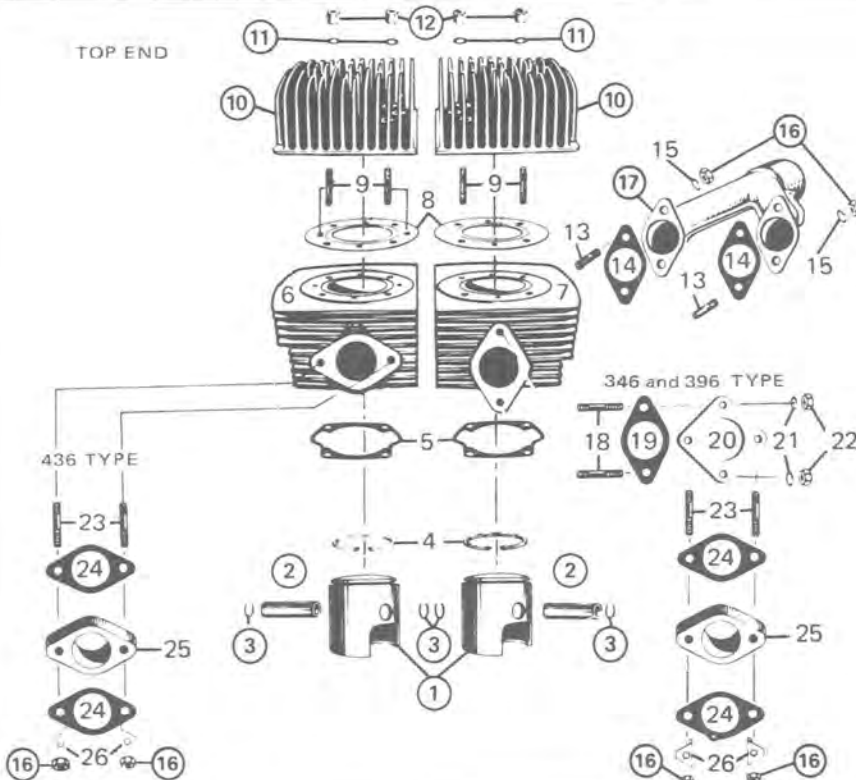
**346, 396, 436 ENGINE TYPE**

BOTTOM END



1. Crankshaft
2. "O" ring
3. Woodruff key
4. Needle bearing
5. Ball bearing
6. Lock washer
7. Magneto retaining ring nut
8. Oil seal
9. Shim (1 mm)
10. Stud (6)
11. Stud (8)
12. Dowel pin
13. Crankcase lower half
14. Stud (4)
15. Lock washer (4)
16. Nut (4), M-12
17. Spring washer (12)
18. Lock washer (14)
19. Nut (14)
20. Stud (8)
21. Rubber plug
22. Crankcase upper half

TOP END

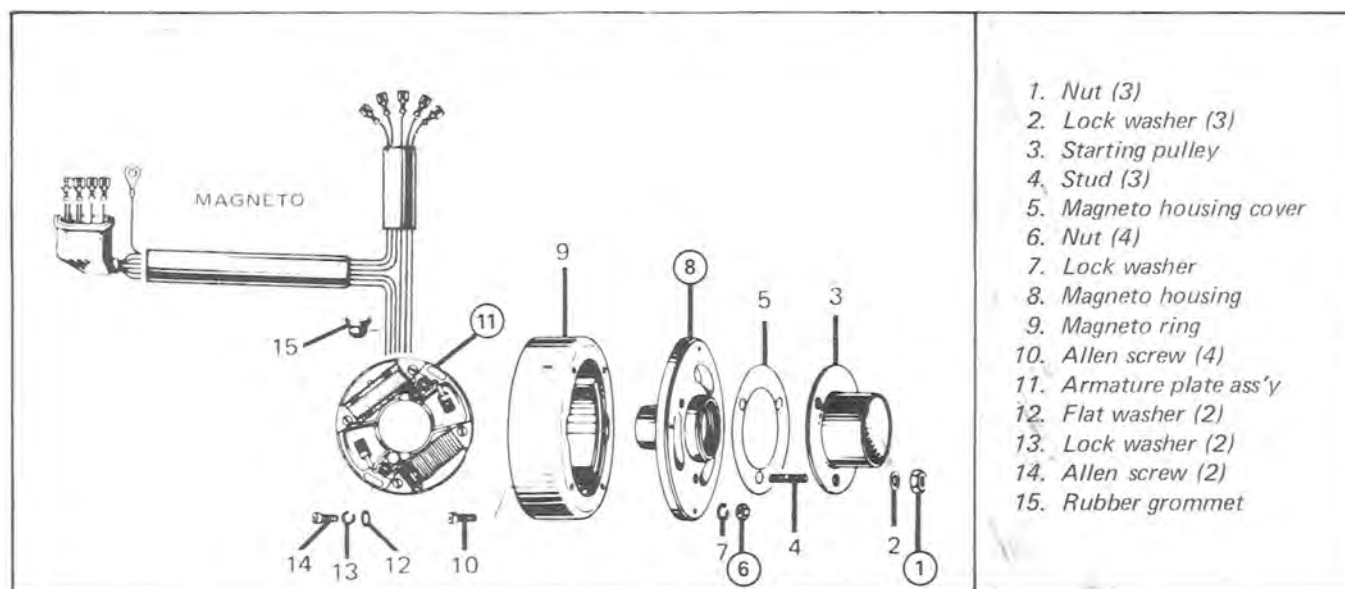


1. Piston
2. Gudgeon pin
3. Circlip
4. Piston ring
5. Cylinder/crankcase gasket
6. Cylinder (P.T.O. side)
7. Cylinder (Mag. side)
8. Cylinder head gasket
9. Cylinder head stud (4 or 8)
10. Cylinder head
11. Plain washer (12 or 16)
12. Cylinder head nut (12 or 16)
13. Exhaust manifold stud (4)
14. Exhaust manifold gasket
15. Lock washer (4)
16. Nut (8)
17. Exhaust manifold
18. Cross flange stud (4)
19. Cross flange gasket (2)
20. Cross flange (2)
21. Lock washer (4)
22. Nut (4)
23. Carburetor stud (4)
24. Flange gasket (4)
25. Isolating flange (2)
26. Lock tab (4)



## SECTION 04

### SUB-SECTION 02 (TWO CYLINDER ENGINE)



#### REMOVAL

Remove or disconnect the following, then lift engine out of vehicle.

- Drive belt
- Muffler
- Rewind starter
- Air silencer
- Choke cable
- Throttle cable
- Fuel lines at carburetor
- Engine mount nuts and washers

*Note: Secure fuel line to steering support so that the open ends are located higher than the fuel tank.*

#### DISASSEMBLY & ASSEMBLY

If necessary, removed drive pulley as described in drive pulley section.

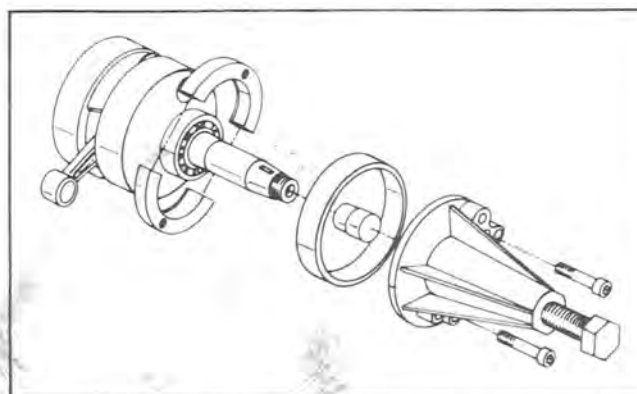
*Note: Refer to Technical Data section for component fitted tolerance and wear limit.*

#### Bottom End

②⑤ The "O" ring/ball combination between early and later production engines vary. For correct assembly, refer to the following chart identification.

Ball bearing Groove Depth	"O" Ring	
	Outside Diameter	Part no.
.059" to .063"	2 5/16"	420 830 350
.047" to .051"	2 1/8"	420 830 355

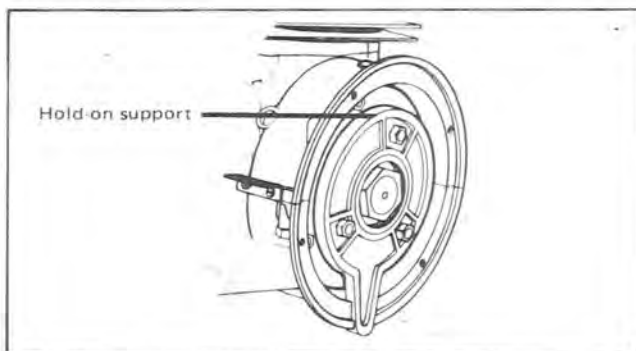
⑤⑨ To remove bearing from crankshaft use a protective cap and special puller, as illustrated. (See Tool Section).



Prior to installation, place bearings into an oil container and heat the oil to 200° F. for 5 to 10 min. (This will expand bearings and ease installation).

Install magneto side bearing with groove outward. Install the P.T.O. side bearings with groove outward. Two (2) .040" shims should be located between each bearing.

⑦ To remove or install magneto retaining nut, lock crankshaft in position with special hold-on support, as illustrated. (See Tool Section).



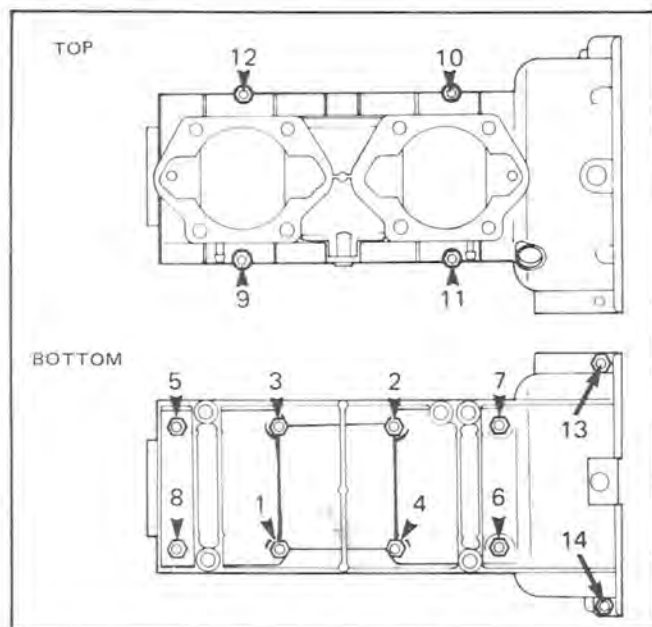


## SECTION 04

### SUB-SECTION 02 (TWO CYLINDER ENGINE)

At assembly torque magneto retaining nut to 58-62 ft/lbs.  
 (13)(17)(18)(19)(22) Prior to joining of crankcase halves, apply a light coat of "Loctite" crankcase sealant to the mating surfaces of the bottom half. Position spring washers, lock washers and nuts on crankcase studs then torque nut to 14-16 ft/lbs. following illustrated sequence.

*Note: There is no spring washer on the last two (2) magneto side studs.*



(16) Torque crankcase/support nut to 30-35 ft/lbs.

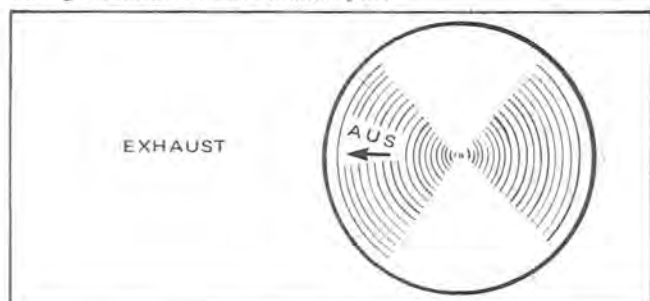
#### Top End

(1)(2)(3) Place a clean cloth over crankcase to prevent circlip from falling into crankcase then use a pointed tool to remove circlips from piston.

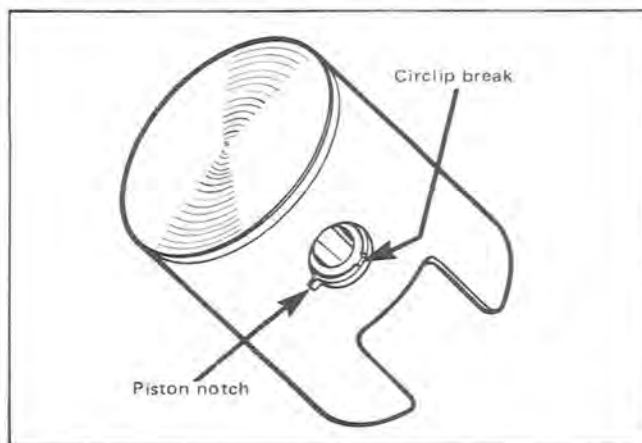
Drive the gudgeon pins in or out using a suitable drive punch and hammer.

**Caution:** When tapping gudgeon pins in or out of pistons, hold firmly in place to eliminate the possibilities of transmitting shock and pressure to the connecting rod.

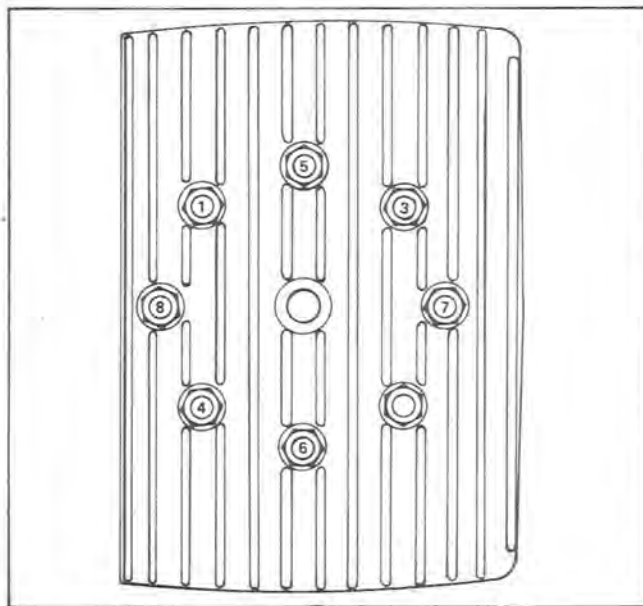
At assembly, place the pistons over the connecting rods with the letters AUS, over an arrow on the piston dome, facing direction of the exhaust port.



*Note: Once the circlips are installed, turn each circlip so that the circlip break is not directly in line with piston notch. Using very fine emery cloth, remove any burrs on piston caused through circlip installation.*



(10)(11)(12)(17) Torque cylinder head nut to 14-16 ft/lbs. following illustrated sequence.



*Note: To prevent possible distortion, install exhaust manifold prior to cylinder head tightening.*

(16)(22) At assembly torque to 14-16 ft/lbs.

#### Magneto

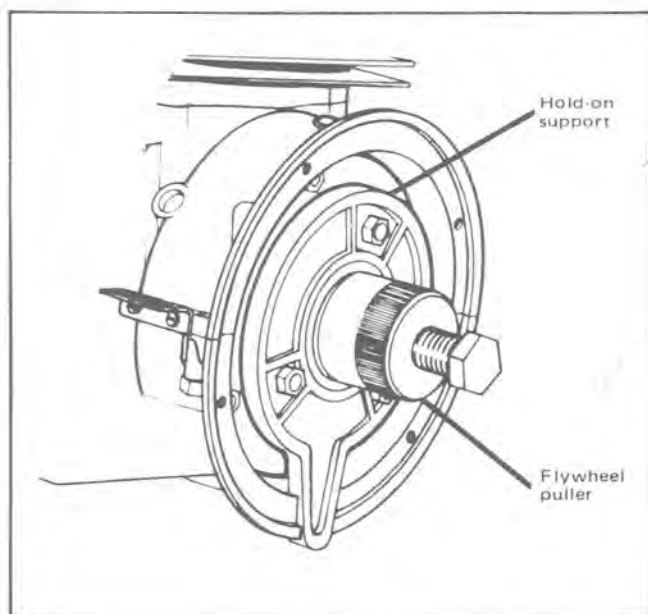
(1) At assembly torque to 14-16 ft/lbs.

(6) At assembly torque to 9 ft/lbs.

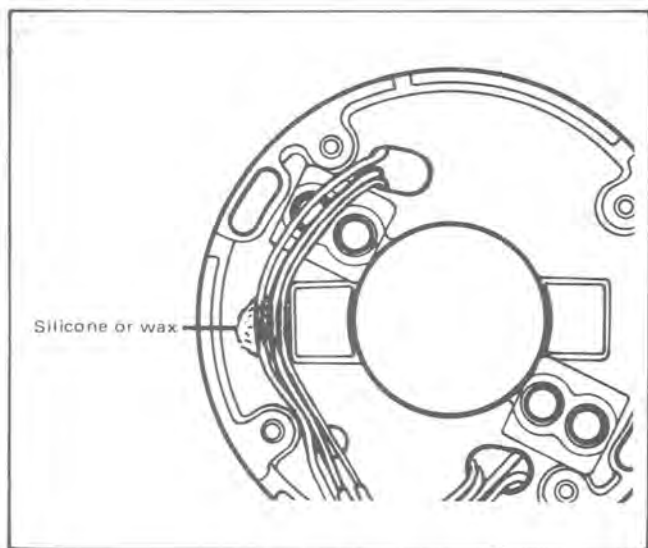
(8) With magneto retaining nut removed and hold-on support in place, install special puller onto hub. Tighten puller nut and at same time, tap on nut head using a hammer to release magneto from its taper. (See Special Tool).

## SECTION 04

### SUB-SECTION 02 (TWO CYLINDER ENGINE)



⑪ At assembly, make sure the three (3) bottom wires are positioned as illustrated to prevent squeezing. (A dab of silicon seal or a few drops of candle wax will hold them in place).



## CLEANING

Discard all oil seals, gaskets and "O" rings.

Clean all metal components using a non-ferrous metal cleaner.

**Caution:** Clean armature using only a clean cloth.

Scrape off any carbon formation from cylinder exhaust ports, cylinder heads and piston domes.

*Note: The letter AUS over an arrow on the piston dome must be visible after cleaning.*

Clean the piston ring grooves with a groove cleaner tool, or using a piece of broken ring.

Remove old sealant from mating surfaces of crankcase with a scraper blade.

**Caution:** Never use a sharp object to scrape away old sealant as score marks incurred are detrimental to crankcase sealing.

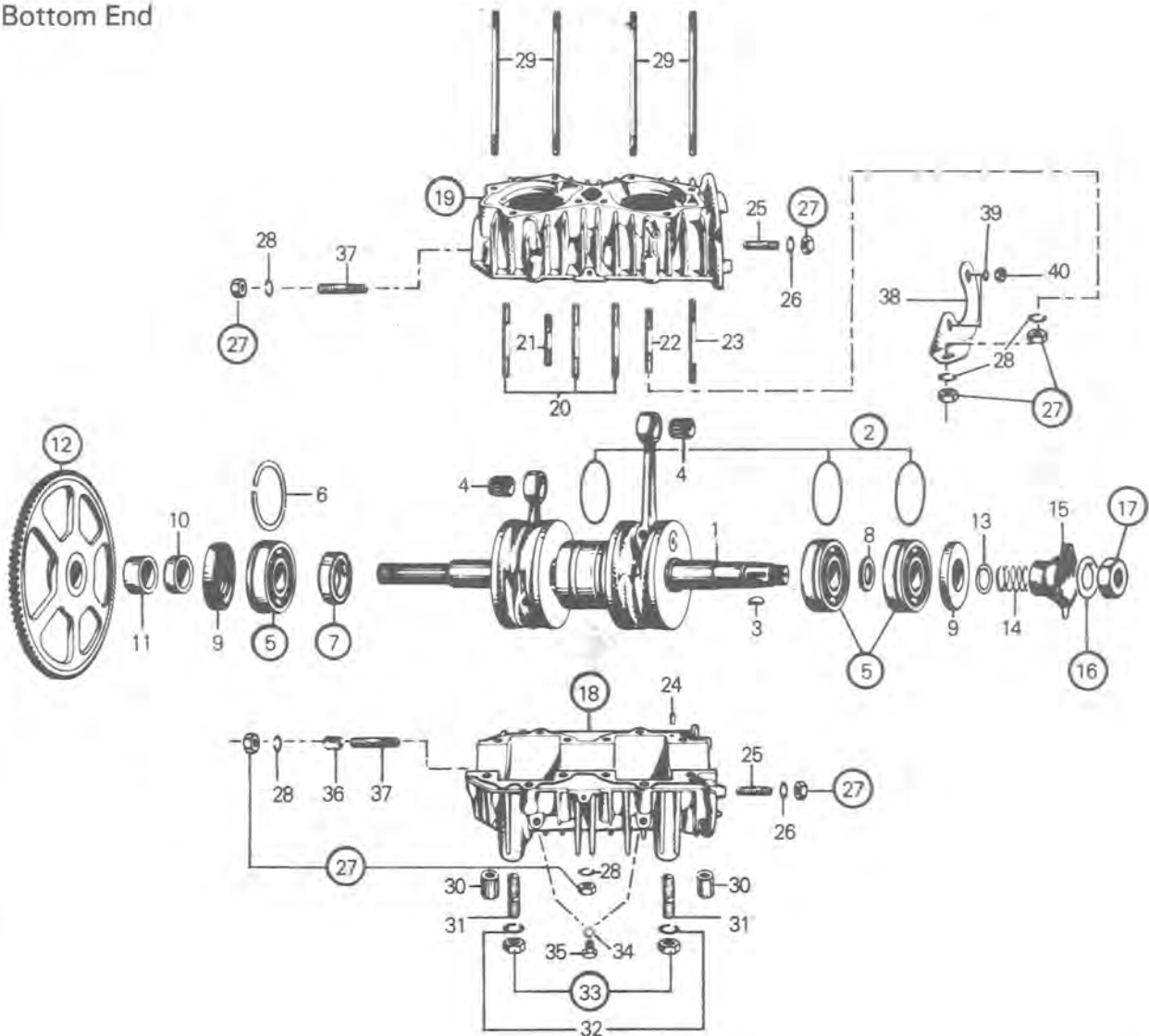
## INSTALLATION

To install engine on vehicle inverse removal procedure, however, special attention should be paid to the following:

- Torque engine mount nuts to 25 ft/lbs.
- After throttle cable installation, check maximum throttle opening adjustment.
- Check pulley alignment.
- Check ignition timing.

434, 440 ENGINE TYPE

Bottom End

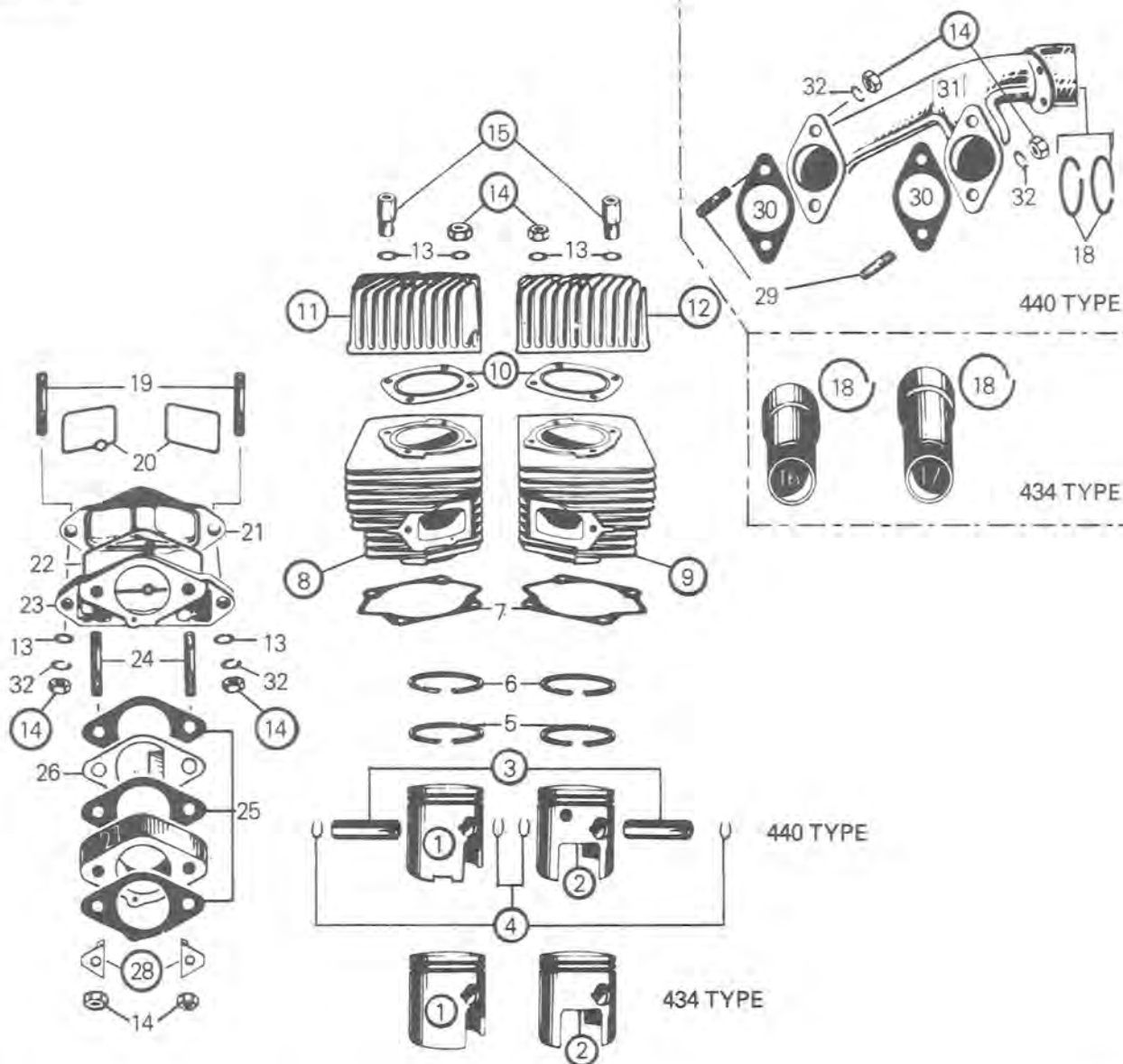


- |                     |                           |                          |                             |
|---------------------|---------------------------|--------------------------|-----------------------------|
| 1. Crankshaft       | 11. Distance sleeve       | 21. Crankcase stud       | 31. Engine bracket stud (4) |
| 2. "O" ring (5)     | 12. Starter ring gear     | 22. Crankcase stud       | 32. Lock washer (4)         |
| 3. Woodruff key     | *13. Washer               | 23. Crankcase stud       | 33. Nut (4)                 |
| 4. Needle bearing   | *14. Spring               | 24. Dowel pin            | 34. Sealing ring            |
| 5. Ball bearing     | *15. Breaker point cam    | 25. Fan housing stud (4) | 35. Crankcase drain plug    |
| 6. Retaining ring   | 16. Tab washer            | 26. Lock washer (4)      | 36. Dowel tube              |
| 7. Distance ring    | 17. Magneto retaining nut | 27. Nut                  | 37. Starter stud (2)        |
| 8. Spacer           | 18. Lower crankcase half  | 28. Lock washer          | 38. Starter bracket         |
| 9. Oil seal         | 19. Upper crankcase half  | 29. Cylinder stud (8)    | 39. Washer (2)              |
| 10. Distance sleeve | 20. Crankcase stud (6)    | 30. Distance sleeve (4)  | 40. Nut (2)                 |

\*Not installed on engine equipped with a C.D. ignition system.

SECTION 04  
SUB-SECTION 02 (TWO CYLINDER ENGINE)

Top End



1. Piston (P.T.O. side)
2. Piston (Mag. Side)
3. Gudgeon pin
4. Circlip
5. Rectangular ring
6. "L"-Trapez or rectangular ring
7. Cylinder gasket
8. Cylinder (P.T.O. side)

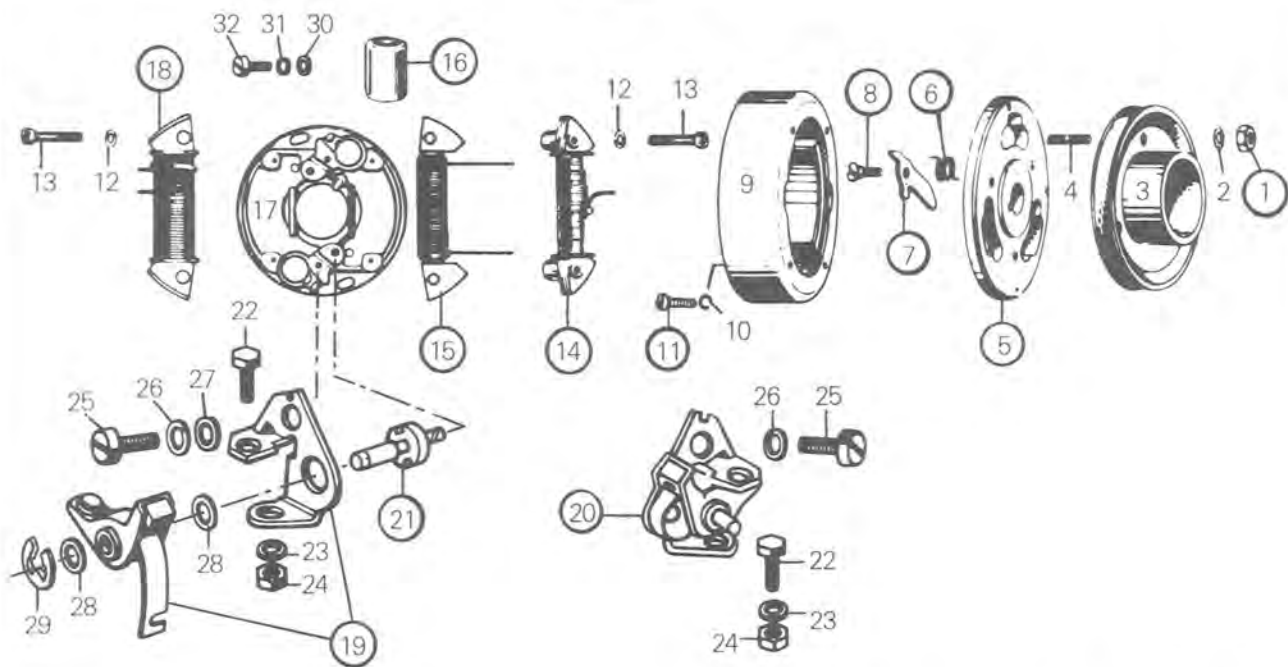
9. Cylinder (Mag. side)
10. Cylinder head gasket
11. Cylinder head (P.T.O. side)
12. Cylinder head (Mag. side)
13. Flat washer (10)
14. Nut (14)
15. Distance nut
16. Exhaust socket (P.T.O. side-short)

17. Exhaust socket (Mag. side-long)
18. Asbestos string
19. Intake manifold stud
20. Intake manifold ring gasket
21. Intake manifold
22. Manifold cover ring gasket
23. Intake manifold cover
24. Carburetor stud

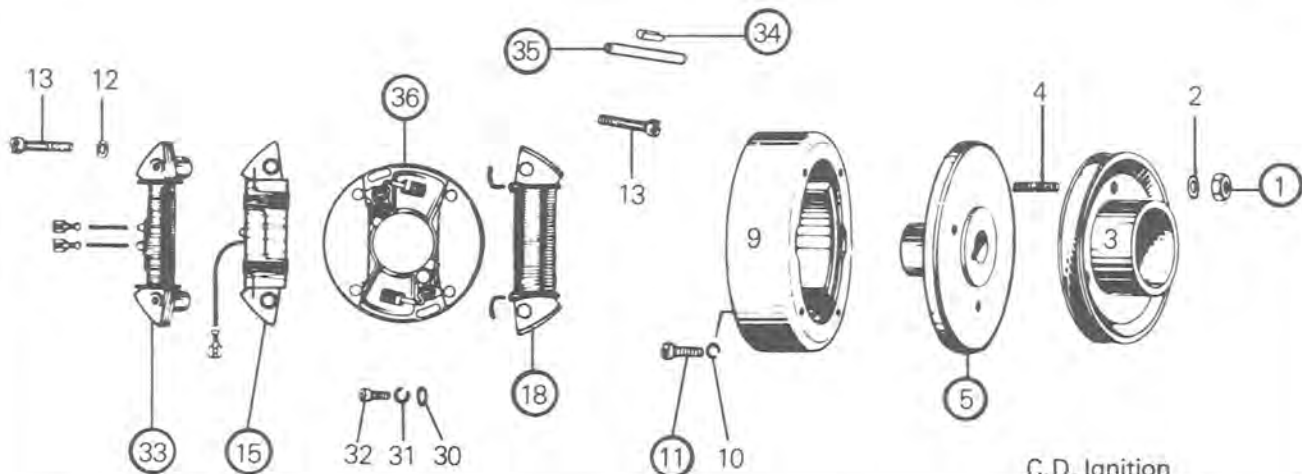
25. Flange gasket
- \*26. Intake deflector
27. Isolating flange
28. Tab washer
29. Exhaust manifold stud (4)
30. Exhaust manifold gasket
31. Exhaust manifold
32. Lock washer

\*Applicable on 440 type only.

Magneto



Breaker Point type Ignition



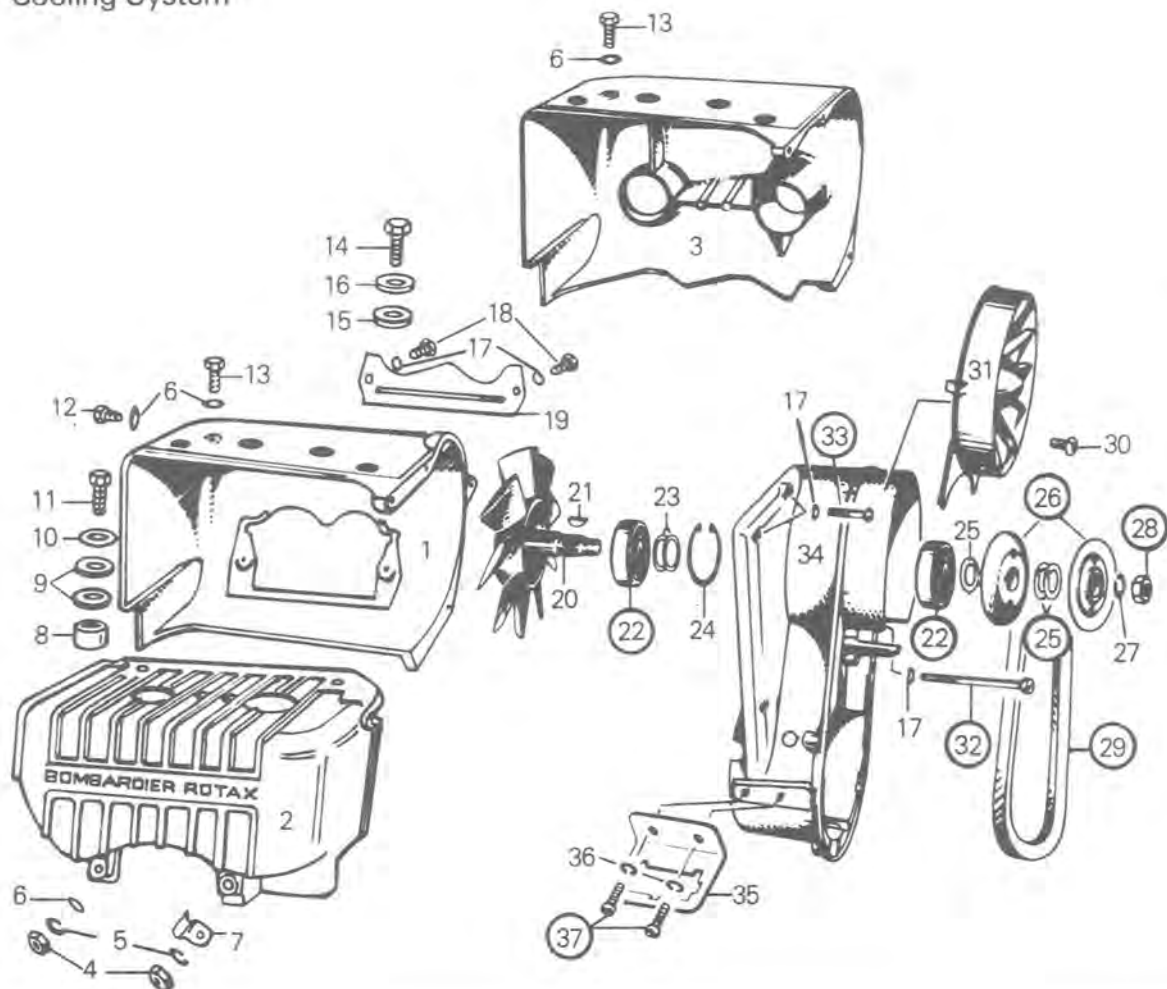
C.D. Ignition

- |                      |  |  |                                       |
|----------------------|--|--|---------------------------------------|
| 1. Nut (3)           | 11. Allen screw (4)                      | 20. Breaker point<br>(unit construction) | 29. Retaining clip                    |
| 2. Lock washer (3)   | 12. Lock washer                          | 21. Pivot pin                            | 30. Washer (2)                        |
| 3. Fan belt pulley   | 13. Coil retaining screw                 | 22. Bolt                                 | 31. Lock washer                       |
| 4. Stud (3)          | 14. Brake light coil (23W)               | 23. Lock washer                          | 32. Allen screw                       |
| 5. Magneto housing   | 15. Ignition generator coil              | 24. Nut                                  | 33. Additional lighting<br>coil (30W) |
| 6. Spring            | 16. Capacitor (2)                        | 25. Screw                                | 34. Cable connector                   |
| 7. Centrifugal lever | 17. Armature plate                       | 26. Lock washer                          | 35. Insulating sleeve                 |
| 8. Bearing screw     | 18. Lighting coil<br>(75W, 100W or 110W) | 27. Plain washer                         | 36. Armature plate<br>ass'y           |
| 9. Magneto ring      | 19. Breaker point set                    | 28. Washer                               |                                       |
| 10. Lock washer (4)  |  |  |                                       |



SECTION 04  
SUB-SECTION 02 (TWO CYLINDER ENGINE)

Cooling System



- |                                      |                                   |
|--------------------------------------|-----------------------------------|
| 1. Cowl (Exhaust side)               | 19. Cowl cover                    |
| 2. Cowl (Intake side)                | 20. Fan                           |
| 3. Cowl (434 type only)              | 21. Woodruff key                  |
| 4. Nut                               | 22. Ball bearing                  |
| 5. Lock washer                       | 23. Spacer                        |
| 6. Flat washer (3)                   | 24. Locking ring                  |
| 7. Cable clamp                       | 25. Shim (5)                      |
| 8. Spacer (2)                        | 26. Pulley half                   |
| 9. Flat washer (3)                   | 27. Lock washer                   |
| 10. Lock washer (2)                  | 28. Fan retaining nut             |
| 11. Front cowl retaining bolt (2)    | 29. Fan belt                      |
| 12. Rear cowl retaining bolt         | 30. Protector retaining screw (3) |
| 13. Rear cowl retaining bolt (short) | 31. Fan protector                 |
| 14. Rear cowl retaining bolt (long)  | 32. Screw                         |
| 15. Rubber washer                    | 33. Flat head screw               |
| 16. Flat washer                      | 34. Fan housing                   |
| 17. Spring washer                    | 35. Junction block bracket        |
| 18. Cover retaining screw            | 36. Lock washer                   |
|                                      | 37. Screw                         |



## REMOVAL

Remove or disconnect the following (if applicable) then lift engine out of vehicle.

- Drive belt.
- Muffler.

*Note: On rear-mounted engine vehicle, the muffler and associated components are accessible through an access panel located under the seat rest.*

- Cab retaining cable.
- Air silencer.
- Choke cable or primer line at carburetor.
- Throttle cable.
- Fuel lines at carburetor.

**Warning:** Secure fuel lines so that the opened ends are higher than the fuel tank.

- Electrical connections.

**Caution:** On electric start model, disconnect negative cable (ground) from battery **before** disconnecting other wires.

- Engine mount nuts.

## DISASSEMBLY & ASSEMBLY

### General

Refer to Technical data Section for component fitted tolerance and wear limit. If necessary, refer to Drive Pulley Section for pulley removal.

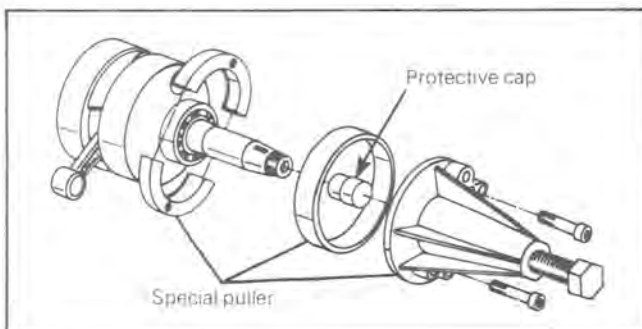
### Bottom End

② The outside diameter of the "O" rings installed on engine type 440, vary.

The two magneto side bearings and the center bearing are fitted with small "O" rings (2 1/8" O.D.) while the two labyrinth seals are fitted with large "O" rings (2 5/16" O.D.).

On 434 engine type, only large "O" rings (2 5/16" O.D.) are installed.

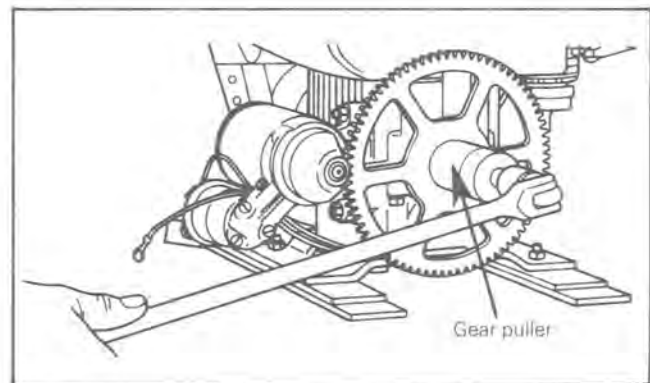
⑥ To remove bearing from crankshaft, use a protective cap and special puller, as illustrated. (See Tool Section).



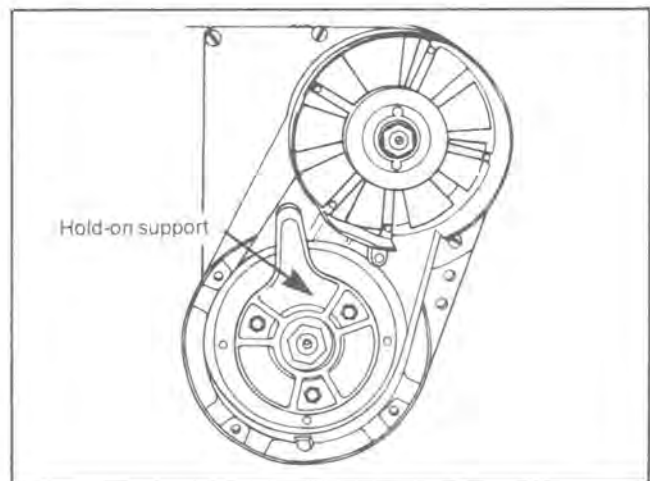
Prior to installation, place bearings into an oil container and heat the oil to 200° F. for 5 to 10 min. This will expand bearing and ease installation. Install bearings with groove outward.

⑦ A distance ring replaces the crankshaft shoulder on type 440 engine, starting from vehicle serial no. 2,749,845.

⑫ To remove starter gear from crankshaft it may be necessary to use a special puller as illustrated (See Tool Section).



⑬ ⑭ To remove or install magneto retaining nut, lock crankshaft in position with special hold-on support as illustrated. (See Tool Section).



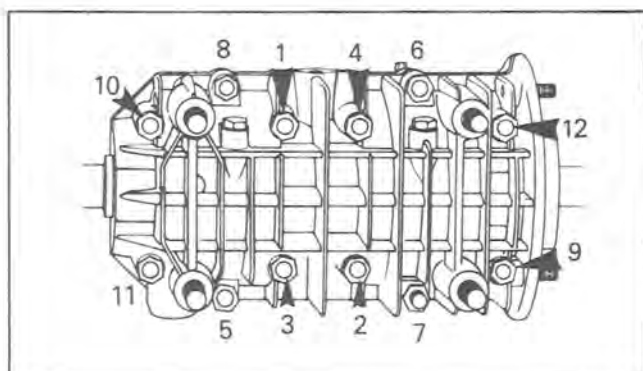
At assembly, torque retaining nut to 50-58 ft-lbs on 434 type, and to 58-63 ft-lbs on 440 type.

*Note: The tab washer located between magneto and retaining nut on late production 440 engine type has been cancelled. Therefore, at assembly apply a light coat of Loctite "Lock'n Seal" on magneto retaining nut threads.*

⑮ ⑯ Prior to joining of crankcase halves, apply a light coat of "Loctite" crankcase sealant to the mating surfaces of the bottom half. Position spring washers and nuts on crankcase studs then torque nuts to 14-16 ft-lbs., following illustrated sequence.

## SECTION 04

### SUB-SECTION 02 (TWO CYLINDER ENGINE)



⑫ At assembly, torque to 14-16 ft-lbs.

⑬ At assembly, torque to 29-35 ft-lbs.

#### Top End

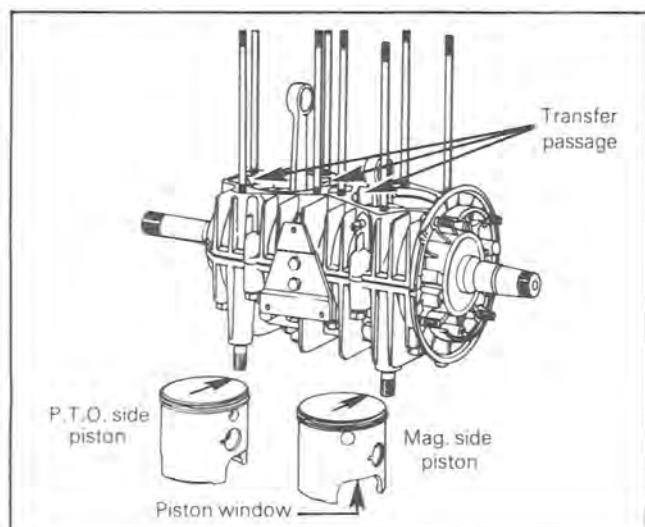
① ② ③ ④ Place a clean cloth over crankcase to prevent circlip from falling into crankcase. Use a pointed tool to remove circlips from piston.

**Caution:** When tapping out gudgeon pins, hold piston firmly in place to eliminate the possibilities of transmitting shock and pressure to the connecting rod.

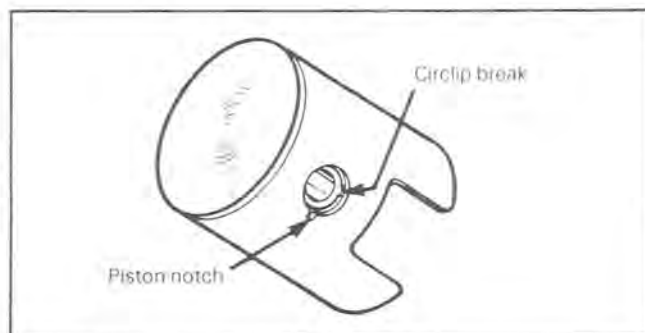
At assembly, place the pistons over the connecting rods with the letters "AUS", over an arrow on the piston dome, facing in direction of the exhaust port.



Also make sure that the piston window is aligned with the crankcase transfer passage when the gudgeon pin orifice is in-line with the connecting rod bore.



*Note:* Once the circlips are installed, turn each circlips so it is not directly on piston notch. Remove any burrs on piston caused through circlip installation using very fine emery cloth.

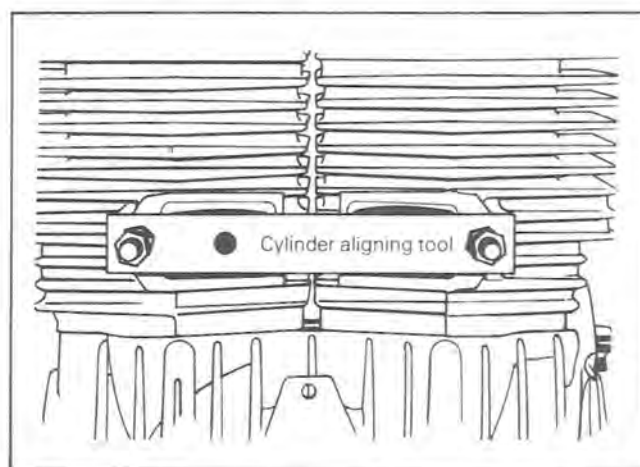


⑧ ⑨ ⑩ ⑪ ⑫ When installing cylinder and / or cylinder head, the cylinder aligning tool must be used to ensure sealing of intake manifold and cylinders. (See Tool Section).

Install exhaust manifold on cylinder then install aligning bar and torque distance nut to 14-16 ft-lbs.

Cross torque cylinder head nuts to 14-16 ft-lbs.

*Note:* Torque each head individually.



⑭ ⑮ At assembly, torque to 14-16 ft-lbs.

⑯ At assembly, position deflector with tap toward inside on magneto side.

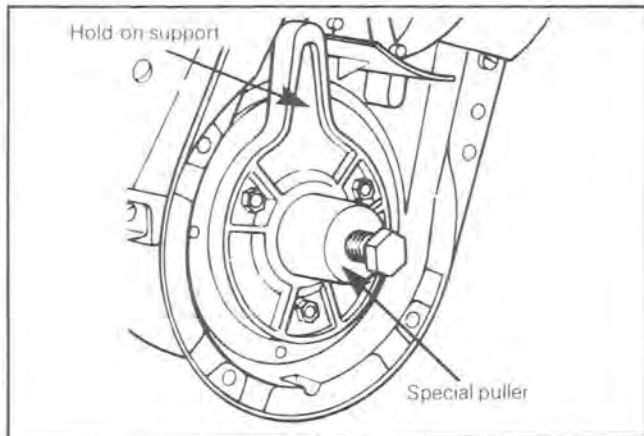
⑰ Tab washer should be replaced if bent more than three (3) times. If in doubt, replace.

#### Magneto

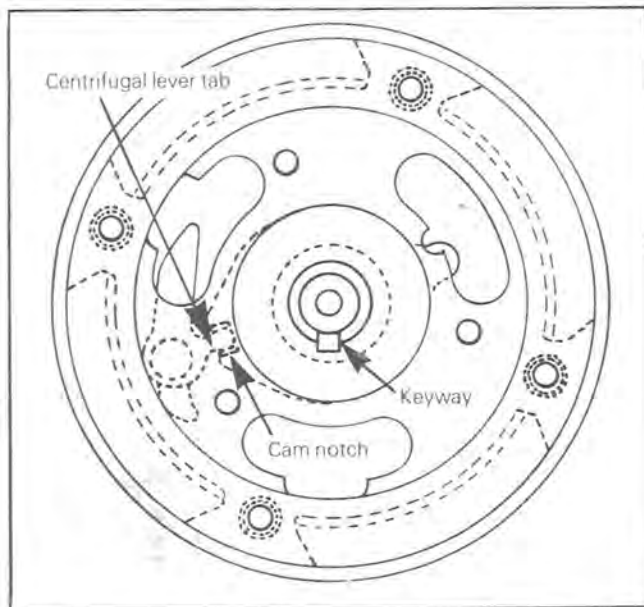
① At assembly, torque to 14-16 ft-lbs.

② With magneto retaining nut removed and hold-on support in place, install special puller onto support.

Tighten puller nut and at same time, tap on nut head using a hammer to release magneto from its taper.



At assembly, install magneto on crankshaft with the keyway, centrifugal lever and breaker point cam position as illustrated.

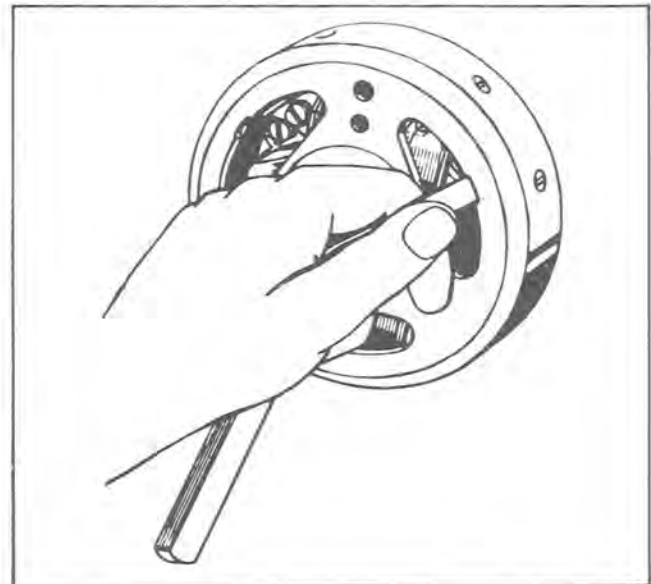


⑥ ⑦ ⑧ At assembly, apply a small amount of low temperature grease into spring seating.

⑪ At assembly, apply Loctite "Lock'n Seal" on retaining screw threads.

⑭ ⑮ ⑯ ⑳ Whenever a coil is replaced, the air gap (distance between magnet and armature end) must be adjusted.

To check air gap, insert a feeler gauge of correct thickness (0.31 mm / .012" 0.45 mm / .018") between magnet and armature ends. To adjust, slacken retaining screw and relocate armature.



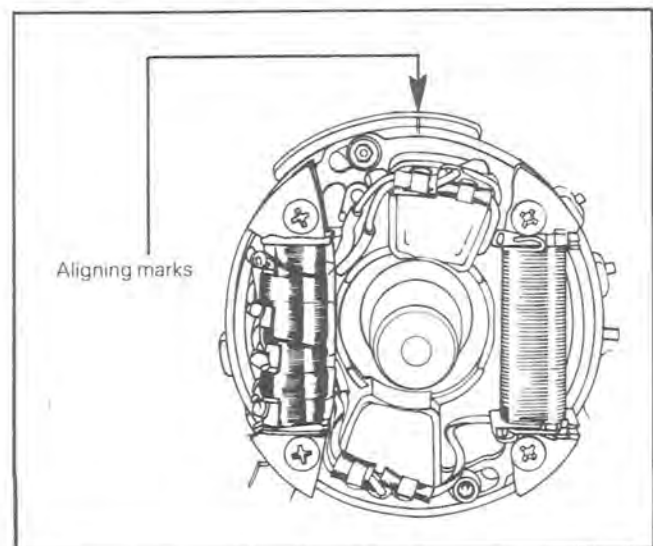
⑮ To replace a capacitor, it is first necessary to unsolder the two (2) black leads using a soldering iron. The capacitor can then be driven out of the armature plate using a suitable drift. To reinstall, inverse procedure.

⑲ ⑳ When replacing breaker point set, apply a light coat of grease on pivot pin and rubbing block.

Do not remove pivot pin unless replacement is needed. At assembly, apply Loctite "Lock'n Seal" on threads.

㉑ When replacing unit construction type breaker point, apply a small amount of grease on rubbing block.

㉒ At assembly, align armature plate crankcase marks.



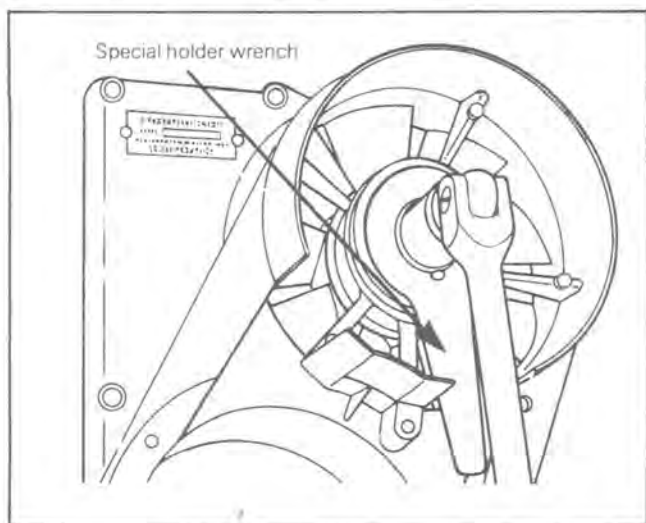
## SECTION 04

### SUB-SECTION 02 (TWO CYLINDER ENGINE)

#### Cooling System

②② Heat bearing housing to 140° - 160° F., prior to bearing removal or installation.

②⑤ ②⑥ ②⑧ ②⑨ Lock fan pulley with special holder wrench or install pulley retaining nut. (See Tool Section).



Shim(s) located between pulley halves are used to adjust fan belt free-play. Correct free-play is  $\frac{1}{4}$ ". If necessary to adjust install or remove shim(s) between pulley halves. Install excess shim(s) between outer pulley half and washer.

At assembly, torque fan shaft nut to 42-50 ft-lbs.

③② ③③ ③⑦ At assembly, apply a light coat of Loctite "Lock'n Seal" on threads.

It should be noted that to correctly remove a Loctite locked screw, it is first necessary to tap on head of screw to break Loctite bond. This will eliminate the possibility of screw breakage.

#### CLEANING

Discard all oil seals, gaskets and "O" rings. Clean all metal components in a non-ferrous metal cleaner.

**Caution:** Clean armature using only a clean cloth. Scrape off carbon formation from cylinder exhaust ports, cylinder heads and piston domes.

*Note: The letter "AUS" over an arrow on the piston dome must be visible after cleaning.*

Clean the piston ring grooves with a groove cleaner tool, or with a piece of broken ring.

Remove old sealant from mating surfaces with Bombardier "Sealant Stripper".

**Caution:** Never use a sharp object to scrape away old sealant as score marks incurred are detrimental to crankcase sealing.

#### INSTALLATION

To install engine on vehicle, inverse removal procedure. However, pay attention to the following:

- Check ignition timing prior to installation in vehicle.
- Check tightness of engine mount nuts.
- After throttle cable installation, check carburetor maximum throttle opening.
- Check pulley alignment.

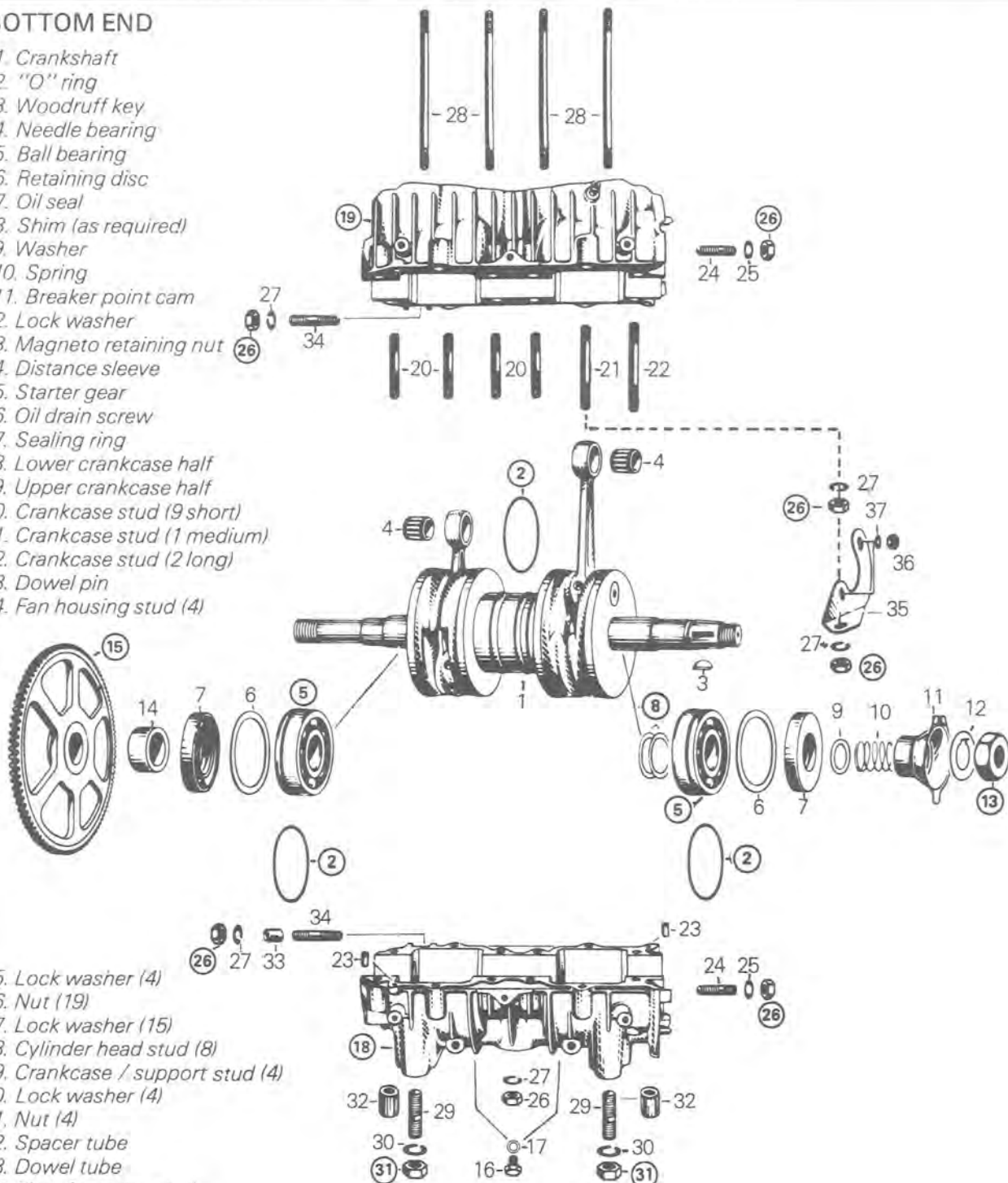


640 ENGINE TYPE

BOTTOM END

1. Crankshaft
2. "O" ring
3. Woodruff key
4. Needle bearing
5. Ball bearing
6. Retaining disc
7. Oil seal
8. Shim (as required)
- \*9. Washer
- \*10. Spring
- \*11. Breaker point cam
12. Lock washer
13. Magneto retaining nut
14. Distance sleeve
15. Starter gear
16. Oil drain screw
17. Sealing ring
18. Lower crankcase half
19. Upper crankcase half
20. Crankcase stud (9 short)
21. Crankcase stud (1 medium)
22. Crankcase stud (2 long)
23. Dowel pin
24. Fan housing stud (4)

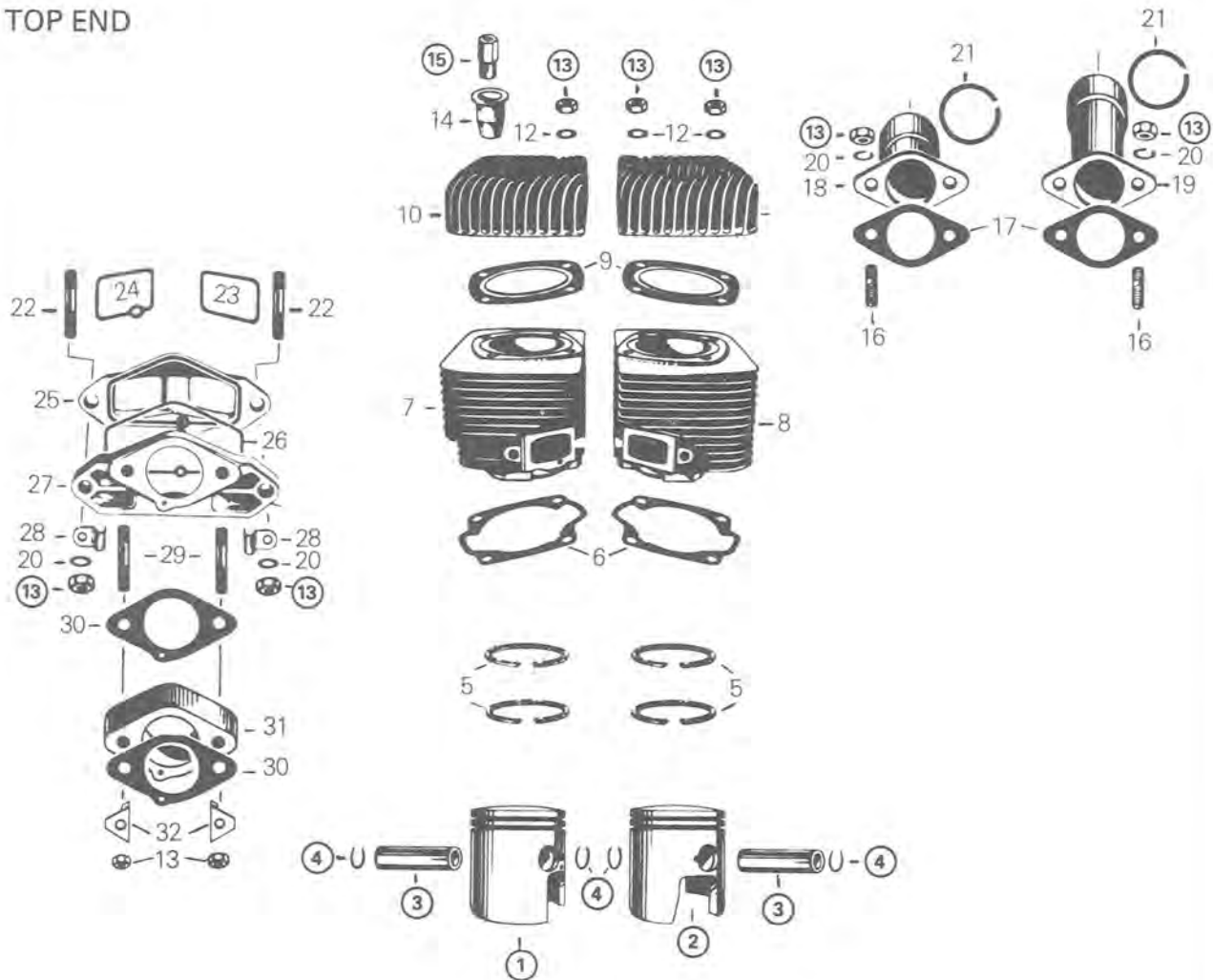
25. Lock washer (4)
26. Nut (19)
27. Lock washer (15)
28. Cylinder head stud (8)
29. Crankcase / support stud (4)
30. Lock washer (4)
31. Nut (4)
32. Spacer tube
33. Dowel tube
34. Electric starter stud
35. Starter bracket
36. Nut (2)
37. Washer (2)



\*Breaker point ignition only.

SECTION 04  
SUB-SECTION 02 (TWO CYLINDER ENGINE)

TOP END

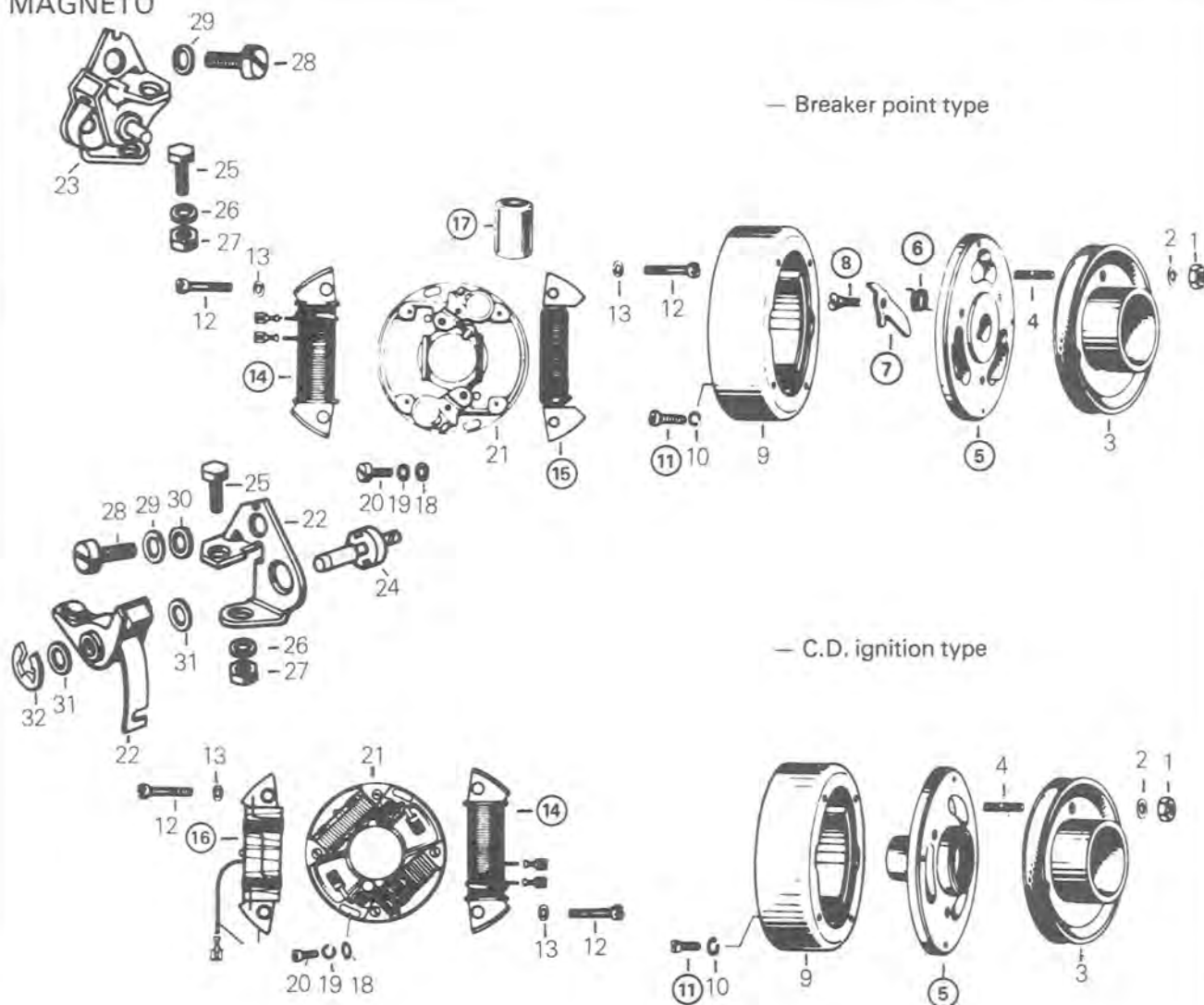


1. Piston (P.T.O. side)
2. Piston (Mag. side)
3. Gudgeon pin
4. Circlip
5. Rectangular ring
6. Crankcase / cylinder gasket
7. Cylinder (P.T.O. side)
8. Cylinder (Mag. side)
9. Cylinder head gasket
10. Cylinder head (P.T.O. side)
11. Cylinder head (Mag. side)
12. Washer (7)
13. Nut (15)
14. Support sleeve
15. Distance nut
16. Exhaust socket stud (4)

17. Exhaust socket gasket
18. Exhaust socket (P.T.O. side)
19. Exhaust socket (Mag. side)
20. Lock washer (6)
21. Sealing ring (2 or 4)
22. Intake manifold stud
23. Profile gasket (Mag. side)
24. Profile gasket (P.T.O. side)
25. Intake manifold
26. Profile gasket
27. Intake manifold cover
28. Ignition cable bracket
29. Carburetor stud
30. Flange gasket
31. Isolating flange
32. Tab washer



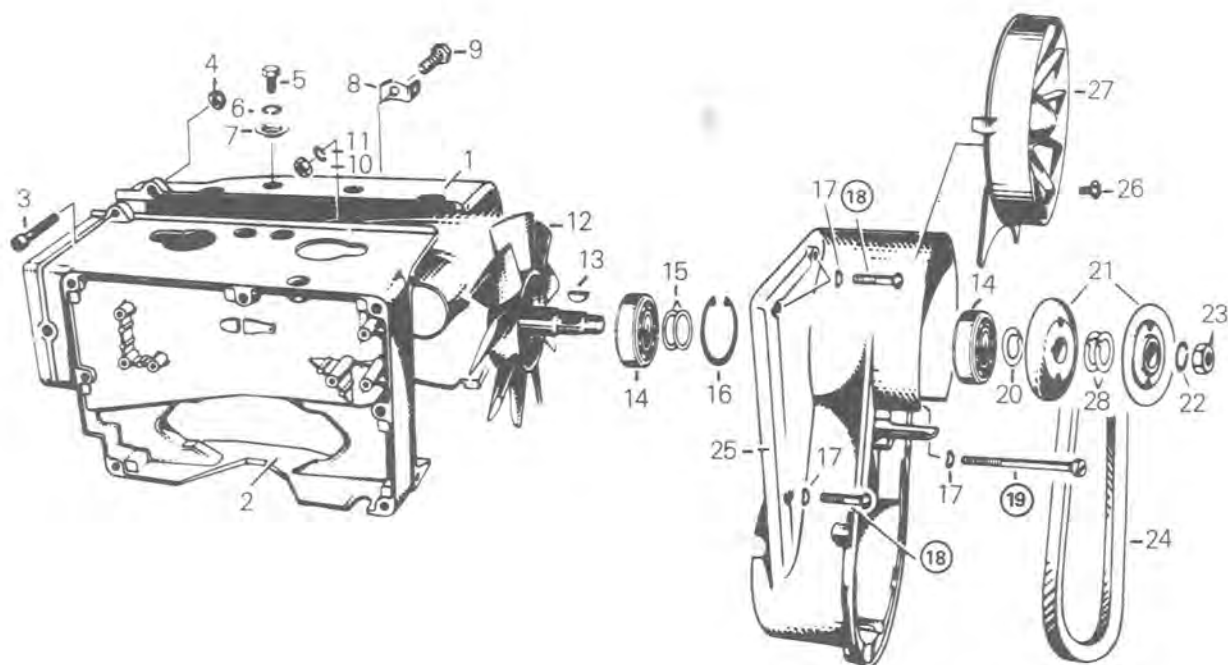
# MAGNETO



1. Nut (3)
2. Lock washer (3)
3. Starting pulley
4. Starting pulley stud (3)
5. Magneto housing
6. Centrifugal lever spring
7. Centrifugal lever
8. Bearing screw
9. Magneto ring
10. Lock washer (4)
11. Allen screw (4)
12. Coil retaining screw (4)
13. Lock washer (4)
14. Lighting coil
15. Ignition generator coil
16. Capacitor charging coil

17. Capacitor (2)
18. Washer (2)
19. Lock washer (2)
20. Allen screw (2)
21. Armature plate
22. Breaker point set
23. Breaker point (unit construction)
24. Pivot pin
25. Bolt
26. Lock washer
27. Nut
28. Screw
29. Lock washer
30. Washer
31. Washer
32. Retaining clip

# COOLING SYSTEM



1. Cylinder cowl (exhaust side)
2. Cylinder cowl (intake side)
3. Allen screw (2)
4. Lock nut (2)
5. Bolt
6. Lock washer
7. Cowl retainer washer
8. Spring holder
9. Bolt
10. Nut
11. Lock washer
12. Fan
13. Woodruff key
14. Ball bearing

15. Spacer (2)
16. Locking ring
17. Spring washer (4)
18. Flat headed screw (3)
19. Screw
20. Spacer
21. Pulley half
22. Lock washer
23. Nut
24. Fan belt
25. Fan housing
26. Cover retaining screw (3)
27. Fan cover
28. Shim (as required)

## REMOVAL

Remove or disconnect the following (if applicable) then lift engine out of vehicle.

- Drive belt.
- Muffler.
- Air silencer tube.
- Choke cable at carburetor.
- Throttle cable at carburetor.
- Fuel lines at carburetor.

*Note: Secure fuel lines so that the opened ends are higher than the fuel level in the tank.*

- Disconnect negative cable (ground) from battery, then disconnect electrical connections leading from engine.
- Console.
- Engine mount nuts.

## DISASSEMBLY & ASSEMBLY

### General


Refer to Technical Data Section for component fitted tolerance and wear limit.

If necessary, refer to Drive Pulley Section for pulley removal.

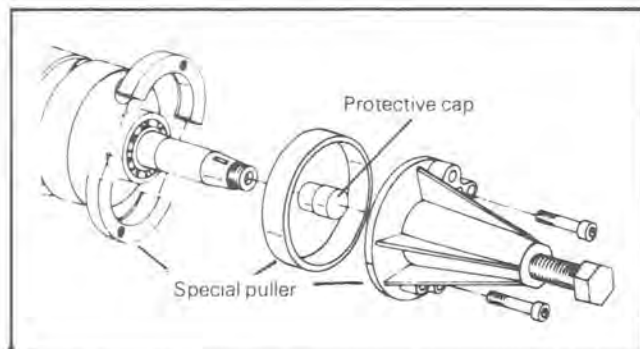
### Bottom End

② The "O" ring / ball bearing combination within the same engine may vary depending on production date of engine.

For correct assembly, refer to the following chart for identification.

Ball bearing groove width 	"O" RING	
	Outside diameter	Part number
118" (3 mm)	2 3/4"	420 830 370
.078" (2 mm)	2 5/16"	420 830 350

⑤ To remove bearing from crankshaft use a protective cap and special puller, as illustrated. (See Tool Section).



Prior to installation, place bearings into an oil container and heat the oil to 200° F. for 5 to 10 min. This will expand bearings and ease installation.

Install bearings with groove outward.

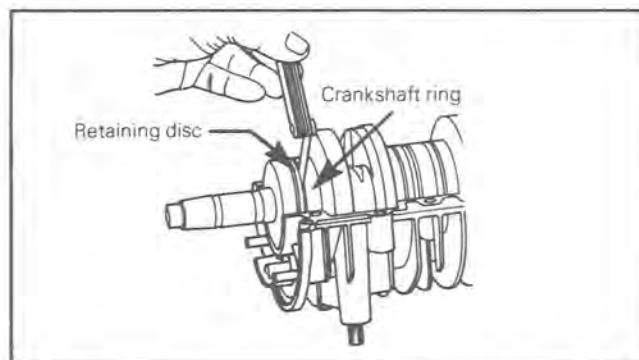
⑧ Crankshaft end-play is adjusted with shim(s) located between crankshaft and magneto side bearing. To determine correct amount of shim(s), proceed as follows.

Remove magneto side bearing and existing shim(s). Slide the appropriate crankshaft ring and the retaining disc on the crankshaft. (See Tool Section).

Position crankshaft assembly into crankcase lower half. Make sure that retaining discs are correctly seated in the grooves.

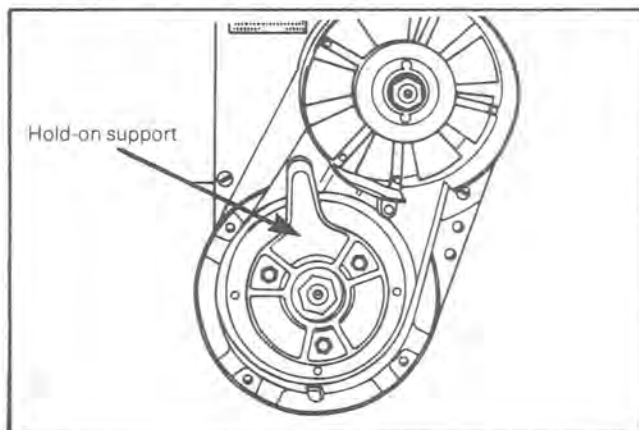
Gently tap crankshaft counterweight until P.T.O. side bearing bears against retaining disc.

Any free-play between the crankshaft ring and magneto side retaining disc, minus recommended end-play, is the distance to be covered by shim(s). Shims are available in the thickness of 0.1 mm / .004", 0.2 mm / .008", 0.3 mm / .012", 0.5 mm / .020", 1 mm / .039".



*Note: Crankshaft end-play requires adjustment only when crankshaft and / or crankcase is replaced.*

⑬ To remove or install magneto retaining nut, lock crankshaft in position with special hold-on support as illustrated. (See Tool Section).

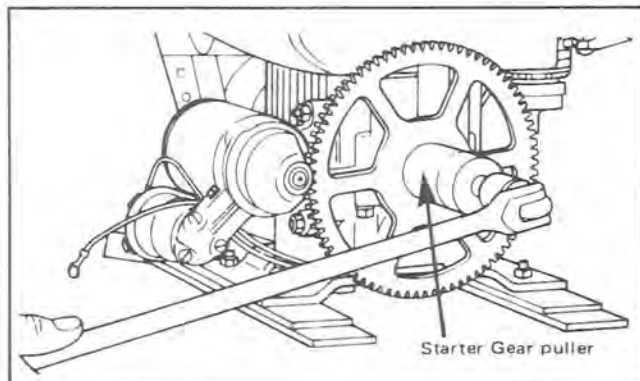


## SECTION 04

### SUB-SECTION 02 (TWO CYLINDER ENGINE)

At assembly, torque retaining nut to 58-63 ft-lbs.

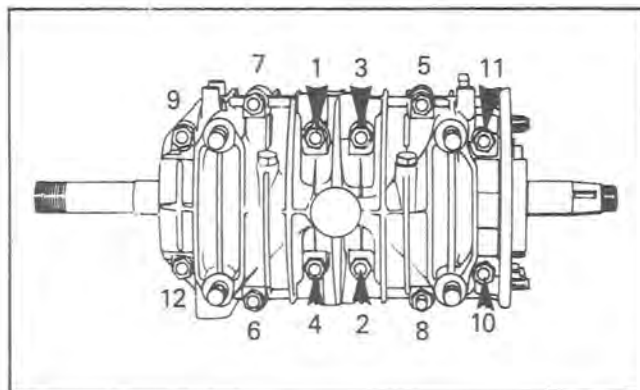
⑮ To remove starter gear from crankshaft it may be necessary to use a special puller as illustrated. (See Special Tool).



At assembly, apply a light coat of anti-seize compound on crankshaft extension nearest starter gear.

⑮ ⑯ Prior to joining of crankcase halves, apply a light coat of "Loctite" crankcase sealant to the mating surfaces of the bottom half.

Position spring washers and nuts on crankcase studs then torque nuts to 14-16 ft-lbs., following illustrated sequence.



⑳ At assembly, torque to 14-16 ft-lbs.

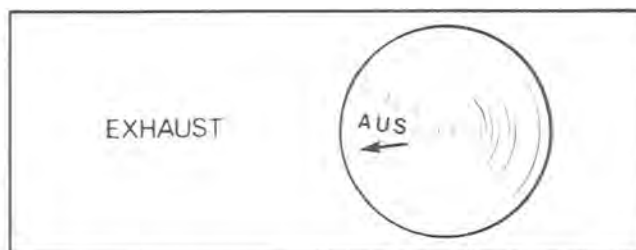
㉑ At assembly, torque to 29-35 ft-lbs.

#### Top End

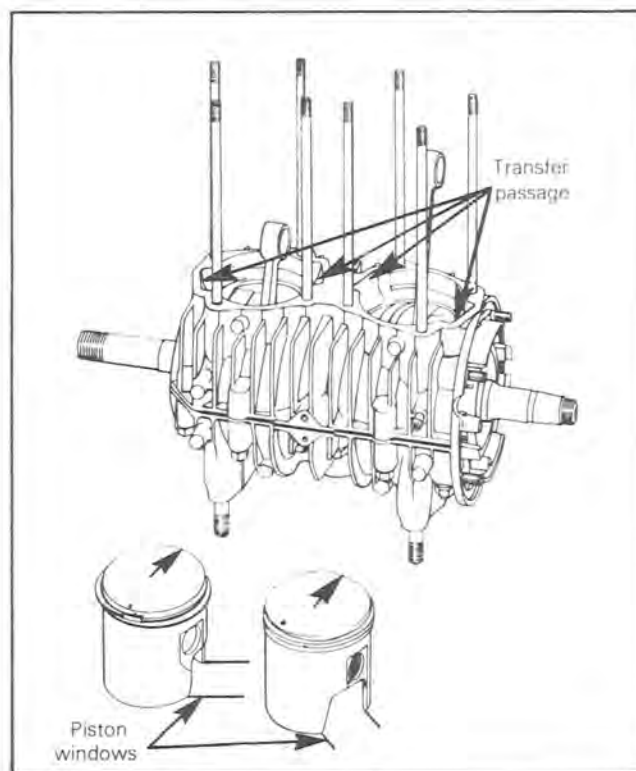
① ② ③ ④ Place a clean cloth over crankcase to prevent circlip from falling into crankcase. Use a pointed tool to remove circlips from piston.

**Caution:** When tapping out gudgeon pins, hold piston firmly in place to eliminate the possibilities of transmitting shock and pressure to the connecting rod.

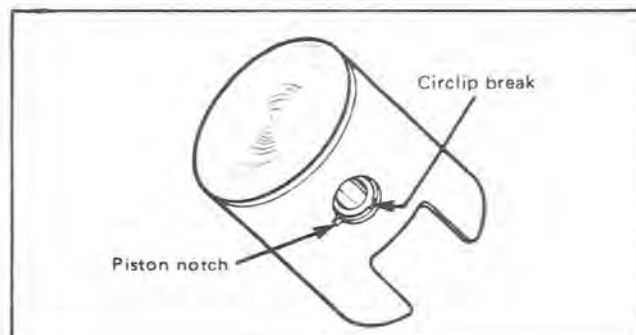
At assembly, place the pistons over the connecting rods with the letters "AUS", over an arrow on the piston dome, facing in direction of the exhaust port.



Also make sure that the piston windows are aligned with the crankcase transfer passages when the gudgeon pin orifice is in-line with the connecting rod bore.



*Note: Once the circlips are installed turn each circlip so the circlip break is not directly on piston notch. Remove any burrs from piston caused through circlip installation using very fine emery cloth.*



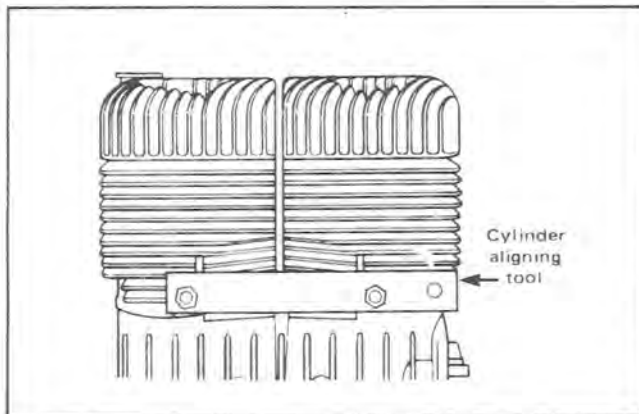
⑦ ⑧ ⑨ ⑩ ⑪ When installing cylinder and / or cylinder head, the cylinder aligning tool must be used to ensure sealing of intake manifold and cylinders. (See Tool Section).

Install muffler on exhaust socket then install aligning bar.

Torque distance nut to 14-16 ft-lbs.

Cross torque cylinder head nut to 14-16 ft-lbs.

*Note: Torque each cylinder head individually.*

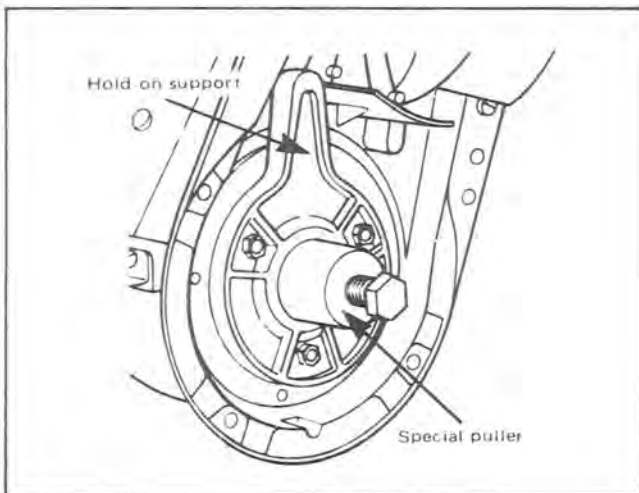


⑬ ⑮ At assembly, torque to 14-16 ft-lbs.

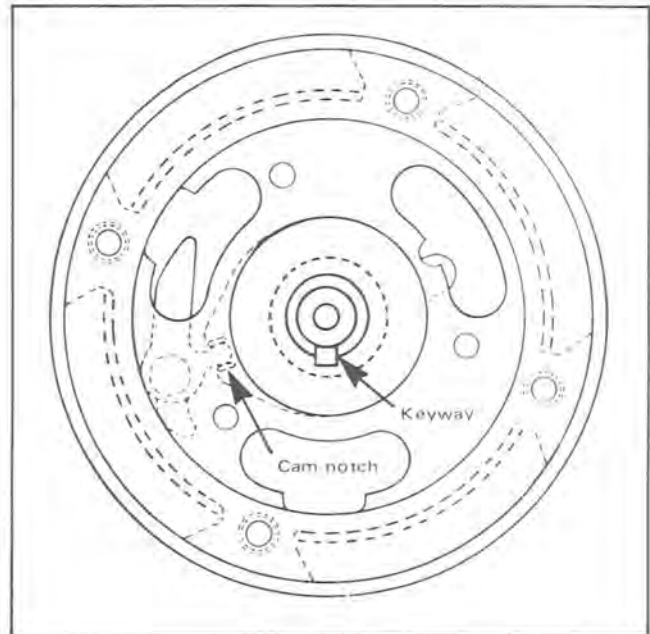
### Magneto

⑤ With magneto retaining nut removed and hold-on support in place, install special puller onto hub.

Tighten puller nut and at same time, tap on nut head using a hammer to release magneto from its taper.



At assembly, on engine fitted with breaker points, position magneto on crankshaft with the keyway and the cam notch positioned as illustrated.



⑥ ⑦ ⑧ At assembly, apply a small amount of low temperature grease into spring seating.

⑪ At assembly, apply Loctite "Lock'n Seal" on retaining screw threads.

⑭ ⑮ ⑯ Whenever a coil is replaced, the air gap (distance between magnet and armature end) must be adjusted.

To check air gap, insert a feeler gauge of correct thickness (0.31 mm / .012" - 0.45 mm / .018") between magnet and armature ends. If necessary to adjust, slacken retaining screw and relocate armature.





## SECTION 04

### SUB-SECTION 02 (TWO CYLINDER ENGINE)

⑰ To replace a capacitor, it is first necessary to unsolder the two (2) black leads. The capacitor can then be driven out of the armature plate using a suitable drift and hammer. To reinstall, inverse procedure.

⑳ ㉔ When replacing breaker point set, apply a light coat of grease on pivot pin and rubbing block.

㉓ When replacing unit construction type breaker point, apply a small amount of grease on rubbing block.

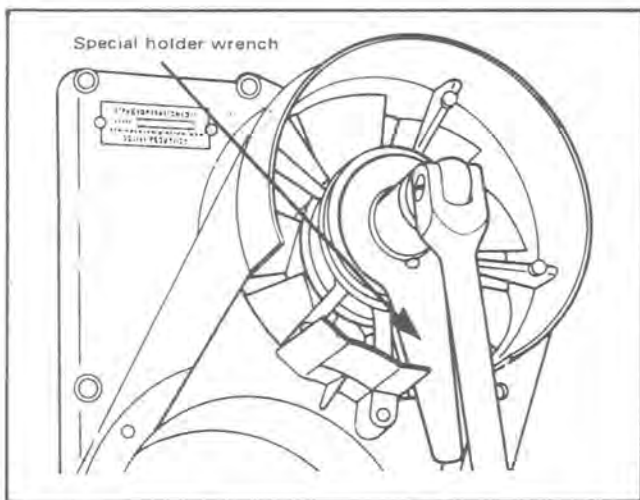
*Note: New unit construction type breaker point may be installed on older engine. To install, simply remove pivot pin, then insert new breaker point pin into threaded hole and secure. A special tool is available to remove old pivot pin. (See Tool Section).*

#### Cooling System

⑭ It is first necessary to heat bearing housing to 140° - 160° F. to remove or install bearing.

⑱ ⑲ At assembly, apply a light coat of Loctite "Lock'n Seal" on threads. It should be noted that to correctly remove a Loctite locked screw, it is first necessary to slightly tap o head of screw to break Loctite bond. The screw can then be removed. This will eliminate the possibility of screw breakage.

㉔ ㉒ ㉓ ㉔ Lock fan pulley with special holder wrench to remove or install pulley retaining nut. (See Tool Section).



Shim(s) located between pulley halves are used to adjust fan belt free-play. Correct free-play is  $\frac{1}{4}$ ". If necessary to adjust, install or remove shim(s) between pulley halves. Install excess shim(s) between outer pulley half and washer.

#### CLEANING

Discard all oil seals, gaskets, "O" rings and sealing rings.

Clean all metal components in a non-ferrous metal cleaner.

**Caution:** Clean armature using only a clean cloth.

Scrape off carbon formation from cylinder exhaust ports, cylinder heads and piston domes using a wooden spatula.

*Note: The letter "AUS" over an arrow on the piston dome must be visible after cleaning.*

Clean the piston ring grooves with a groove cleaner tool, or with a piece of broken ring.

Remove old sealant from crankcase mating surfaces with Bombardier "Sealant stripper"

**Caution:** Never use a sharp object to scrape away old sealant as score marks incurred are detrimental to crankcase sealing.

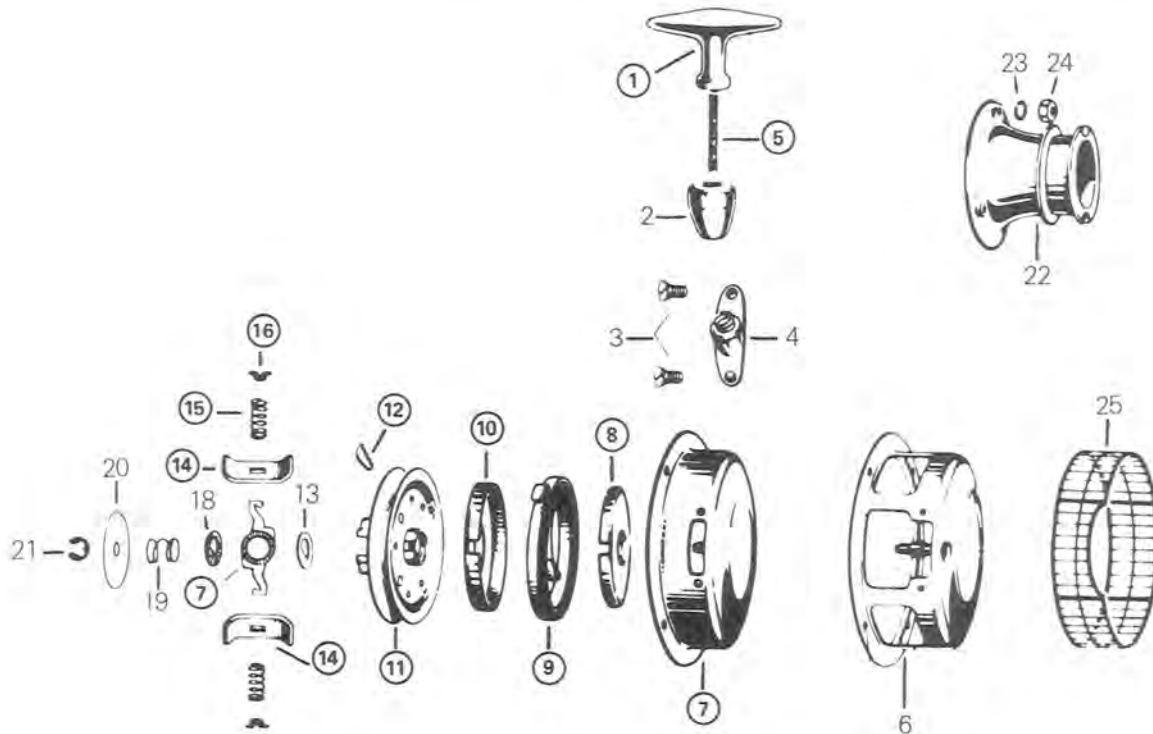
#### INSTALLATION

To install engine on vehicle, inverse removal procedure. However, pay attention to the following:

- Check ignition timing prior to installation on vehicle.
- Check tightness of engine mount nuts.
- After throttle cable installation, check carburetor maximum throttle opening.
- Check pulley alignment.



REWIND STARTER



1. Starter grip
2. Rubber buffer
3. Countersunk screw
4. Starter stop
5. Starter rope
- \*6. Starter housing
7. Starter housing
8. Spring cartridge guide
9. Rewind spring
10. Spring cartridge cover
11. Rope sheave
12. Key clamp
13. "D" washer

14. Pawl
15. Pawl spring
16. Pawl spring stop
17. Pivoting arm
18. Friction spring
20. Cover washer
21. "E" clip
- \*22. Starting pulley
- \*23. Lock washer (3)
- \*24. Nut (3)
- \*25. Protection sleeve

\*Applicable to one (1) cylinder engine only.

SECTION 04  
SUB-SECTION 03 (REWIND STARTER)

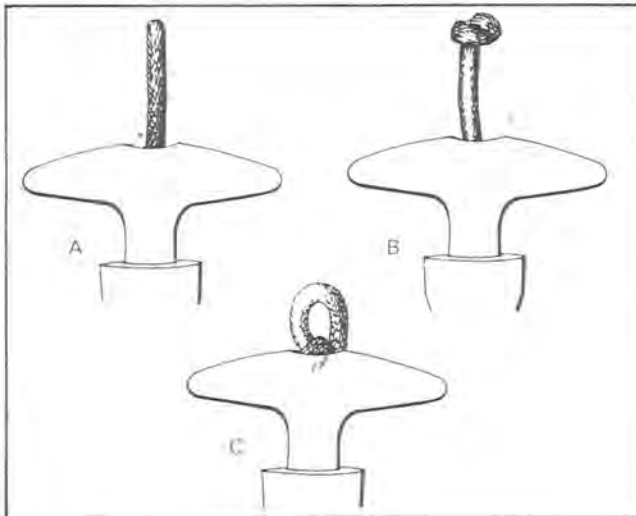
## REMOVAL

Remove the four (4) bolts and washers securing rewind starter to engine, then remove.

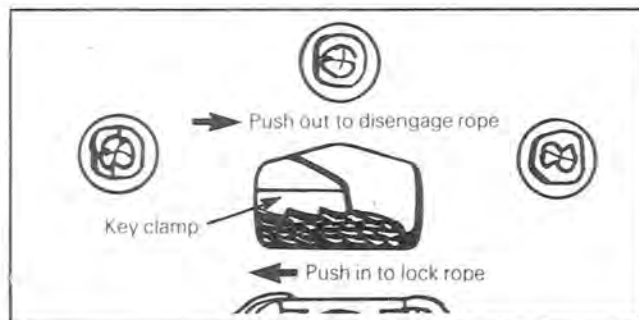
*Note: On some models, the cab needs support. (The retaining cable is attached to one of the rewind starter attaching bolt).*

## DISASSEMBLY & ASSEMBLY

①⑤ Prior to installing starter grip on new rope, it is first necessary to fuse the rope end with a lite match. Pass rope through starter grip, and tie a knot in the rope end. Fuse the knot with a lite match then turn the knot down and pull the starter grip over the knot.



⑤⑪⑫ To remove rope from rewind starter mechanism, fully extend rope and hold rope sheave in position. Using a pointed tools, disengage key clamp, then pull rope free.



To install rope, proceed as follows:

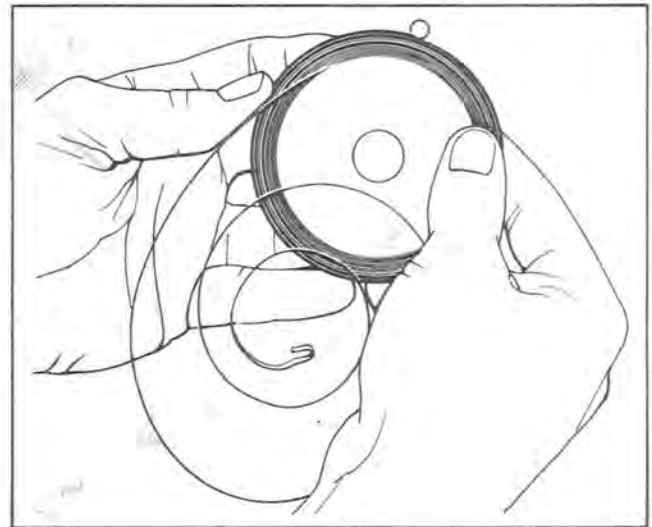
- Rotate sheave counter-clockwise six (6) turns to achieve correct recoil tension. **Hold** in position.
- Look through the starter stop orifice, and rotate the sheave until the starter stop orifice and sheave orifices align.

- Insert rope through both orifices until  $\frac{3}{4}$  inch of rope is visible in the key clamp housing.
- Position the key clamp in its housing then push in to lock the rope.

⑦⑧⑨⑩⑪ To open spring cartridge, use a thin screwdriver as a pry.

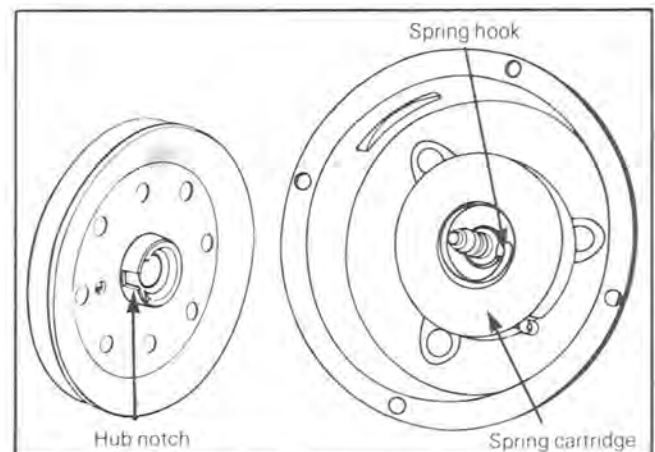
**Warning:** Since the spring is tightly wound inside the cartridge it may fly out when the cartridge is opened.

At assembly, position spring outer end into spring cartridge guide notch then wind the spring counter-clockwise into guide.



Before installing spring cartridge cover, apply a coat of low temperature grease onto spring.

Position spring cartridge assembly into starter housing as illustrated, then place rope sheave into starter housing making sure that the sheave hub notch engages in the spring hook.



⑭⑮⑯⑰ Position pawls, springs and spring stops on pivoting arm as illustrated:

## TWO CYLINDER ENGINE-BREAKER POINTS TYPE

### FOREWORD

For timing purposes, it is necessary to separate the breaker points type of twin cylinder engines into three groups.

**GROUP I:** This group includes engine type 248 and 294. Standard timing procedure applies, except where notice is made to hold the centrifugal lever at the full advance position. Since these engines do not incorporate an advance mechanism, disregard the notice. The ignition timing is set at the full advance mark stamped on the magneto ring.

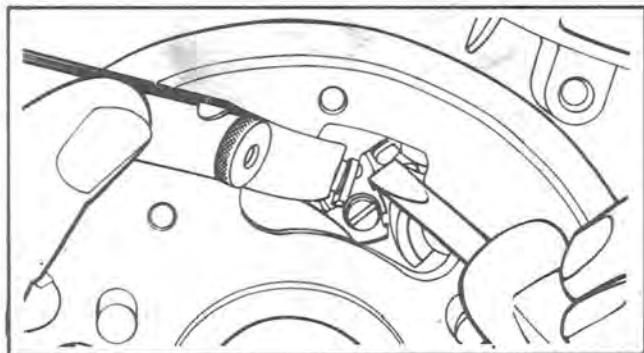
**GROUP II:** This group includes the following:  
All 338 type engines; all 343 type engines prior to engine serial no 2,670,920; all 401 type engines; all 434 type engines; all 440 type engines prior to engine serial no 2,748,146; and all 640 type engines prior to engine no 2,637,301.

Standard procedure applies for this group. The timing is set at the **no advance** mark stamped on the magneto ring.

**GROUP III:** This group includes the following:  
All 305 type engines; all 343 type engines from engine serial no 2,670,920; all 440 type engines from engine serial no 2,748,146; and all 640 type engines starting from engine serial no 2,637,301. On these engines the timing mark on the magneto ring is stamped at the **full advance** position. Therefore, when using the timing mark to set the ignition timing always hold the centrifugal lever at the full advance position. This applies when performing steps 6 and 7 of the following procedure.

### TIMING PROCEDURE USING THE TIMING MARKS

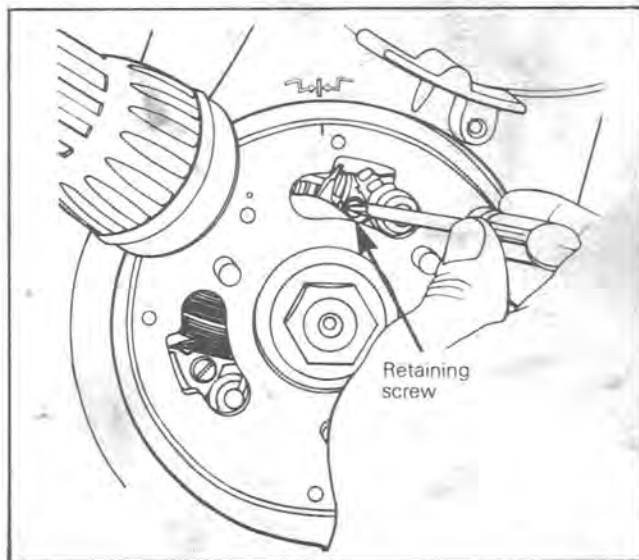
1. Disconnect spark plug wires and remove spark plugs.
2. Remove rewind starter assembly from engine then remove the fan protector.
3. Remove starting pulley and "V" belt from engine.



4. Rotate crankshaft until breaker points, visible through magneto ring opening, are fully open. Adjust points setting to .014" - .018" using a feeler gauge and screwdriver, as illustrated. Repeat procedure for other set of points.

*Note: The upper breaker points set controls the timing of the magneto side piston and the lower breaker points set control the P.T.O. side piston.*

5. Disconnect junction block at engine, then connect one lead of a timing light (flashlight type or of a tone timer), to the blue wire (mag. side) leading from engine. Connect other wire to fan cowl (ground).
6. Turn timing instrument ON. Rotate crankshaft until mag. side piston approaches top dead center and timing marks align. Slacken breaker points retaining screw then using a screwdriver, twist breaker points from one side to the other until timing light fluctuates (from dim to bright) or tone signal is no longer heard. Retighten retaining screw at this position.



7. Rotate the magneto counter-clockwise  $\frac{1}{4}$  of a turn and slowly turn the magneto back in a clockwise direction. As soon as the timing marks align the breaker points should just begin to open and the timing light should fluctuate, or the tone signal should no longer be heard.

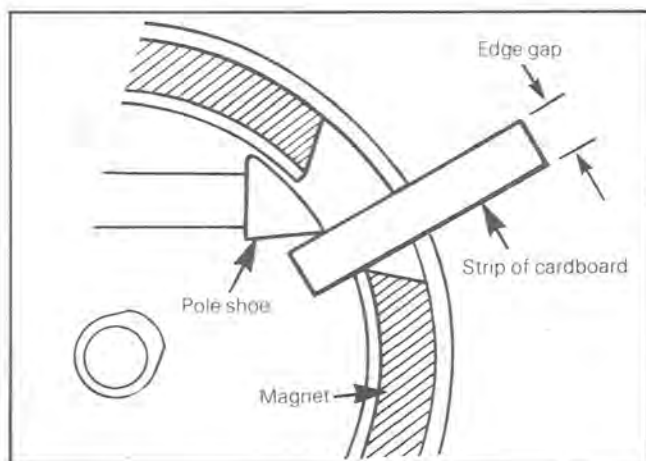
*Note: On group III engines, hold centrifugal lever in the open position (toward magneto rim) while performing steps 6 and 7 above).*

8. Check and adjust the edge gap as follows:
  - From timing marks, rotate magneto clockwise  $\frac{1}{8}$  of a turn. Hold advance mechanism centrifugal weight in the open position (toward magneto rim),

## SECTION 04

### SUB-SECTION 04 (IGNITION TIMING)

then slowly turn magneto back counter-clockwise until timing light fluctuates or tone signal is no longer heard. At this point, check the distance between pole shoe trailing edge and magnet (edge gap) with a strip of cardboard of appropriate width (Refer to Technical Data Section).



- If the edge is less than specified, loosen armature plate retaining screws and rotate armature plate ass'y counter-clockwise until correct edge gap is obtained. Reset the ignition timing and recheck the edge gap.
- If the edge gap is greater than specified, loosen armature plate retaining screws and rotate armature plate ass'y clockwise until correct edge gap is obtained. Reset the ignition timing and recheck the edge gap.

9. Rotate crankshaft approx. 180° or until PTO piston approaches top dead center. Disconnect timing instrument wire from blue wire then reconnect it to the black wire leading from engine. Repeat steps 6 and 7 for PTO side breaker points.

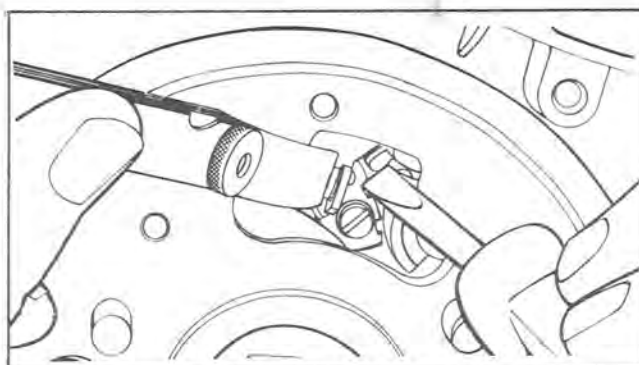
10. Disconnect timing instrument and reinstall previously removed components on engine.

### TIMING PROCEDURE USING T.D.C. GAUGE

1. Disconnect spark plug wires and remove spark plugs.
2. Remove rewind starter assembly from engine then remove the fan protector.
3. Remove starting pulley and "V" belt from engine.
4. Rotate crankshaft until breaker points, visible through magneto ring opening, are fully open. Adjust points setting to .014" - .018" using a feeler gauge and screwdriver, as illustrated. Repeat procedure for other set of points.

*Note: The upper breaker points set controls the timing of the magneto side piston and the lower breaker points set control the P.T.O. side piston.*

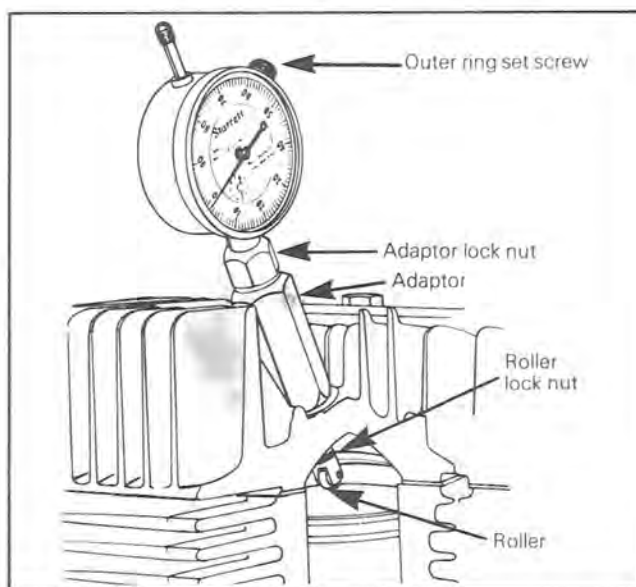
(TWO CYLINDER ENGINE-BREAKER POINTS TYPE), PAGE 2



5. Disconnect junction block at engine, then connect one lead of a timing light (flashlight type or a tone timer), to the blue wire (mag. side) leading from engine. Connect other wire to fan cowl (ground).

6. Install and adjust T.D.C. gauge on engine as follows:

- Rotate crankshaft until mag side piston is just before top dead center.
- With gauge in adaptor, adjust roller so that it is parallel with dial face. Tighten roller lock nut.

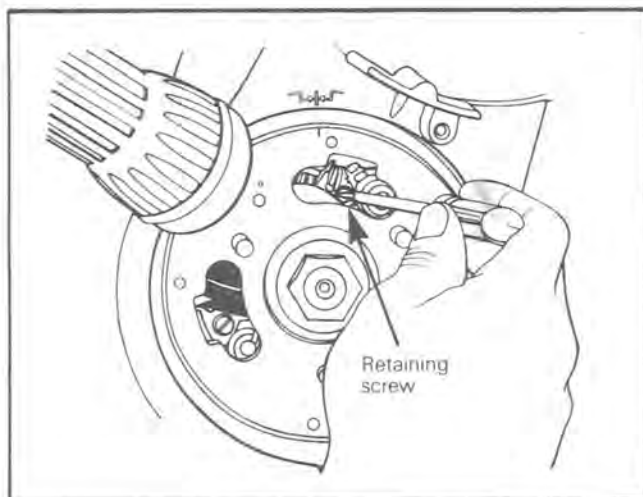


- Loosen adaptor lock nut then holding gauge, screw adaptor into spark plug hole.
- Position the face of dial towards magneto side and adjust gauge stem for precise reading. Finger tighten adaptor lock nut.
- Rotate crankshaft until piston is at Top Dead Center.
- Unlock outer ring of dial and turn it until "O" on dial aligns with pointer.
- Lock outer ring in position.

7. Turn timing instrument ON. Slightly slacken breaker points retaining screw.



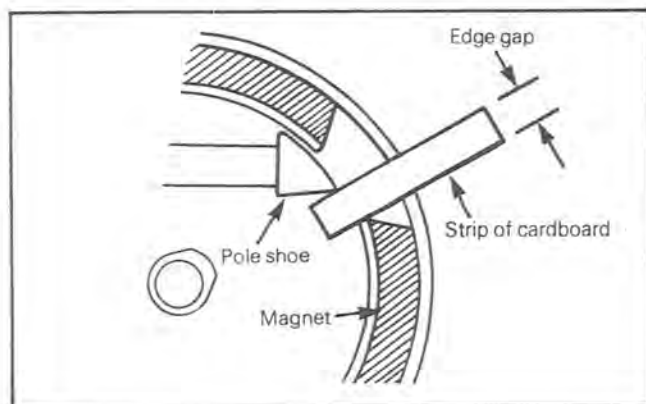
8. Rotate magneto counter-clockwise until specified piston position before top dead center is reached. Hold advance mechanism centrifugal lever in full advance position (toward magneto rim). Twist breaker points from one side to the other until timing light fluctuates (from dim to bright) or until tone signal is no longer heard. Retighten retaining screw at this position.



9. Still holding centrifugal lever in full advance position, rotate magneto counter-clockwise  $1/8$  of a turn and slowly turn magneto back in a clockwise direction. As soon as pointer matches specified reading on dial, the timing light should fluctuate or the tone signal should no longer be heard.

10. Check and adjust the edge gap as follows:

- From timing marks, rotate magneto clockwise  $1/8$  of a turn. Hold advance mechanism centrifugal weight in the open position (toward magneto rim) then slowly turn magneto back counter-clockwise until timing light fluctuate or tone signal is no longer heard. At this point check the distance between pole shoe trailing edge and magnet (edge gap) with a strip of cardboard of appropriate width (Refer to Technical Data Section).



- If the edge gap is less than specified, loosen armature plate retaining screws and rotate armature plate ass'y counter-clockwise until correct edge gap is obtained. Reset the ignition timing and recheck the edge gap.
- If the edge gap is greater than specified, loosen armature plate retaining screws and rotate armature plate ass'y clockwise until correct edge gap is obtained. Reset the ignition timing and recheck the edge gap.

11. Rotate crankshaft approx.  $180^\circ$  or until PTO piston approaches top dead center. Disconnect timing instrument wire from blue wire then reconnect it to the black wire leading from engine. Remove T.D.C. gauge from mag. side and reinstall on PTO side. Repeat steps 6, 7, 8 and 9 for PTO side breaker points.

12. Remove TDC gauge from engine, disconnect timing instrument and reinstall previously removed components on engine.



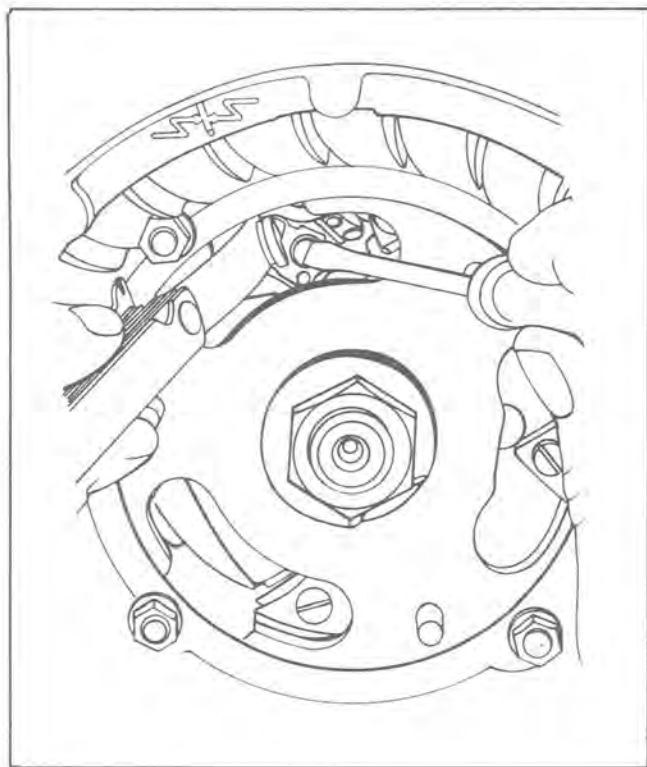


## ENGINE TIMING — ONE CYLINDER

Two timing procedures are detailed in this section; the first using the timing marks stamped on the engine, and the second using a T.D.C. gauge.

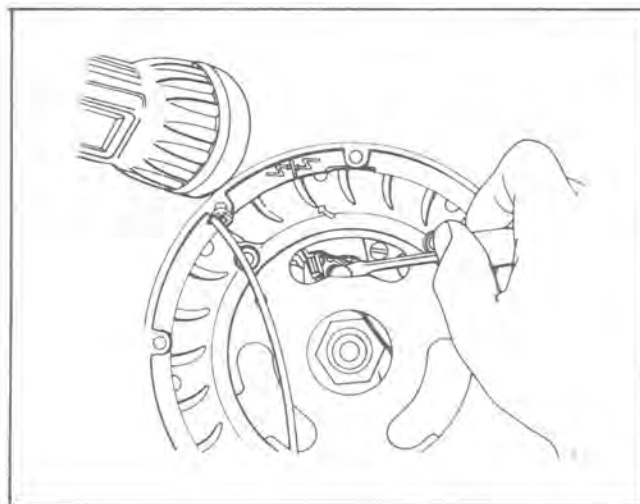
### PROCEDURE USING TIMING MARKS

1. Disconnect spark plug wire and remove spark plug.
2. Remove rewind starter assembly from engine then remove the starting pulley from magneto ring.
3. Rotate crankshaft until breaker points, visible through magneto ring opening, are fully open. Adjust points setting to .014" - .018" using a feeler gauge and screwdriver as illustrated.



4. Disconnect junction block at engine, then connect one lead of a timing light (flashlight type) or at tone timer to the black wire leading from engine. Connect other wire to fan cowl (ground).

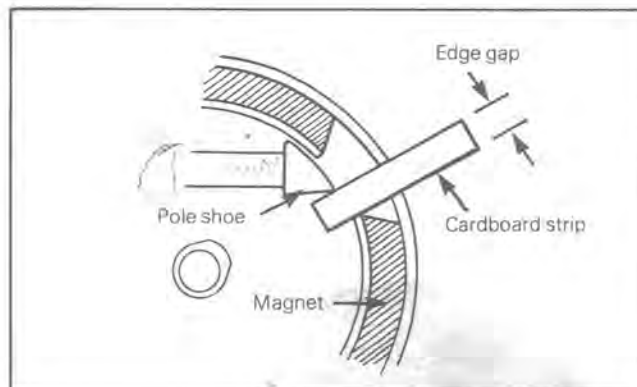
5. Turn timing instrument ON, and rotate crankshaft until timing marks align. Slacken breaker points retaining screw then using a screwdriver, twist breaker points from one side to the other until timing light fluctuates (from dim to bright) or tone signal is no longer heard. Retighten retaining screw at this position.



6. Rotate the magneto counter-clockwise  $\frac{1}{4}$  of a turn and slowly turn the magneto back in a clockwise direction. As soon as the timing marks align the breaker points should just begin to open and the timing light should fluctuate, or the tone signal should no longer be heard.

7. Check and adjust the edge gap as follows:

- From timing marks, rotate magneto clockwise  $\frac{1}{4}$  of a turn. Hold advance mechanism centrifugal weight in the open position (toward magneto rim), then slowly turn magneto back counter-clockwise until timing light fluctuates or tone signal is no longer heard. At this point, check the distance between pole shoe trailing edge and magnet (edge gap) with a strip of cardboard of appropriate width (Refer to Technical Data Section).
- If the edge gap is less than specified, loosen armature plate retaining screw and rotate armature plate ass'y counter-clockwise until correct edge gap is obtained. Reset the ignition timing and recheck the edge gap.



## SECTION 04

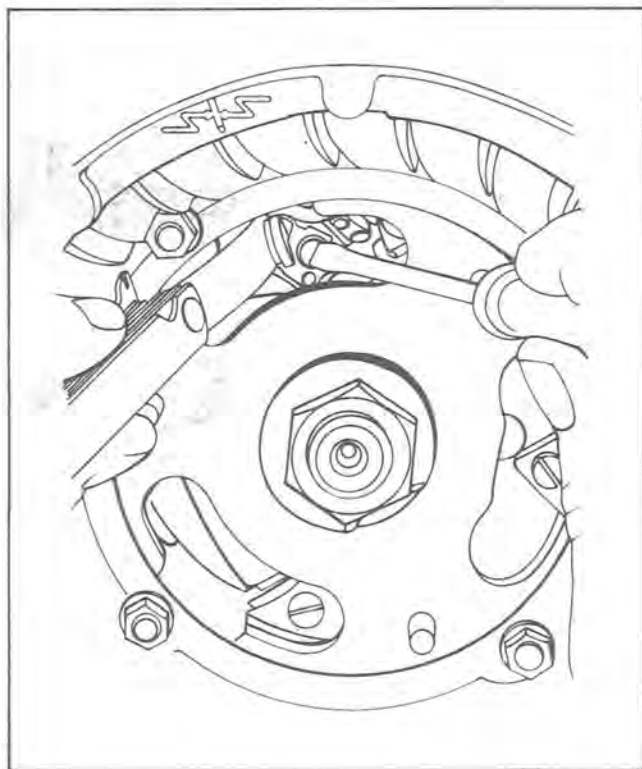
### SUB-SECTION 04 (ENGINE TIMING)

- If the edge gap is greater than specified, loosen armature plate retaining screw and rotate armature plate ass'y clockwise until correct edge gap is obtained. Reset the ignition timing and recheck the edge gap.

8. Re-install previously removed components on engine.

#### PROCEDURE USING T.D.C. GAUGE

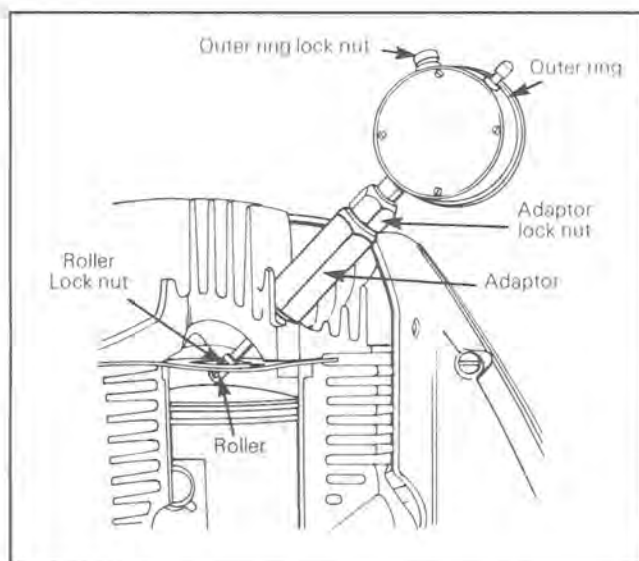
1. Disconnect spark plug wire and remove spark plug.
2. Remove rewind starter assembly from engine then remove the starting pulley from magneto ring.
3. Rotate crankshaft until breaker points, visible through magneto ring opening, are fully opened. Adjust points gap between .014" and .018" using a feeler gauge and screwdriver, as illustrated.



4. Disconnect junction block at engine, then connect one lead of a timing light (flashlight type or of a tone timer), to the black wire coming from engine. Connect other wire to fan cowl (ground).

5. Install and adjust T.D.C. gauge on engine as follows:

- Rotate crankshaft until piston is just before top dead center.
- With gauge in adaptor, adjust roller so that it is parallel with dial face. Tighten roller lock nut.



- Loosen adaptor lock nut then holding gauge, screw adaptor into spark plug hole.
- Position the face of dial towards magneto side and adjust gauge stem for precise reading. Finger tighten adaptor lock nut.
- Rotate crankshaft until piston is at Top Dead Center.
- Unlock outer ring of dial and turn it until "O" on dial aligns with pointer.
- Lock outer ring in position.

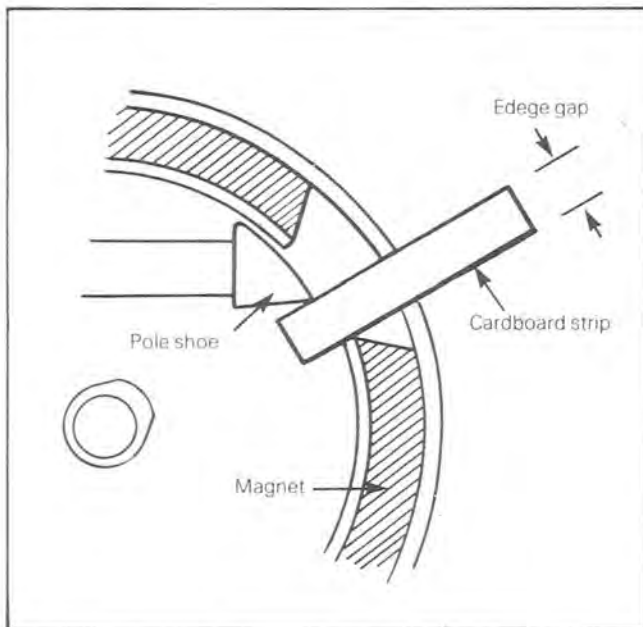
6. Turn timing instrument ON. Slightly loosen breaker points retaining screw.

7. Rotate magneto counter-clockwise until specified piston position before top dead center is reached. Hold advance mechanism centrifugal lever in full advance position (toward magneto rim). Twist breaker points from one side to the other until timing light fluctuates (from dim to bright) or until tone signal is no longer heard. Retighten retaining screw at this position.

8. Still holding centrifugal lever in full advance position, rotate magneto counter-clockwise 1/4 of a turn and slowly turn magneto back in a clockwise direction. As soon as pointer matches specified reading on dial, the timing light should fluctuate or the tone signal should no longer be heard.

9. Check and adjust the edge gap as follows:

- From timing marks, rotate magneto clockwise 1/4 of a turn. Hold advance mechanism centrifugal weight in the open position (toward magneto rim) then slowly turn magneto back counter-clockwise until timing light fluctuates or tone signal is no longer heard. At this point check the distance between pole shoe trailing edge and magnet (edge gap) with a strip of cardboard of appropriate width (Refer to Technical Data Section).



- If the edge gap is less than specified, loosen armature plate retaining screw and rotate armature plate ass'y counter-clockwise until correct edge gap is obtained. Reset the ignition timing and recheck the edge gap.
- If the edge gap is greater than specified, loosen armature plate retaining screw and rotate armature plate ass'y clockwise until correct edge gap is obtained. Reset the ignition timing and recheck the edge gap.

10. Remove T.D.C. gauge from engine and reinstall previously removed components.



C.D. IGNITION

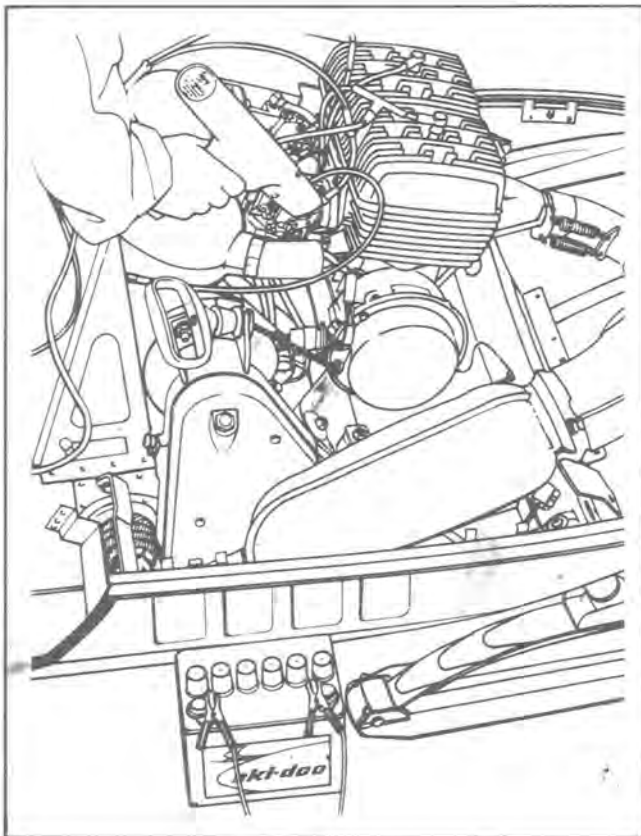
## FOREWORD

On models equipped with a C.D. ignition system, plug firing is initiated by an electrical pulse. This pulse is released when a metal projection on the flywheel hub rotates past the pick-up coil. Therefore, timing must be performed while the engine is running.

A stroboscopic timing light such as Sun PTL 45, Snap-On MT215B, Bosch EFAW 169A, or a suitable equivalent, plus a 12 volt battery are needed.

## PROCEDURE

Place skis tips against a wall. Use a support incorporating a protective guard to block vehicle off the ground. (Approx. 6" between track and floor). Remove rubber plug from upper crankcase half. Connect an operating timing light to magneto side spark plug wire.

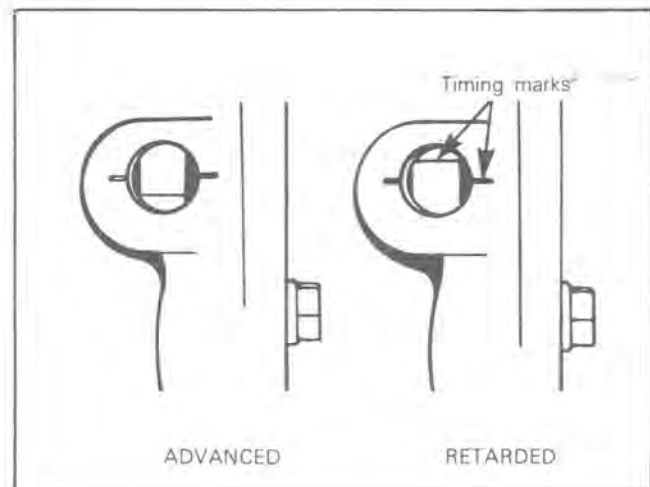


**Warning:** Ensure that no one will pass behind the vehicle, even momentarily, while timing engine. Also, make sure that pulley guard is in position and that track is clear of tools, clothes, etc.

Start engine. The magneto ring / crankcase timing marks should coincide when full advance is obtained. Full advance is at 5,000 RPM.

**Caution:** Running the engine unnecessarily will cause premature slider shoe wear.

If the timing marks do not coincide, remove rewind starter and starting pulley. Slacken off the two (2) Allen capscrews securing the armature plate. Rotate plate clockwise if timing is advanced, counter-clockwise if timing is retarded.



Once timing is correct on Mag. side, release throttle, apply the brake and turn off the ignition. Connect timing light to P.T.O. side spark plug wire. Start engine and check if P.T.O. timing coincides with Mag. side timing.

If timing does not coincide, install a T.D.C. gauge into P.T.O. spark plug hole. Scribe true marks on magneto rings at lower and upper timing limits B.T.D.C. (Refer to Technical Data). Repeat for other cylinder.

Position armature plate so that both cylinders fire within specified tolerance.

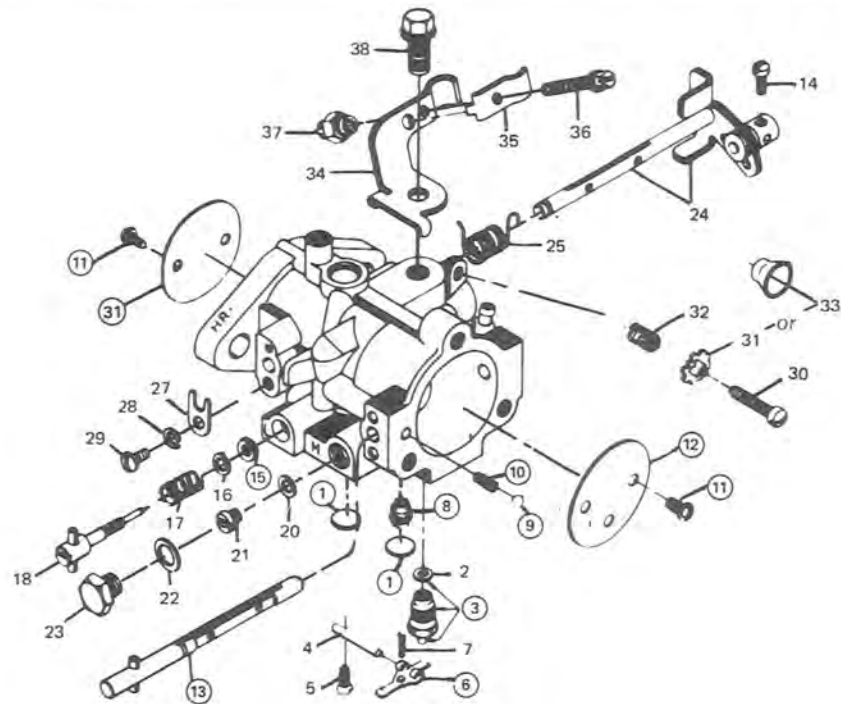




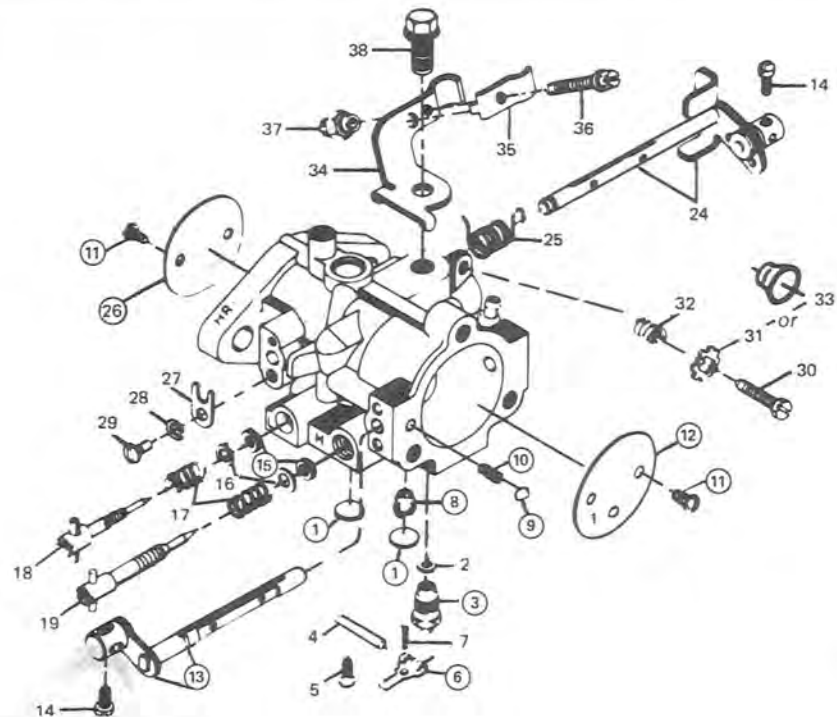
SECTION 04  
SUB-SECTION 05 (CARBURETOR)

HR TYPE

APPLICABLE ON: HR 131A  
HR 133A  
HR 134A  
HR 135A  
HR 155A  
HR 161A

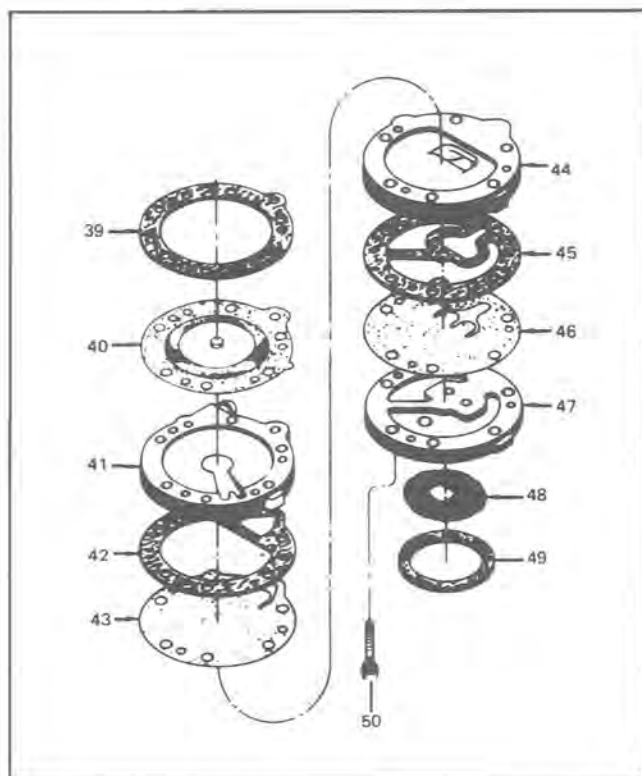


APPLICABLE ON: HR 132A  
HR 149A  
HR 164A



## SECTION 04

### SUB-SECTION 05 (CARBURETOR)



1. Welch plug.
2. Inlet seat gasket.
3. Inlet needle and seat.
4. Fulcrum pin.
5. Retaining screw.
6. Fulcrum lever.
7. Fulcrum lever spring.
8. Main nozzle check valve.
9. Friction ball.
10. Friction spring.
11. Shutter screw.
12. Choke shutter.
13. Choke shaft.
14. Wire retaining screw.
15. Packing.
16. Washer.
17. Adjusting screw spring.
18. Idle mixture adjusting screw.
19. High speed mixture adjusting screw.
20. Main fuel jet gasket.
21. Main fuel jet.
22. Plug screw gasket.
23. Main jet plug screw.
24. Throttle shaft.
25. Throttle shaft spring.
26. Throttle shutter.
27. Throttle shaft clip.

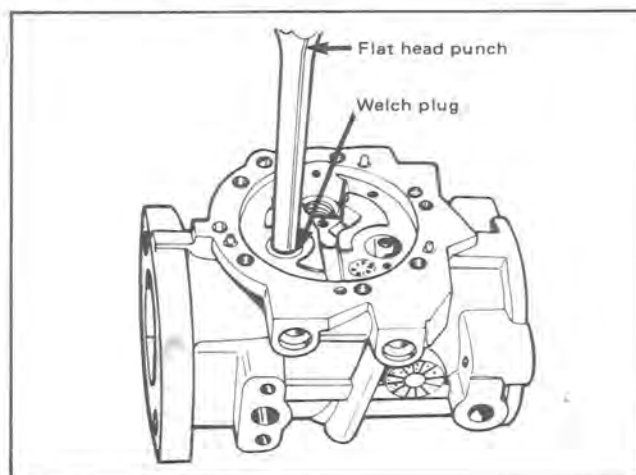
28. Lockwasher.
29. Retaining screw.
30. Idle speed adjusting screw.
31. Washer.
32. Adjusting screw spring.
33. Cup.
34. Throttle cable bracket.
35. Throttle cable clamp.
36. Cable clamp retaining screw.
37. Cable clamp retaining nut.
38. Retaining screw and lockwasher.
39. Diaphragm gasket.
40. Metering diaphragm.
41. Diaphragm cover.
42. Fuel pump gasket.
43. Fuel pump diaphragm.
44. Fuel pump body.
45. Inlet valve gasket.
46. Inlet valve diaphragm.
47. Inlet valve body.
48. Fuel strainer screen.
49. Fuel strainer gasket.
50. Body screw and lockwasher.

## REMOVAL

Detach the following items from carburetor: air silencer, choke cable, throttle cable and housing, fuel lines and pulsation line. Open tab locks then remove nuts securing carburetor.

## DISASSEMBLY & ASSEMBLY

- ① To remove welch plug, break through the plug using a 1/8 inch drill. Avoid plug center. Drill should penetrate the plug only, not the chamber. Pry from seating using a pointed tool. To install, position a new welch plug (convex side up) then using a 5/16" flat end punch and hammer, gently tap the plug until flat.



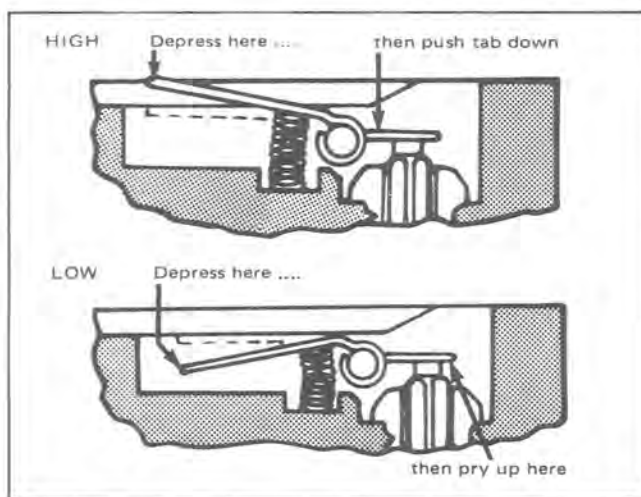
## SECTION 04

### SUB-SECTION 05 (CARBURETOR)

Leak test welch plugs by allowing controlled compressed air (max. 50 P.S.I.) into the idle and high speed adjusting screw orifices. The carburetor must be inverted, welch plugs up, and a drop or two of oil laying over each plug. Small air bubbles indicate leak. Reseal with a punch and hammer then leak test once again.

③ At assembly, torque the needle inlet seat to 25-30 inch/lb.

⑥ Adjust the inlet control lever until the center of the lever contacting the metering diaphragm is flush with the metering chamber wall. To adjust, bend lever as illustrated.



⑧ Test main nozzle check valve operation by alternately applying pressure and vacuum with the mouth on the nozzle section. The check valve must hold pressure and release under vacuum.

⑨ ⑩ ⑬ Exercise care when pulling choke shaft from carburetor. The friction ball and spring can fly out from the casting.

At assembly, position spring and friction ball into casting. Using a suitable tool, depress friction ball. At same time, push choke shaft into carburetor body.

⑪ Apply a light coat of thread locking compound on threads.

⑫ The choke shutter must be installed with shutter hole facing down and with location mark facing outward.

⑮ Prior to assembly, lubricate "O" ring with petroleum jelly.

⑳ Spring to be wound to approximately 1 1/4 turns.

㉑ The throttle shutter sides are slightly angled to match the carburetor bore when closed. At assembly, make sure shutter is correctly positioned and location mark is facing outward.

#### CLEANING & INSPECTION

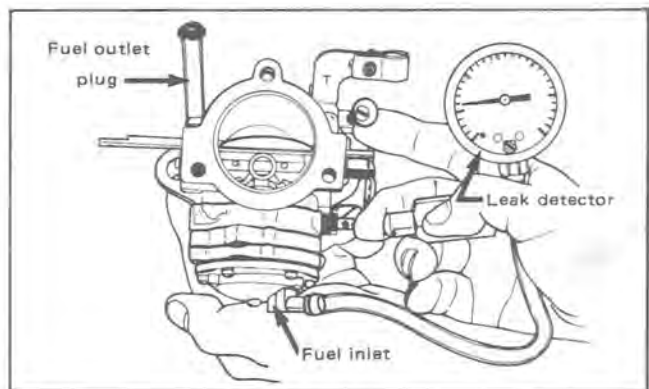
The entire carburetor should be cleaned with fuel and dried with compressed air before disassembly. If carburetor is very dirty it should be pre-soaked in a suitable solvent.

**Caution:** Some solvents and cleaners have a damaging effect on the synthetic rubber parts of the carburetor. It is best to use a petroleum product for cleaning. Do not use alcohol, lacquer, acetone, thinner, benzol or any solvent with a blend of these ingredients unless the rubber parts and gaskets are removed. If you are in doubt about the solvent, test a used part and observe the reaction.

Inspect all diaphragms. They should be free of holes or imperfections. Replace as needed.

Check inlet needle tip condition. If worn, the inlet needle and seat must be replaced as a matched set.

After assembly, leak test carburetor inlet needle as follows: With both idle speed and high speed adjustment screws open and fuel return outlet plugged, connect a leak detector to the fuel inlet. (See Tool Section).



Pump detector until inlet needle release pressure is reached (sudden pressure drop), then observe gauge reading; the system must stay pressurized.

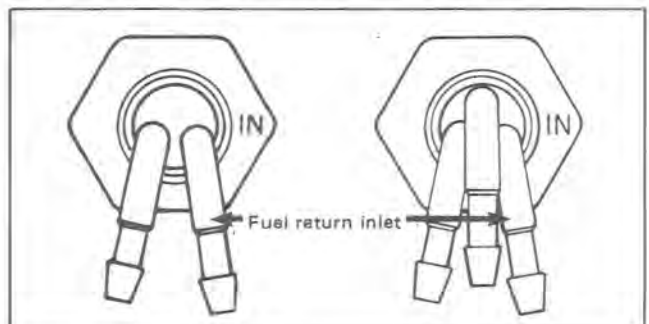
If pressure drops completely the carburetor is leaking and cause should be investigated.

Immerse carburetor in clean gas then pressurize it to a pressure lower than the inlet needle release pressure.

Air bubbles escaping from inside the carburetor bore indicates a leaking inlet needle. Bubbles escaping from a leaking gasket or diaphragm indicates tightening or replacement.

#### INSTALLATION & ADJUSTMENT

To install carburetor on engine, inverse removal procedure. For identification purpose, the fuel return line inlet on the tank male connector is stamped with the letters "IN".



## SECTION 04

### SUB-SECTION 05 (CARBURETOR)

**Caution:** Tab locks should be changed after being opened three times, or if damaged.

#### Maximum Throttle Opening

With engine off and air silencer removed, depress throttle lever at handlebar and hold. Throttle butterfly should be horizontal when the lever gently touches the handlebar grip. To adjust for maximum opening, loosen screw at point where cable joins carburetor lever. Clamp throttle lever to handlebar. With finger, hold carburetor throttle lever in fully open position (UP), pull cable until taut and retighten screw. Unclamp throttle lever from handlebar and install air silencer.

**Warning:** Before starting engine, carburetor throttle lever must return to idle position (throttle shutter closed). Do not start engine unless this is verified.

#### Low Speed Mixture Adjustment

A primary adjustment, engine off, should be made by first turning idle mixture screw fully clockwise until closed, then back off to specification.

#### Idle Speed Adjustment

Allow engine to warm then using a screwdriver, turn the idle speed adjusting screw(s) clockwise to increase idling speed, counter-clockwise to decrease. Adjust to specification.

#### High Speed Mixture Adjustment

A primary adjustment, with engine off should be made by first turning high speed mixture screw fully clockwise until closed, then back off to nominal specification.

For final adjustment, start engine and allow it to warm. Drive the vehicle for approximately one (1) mile at 6000 RPM. (The high speed jet will be operational at this RPM range). Stop the engine immediately. Remove and inspect plug face.

The plug face will indicate whether the mixture is rich, normal or lean. A brownish tip reflects ideal carburetor adjustment. A black insulation tip indicates a rich mixture. Light grey insulator tip indicates a lean mixture. If the mixture is incorrect, readjust  $\frac{1}{8}$  of a turn and recheck color of spark plug face.

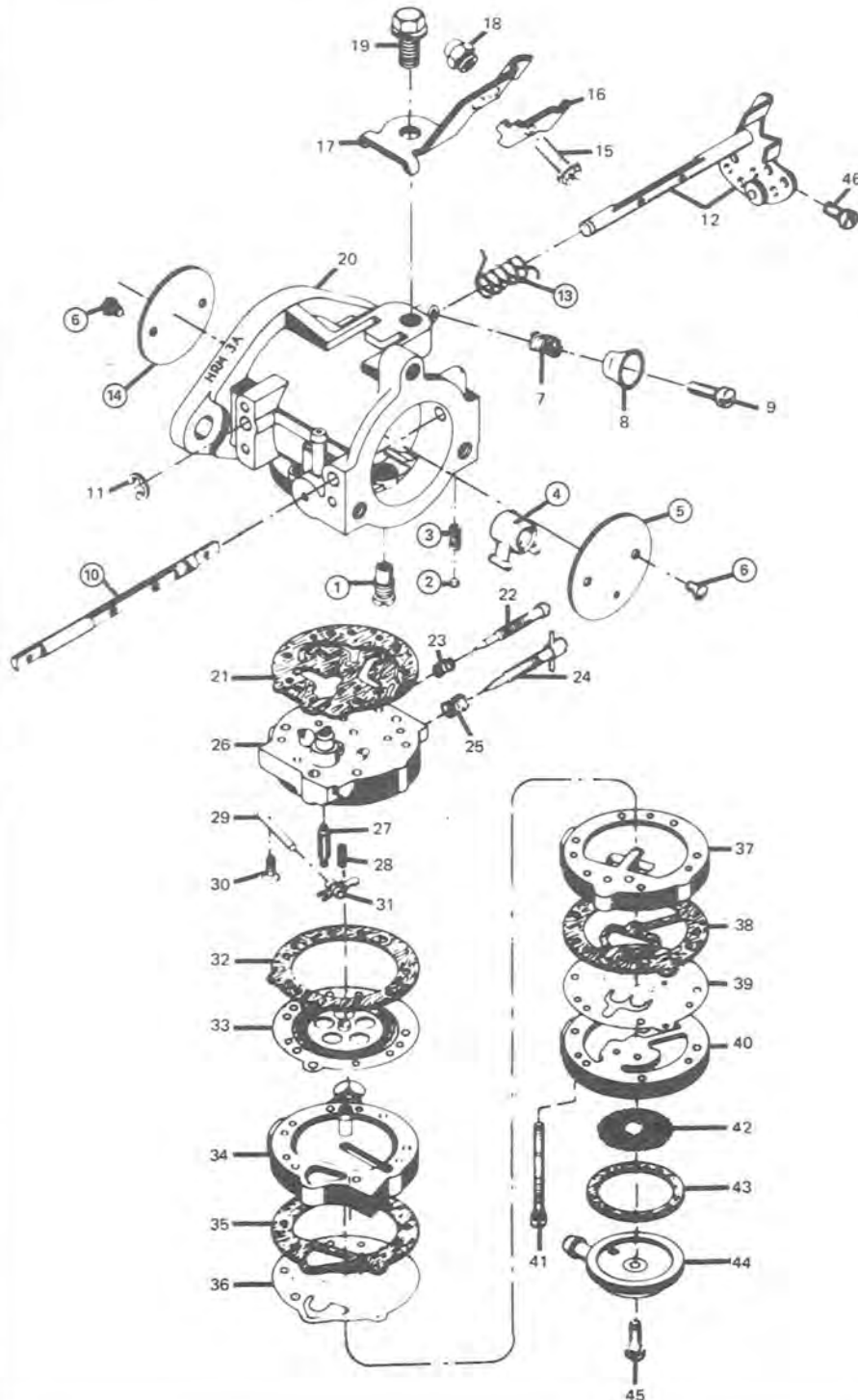
*Note: This method applies to an engine in good working condition. If after adjustment it is found there is considerable deviation from nominal setting, the carburetor and/or the engine is defective and needs repair. (Leaking Welch plug, crankcase seal, wrong spark plug heat range, etc.).*



SECTION 04  
SUB-SECTION 05 (CARBURETOR)

HRM TYPE

APPLICABLE ON: HRM 3A



1. Nozzle check valve.
2. Friction ball.
3. Spring.
4. Primary venturi.
5. Choke shutter.
6. Screw.
7. Spring.
8. Cup.
9. Idle speed screw.
10. Choke shaft.
11. Circlip.
12. Throttle shaft.
13. Spring.
14. Throttle shutter.
15. Screw.
16. Throttle cable clamp.
17. Throttle cable bracket.
18. Nut.
19. Bolt.
20. Carburetor body.
21. Adjuster.
22. Idle mixture screw.
23. Spring.
24. High speed mixture screw.
25. Spring.
26. Adjustment module.
27. Inlet needle.
28. Inlet tension spring.
29. Fulcrum pin.
30. Retaining screw.
31. Inlet control lever.
32. Diaphragm gasket.
33. Metering diaphragm.
34. Diaphragm cover.
35. Fuel pump gasket.
36. Fuel pump diaphragm.
37. Fuel pump body.
38. Inlet valve gasket.
39. Inlet valve diaphragm.
40. Inlet valve body.
41. Body screw and lock washer.
42. Fuel strainer screen.
43. Cover gasket.
44. Fuel strainer cover.
45. Cover retaining screw.
46. Cable retaining screw.

## SECTION 04

### SUB-SECTION 05 (CARBURETOR)

#### REMOVAL

Detach the following items from carburetor(s): air silencer, choke cable and housing, throttle cable and housing, fuel lines and pulsation line(s).

Open tab locks then remove nuts securing carburetors.

#### DISASSEMBLY & ASSEMBLY

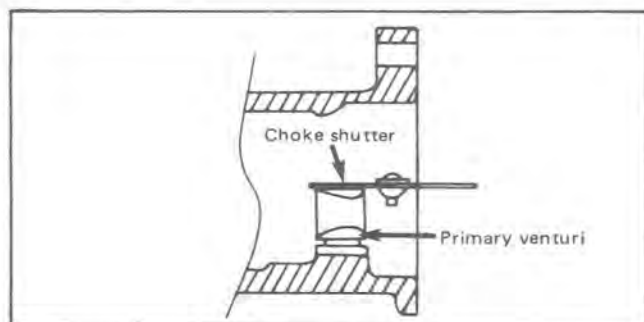
① Test main nozzle check valve operation by alternately applying pressure and vacuum with the mouth on the nozzle section.

The check valve must hold under pressure and release under a vacuum.

② ③ ⑩ Exercise care when pulling choke shaft from carburetor. Friction ball and spring can "fly out" of the casting.

At assembly, position spring and friction ball into casting. Using a suitable tool, depress friction ball, at same time, push choke shaft into carburetor body.

④ Primary venturi must be installed with largest section toward front of carburetor.



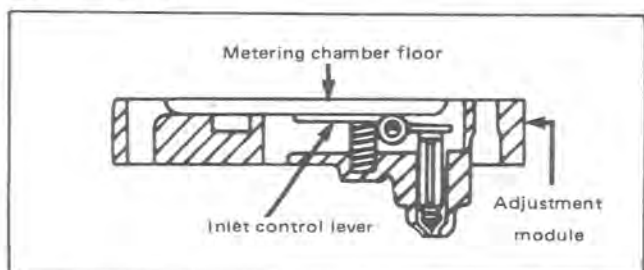
⑤ At assembly, ensure the shutter hole faces down and the location mark faces outward.

⑥ Apply a light coat of thread locking compound on threads.

⑬ Spring should be wound close to  $\frac{1}{2}$  a turn.

⑭ The throttle shutter sides are slightly angled to match the carburetor bore when closed. At assembly, make sure shutter is correctly positioned and location mark is facing outward.

⑳ Adjust inlet control lever so that the center of lever contacting the metering diaphragm is flush with the metering chamber floor.



#### CLEANING & INSPECTION

The entire carburetor should be cleaned with fuel and dried with compressed air before disassembly. If carburetor is very dirty it should be pre-soaked in a suitable solvent.

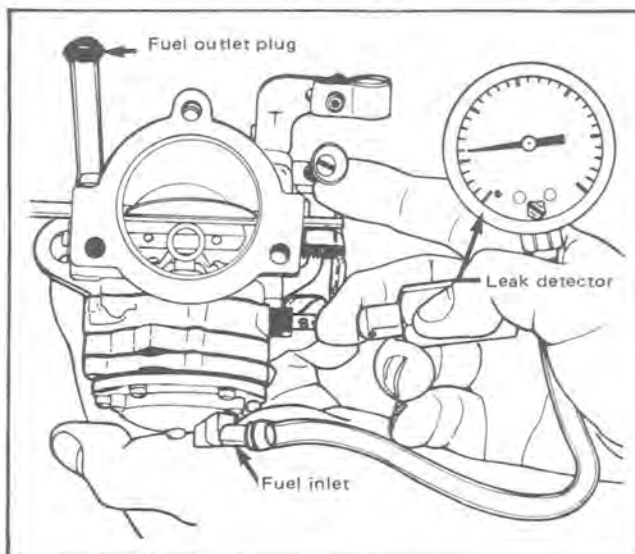
**Caution:** Some solvents and cleaners have a damaging effect on the synthetic rubber parts of the carburetor. It is best to use a petroleum product for cleaning. Do not use alcohol, lacquer, acetone, thinner, benzol or any solvent with a blend of these ingredients unless the rubber parts and gaskets are removed. If you are in doubt about the solvent, test a used part in it and observe the reaction.

Inspect all diaphragms. They should be free of holes or imperfections. Replace as needed.

Check inlet needle point. If worn, replace. If needle seat is damaged, the adjustment module must be replaced.

After assembly, leak test carburetor inlet needle as follows: With both high and low speed adjustment screws open and fuel return outlet plugged, connect a leak detector to the fuel inlet. (See Tools Section).

Pump detector until needle release pressure is reached (sudden pressure drop), then note gauge reading; the system must stay pressurized.



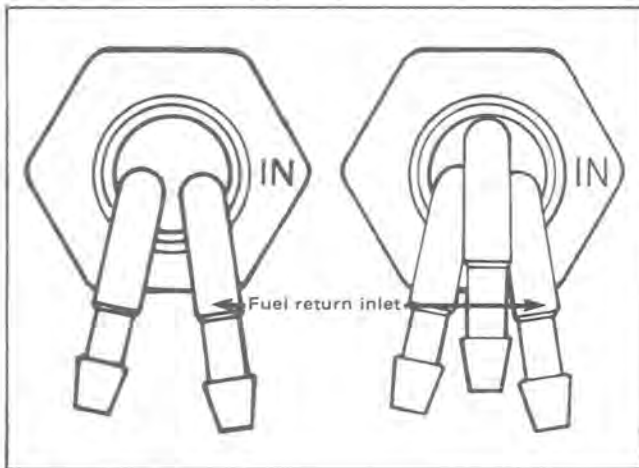
If pressure drops completely, the carburetor is leaking and cause should be investigated.

Immerse carburetor in clean gas then pressurize carburetor to a pressure lower than the inlet needle release pressure. Air bubbles appearing inside the carburetor bore indicates a leaking inlet needle. Bubbles escaping from a leaking diaphragm or gasket either indicates repair, replacement or tightening.

#### INSTALLATION & ADJUSTMENT

To install carburetor(s) on engine, inverse removal procedure. Special care must be exercised when connecting fuel lines. For identification purposes, the fuel return line inlet on the tank male connector is stamped with the letters "IN".

**SECTION 04**  
**SUB-SECTION 05 (CARBURETOR)**



*Note: This method applies to an engine in good working condition. If after adjustment it is found there is a considerable deviation from nominal setting, the carburetor and/or the engine is defective and needs repair. (Leaking welch plug, leaking crankcase seal, wrong spark plug heat range, etc.).*

**Caution:** Tab locks should be changed after being opened three times, or if damaged.

**Maximum Throttle Opening**

With engine off and air silencer removed, depress throttle lever at handlebar and hold. Throttle butterfly should be horizontal when the lever gently touches the handlebar grip.

To adjust for maximum opening, loosen screw at point cable joins carburetor lever. Clamp throttle lever to handlebar. With finger, hold carburetor throttle lever in fully open position (UP), pull cable until taut and retighten screw. Unclamp throttle lever from handlebar. Install air silencer.

**Warning:** Before starting engine, carburetor throttle lever must return to idle position (throttle shutter closed). Do not start engine unless this is verified.

**Low Speed Mixture Adjustment**

A primary adjustment, engine off, should be made by first turning idle mixture screw(s) fully clockwise until closed, then back off to specification.

**Idle Speed Adjustment**

Allow engine to warm then using a screwdriver, turn the idle speed adjusting screw(s) clockwise to increase idling speed, counter-clockwise to decrease. Adjust to specification.

**High Speed Mixture Adjustment**

A primary adjustment, with engine off, should be made by first turning high speed mixture screw(s) fully clockwise until closed, then back off to nominal specification.

For final adjustment, start engine and allow it to warm. Drive the vehicle for approximately one (1) mile at 6000 RPM min. (The high speed jet will be operational at this RPM range). Stop the engine immediately. Remove and inspect plug face.

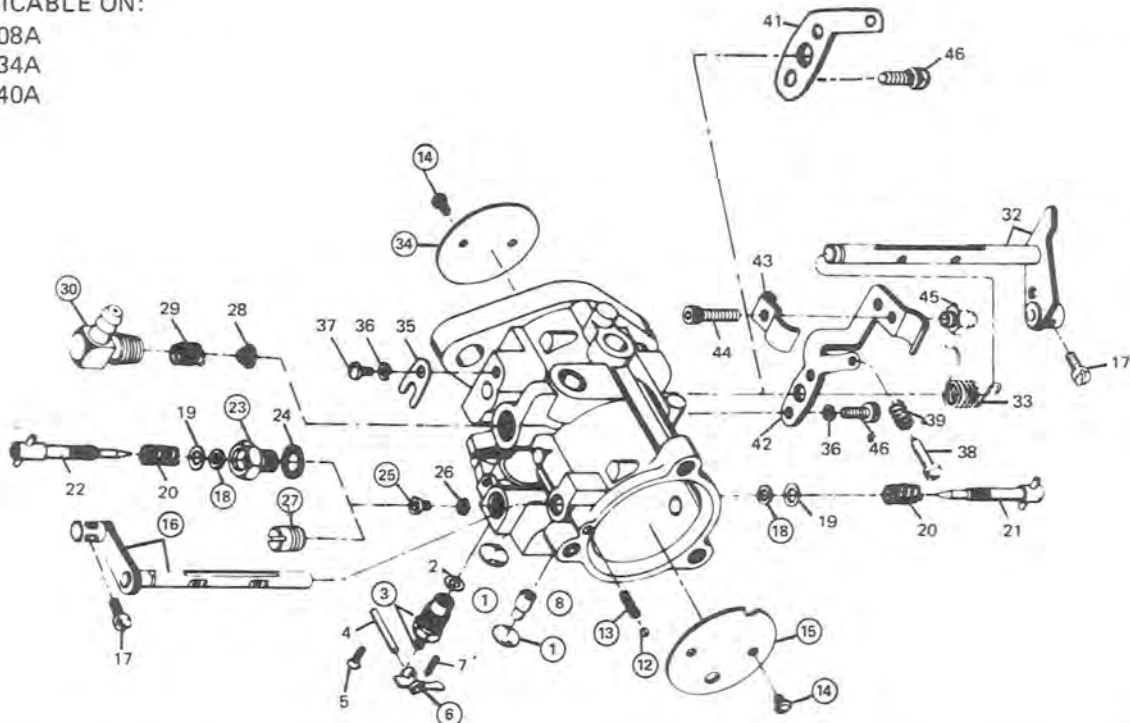
The plug face will indicate whether the mixture is rich, normal or lean. A brownish tip reflects ideal carburetor adjustment. A black insulator tip indicates a rich mixture. Light grey insulator tip indicates a lean mixture.

If the mixture is incorrect, readjust  $\frac{1}{8}$  of a turn and recheck color of spark plug face.

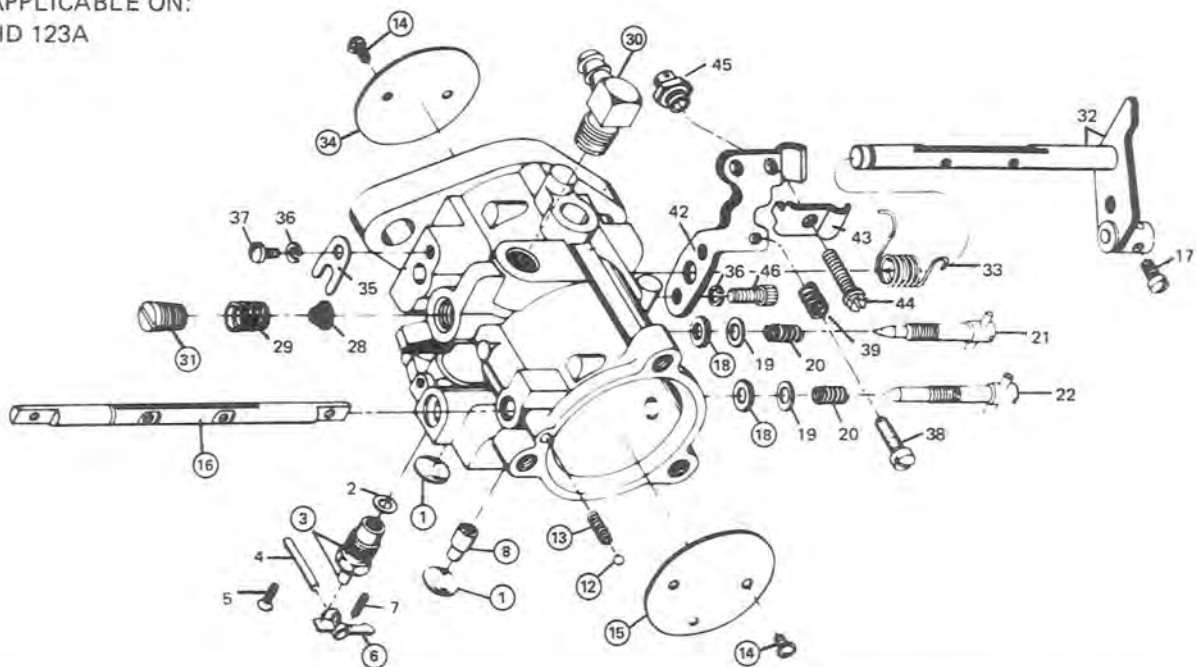


H.D. TYPE

APPLICABLE ON:  
HD 108A  
HD 134A  
HD 140A



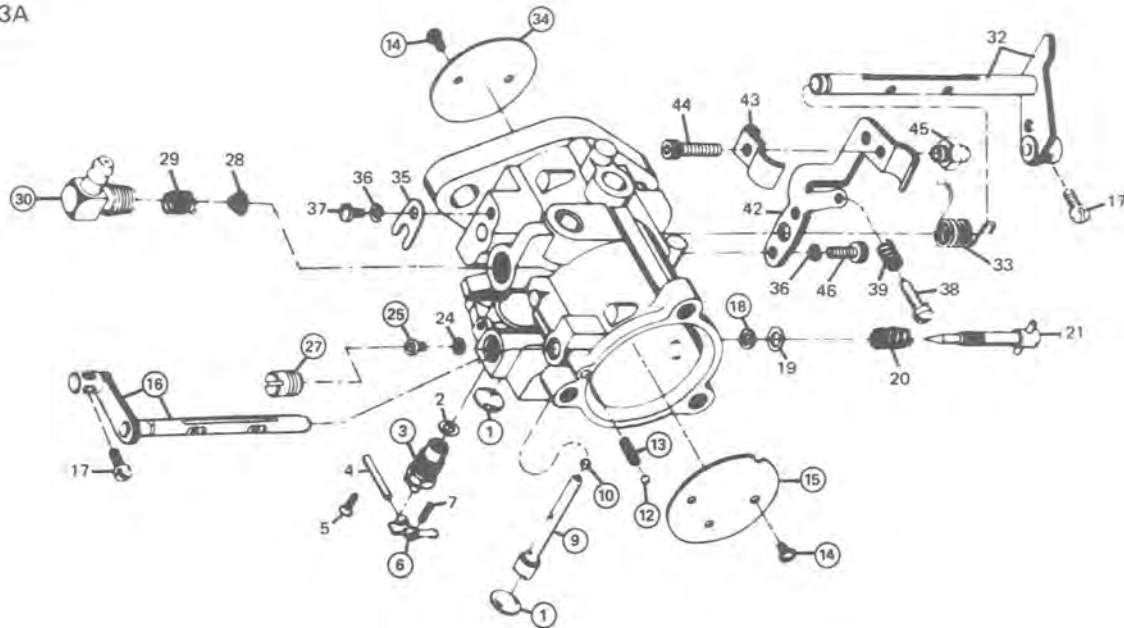
APPLICABLE ON:  
HD 123A



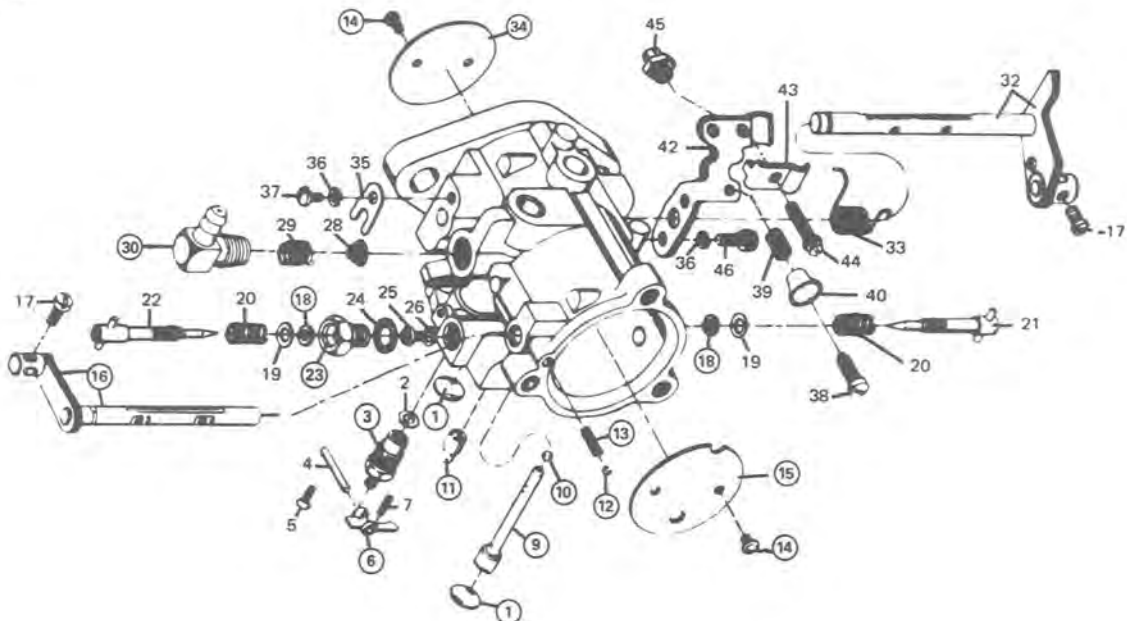


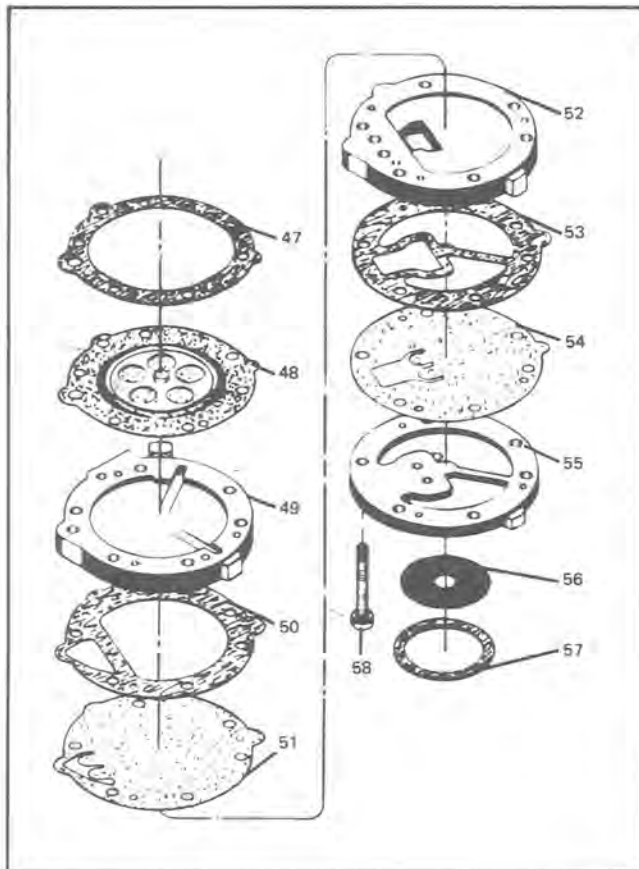
**SECTION 04**  
**SUB-SECTION 05 (CARBURETOR)**

APPLICABLE ON  
 HD 124A  
 HD 133A



APPLICABLE ON  
 HD 138A





1. Welch plug.
2. Inlet seat gasket.
3. Inlet needle and seat.
4. Fulcrum pin.
5. Retaining screw.
6. Fulcrum lever.
7. Fulcrum lever spring.
8. Main nozzle check valve.
9. Main nozzle check valve/discharge tube.
10. Lead shot.
11. Intermediate nozzle check valve.
12. Friction ball.
13. Friction spring.
14. Shutter screw.
15. Choke shutter.
16. Choke shaft.
17. Wire retaining screw.
18. Packing.
19. Washer.
20. Adjusting screw spring.
21. Idle mixture adjusting screw.
22. High speed mixture adjusting screw.
23. Mixture screw gland.
24. Fiber gasket.

25. Main fuel jet.
26. Main fuel jet gasket.
27. Main fuel jet plug screw.
28. Inlet screen.
29. Inlet screen retaining spring.
30. Fuel outlet connector.
31. Body channel plug screw.
32. Throttle shaft.
33. Throttle shaft spring.
34. Throttle shutter.
35. Throttle shaft clip.
36. Lock washer.
37. Retaining screw.
38. Idle speed screw.
39. Idle speed screw spring.
40. Idle speed screw cup.
41. Idle speed screw bracket.
42. Throttle cable bracket.
43. Throttle cable clamp.
44. Cable clamp retaining screw.
45. Cable clamp retaining nut.
46. Bracket retaining screw.
47. Diaphragm gasket.
48. Metering diaphragm.
49. Diaphragm cover.
50. Fuel pump gasket.
51. Fuel pump diaphragm.
52. Fuel pump body.
53. Inlet valve gasket.
54. Inlet valve diaphragm.
55. Inlet valve body.
56. Fuel strainer screen.
57. Fuel strainer gasket.
58. Body screw & lockwasher.

## REMOVAL

Detach the following items from carburetor: air silencer, choke cable, throttle cable and housing, fuel lines and pulsation line. Open tab locks then remove nuts securing carburetor.

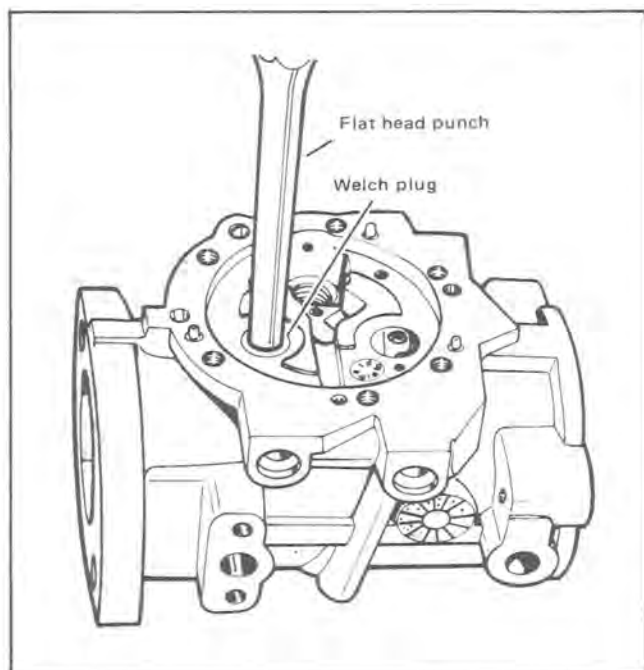
## DISASSEMBLY & ASSEMBLY

① To remove welch plug, break through the plug using a  $\frac{1}{8}$  inch drill. Avoid plug center. Drill should penetrate the plug only, not the chamber. Pry from seating using a pointed tool.

To install, position a new welch plug (convex side up) then using a  $\frac{5}{16}$ " flat end punch, gently tap the plug until flat.

## SECTION 04

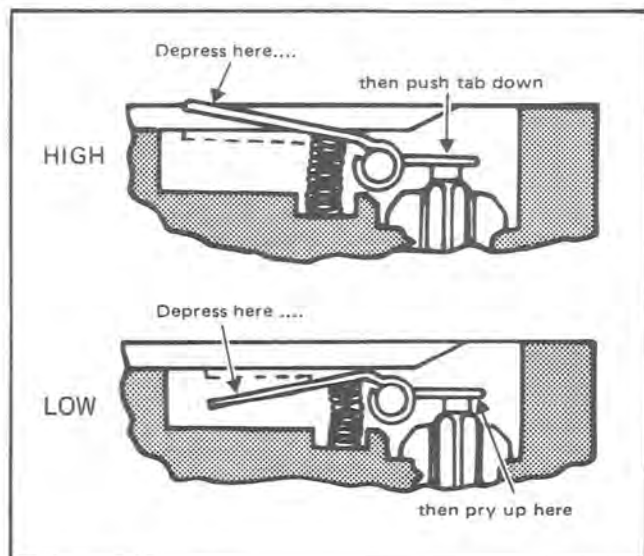
### SUB-SECTION 05 (CARBURETOR)



Leak test welch plugs by allowing controlled compressed air (max. 50 P.S.I.) into the idle and high speed adjusting screw orifices. The carburetor must be inverted, welch plugs up, and a drop or two of oil laying over each plug. Small air bubbles indicate leak. Reseal with a punch and hammer then leak test once again.

3 At assembly, torque the needle inlet seat to 40-45 inch/lb.

⑤ Adjust the inlet control lever until the center of the lever contacting the metering diaphragm is flush with the metering chamber wall. To adjust, bend lever as illustrated.



⑧ ⑪ To remove nozzle check valve from carburetor body, carefully tap out of casting using a suitable drive punch.

At assembly, drive the check valve into carburetor body using a suitable punch. (Depth specified in Technical Data). Test main nozzle check valve operation by alternately applying pressure and vacuum with the mouth on the nozzle section. The check valve must hold under pressure and release under vacuum.

9 ⑩ Do not remove nozzle check valve/discharge tube assembly from carburetor, unless replacement is needed. If replacement is necessary, cut old discharge tube at base then drive out lower section. Discard tube and lead shot.

At assembly, place a new lead shot into carburetor bore, then gently drive nozzle check valve assembly in carburetor with a suitable punch and hammer.

(Refer to "Technical Data" for proper installation position and depth).

Test main nozzle check valve operation by alternately applying pressure and vacuum with the mouth on the inlet side. The check valve must hold under vacuum and release under pressure.

⑫ ⑬ ⑭ Exercise care when pulling choke shaft from carburetor. The friction ball and spring can fly out from the casting.

At assembly, position spring and friction ball into casting. Using a suitable tool, depress friction ball. At same time, push choke shaft into carburetor body.

⑮ Apply a light coat of thread locking compound on threads.

⑯ The choke shutter must be installed with shutter hole facing down and with location mark facing outward.

⑰ Prior to assembly, lubricate "O" ring with petroleum jelly.

⑲ Torque gland to 25-35 inch/lb.

⑳ The main fuel jet has L.H.S. threads. To remove, turn in a clockwise direction.

㉑ ㉒ ㉓ Apply a light coat of thread sealing compound on threads prior to installation.

㉔ Spring to be wound close to 1/2 turn.

㉕ The throttle shutter sides are slightly angled to match the carburetor bore when closed. At assembly, make sure shutter is correctly positioned and location mark is facing outward.

## CLEANING & INSPECTION

The entire carburetor should be cleaned with fuel and dried with compressed air before disassembly. If carburetor is very dirty it should be pre-soaked in a suitable solvent.

**Caution:** Some solvents and cleaners have a damaging effect on the synthetic rubber parts of the carburetor. It is best to use a petroleum product for cleaning. Do not use alcohol, lacquer, acetone, thinner, benzol or any solvent with a blend of these ingredients unless the rubber parts and gaskets are removed. If you are in doubt about the solvent, test a used part and observe the reaction.

Inspect all diaphragms. They should be free of holes or imperfections. Replace as needed.



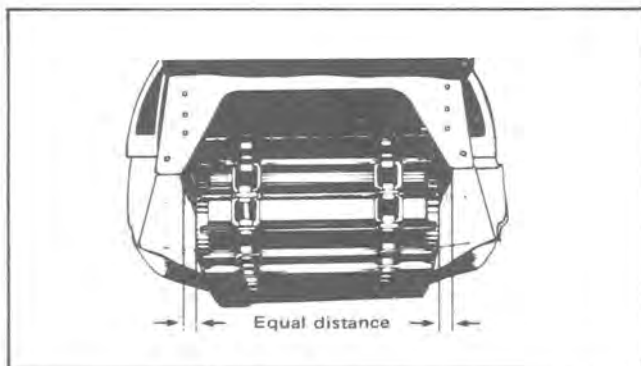
## SECTION 01

### SUB-SECTION 02 (SLIDE SUSPENSION)

*Note: Adjustment ride and track tension and alignment are inter-related. Do not adjust one without the other.*

After track tension has been corrected, start the engine and accelerate slightly so that track turns **slowly**. Check if track is well centered and turns evenly. To correct, loosen the lock nut and tighten the adjuster bolt on side where track is closest to the frame.

Tighten lock nut and recheck tension and alignment.



**Warning:** Before checking track alignment, ensure that the track is free of all particles which could be thrown out while track is rotating. Keep hands, feet, tools and clothing clear of track.

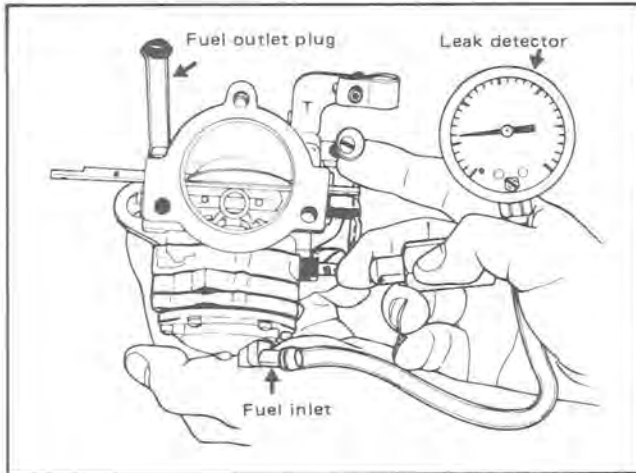


## SECTION 04

### SUB-SECTION 05 (CARBURETOR)

Check inlet needle tip condition. If worn, the inlet needle and seat must be replaced as a matched set.

After assembly, leak test carburetor inlet needle as follows: With both idle speed and high speed adjustment screws open and fuel return outlet plugged, connect a leak detector to the fuel inlet. (See Tool Section).



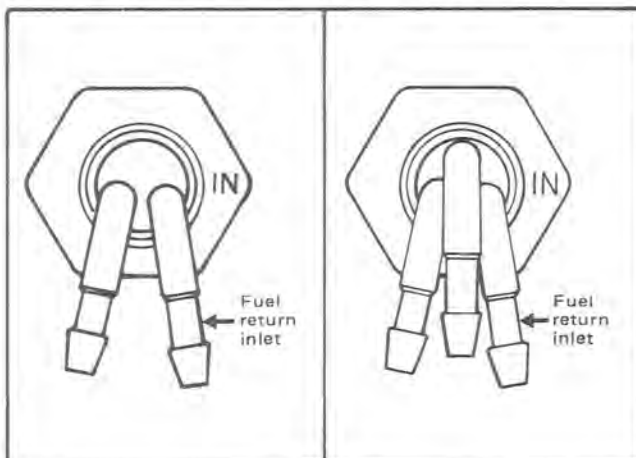
Pump detector until inlet needle release pressure is reached [sudden pressure drop], then observe gauge reading; the system must stay pressurized.

If pressure drops completely the carburetor is leaking and cause should be investigated.

Immerse carburetor in clean gas then pressurize carburetor to a pressure lower than the inlet needle release pressure. Air bubbles escaping from inside the carburetor bore indicates a leaking inlet needle. Bubbles escaping from a leaking gasket(s) or diaphragm either indicates replacement or tightening.

#### INSTALLATION & ADJUSTMENT

To install carburetor on engine, inverse removal procedure. For identification purposes, the fuel return line inlet on the tank male connector is stamped with the letters "IN".



**Caution:** Tab locks should be changed after being opened three times or if damaged.

#### Maximum Throttle Opening

With engine off and air silencer removed, depress throttle lever at handlebar and hold. Throttle butterfly should be horizontal when the lever gently touches the handlebar grip.

To adjust for maximum opening, loosen screw at point where cable joins carburetor lever. Clamp throttle lever to handlebar. With finger, hold carburetor throttle lever in fully open position (UP), pull cable until taut and retighten screw. Unclamp throttle lever from handlebar and install air silencer.

**Warning:** Before starting engine, carburetor throttle lever must return to idle position (throttle shutter closed). Do not start engine unless this is verified.

#### Low Speed Mixture Adjustment

A primary adjustment, engine off, should be made by first turning idle mixture screw fully clockwise until closed, then back off to specification.

#### Idle Speed Adjustment

Allow engine to warm then using a screwdriver, turn the idle speed adjusting screw clockwise to increase idling speed, counter-clockwise to decrease. Adjust to specification.

#### High Speed Mixture Adjustment

A primary adjustment, with engine off, should be made by first turning high speed mixture screw fully clockwise until closed, then back off to nominal specification.

For final adjustment, start engine and allow it to warm. Drive the vehicle for approximately one (1) mile at 6000 RPM. min. (The high speed jet will be operational at this RPM range). Stop the engine immediately. Remove and inspect plug face. The plug face will indicate whether the mixture is rich, normal or lean. A brownish tip reflects ideal carburetor adjustment. A black insulator tip indicates a rich mixture. Light grey insulator tip indicates a lean mixture.

If the mixture is incorrect, readjust  $\frac{1}{8}$  of a turn and recheck color of spark plug face.

*Note: This method applies to an engine in good working condition. If after adjustment it is found there is a considerable deviation from nominal setting, the carburetor and/or the engine is defective and needs repair. (Leaking Welch plug, leaking crankcase seal, wrong spark plug heat range, etc.).*



**SECTION 05**  
**SUB-SECTION 01 (ELECTRICAL CHARTS)**

**BULB SPECIFICATION AND CHART INDEX**

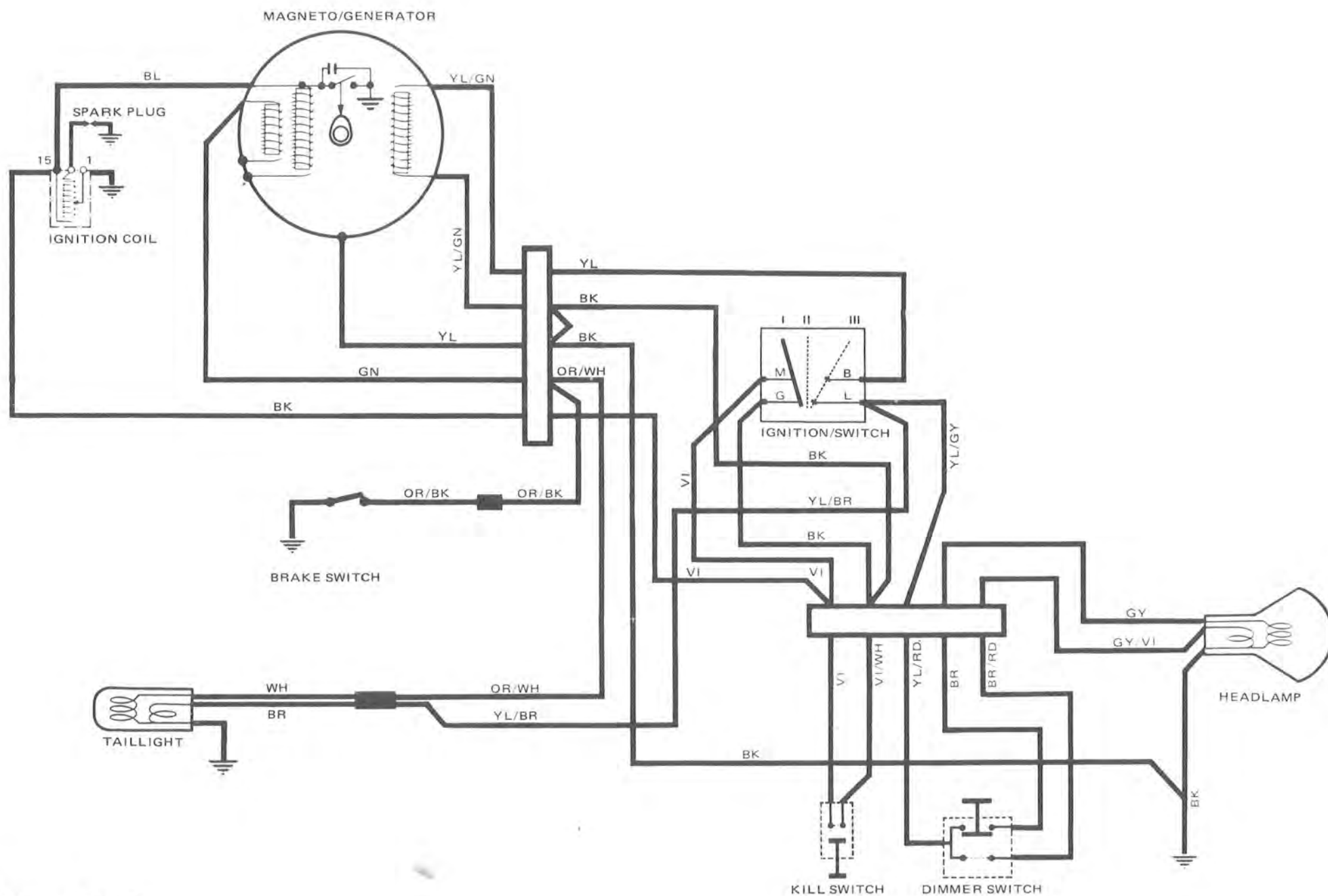
MODEL	YEAR	HEADLAMP WATT	TAILLIGHT WATT	CHART NO.
Elan 250	1974	60/60	8/23	1
Elan 250E	1974	35/35	8/23	3
Elan 250 Deluxe, 294SS	1974	35/35	5/18	4
Olympique 300	1974	60/60	8/23	2
Olympique 340, 400, 440	1974	60/60	8/23	5
Olympique 340E, 440E	1974	35/35	8/23	6
T'NT 300SM	1974	35/35	5/18	4
T'NT 340SM, 440SM, Everest	1974	60/60	5/18	7
T'NT 340SE, 440SE	1974	60/60	5/18	8
T'NT F/A 340, 400, 440	1974	60/60	5/18	9
Nordic 640ER	1974	60/60	8/23	10
Alpine 440ER	1974	35/35	8/23	11
Alpine 440ER	1974	35/35	8/23	11
Alpine 640ER	1974	35/35	8/23	12
Elite 440ER	1974	35/35	5/18	13

\* 35/35 W with electric start option.

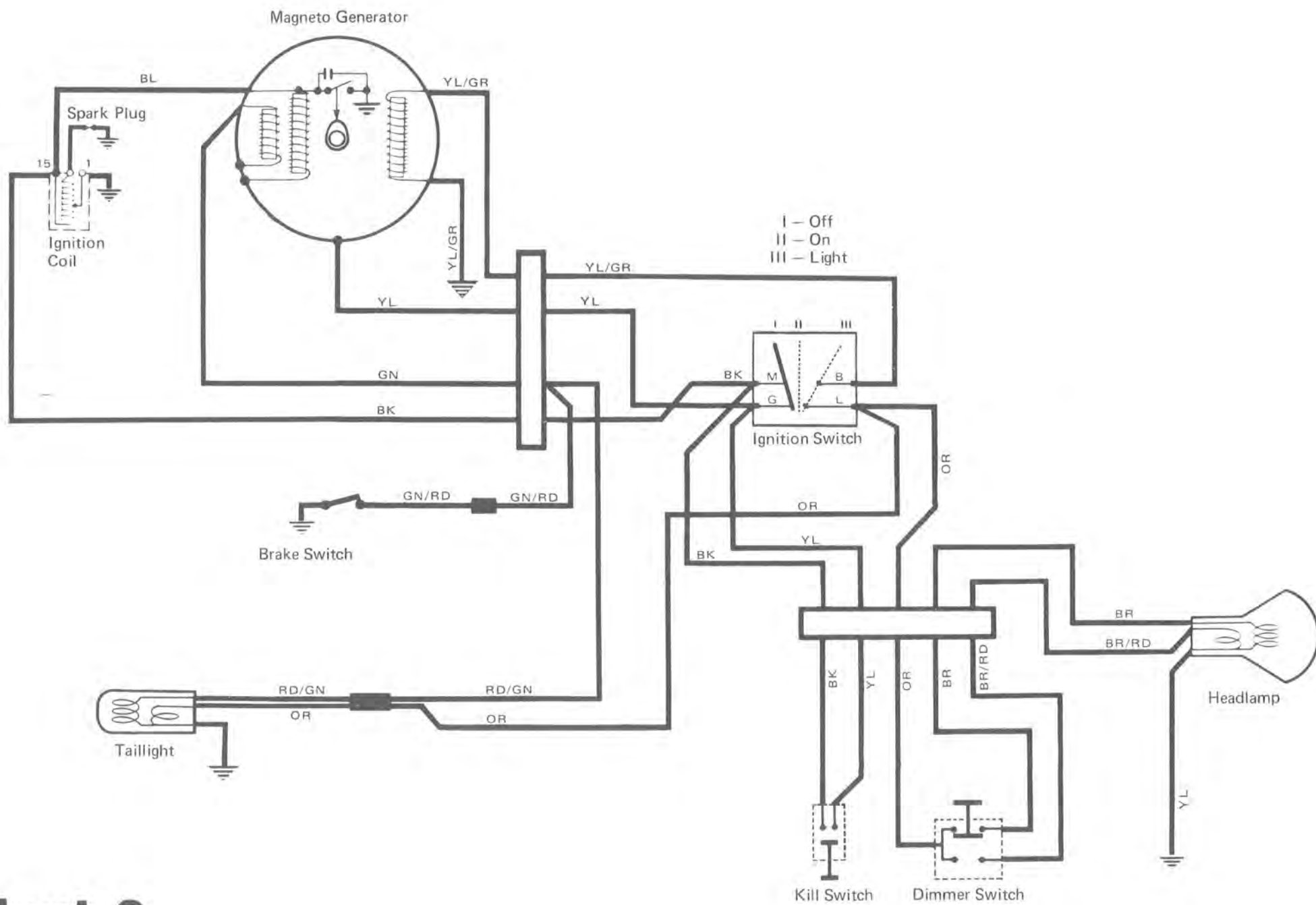
**COLOR CODE**

BL	—	Blue
BR	—	Brown
BK	—	Black
GN	—	Green
GY	—	Grey
RD	—	Red
VI	—	Violet
WH	—	White
YL	—	Yellow



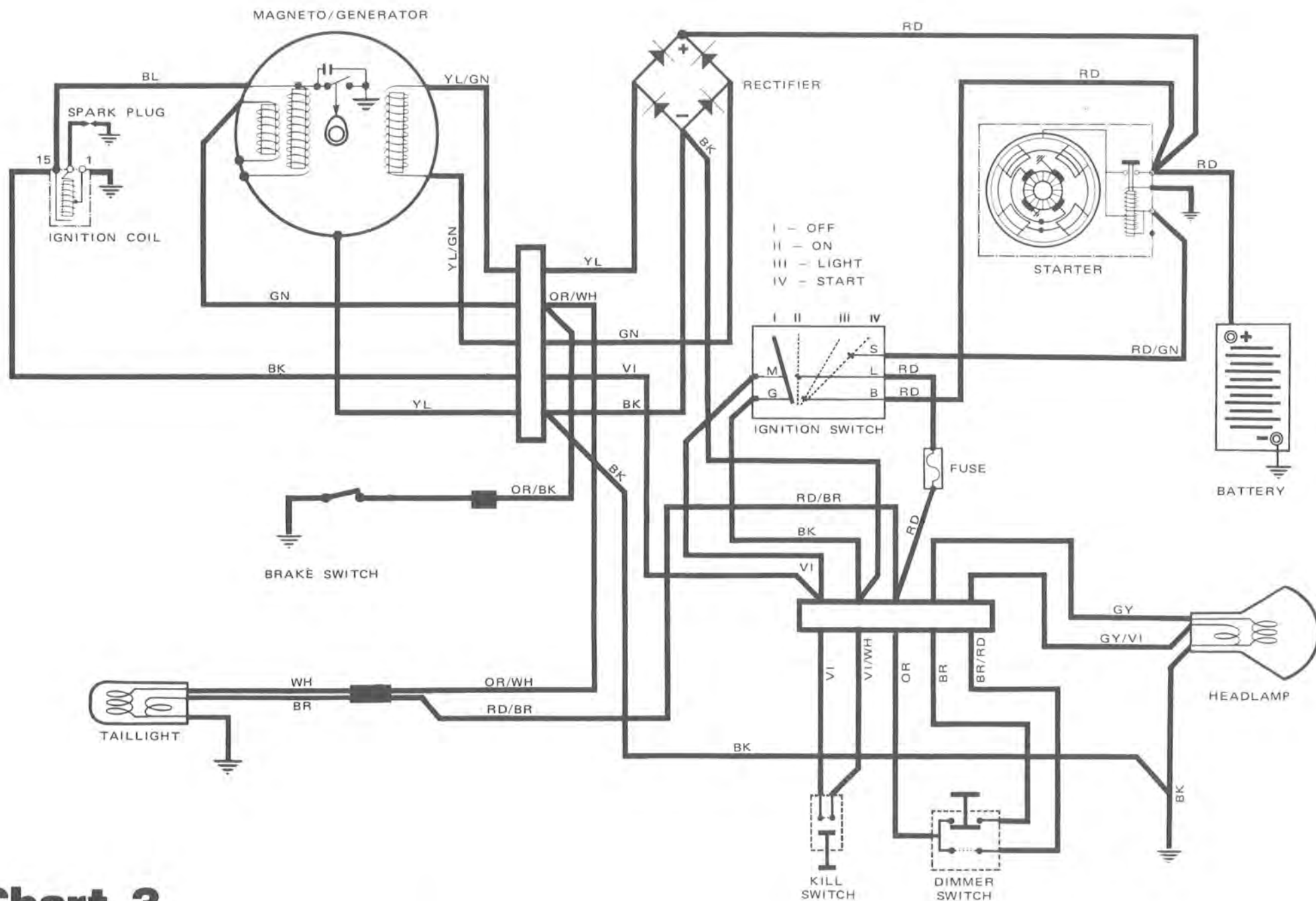


**Chart 1**

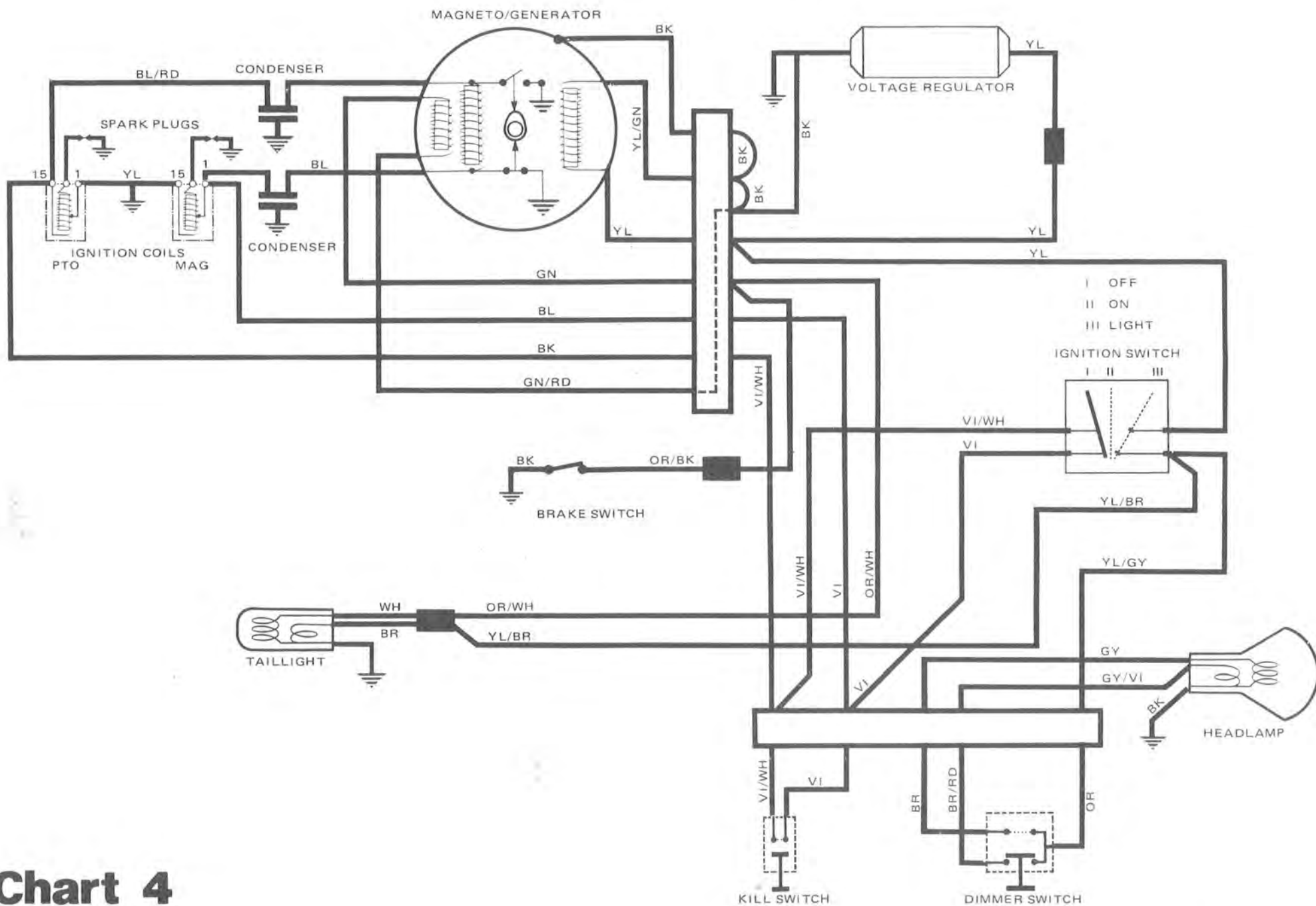


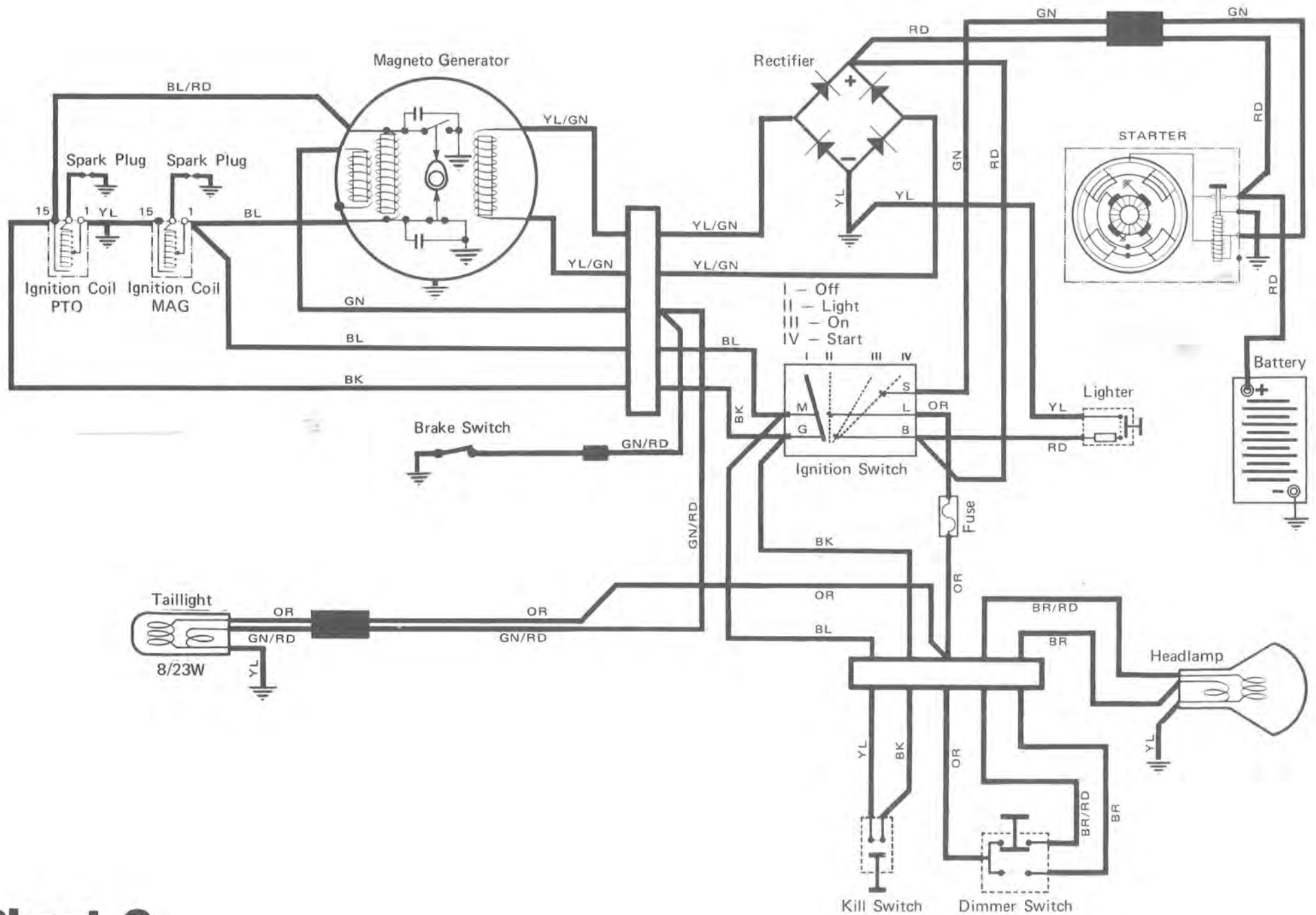
**Chart 2**



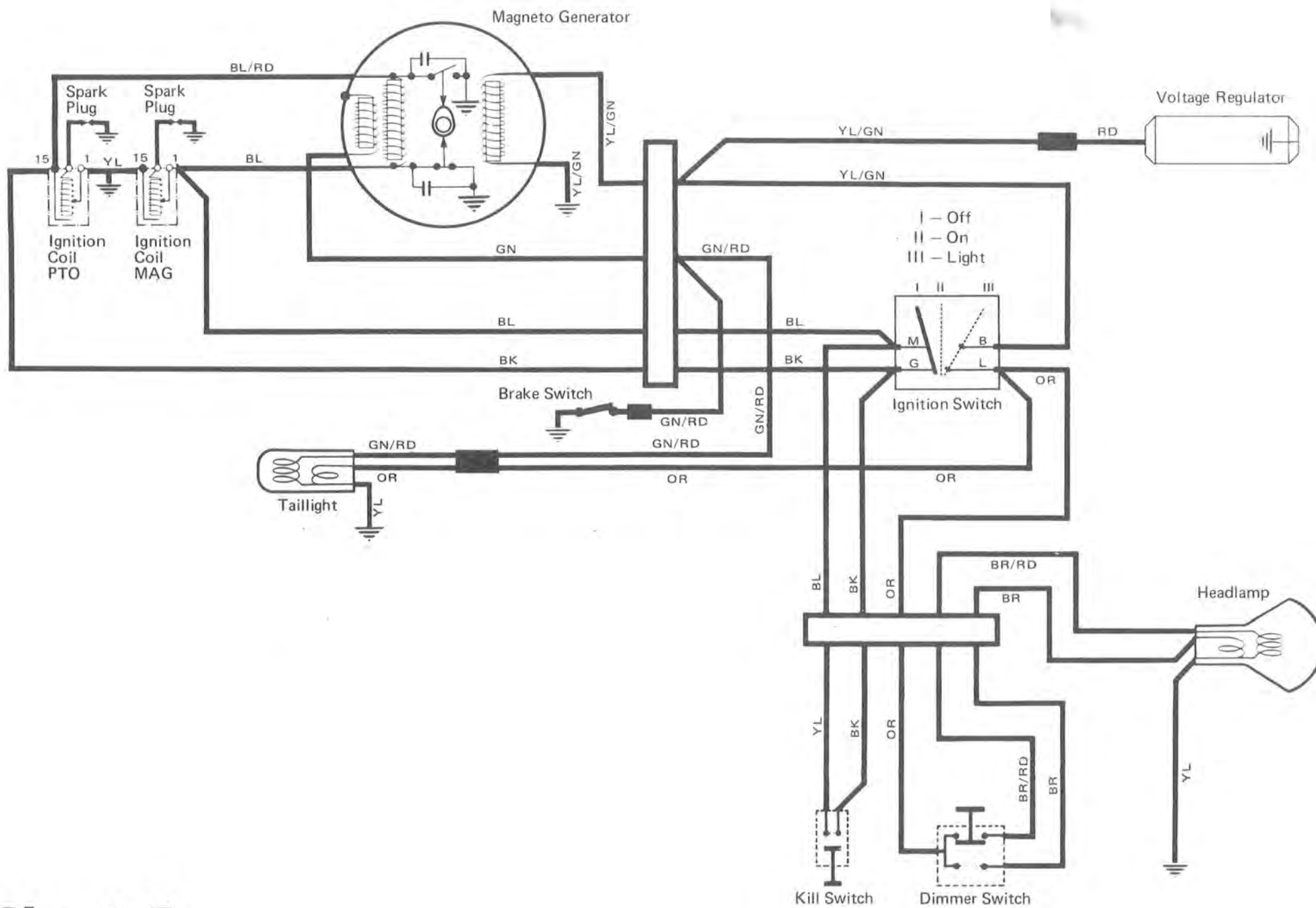


**Chart 3**

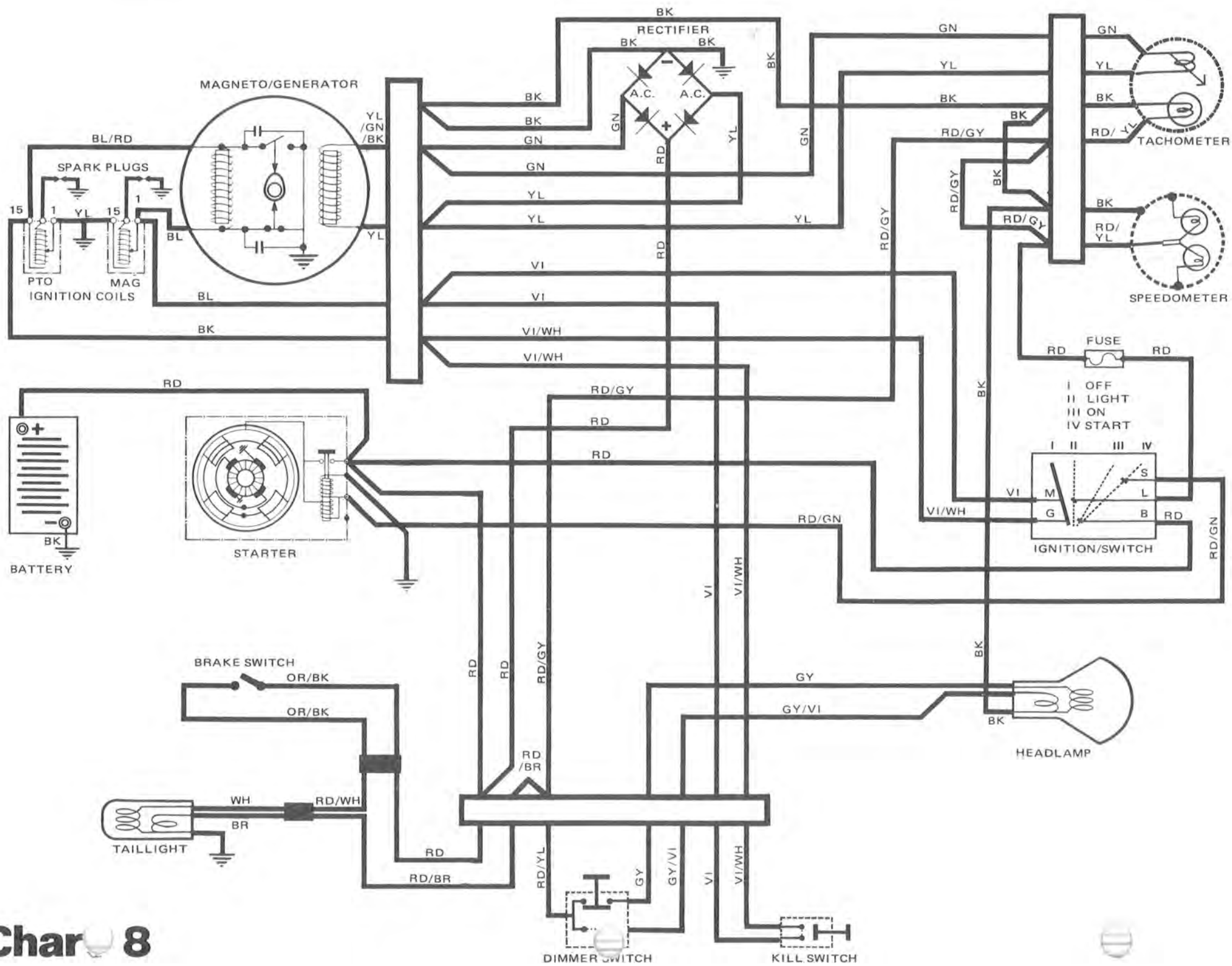




**Chart 6**

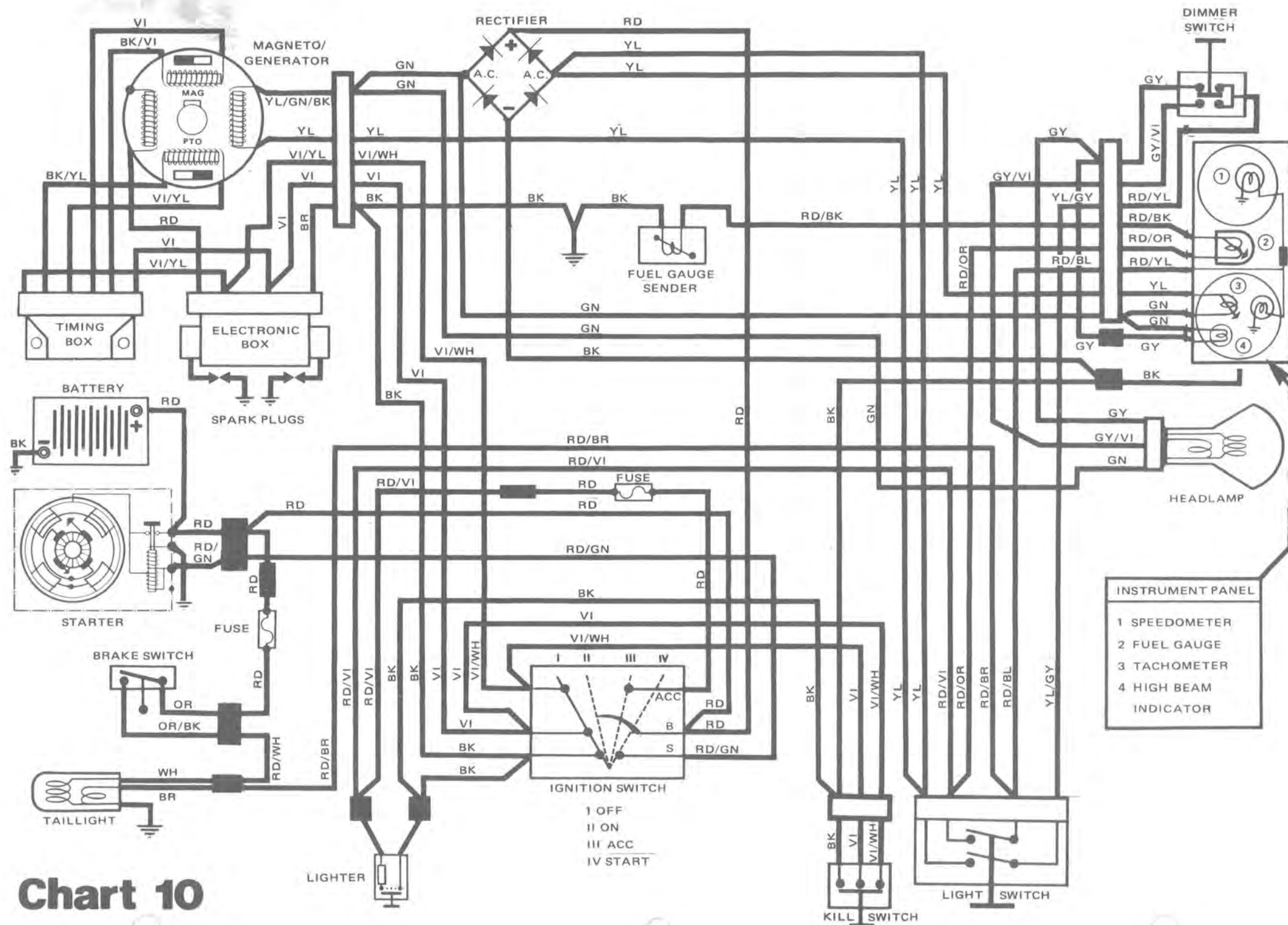


**Chart 5**

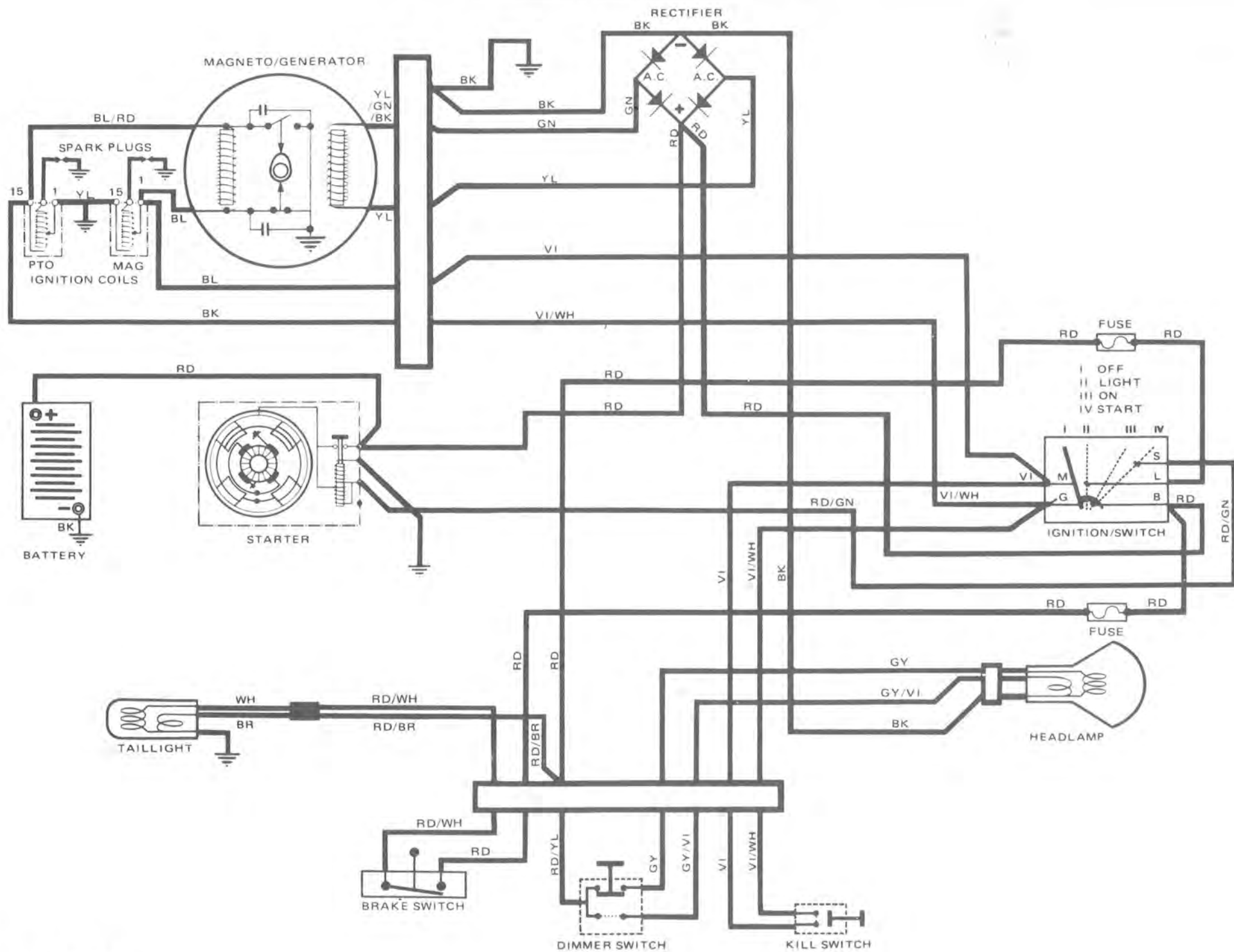


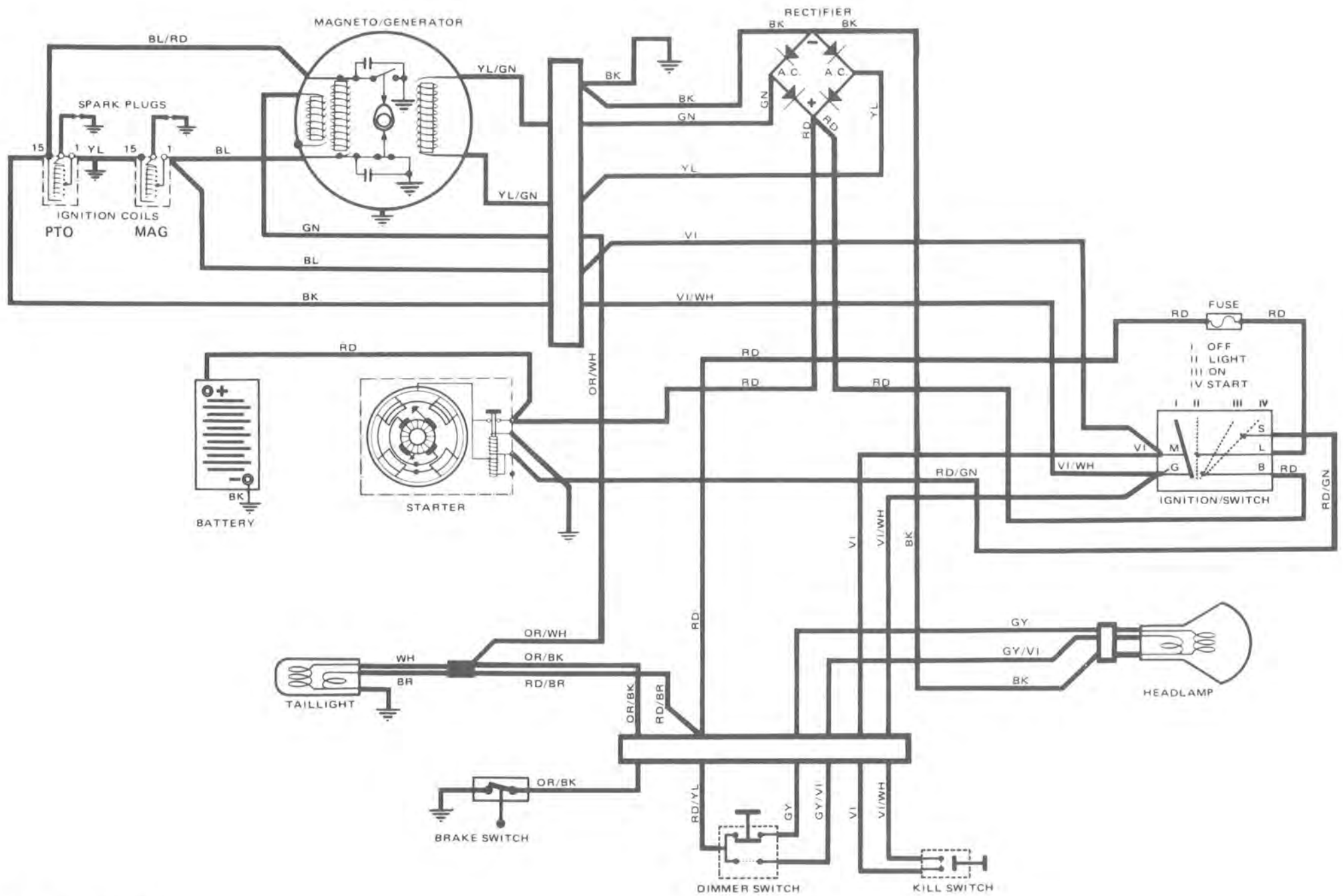












**Chart 11**







## SPARK PLUG

### BOSCH SPARK PLUG NUMBERING SYSTEM

W 225 T 1 — Indicates particular design detail.

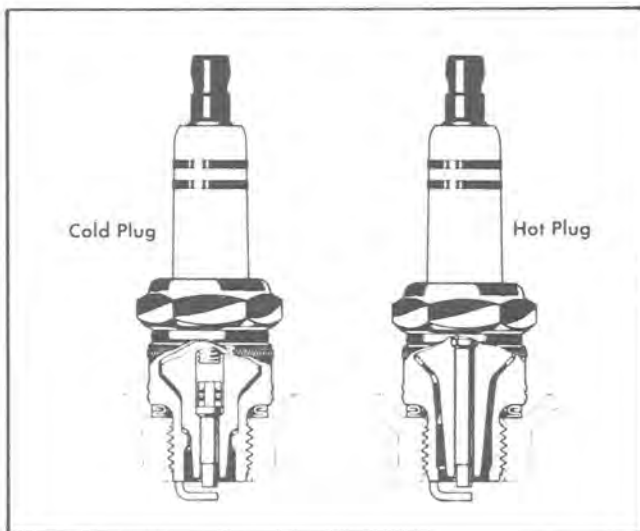
T: Standard type  
M: Two cycle engine  
Z: Semi covered front electrode

Heat range: If we consider a 225 rating as normal, a plug with a 175 rating is "hotter" and a 240 rating is "colder."

W: indicates 14 mm thread  
M: indicates 18 mm thread

### HEAT RANGE

The proper operating temperature or heat range of the spark plug is determined by the spark plug's ability to dissipate the heat range generated by combustion. The longer the heat path between the electrode tip to the plug shell, the hotter the spark plug operating temperature will be—and inversely, the shorter the heat path, the colder the operating temperature will be.



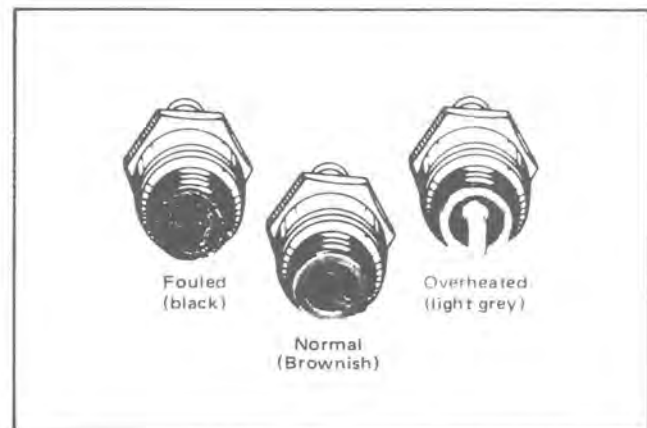
This is why Bombardier Limited specifies a spark plug which is the most favourable when operating the vehicle at full throttle. However, when prevailing conditions do not permit such operation, a hotter plug (one heat range hotter) can be installed to prevent possible fouling. To prevent piston failure, always reinstall standard plug for high speed operation. (See Technical Data).

### FOULING

Fouling of the spark plug is indicated by irregular running

of the engine, decreasing engine speed due to misfiring, reduced performance, and increased fuel consumption. This is due to a loss of compression. Other possible causes are: prolonged idling, running the engine with the choke on, or running on a too rich a mixture due to a faulty carburetor adjustment or incorrect fuel and/or fuel mixing. The plug face of a fouled spark plug has either a dry coating of soot or an oily, glossy coating given by an excess either of oil or of oil with soot. Such coatings form a conductive connection between the center electrode and ground.

### PLUG FACE



The plug face reveals the condition of the engine, operating condition, method of driving, and fuel mixing. For this reason it is advisable to inspect the spark plug at regular intervals, examining in particular the plug face (i.e. the part of the plug projecting into the combustion chamber). The plug face generally reveals any trouble symptoms.

### SPARK PLUG INSTALLATION

Prior to installation make sure that contact surfaces of the cylinder head and spark plug are free of grime.

1. Using a wire feeler gauge, set electrode gap to .020 inch.
2. Apply a light coat of graphite grease over the spark plug threads to prevent possible seizure.
3. Hand screw spark plug into cylinder head and tighten with a torque wrench.

18 mm (M) 30 lbs/pi. ( 4.1 kg-m )  
14 mm (W) 20 lbs/pi. ( 2.7 kg-m )

### SPARK PLUG CHART

See Technical Data.

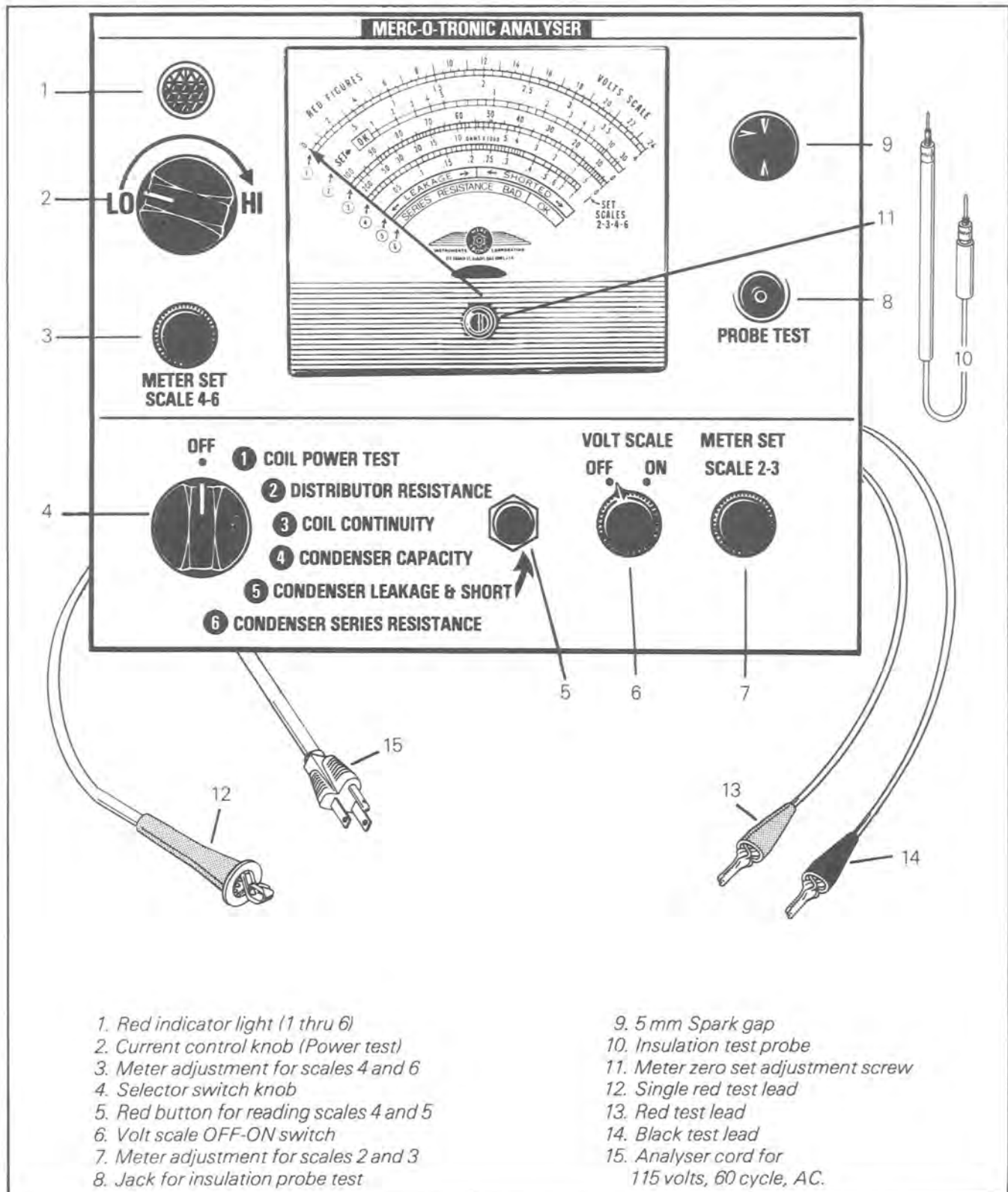


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MERC-O-TRONIC ANALYSER IDENTIFICATION



## SECTION 05

### SUB-SECTION 03 (MERC-O-TRONIC TEST)

**IMPORTANT:** To test the armature plate components, remove armature plate and ignition coil(s) from engine.

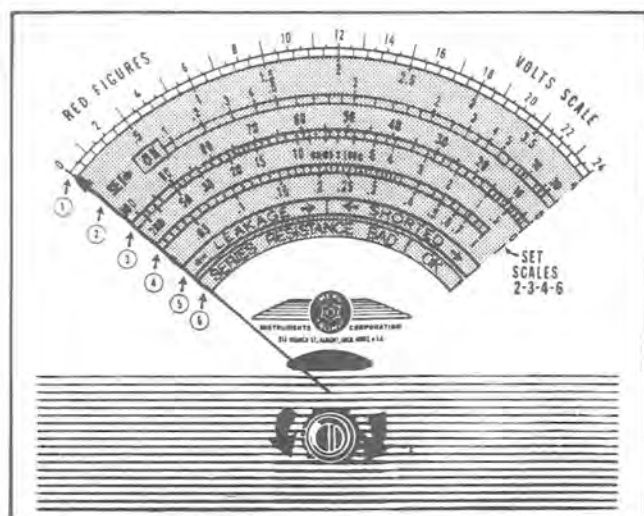
**Caution:** Do not connect test leads together when selector switch is turned to position No. 1 as this will result in a direct battery short.

**Warning:** When testing any components, place your Merc-O-Tronic analyser as well as the components on an insulated or wooden table top. This will prevent any leakage or shock hazards.

### ANALYSER TEST

Prior to testing the circuitry or any electrical component, it is first necessary to test the operation and battery power of the analyser. To do this, proceed as follows:

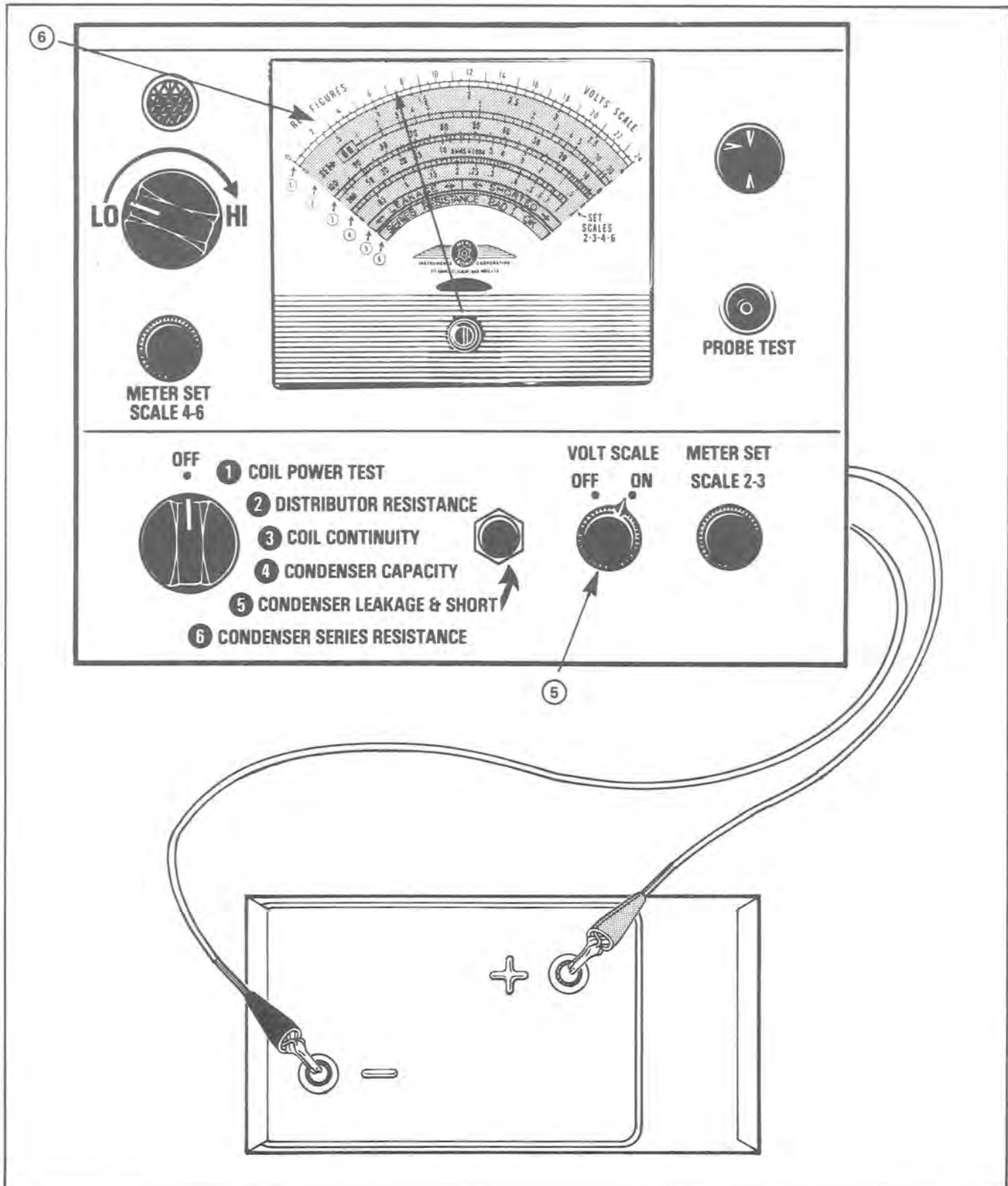
1. Turn the small adjustment screw (11) so that the needle pointer aligns with the "O" reading on scale No. 1 of meter.



2. Remove the two (2) screws affixing analyser cover and expose the analyser battery.
3. Attach the black test lead (14) of analyser to negative post of analyser battery.
4. Attach the red test lead (13) of the analyser to positive post of analyser battery.
5. Turn the volt scale No. 1 switch (6) to the ON position.
6. Read RED figures on top of scale No. 1. Reading must not be less than 6.0 volts, if less, replace battery.



ANALYSER TEST



---

**TEST NO. 1 IGNITION COIL POWER TEST**

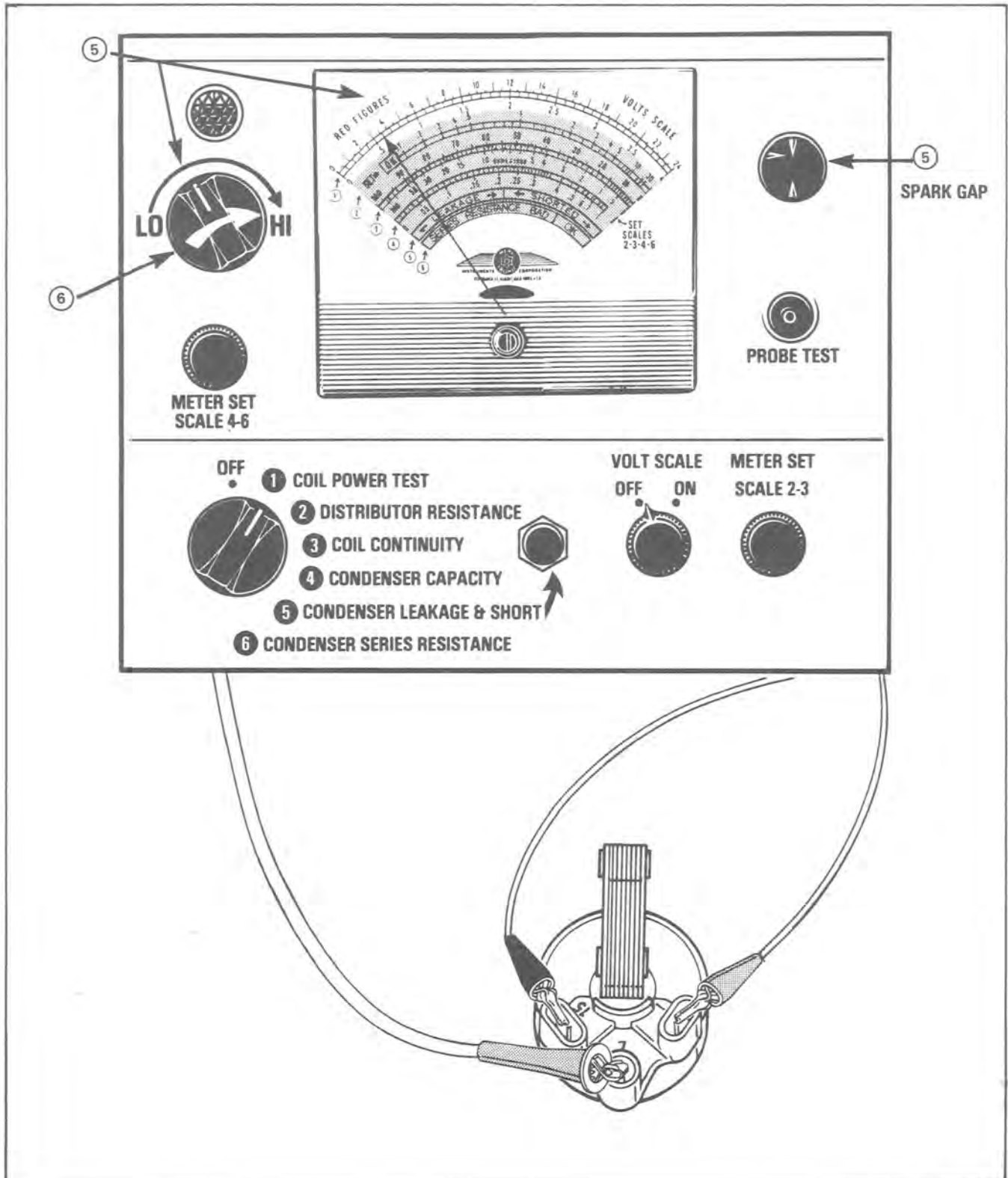
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For test No. 1 and 2, the battery normally installed in the analyser has insufficient voltage to produce exact readings required. Therefore, disconnect the analyser battery cables at the battery posts and connect each cable to appropriate post of 12 volt battery. Test condition of the connected 12 volt battery as detailed in analyser test.

1. Connect the black test lead (14) to terminal no. 15 of the ignition coil.
2. Connect the red test lead (13) to terminal no. 1 of ignition coil.
3. Connect the single red test lead (12) to spark plug terminal.
4. With the current control knob (2) at LO position, turn the selector switch (4) to position No. 1— **COIL POWER TEST**.
5. Slowly turn the current control knob clockwise and note the current value on scale No. 1. When it reaches the operating amperage (.6 amp) for that particular winding, stop and note the spark gap indicator (9) located on right hand side of analyser. It should fire steadily. If the spark is faint, the coil is defective and should be replaced. If the coil is good, perform the high speed test as follows:
6. Continue turning the current control knob clockwise to obtain maximum meter reading. The spark gap should fire steadily. If the spark is faint, the coil is defective and should be replaced.

**Caution:** Complete the test as quickly as possible and immediately upon completion of test, turn selector switch to **OFF** position and current control knob to **LO** position.

TEST NO. 1 IGNITION COIL POWER TEST



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## TEST NO. 2 IGNITION COIL INSULATION

---

1. Connect the black test lead to terminal no. 15 of the ignition coil.
2. Connect the red test lead to terminal no. 1 of ignition coil.
3. Plug the Insulation Test Probe into "jack" located at the front of analyser.
4. Turn selector switch to position NO. 1. **COIL POWER TEST.**
5. Turn current control knob to obtain maximum current reading.

**Caution:** Do not exceed maximum meter reading.

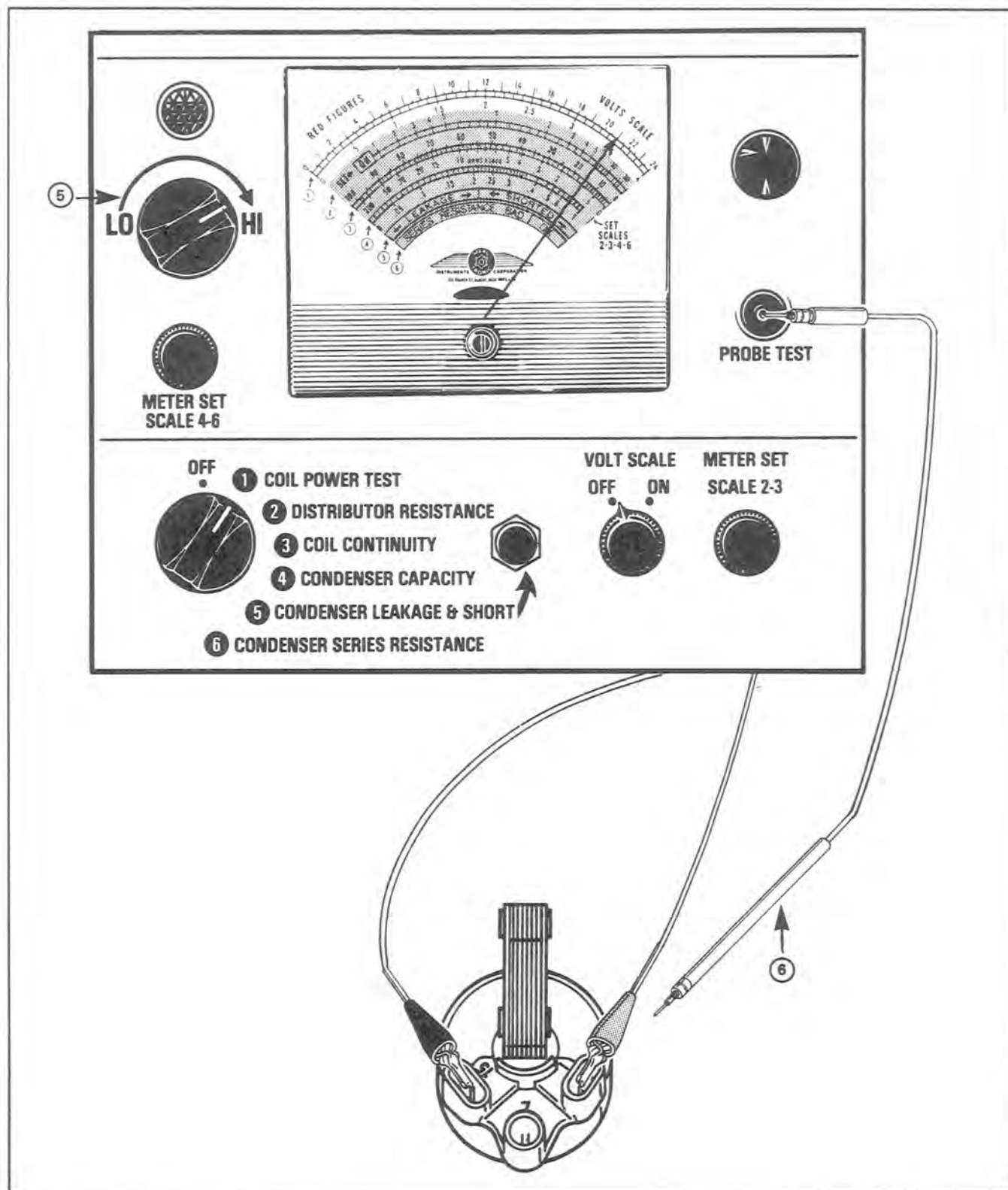
6. Pass the Insulation Test Probe tip over the insulating surface of the coil and spark plug wire. If coil insulation is cracked, leaking or damaged, a spark discharge will be noted at the cracked or leaking surface.

**Caution:** Do not allow test probe to linger at any one point during test operation. Complete test as fast as possible as this is a severe test for a coil.

*Note: A faint spark, occurring around coil insulation is a "corona spark" and does not mean a defective coil.*

7. Disconnect 12 volt battery and reinstall the analyser battery (6 volts).

TEST NO. 2 IGNITION COIL INSULATION



---

ADJUSTMENT OF SCALE NO. 3  
FOR TESTS NO. 3-11

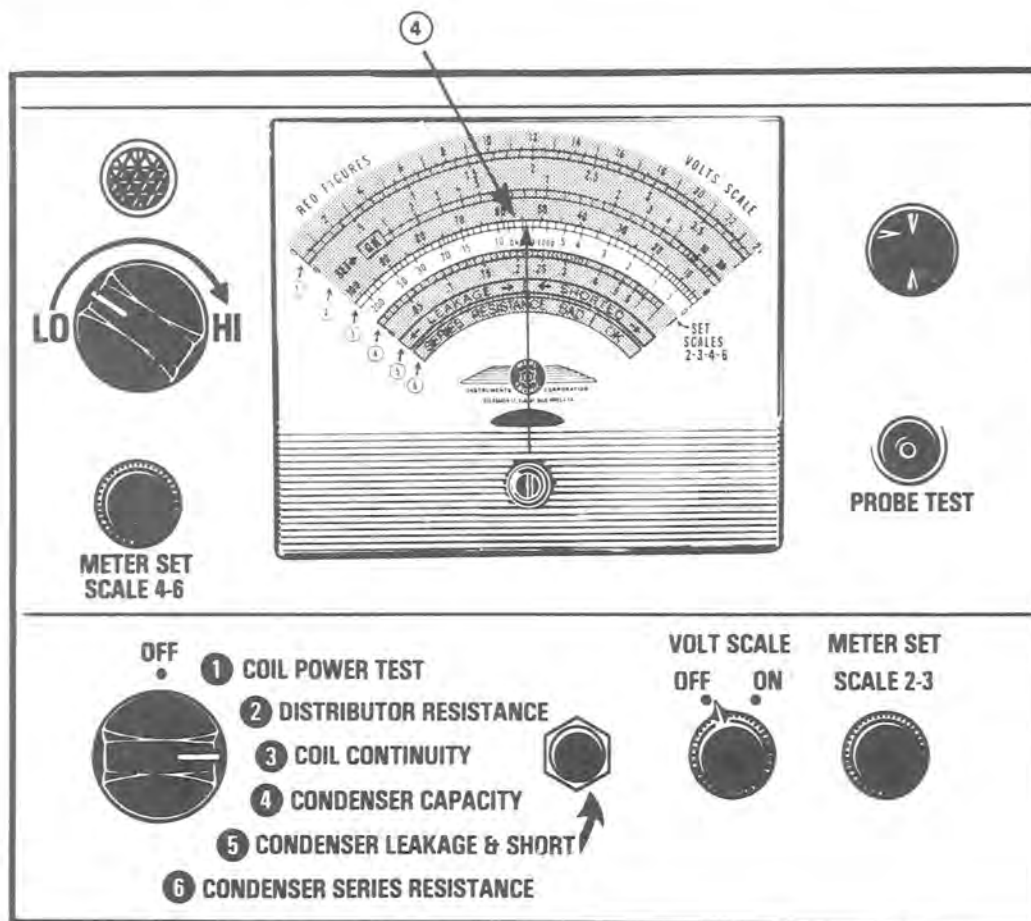
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1. Turn selector switch to position No. 3 — COIL CONTINUITY.
2. Temporarily attach the red and black test leads together.
3. Turn meter adjustment knob for scale No. 3 until pointer aligns with set position "O" on right side of scale. Disconnect leads.
4. Proceed with test No. 3 or No. 11.

*Note: Always readjust scale No. 3 before starting these tests (3 & 11).*



TEST NO.3 IGNITION COIL RESISTANCE (SECONDARY)



---

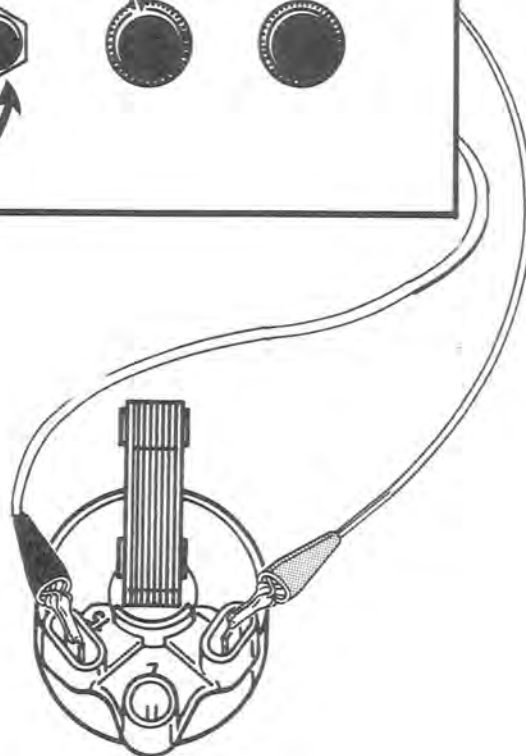
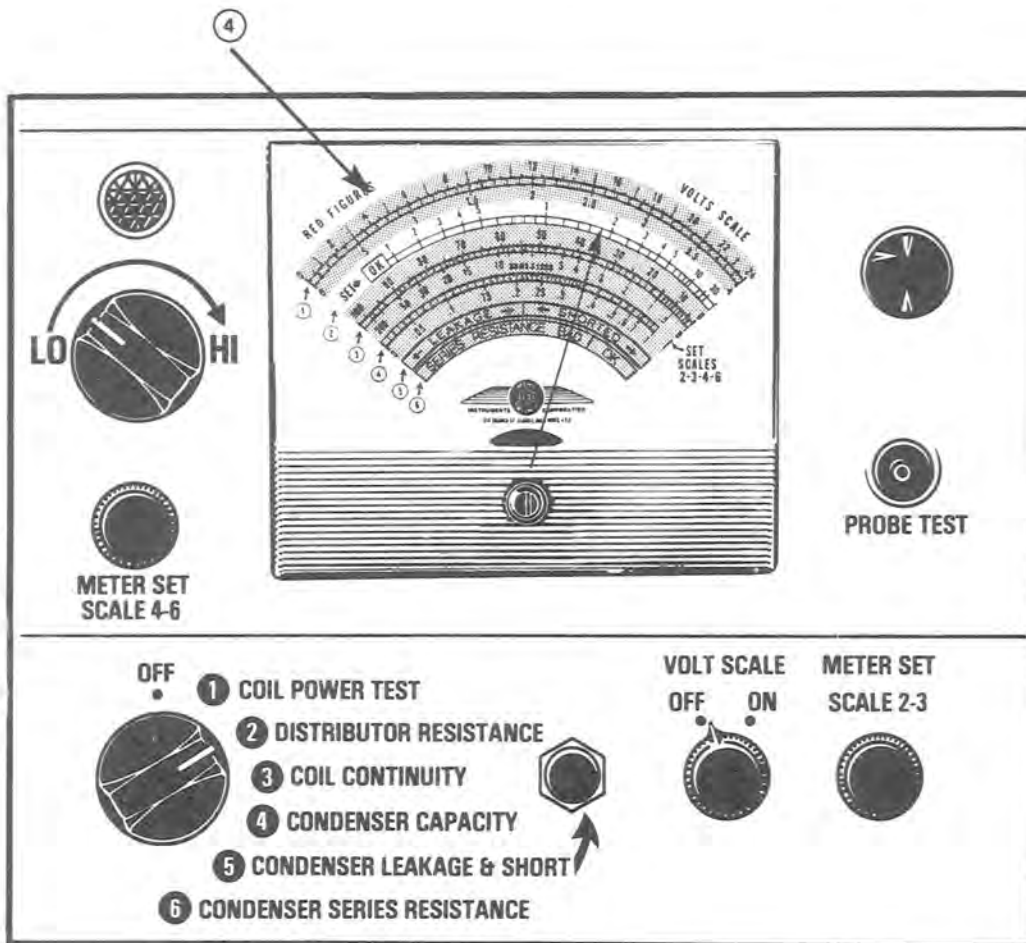
**ADJUSTMENT OF SCALE NO. 2  
FOR TESTS NO. 4-5-9-10**

---

1. Turn selector switch to position No. 2 — (**DISTRIBUTOR RESISTANCE** — for checking low ohm values.)
2. Do not clip test leads together. Turn meter adjustment knob for scale no. 2 until pointer aligns with set position "O" on right side of scale.

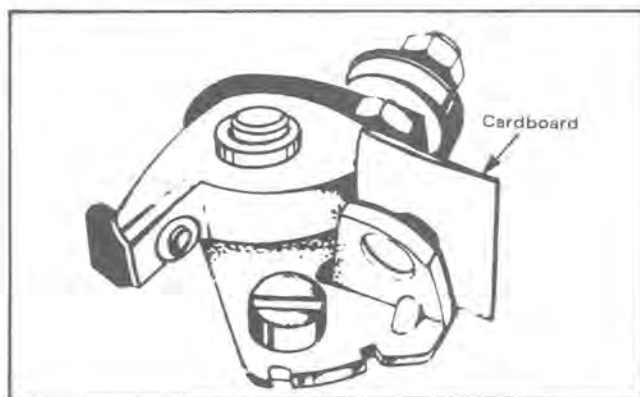
*Note: Always readjust scale No. 2 before starting these tests (4,5, 9,10).*

TEST NO. 4 IGNITION COIL RESISTANCE (PRIMARY)



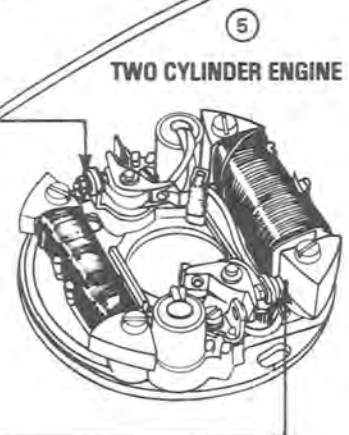
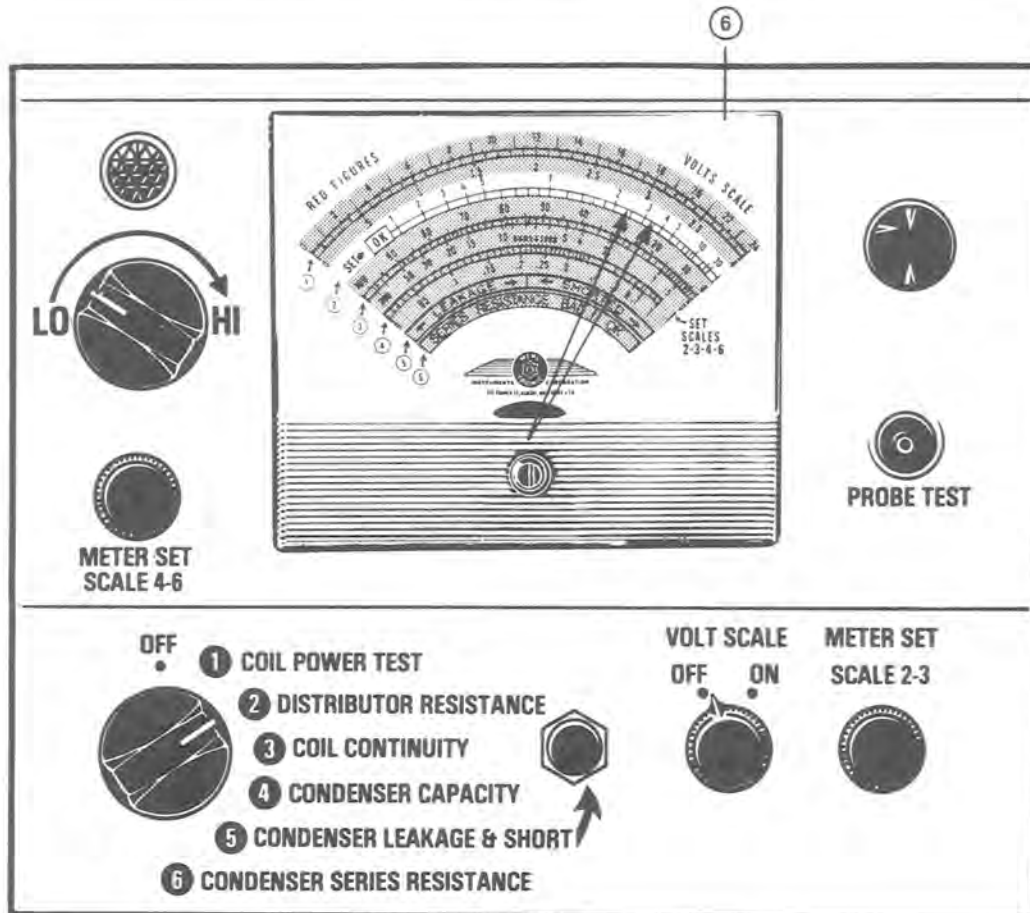
### TEST NO. 5A IGNITION GENERATING COIL CONTINUITY

1. Turn selector switch to position No. 2 — (**DISTRIBUTOR RESISTANCE** — for checking low ohm values.)
2. Turn meter adjustment knob for scale no. 2 until meter pointer aligns with set position on right side of scale. (See page 12 & 13).
3. Insulate breaker points by placing a small piece of cardboard between breaker points.



4. On single cylinder engine equipped with an external high tension coil, carry out the following procedure:
  - a) Connect the black test lead to armature plate (ground).
  - b) Connect the red test lead to breaker points terminal.
5. On double cylinder engine carry out the following procedure:
  - a) Connect the black test to one breaker points terminal.
  - b) Connect the red test lead to the other breaker points terminal.
6. Read the RED figures on scale no. 2. Meter reading must be within specification limits. If not, replace the defective coil. (See Technical Data 08 05-03.)

TEST NO. 5A IGNITION GENERATING COIL CONTINUITY



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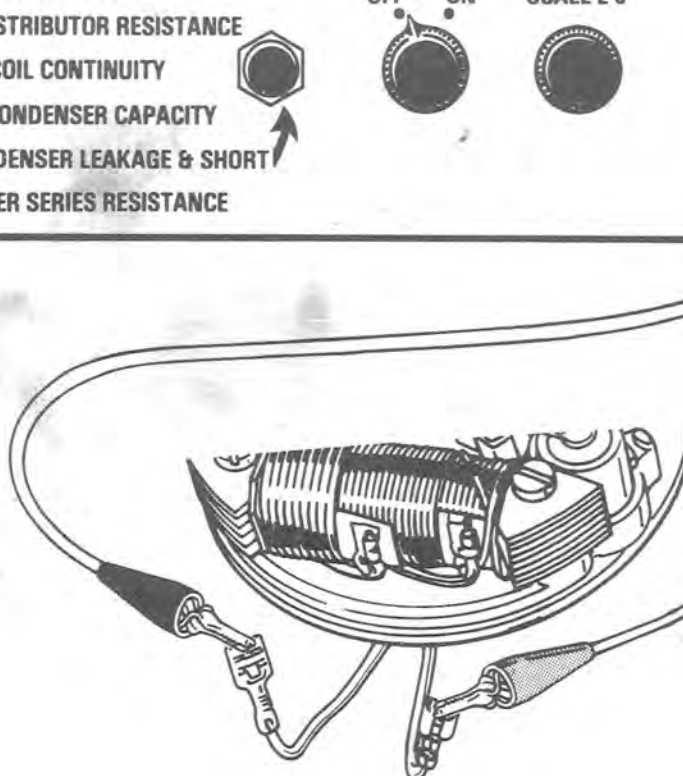
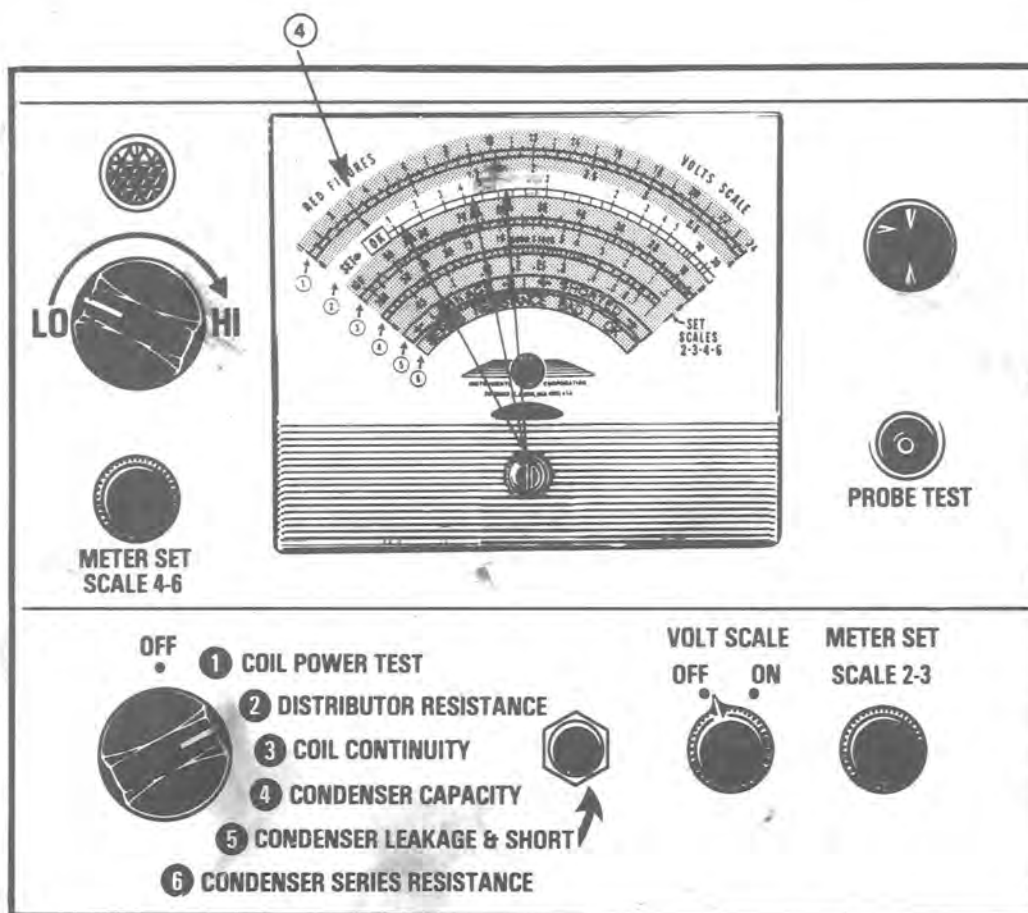
**TEST NO. 5B LIGHTING COIL CONTINUITY**

---

1. Turn selector switch to position No. 2 — **(DISTRIBUTOR RESISTANCE** — for checking low ohm values).
2. Turn meter adjusting knob for scale no. 2 until meter pointer aligns with set position on right side of scale. See pages 12 & 13.
3. On all engines, carry out the following procedure:
  - a) Connect the black test lead to one of the yellow wires (yellow / green, yellow / red, yellow / black).
  - b) Connect the red test lead to the other yellow wire (yellow / green, yellow / red, yellow / black).
4. Read the RED figures on scale no. 2. Meter reading must be within specification limits. If not, replace the defective coil. (See Technical Data 08 05-03).



TEST NO. 5B LIGHTING COIL CONTINUITY



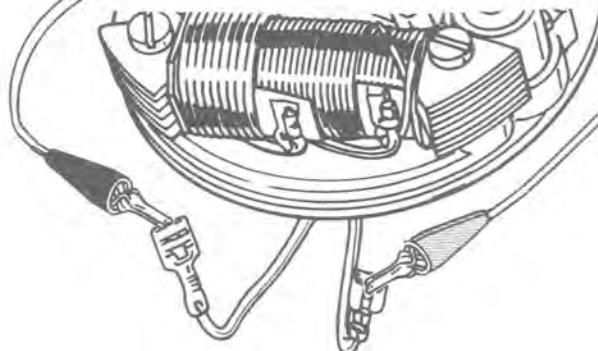
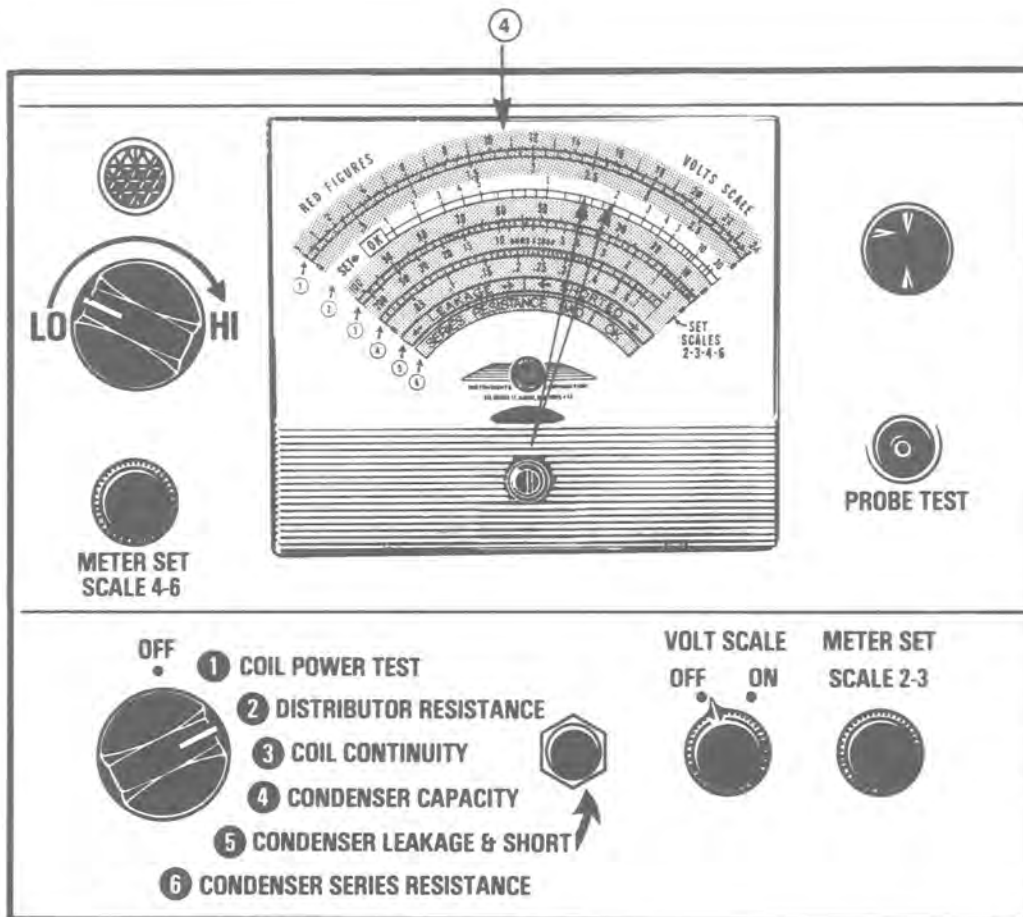
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**TEST NO. 5C BRAKE LIGHT  
COIL CONTINUITY**

---

1. Turn selector switch to position No. 2 — (**DISTRIBUTOR RESISTANCE** — for checking low ohm values).
2. Turn meter adjusting knob for scale no. 2 until meter pointer aligns with set position on right side of scale. (See pages 12 & 13)
3. On engines equipped with brake light coil, carry out the following procedure:
  - a) Connect the black test lead to one of the green wires.
  - b) Connect the red test lead to the other green wire.
4. Read the RED figures on scale no. 2. Meter reading must be within specification limits. If not, replace the defective coil. See Technical Data 08 05-03.

TEST NO. 5C BRAKE LIGHT COIL CONTINUITY



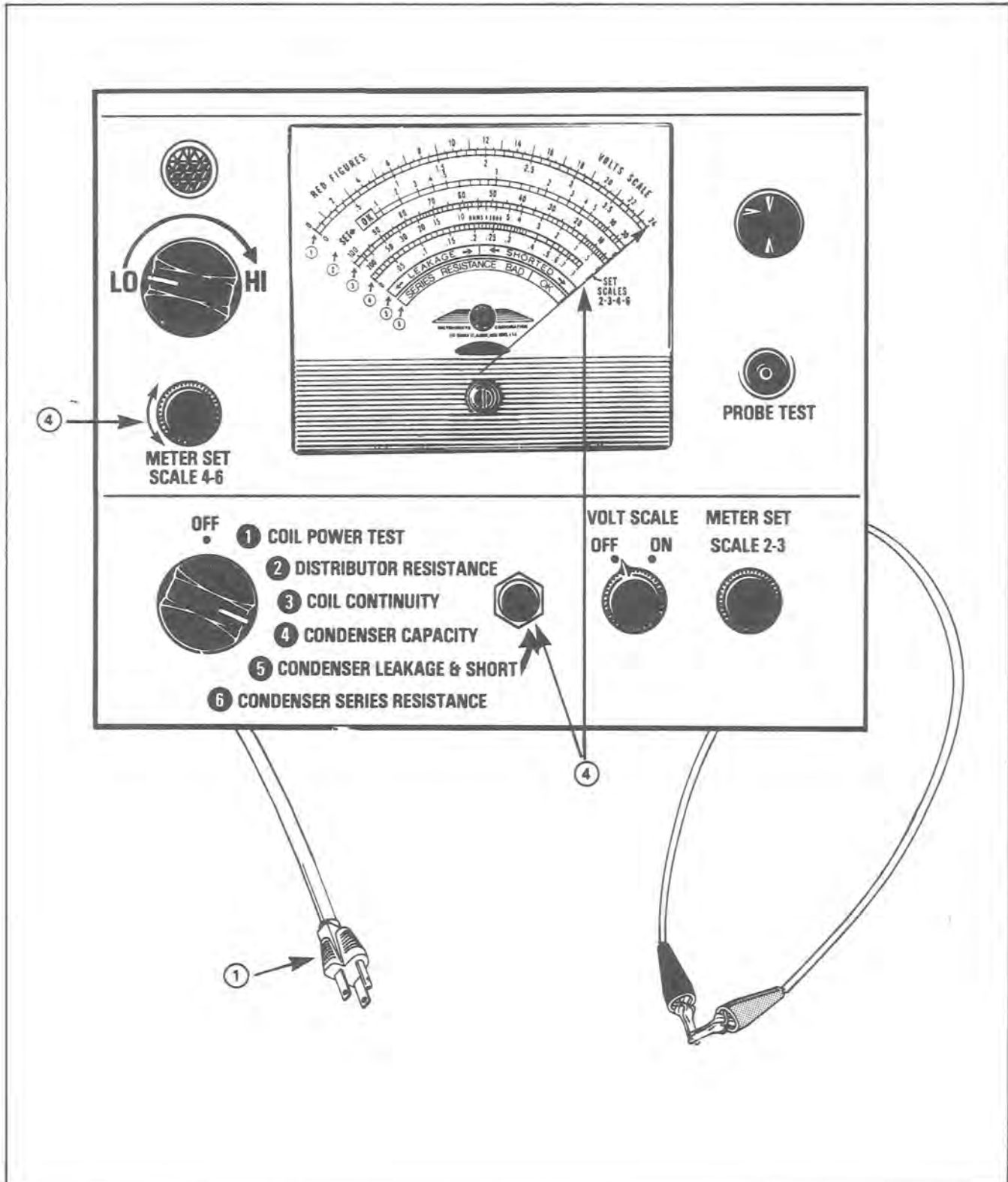
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**ADJUSTMENT OF SCALE NO. 4  
FOR TEST NO. 6**

---

1. Plug the analyser cord ⑮ into 115 volts, 60 cycle, AC outlet.
2. Place analyser selector switch to position No. 4 — **CONDENSER CAPACITY.**
3. Temporarily attach the red and black test leads together.
4. Depress red button and turn meter adjustment of scale No. 4 to set pointer "O". Unclip test leads.
5. Proceed with test No. 6.

ADJUSTMENT OF SCALE NO. 4 FOR TEST NO. 6



---

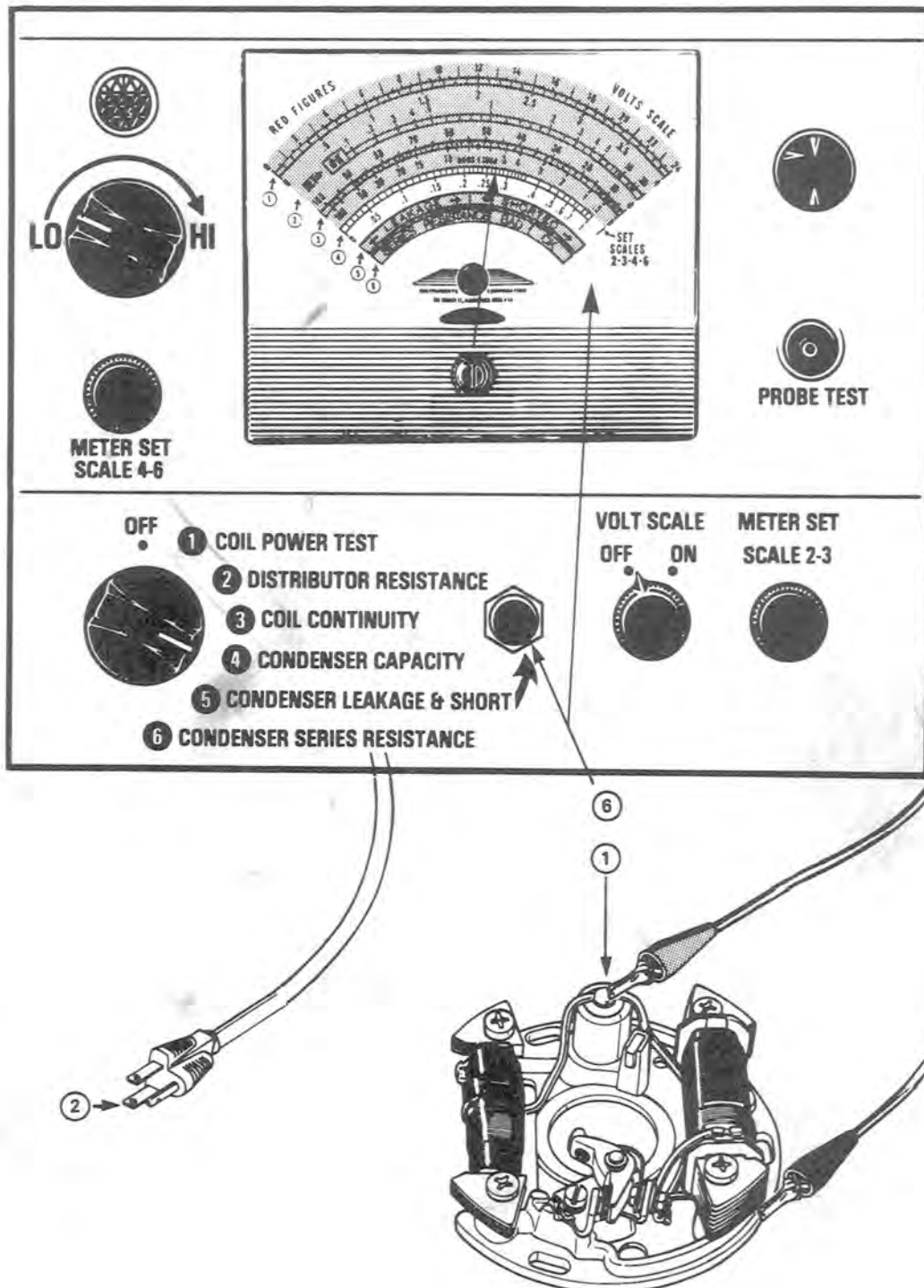
**TEST NO. 6 CONDENSER CAPACITY TEST**

---

1. Unsolder the wire(s) located on top of condenser.
2. Plug the analyser cord into 115 volts, 60 cycle, AC outlet.
3. Place analyser selector switch to position No. 4 — **CONDENSER CAPACITY.**
4. Connect the red test lead to condenser lead weldment.
5. Connect the black test lead to armature plate (ground).
6. Depress red button and read scale No. 4. Condenser capacity must be between **.26 to .30 mfd**, if not, replace the defective condenser. If condenser is within specification do not resolder wire(s) on condenser but proceed with test no. 7.



TEST NO. 6 CONDENSER CAPACITY TEST



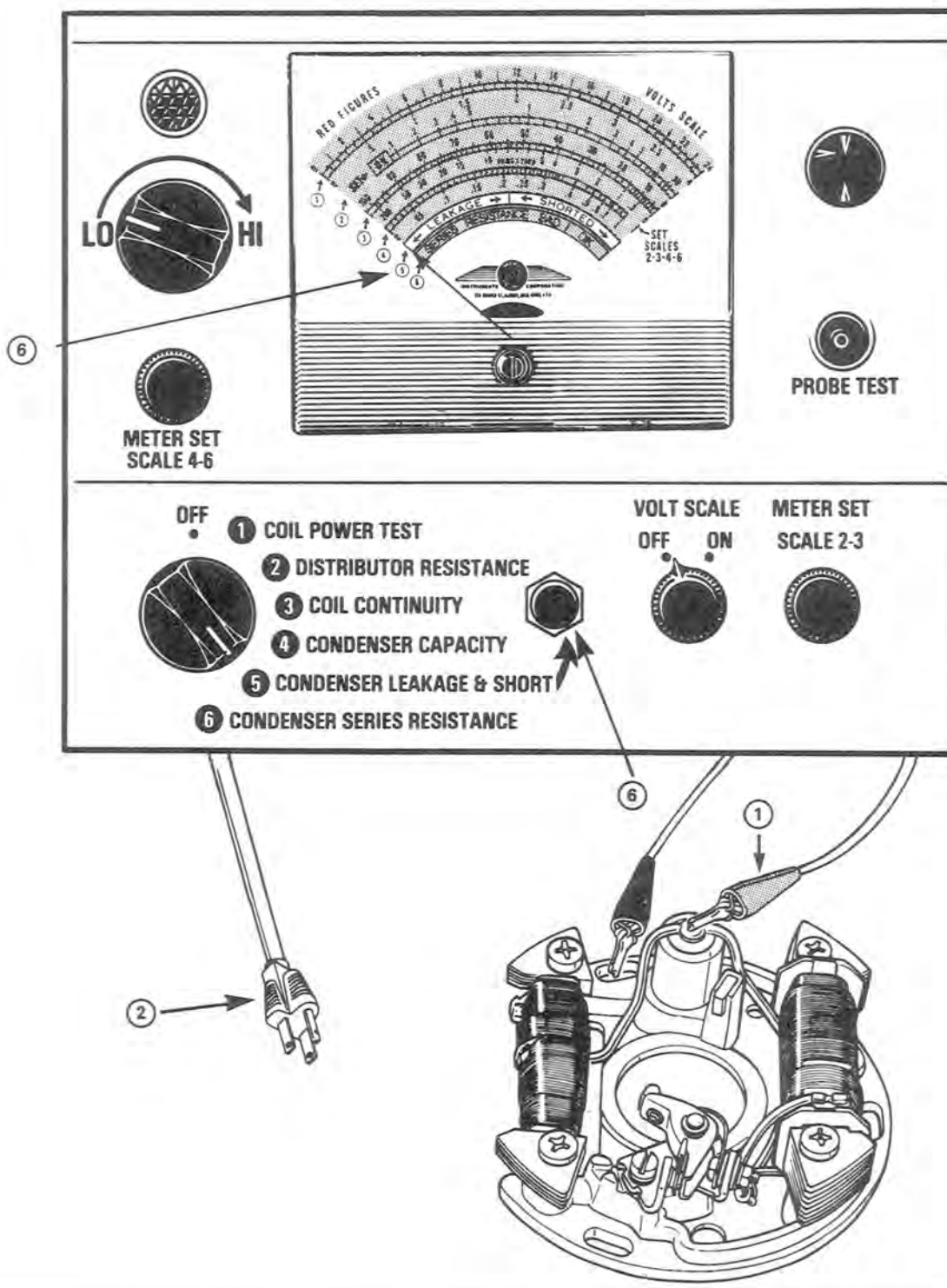
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**TEST NO. 7 CONDENSER  
LEAKAGE & SHORT**

---

1. Unsolder the wire(s) located on top of condenser.
2. Plug the analyser cord into 115 volts, 60 cycle, AC outlet.
3. Connect the red test lead to condenser lead weldment.
4. Connect the black test lead to armature plate (ground).
5. Turn selector switch to position No. 5 — **LEAKAGE AND SHORT.**
6. Depress red button and **hold** for a minimum time of 15 seconds. Read scale No. 5. The meter pointer will move to the right and must return within range of the narrow black bar at the left. If not, read on scale No. 5 and check if condenser is shorted or leaking. In either case, replace condenser.
7. If condenser is good, disconnect analyser cord and resolder wire(s) to the top of the condenser

TEST NO. 7 CONDENSER LEAKAGE & SHORT



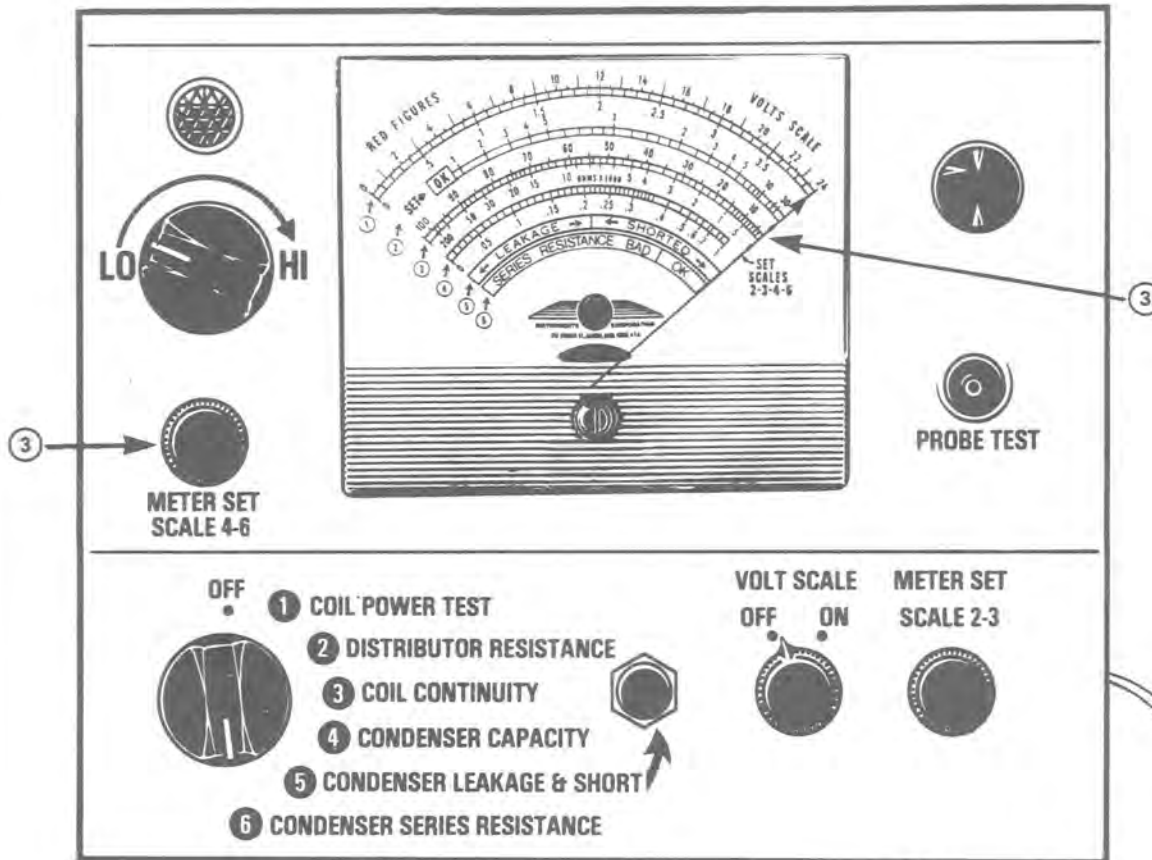
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**ADJUSTMENT OF SCALE NO. 6  
FOR TEST NO. 8**

---

1. Place selector switch to position No. 6 — **CONDENSER SERIES RESISTANCE.**
2. Temporarily attach the red and black test leads together.
3. Adjust meter set scale No. 6 to set line on right side of dial. Unclip test leads.
4. Proceed with test No. 8.

ADJUSTMENT OF SCALE NO. 6 FOR TEST NO. 8

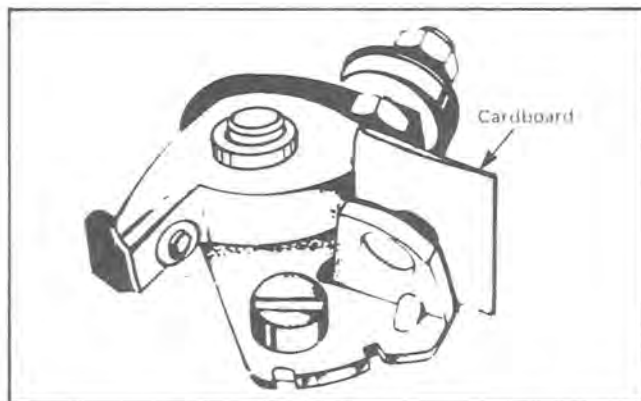


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**TEST NO. 8 CONDENSER  
SERIES RESISTANCE**

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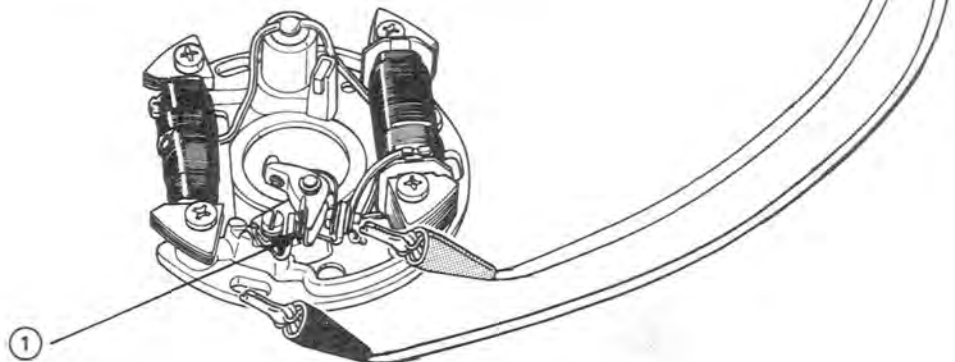
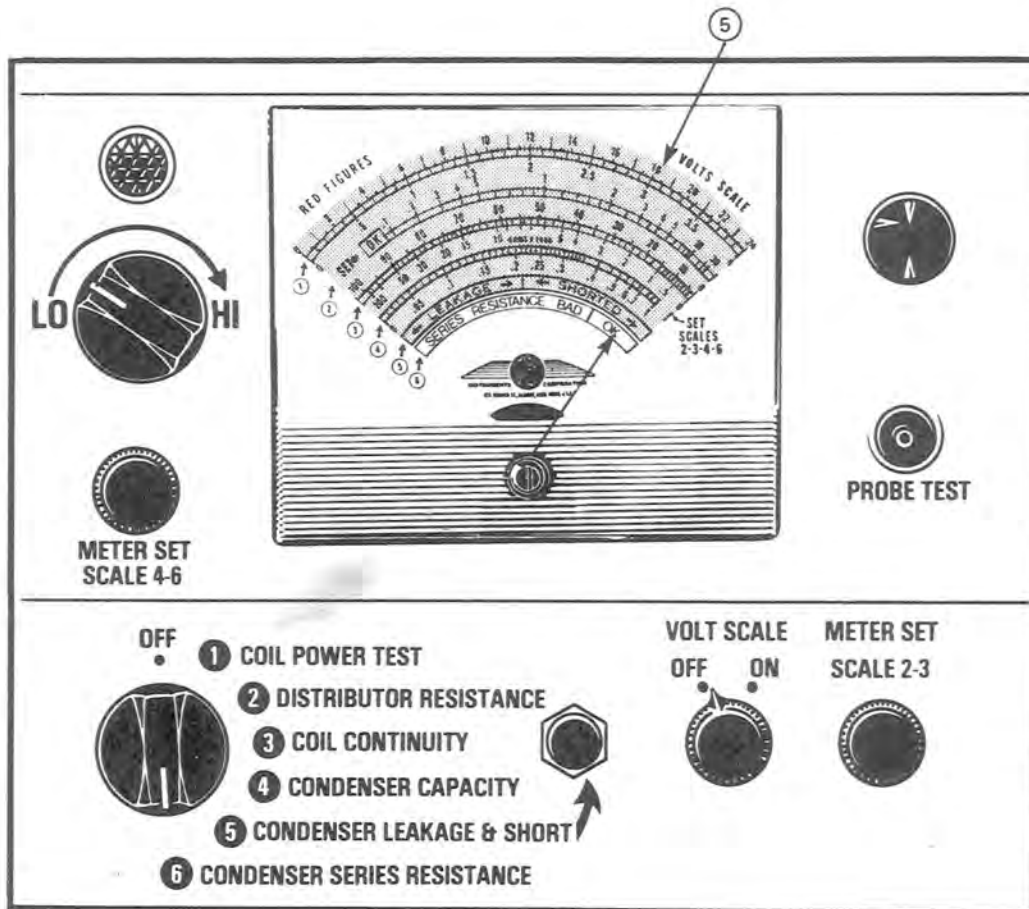
1. Insert a piece of carboard between breaker point(s).



2. Place selector switch to position No. 6 — **CONDENSER SERIES RESISTANCE**.
3. Connect the red test lead to breaker points terminal.
4. Connect the black test lead to armature plate.
5. Meter pointer must be within OK green block on scale No. 6 on right side of meter. While testing, move and "wiggle" the condenser lead. Observe meter pointer for movement. Loose connections can cause trouble if the condenser is subjected to vibration. If meter pointer remains within OK green bar on scale No. 6, the condenser is good. If meter pointer moves into the red section on scale No. 6, the condenser is defective and must be replaced.



TEST NO. 8 CONDENSER SERIES RESISTANCE



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**TEST NO. 9 TESTING FOR HIGH  
RESISTANCE IN PRIMARY CIRCUIT**

---

1. Adjust scale No. 2: See pages 12 & 13.
2. Turn selector switch to position No. 2 — **DISTRIBUTOR RESISTANCE.**
3. Connect the red test lead to breaker points terminal.
4. Connect the black test lead to armature plate.

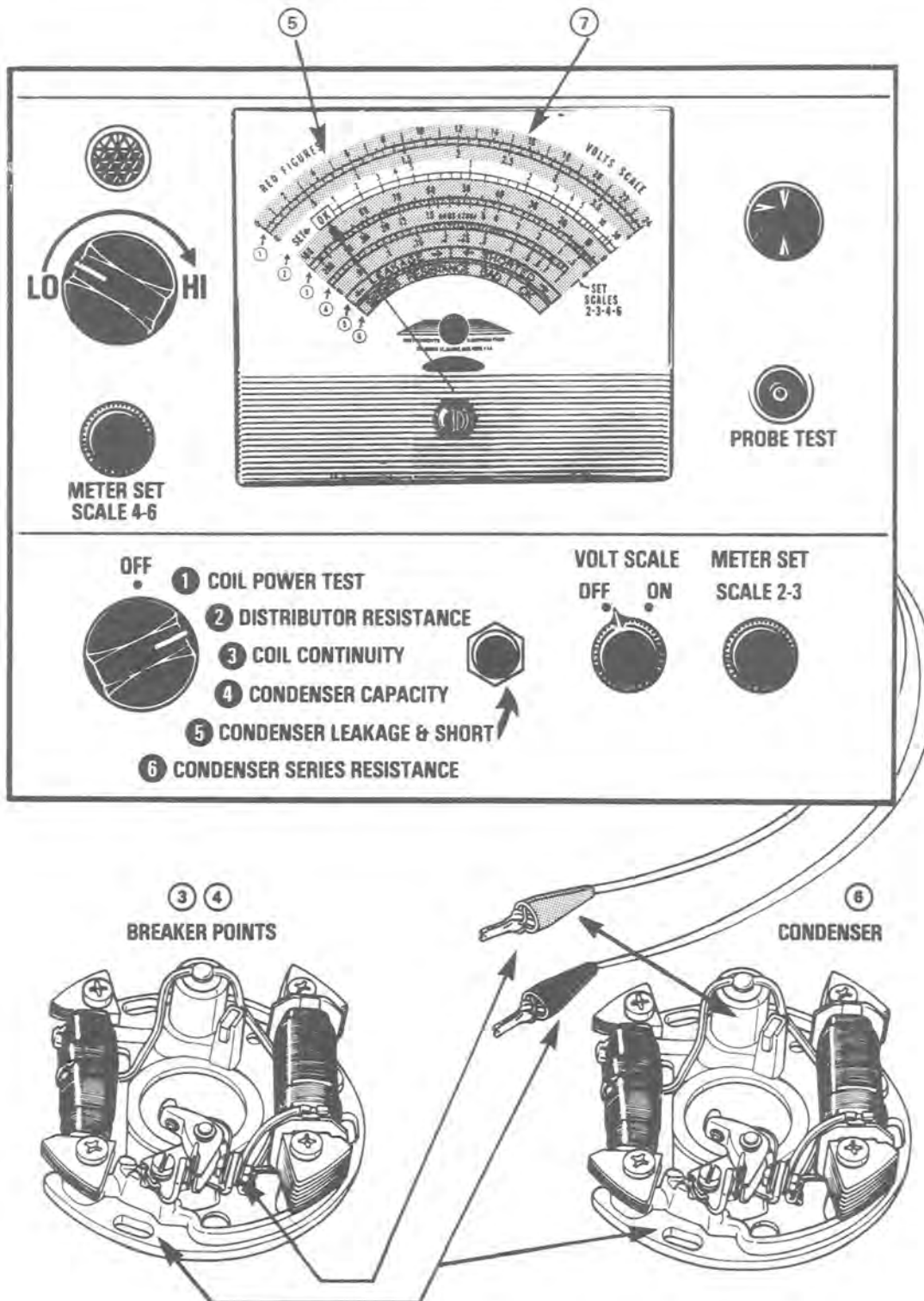
5. The meter pointer must return within the OK block. If the meter pointer is in the high resistance band, this indicates that there is foreign matter between the breaker points.

*Note: If resistance is too high, clean the breaker point tips to remove possible oil or dirt.*

6. To check condenser for proper grounding, unclip red test lead from breaker points terminal and connect it to condenser body.

7. Read scale No. 2, meter pointer must be within the OK block. If not, condenser is not properly ground.

TEST NO. 9 TESTING FOR HIGH RESISTANCE IN PRIMARY CIRCUIT



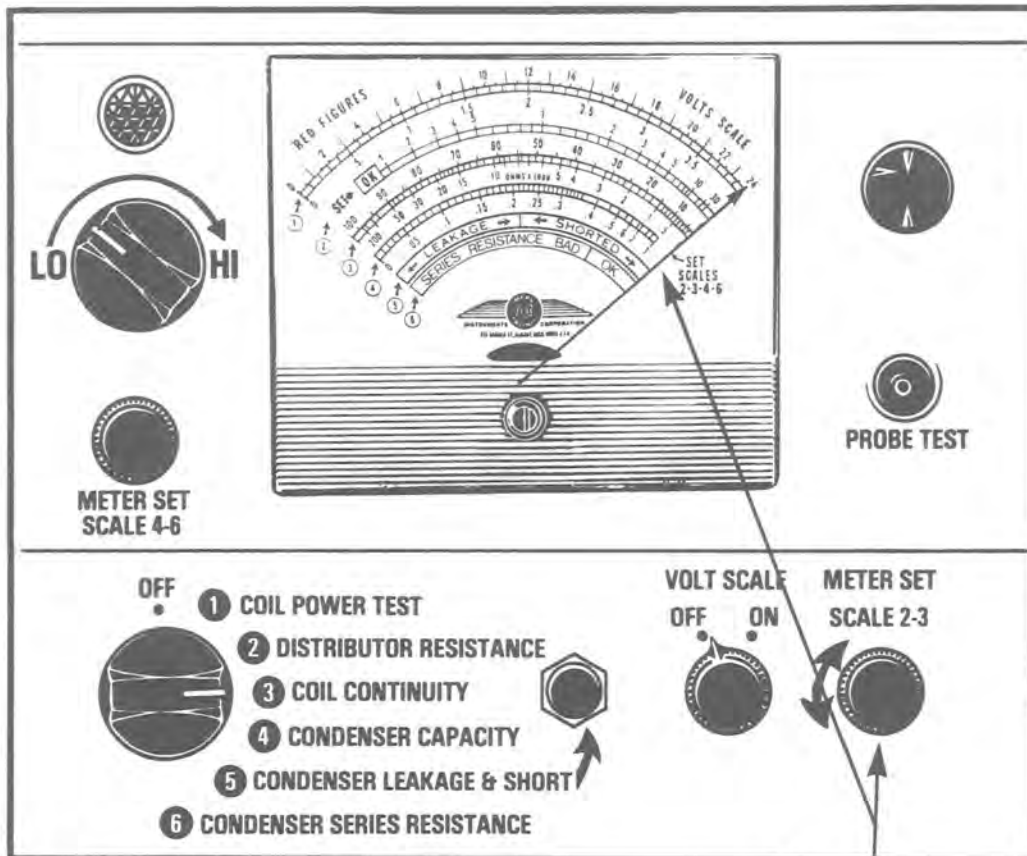
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**TEST NO. 10 SOLENOID TEST**

---

1. Adjust scale No. 2: See pages 12 & 13.
2. Turn selector switch to position No. 2 — **DISTRIBUTOR RESISTANCE.**
3. Connect the black test lead to one of the large terminals of solenoid.
4. Connect the red test lead to other large terminal of solenoid.
5. With a 12 volt battery, place two (2) jumper leads on battery posts. Connect the positive jumper lead to small terminal of solenoid.
6. Connect negative jumper lead to solenoid housing and at same time, push-in solenoid plunger until plunger holds itself.
7. The meter pointer must return within the OK block. If not replace solenoid.

ADJUSTMENT OF SCALE NO. 3 FOR TESTS NO 3 AND 11



**SECTION 05**  
**SUB-SECTION 03 (MERC-O-TRONIC TEST)**

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**TEST NO. 3 IGNITION COIL  
RESISTANCE (SECONDARY)**

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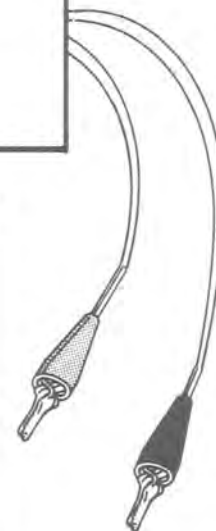
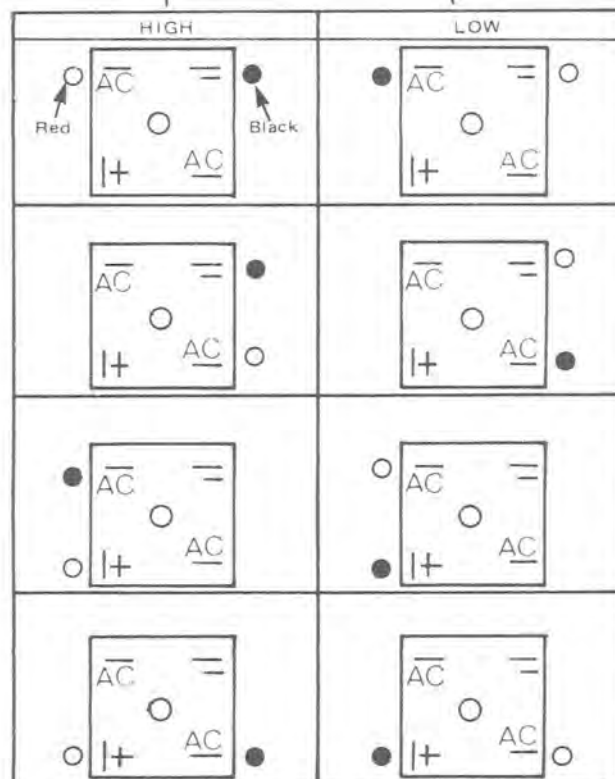
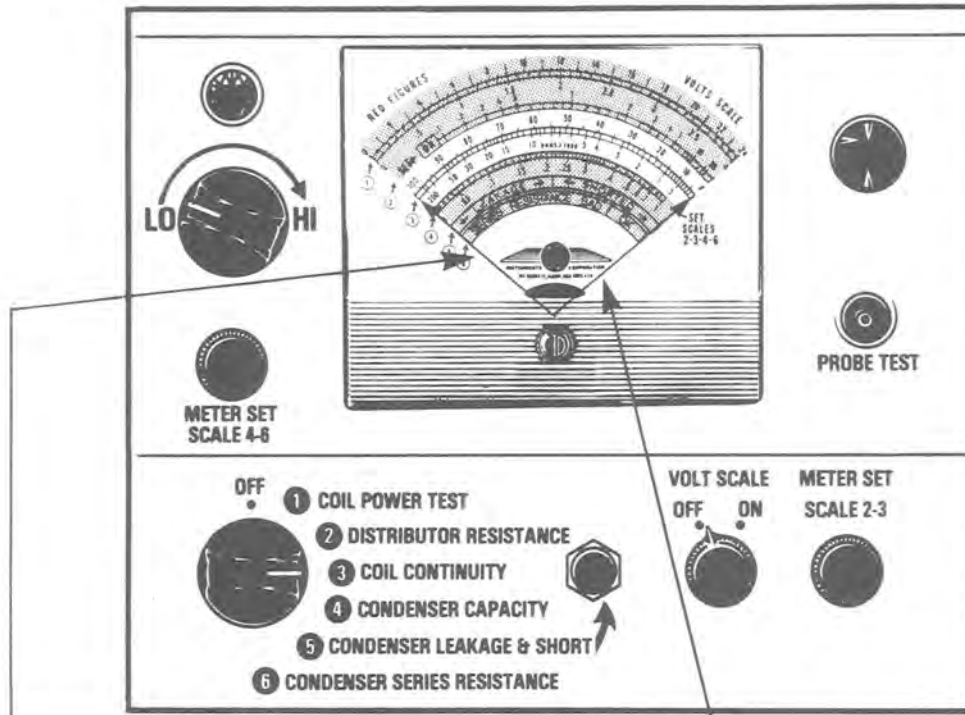
1. Turn selector switch to position No. 3 — **COIL CONTINUITY.**
2. Connect the black test lead to terminal no. 15 of the external coil.
3. Connect the red test lead to the spark plug terminal of the coil.
4. Read the RED figures of Scale No. 3. Meter reading must be between specification limits. The values on red scale no. 3 are in OHM and must be multiplied by 1,000. If coil is not within specifications, replace the defective coil.

SECONDARY RESISTANCE	
MIN. 6300 ohms	MAX. 8500 ohms

6.3 kΩ



TEST NO. 11 RECTIFIER



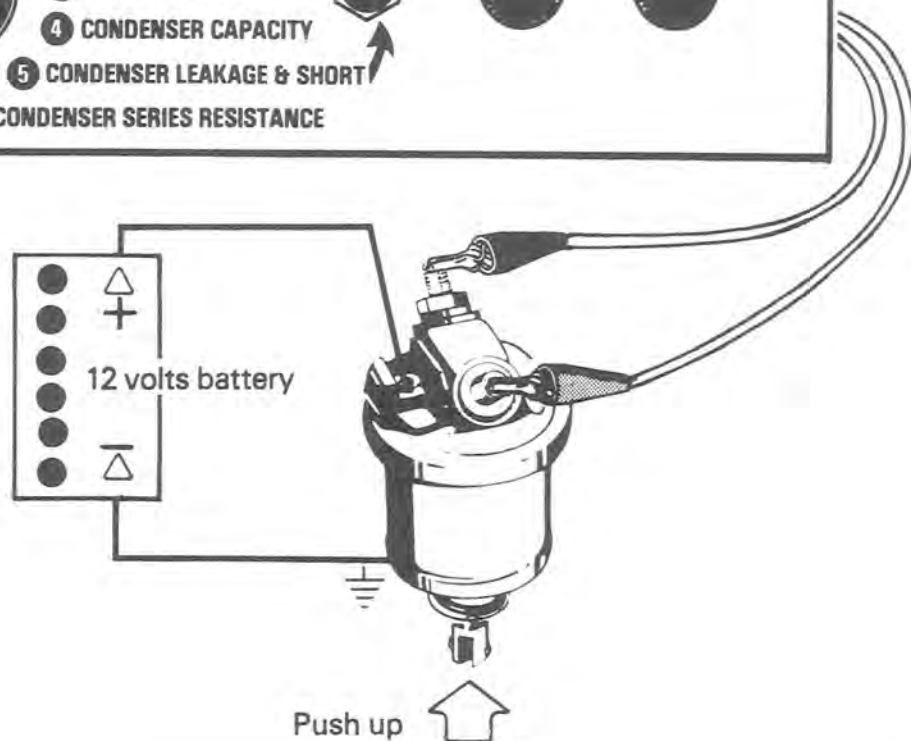
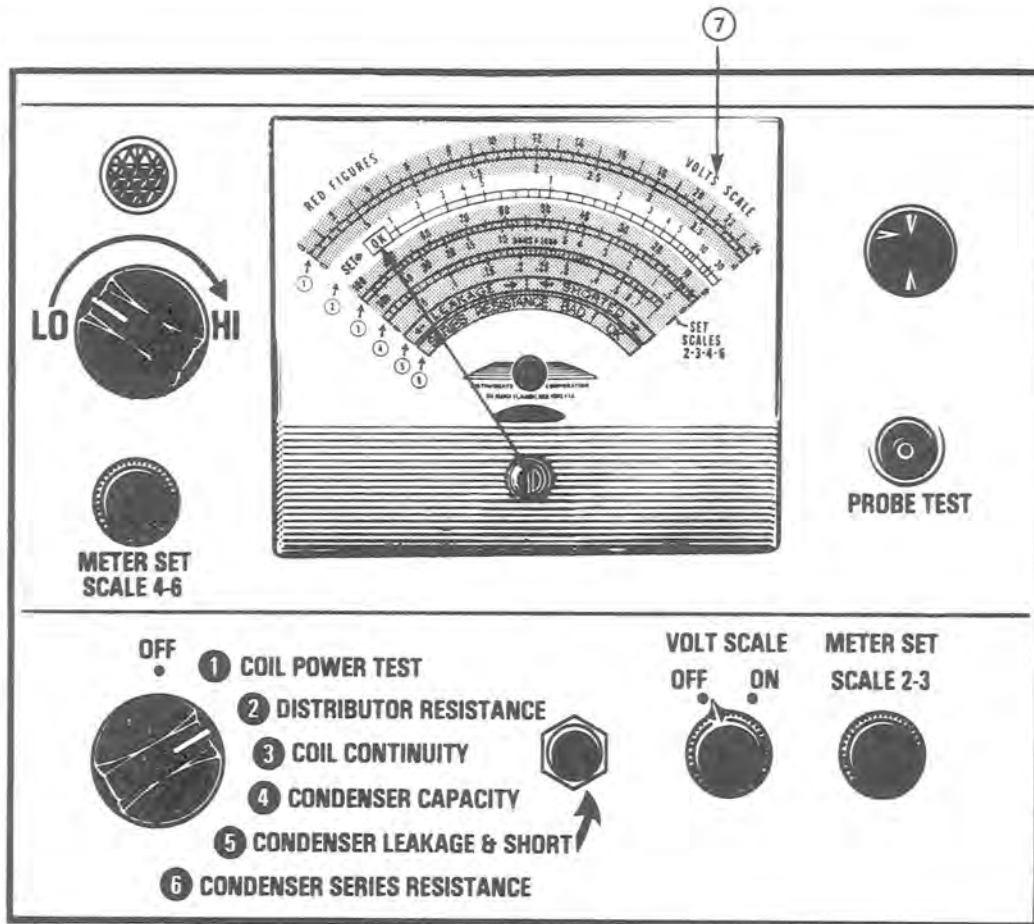
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TEST NO. 12 CONTINUITY TEST  
(GENERAL)

---

To check any wire, connection or switch for continuity, use position No. 3 — COIL CONTINUITY. Any discontinuity in an electrical system will result in an infinite resistance (no reading).

TEST NO. 10 SOLENOID TEST



---

TEST NO. 11 RECTIFIER

---

1. Adjust scale No. 3; see page 8 & 9.

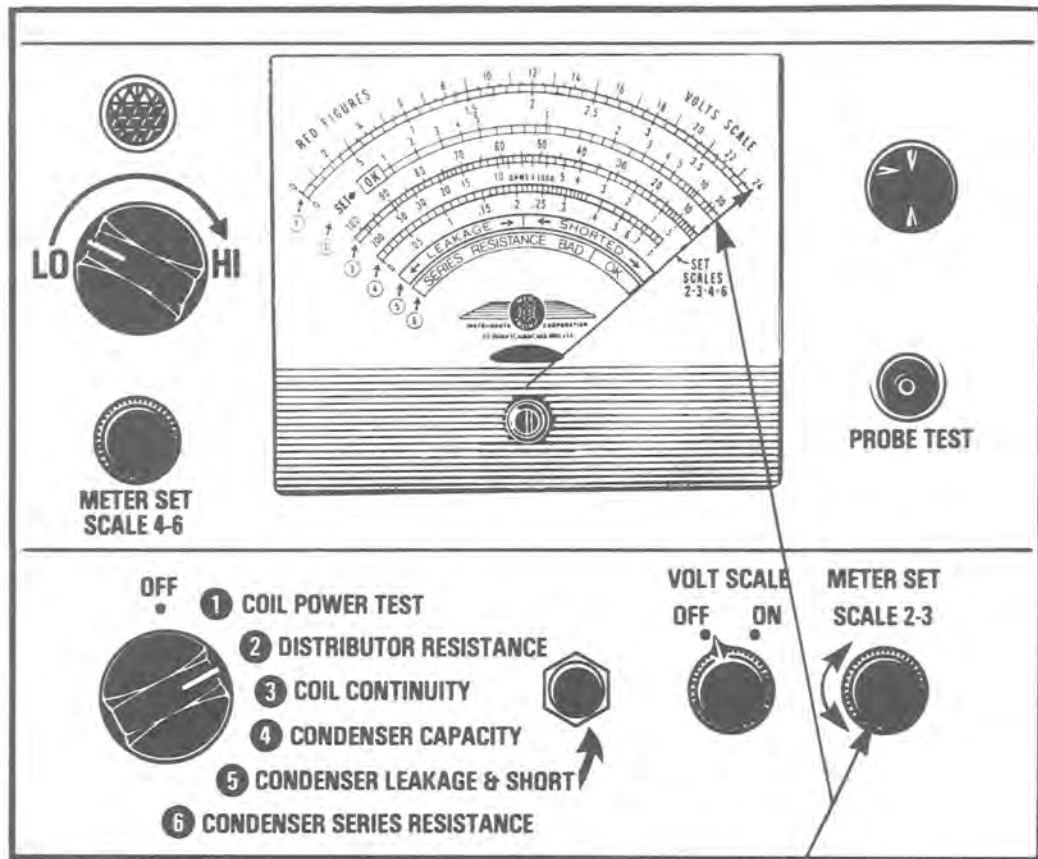
*Note: The full wave rectifier use on Ski-Doo snowmobiles incorporates 4 diodes. To test diodes for shorts and open, each diode must be checked twice. These checks are accomplished by reversing the polarity of the test leads.*

2. Turn selector switch to position No. 3 — COIL CONTINUITY.

3. Connect the test leads    Red ○  
As shown on page 37        Black ●

4. A normal diode will show a HIGH reading in one direction. A zero reading or infinite reading in both tests indicate a defective diode and the rectifier must be replaced.

ADJUSTMENT OF SCALE NO. 2 FOR TESTS NO. 4,5,9,10



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**TEST NO. 4 IGNITION COIL  
RESISTANCE (PRIMARY)**

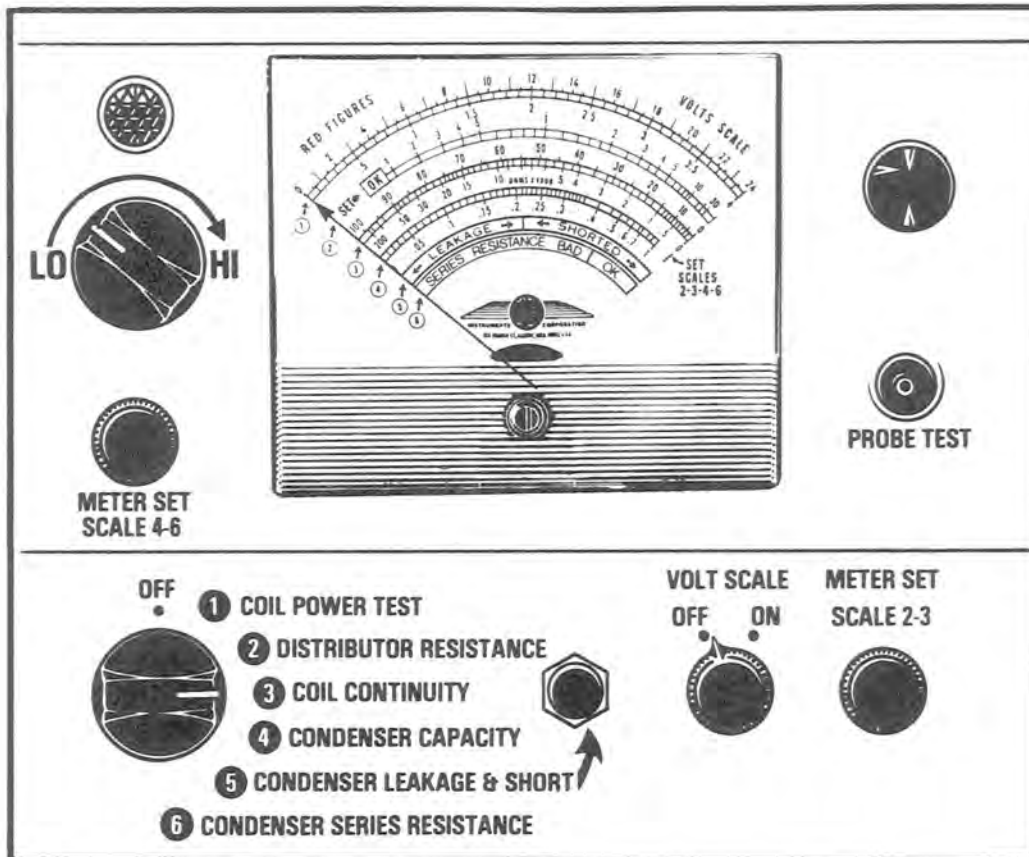
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1. Turn selector switch to position No. 2 — (**DISTRIBUTOR RESISTANCE** — for checking low ohm values.)
2. Connect the black test lead to no. 15 terminal of the ignition coil.
3. Connect the red test lead to no. 1 terminal of the ignition coil.
4. Read the RED figures on scale no. 2 Meter reading must be between specification limits. If not, replace the defective coil.

**PRIMARY RESISTANCE:** 1.9 ohms  $\pm$  10%



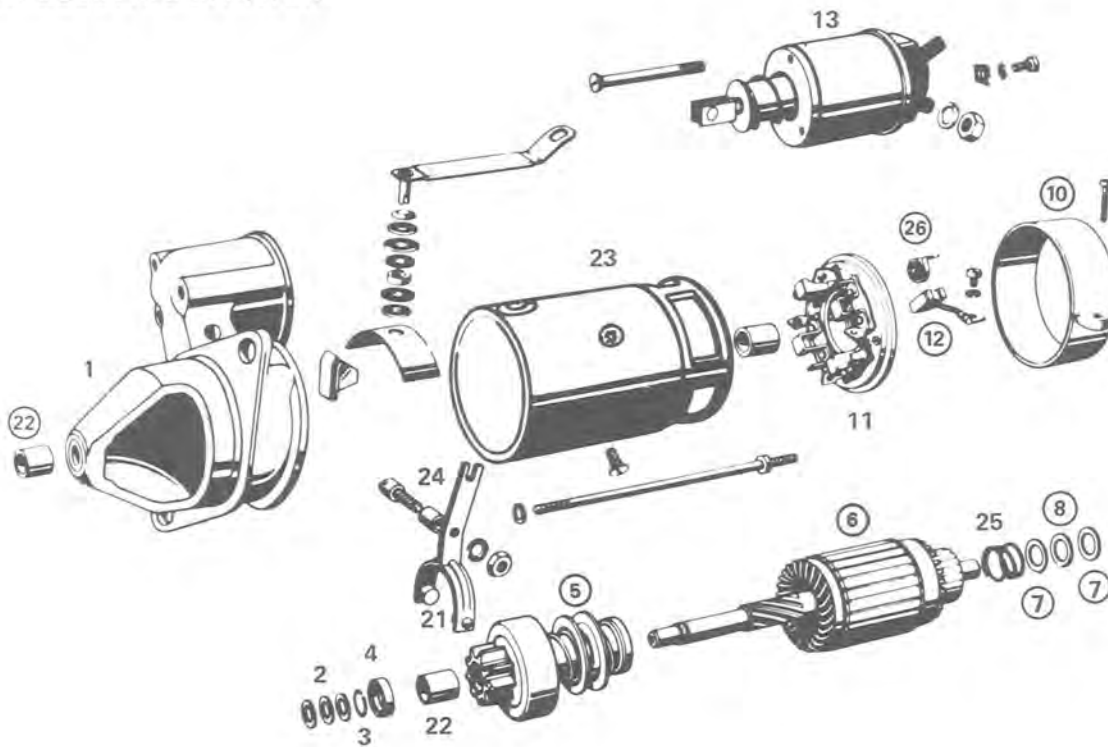
TEST NO. 12 CONTINUITY TEST (GENERAL)



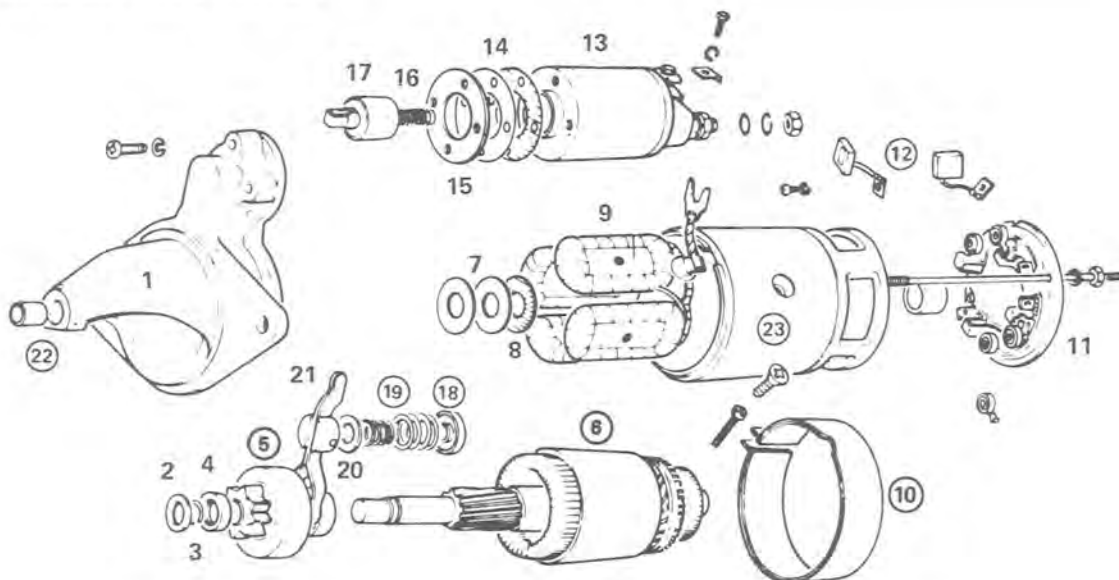


ELECTRIC STARTER

BOSCH ELECTRIC STARTER



MAA ELECTRIC STARTER



## SECTION 05

### SUB-SECTION 04 (ELECTRIC STARTER)

- |                        |                            |                      |                          |
|------------------------|----------------------------|----------------------|--------------------------|
| 1. Drive end bracket   | 8. Isolating washer        | 13. Solenoid switch  | 20. Spring retainer      |
| 2. Shim(s)             | 9. Field winding (4)       | 14. Paper spacer(s)  | 21. Solenoid shift lever |
| 3. Lock ring           | 10. End closing band       | 15. Metal spacer     | 22. Bushing              |
| 4. Locking collar      | 11. Commutator end bracket | 16. Spring           | 23. Starter housing      |
| 5. Drive unit (clutch) | 12. Carbon brush           | 17. Plunger          | 24. Bushing              |
| 6. Armature            | (2 left, 2 right)          | 18. Spring holder    | 25. Helical spring       |
| 7. Steel washer(s)     |                            | 19. Lever spring (2) | 26. Pressure spring      |

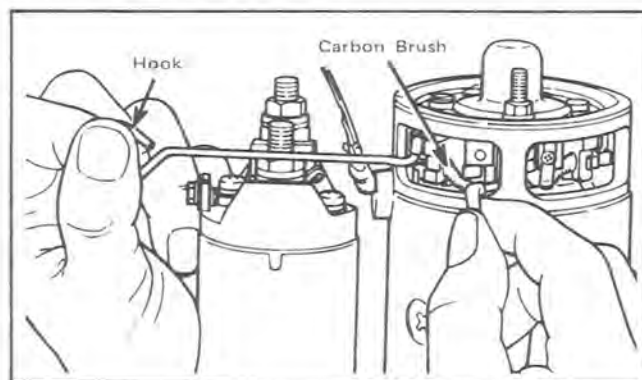
#### REMOVAL

Disconnect black cable ground connection from battery. Disconnect red battery cable and red and green wire from solenoid switch. Remove starter.

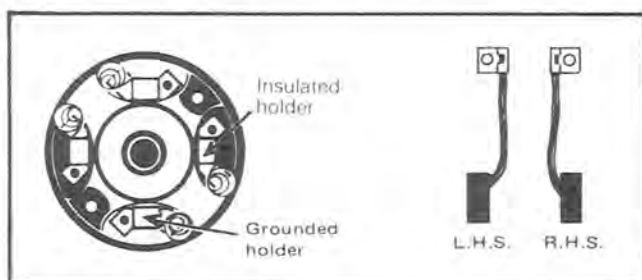
#### DISASSEMBLY & ASSEMBLY

**IMPORTANT:** To carry out some of the following procedures, it is necessary that special equipment be available. If you do not possess such equipment, either replace the damaged components or have the parts overhauled in a workshop equipped with proper tooling.

- ⑩ Mark the installation position of the end closing band to facilitate reinstallation.
- ⑫ To remove brushes: disconnect carbon brush leads then using a hook, lift the pressure spring (26) and pull out the carbon brushes.



*Note: On MAA starters, two (2) different sets of brushes are used. The set with the L.H.S. tab are ground holders, the set with the R.H.S. tab, insulated holders (armature).*



- ⑦ ⑧ Note position for reinstallation.

⑮ ⑯ On MAA starters, the spring holder, lever springs (2) and retainer are held in location by the starter housing (23). After housing removal these components are free in the drive end bracket and can be removed.

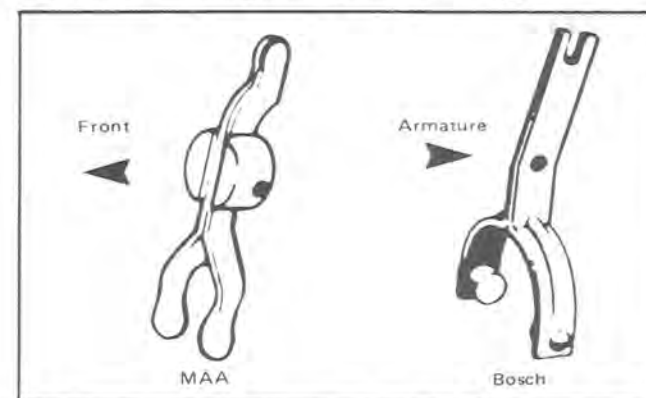
⑳ Do not remove bushings from drive or commutator end bracket of either starter, unless damaged and replacement is necessary.

**IMPORTANT:** Prior to assembly, apply a light coat of machine oil on armature shaft (6) and splines. Also, apply a light coat of low temp. grease over solenoid switch plunger (17), shift lever ends (21), shift lever pivot, steel washers (7), shims (2), and isolating washer (8).

⑤ The drive assembly (clutch) must sit correctly on the armature shaft and move freely without catching or binding.

On BOSCH starters, install armature assembly (6) as follows:

- a) Position the solenoid shift lever (21) on drive assembly (5) with the lever angle facing the armature (6).



- b) Insert the appropriate number of shims (2) into drive end bracket (1) and position the lever (21), drive assembly (5) and armature (6) into drive end bracket (1).
- c) Affix the lever (21) into the drive end bracket (1) using pivot screw, bushing (24).
- d) Install profile rubber grommet into drive end bracket.

On MAA starters, install armature assembly as follows:

- a) Position the solenoid shift lever (21) on the drive assembly (5) with the lever angle facing the armature (6).
- b) Place the appropriate washer (2) on the clutch side of the armature shaft.

## SECTION 05

### SUB-SECTION 04 (ELECTRIC STARTER)

c) Insert the lever (21) and drive assembly (5) into drive end bracket (1).

d) Insert the spring retainer (20), two lever springs (19) and the spring holder (18) into drive end bracket (1).

(11) (23) Starter housing and commutator end bracket must join at commutator end bracket nose and starter housing groove.

#### CLEANING

**Caution:** Armature (6) field winding coils (9) and drive unit assembly (5) must not be immersed in cleaning solvent.

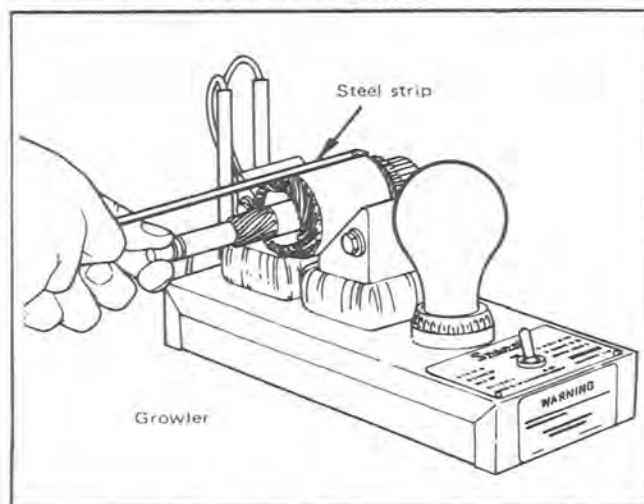
Clean carbon brushes and holders with a clean cloth soaked in gasoline. Brushes must be dried thoroughly with a clean cloth. Blow brush holders clean using compressed air. Remove dirt, oil or grease from commutator using a clean cloth soaked in gasoline. Dry well using a clean, dry cloth. Clean engine starter gear teeth and drive unit (clutch).

*Note: Bearing bushing (22) of the drive unit must not be cleaned with grease dissolving agents.*

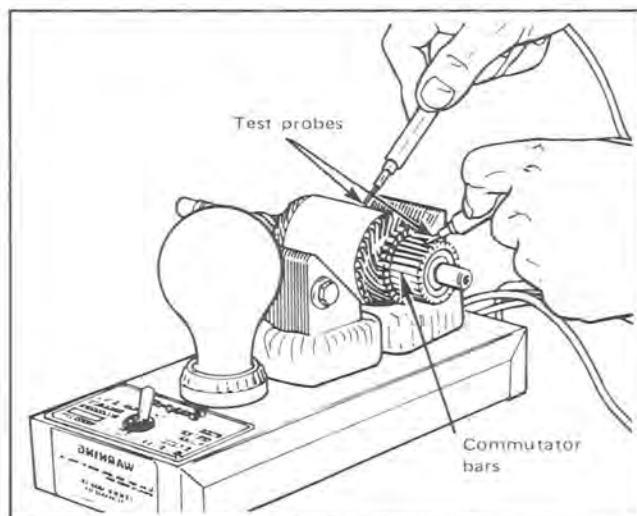
Immerse all metal components in cleaning solution. Dry using a clean, dry cloth.

#### INSPECTION

1. Test armature for shorted windings using a growler. When the armature is rotate in the growler with a steel strip held above it, the strip will vibrate over that area of the armature which has shorted circuited.



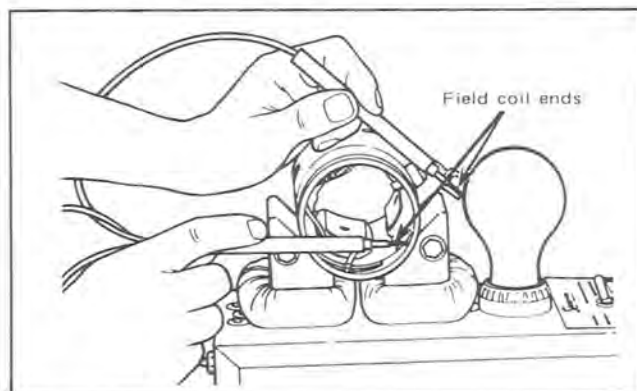
2. Test for grounds in the armature using growler test probes. Check between armature core and the commutator bars. If probe lamp turn ON, bars are grounded.



3. Check for good solder joints between commutator bars and soldered lugs.

4. Visually check general condition of commutator. If commutator requires turning, contact a specialized work-shop.

5. Inspect for opened field coils. Connect growler test probes to ends of field coils. If the probe lamp does not light, the fields coils are open.



6. Check for grounded field coils by connecting growler test probes between housing and ends of field coils. If the probe lamp turns ON, the field coils are grounded.

7. Visually inspect field coils, the coils must not be burnt or unsoldered, nor should they protrude over the pole shoes.

8. Check that carbon brushes move freely in the guides of the brush holders. Replace damaged or blued brush springs. Test brushes pressure with spring scale (1.2 to 1.5 lbs).



## SECTION 05

### SUB-SECTION 04 (ELECTRIC STARTER)

9. Replace drive assembly if damaged or worn.
10. Inspect starter solenoid for damage or wear. Test solenoid operation as detailed in section 05-03.

#### INSTALLATION

Make sure that starter and engine mating surfaces are free of dirt. Serious trouble may arise if starter is not properly aligned.

Install starter.

Connect the red battery cable and the red wire to the large terminal of the solenoid. Connect green wire to small terminal of solenoid.

Connect black cable to battery.

**Warning:** After installation of electric starter, always install the solenoid rubber cap.

#### TROUBLE SHOOTING

Causes of troubles are not necessarily in the starting system (starter) but may be due to a defective battery, switches, electrical cables and/or connections. Trouble may also be attributed to a malfunctioning of the ignition system and/or fuel system. The following trouble shooting table is limited to the starting system.

**Warning:** Short circuiting the electric starter is always a danger, therefore disconnect the ground cable at the battery before carrying out any kind of maintenance on the starting system. Do not place tools on battery.

SYMPTOM	CAUSE	REMEDY
Starter continues to run after the switch is released.	1. Starter switch does not switch off or the solenoid is stuck.	1. Immediately disconnect the starter cable at the battery or starter. Repair or replace switch. If solenoid is stuck, replace solenoid.
When switching on, the starter armature turns until it engages then it stops.	1. Battery is insufficiently charged. 2. Carbon brush spring pressure too low. 3. Starter solenoid switch defective. 4. Voltage drop across battery cables. 5. Drive assembly (clutch) slipping.	1. Charge battery. 2. Check for worn or damaged carbon brushes and/or springs. Clean or replace defective brushes or springs. 3. Check condition as detailed in section 05-03. 4. Check condition and connection of cables and wiring. 5. Repair or replace drive assembly (clutch).
Armature turns but drive assembly does not engage.	1. Defective solenoid. 2. Drive assembly (clutch) dirty. 3. Drive assembly (clutch) or engine flywheel teeth chipped, burr formation.	1. Replace solenoid. 2. Clean drive assembly clutch. 3. File off burrs or replace.



**SECTION 05**  
**SUB-SECTION 04 (ELECTRIC STARTER)**

SYMPTOM	CAUSE	REMEDY
Drive assembly (clutch) does not disengage when the engine starts.	<ol style="list-style-type: none"> <li>1. Damaged drive assembly and engine starter gear or dirty helical spline.</li> <li>2. Return spring weak or broken.</li> </ol>	<ol style="list-style-type: none"> <li>1. Carefully clean or file the burrs on engine starter gear or drive assembly and clean helical spline.</li> <li>2. Replace defective springs.</li> </ol>
When engaging the starter shaft does not turn or turns too slowly.	<ol style="list-style-type: none"> <li>1. Battery discharged.</li> <li>2. Battery defective (cracked casing damaged or loose posts).</li> <li>3. Loose or bad ground connection.</li> <li>4. Battery poles and/or cable terminals oxidized.</li> <li>5. Starter terminals or brushes shorted to ground.</li> <li>6. Starter carbon brushes are not sitting on the commutator or are clamped in their guides.</li> <li>7. Starter carbon brushes worn, broken or dirty.</li> <li>8. Ignition switch damaged or burnt (loose parts so that switch does not make contact).</li> <li>9. Starter solenoid damaged.</li> <li>10. Voltage drop across battery cables.</li> </ol>	<ol style="list-style-type: none"> <li>1. Charge battery and check rectifier</li> <li>2. Replace battery</li> <li>3. Tighten cable terminals</li> <li>4. Clean battery posts and cable terminals.</li> <li>5. Repair.</li> <li>6. Check seating and security of carbon brushes.</li> <li>7. Clean or replace brushes and brush holders. Replace defective components.</li> <li>8. Verify operation of switch.</li> <li>9. Check as detailed in section 05-03.</li> <li>10. Check condition and connections of cables.</li> </ol>



BATTERY

REMOVAL

**Warning:** When disconnecting battery cables, always remove the black negative cable first then the positive cable (red). Care should be taken while disconnecting above mentioned cables otherwise battery post breakage could occur.

CLEANING

Clean the battery casing, vent caps, cables and battery posts using a solution of baking soda and water.

**Caution:** Do not allow cleaning solution to enter battery interior since it will destroy the electrolyte.

Remove corrosion from battery cable terminals and battery posts using a firm copper brush.

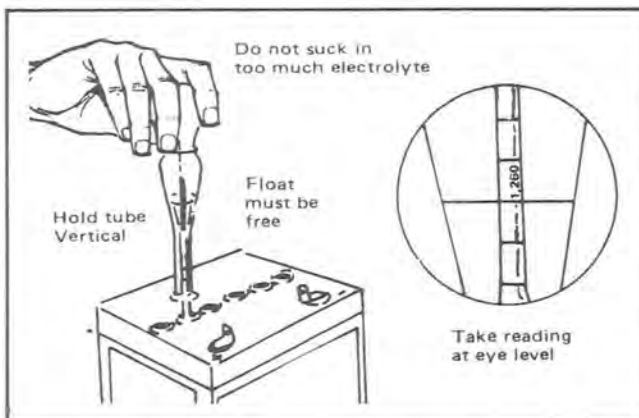
INSPECTION

Visually inspect battery casing for cracks or other possible damage. If casing is damaged, replace battery.

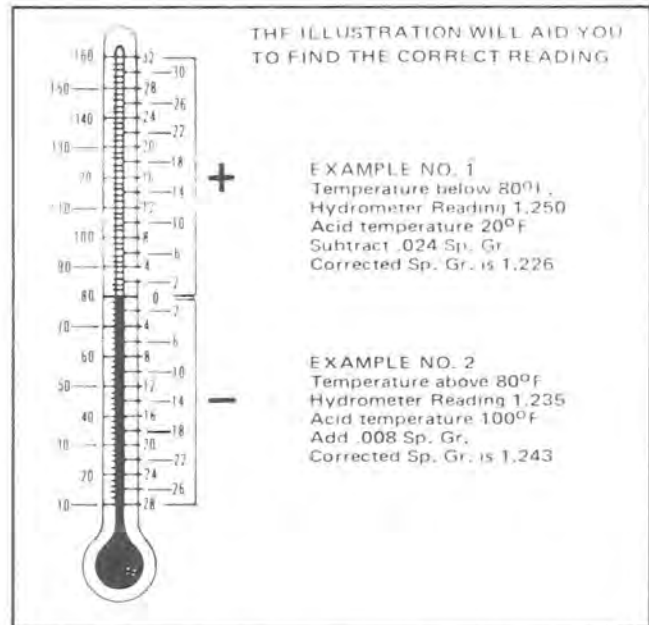
Inspect battery posts for security of mounting. Inspect for cracked or damaged battery caps. Ensure that vent holes are unobstructed. Replace defective caps. If vent hole is blocked, clean using a firm strand of wire.

**Warning:** Some battery caps do not have holes. Make sure that overflow tube is unobstructed.

HYDROMETER TEST



A hydrometer measures a battery's state of charge in terms of specific gravity. Most hydrometers only read true at 80° F. In order to obtain correct readings, adjust the initial reading by adding .004 points to the hydrometer readings for each 10 degrees of temperature above 80° F. and by subtracting .004 points for every 10 degrees of temperature below 80° F.



**Caution:** Do not install a partially charged battery on a snowmobile since the casing may crack at freezing temperature. The following chart shows the freezing point of the electrolyte in relation to the battery's state of charge.

Temperature-Corrected Specific Gravity	Battery State of Charge	Freezing Point of Battery
1.260	Fully charged	- 74° F
1.230	3/4 charged	- 42° F
1.200	1/2 charged	- 16° F
1.170	1/4 charged	0° F
1.110	Discharged	+ 19° F

SEVEN STEPS OF BATTERY STORAGE

**Step one** — After disconnecting and removing the battery from the vehicle, check specific gravity of each cell using a hydrometer. Cells should give uniform reading of 1.260 if battery is fully charged at 80° F.

**Step two** — Check electrolyte in each cell and add distilled water as necessary. (If unavailable, use drinkable water). Accurate electrolyte readings can only be taken after the cell fluids are thoroughly mixed, i.e. after charging.

**Caution:** Do not overfill bottom of vent wells.

**Step three** — Charge the battery fully. Use a 12 volt charger. (5 amp) or trickle charger until 1.260 specific gravity readings are achieved.

**Caution:** Battery electrolyte must not exceed 120° F.

## SECTION 05

### SUB-SECTION 05 (BATTERY)

**Step four** — Clean battery terminals and cable connections using a copper brush. Apply a light coat of L.P.S. No 1 Metal Protector on each. (If unavailable use petroleum jelly).

**Step five** — Clean battery casing and vent caps using a solution of baking soda and water. (Do not allow cleaning solution, to enter battery, otherwise it will destroy the electrolyte). Rinse battery with clear water and dry well using a clean cloth.

**Step six** — Store battery in a cool, dry place. Such conditions reduce self-discharging and keep fluid evaporation to a minimum.

**Step seven** — During the storage period, recheck electrolyte level and specific gravity readings at least every forty (40) days. As necessary, keep the battery "topped up" and near full charge as possible (trickle charge).

#### ACTIVATION INSTRUCTIONS FOR A NEW BATTERY

##### BLACK CASING

For storage purposes each battery is fitted with a temporary sealing tube. Do not remove sealing tube or loosen battery caps unless activation is desired. In case of accidental removal of caps or sealing tube prematurely, battery should be given a full charge.

1. Remove sealing tube from vent elbow. Install overflow tube contained in kit.

**Warning:** Failure to remove sealing tube could result in an explosion.

2. Remove caps. Fill battery cells to upper level line with electrolyte.

3. Boost charge (25 to 30 amps) until specific gravity of electrolyte has reached a **minimum of 1.250** and electrolyte temperature is **at least 80°F**. **Both conditions must be met.**

*Note: If excessive bubbling occurs, reduce charging rate.*

Check electrolyte level of each cell. Top up if necessary. Level should not be above the bottom of filler hole.

**Warning:** Keep sparks and flames away from the battery at all times.

4. Reinstall caps. Wipe battery clean then install on vehicle.

**Warning:** Overflow tube must be free and open. A kinked or bent tube will restrict ventilation and create gas accumulation that could result in an explosion.

Do not add further acid after installation.

##### TRANSLUCID CASING

For storage purposes each battery is fitted with a temporary sealing tube. Do not remove sealing tube or loosen battery caps unless activation is desired. In case of accidental removal of caps or sealing tube prematurely, battery should be given a full charge.

1. Remove sealing tube from vent elbow. Install overflow tube contained in vehicle kit.

**Warning:** Failure to remove sealing tube could result in an explosion.

2. Remove caps. Fill battery cells to upper level line with electrolyte.

3. Charge battery until specific gravity of 1.280 at 68°F. (20°C) is attained.

**Caution:** If cell temperature rises higher than 127°F. discontinue charging temporarily, or reduce charging rate.

4. Reinstall caps. Wipe battery clean then install on vehicle.

**Warning:** Overflow tube must be free and open. A kinked or bent tube will restrict ventilation and create gas accumulation that could result in an explosion.

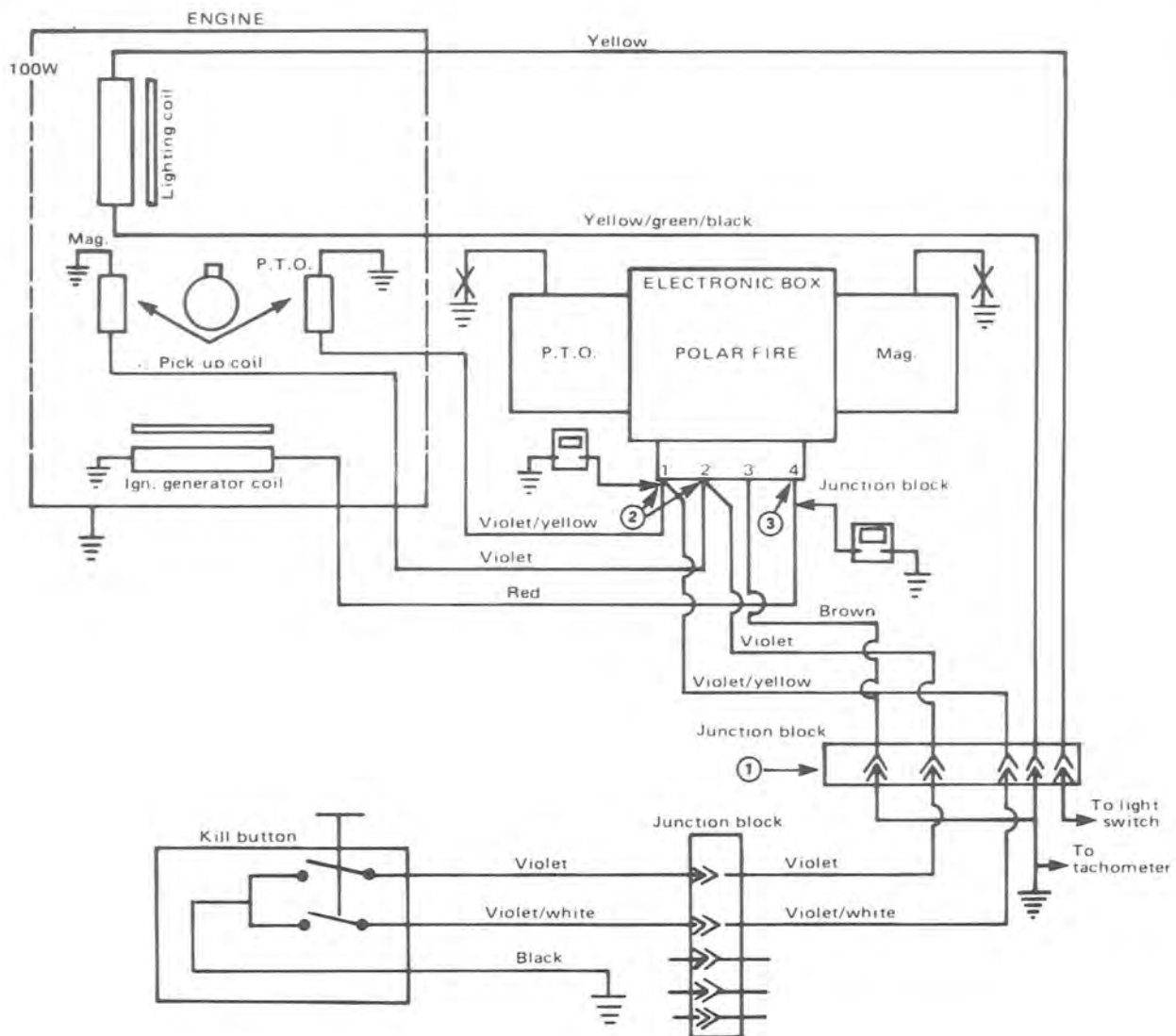
##### INSTALLATION

Install battery, connect positive cable (red) then negative cable (black).

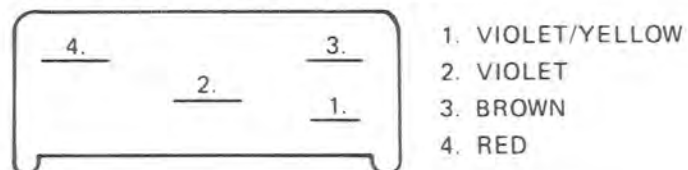
Coat battery posts with petroleum jelly then slide protective cap over positive post.

Connect battery overflow tube to outlet tube located on bottom plate.

**Caution:** Ensure that neither the positive nor the negative cables touch the muffler.



### JUNCTION BLOCK OF THE ELECTRONIC BOX



## SECTION 05

### SUB-SECTION 06 (C.D.I. TROUBLE-SHOOTING)

#### **SYMPTOM: Firing on one cylinder only**

Before checking circuit, make sure high tension wires and spark plugs are in working order.

① Check cut-out button operation by disconnecting junction block ① and by starting engine. If both cylinders are firing, replace defective cut-out button. If not, proceed with following test.

② Disconnect electronic box junction block and check each pick-up coil by connecting an ohmmeter between ground and points ② (points ② are in the junction block, not in the electronic box). Reading must be between 55 to 60 ohms. If not, armature plate assembly should be replaced.

If reading is within limits, the electronic box is defective and must be replaced.

*Note: While performing this test, make sure cut-out button is in release upper position.*

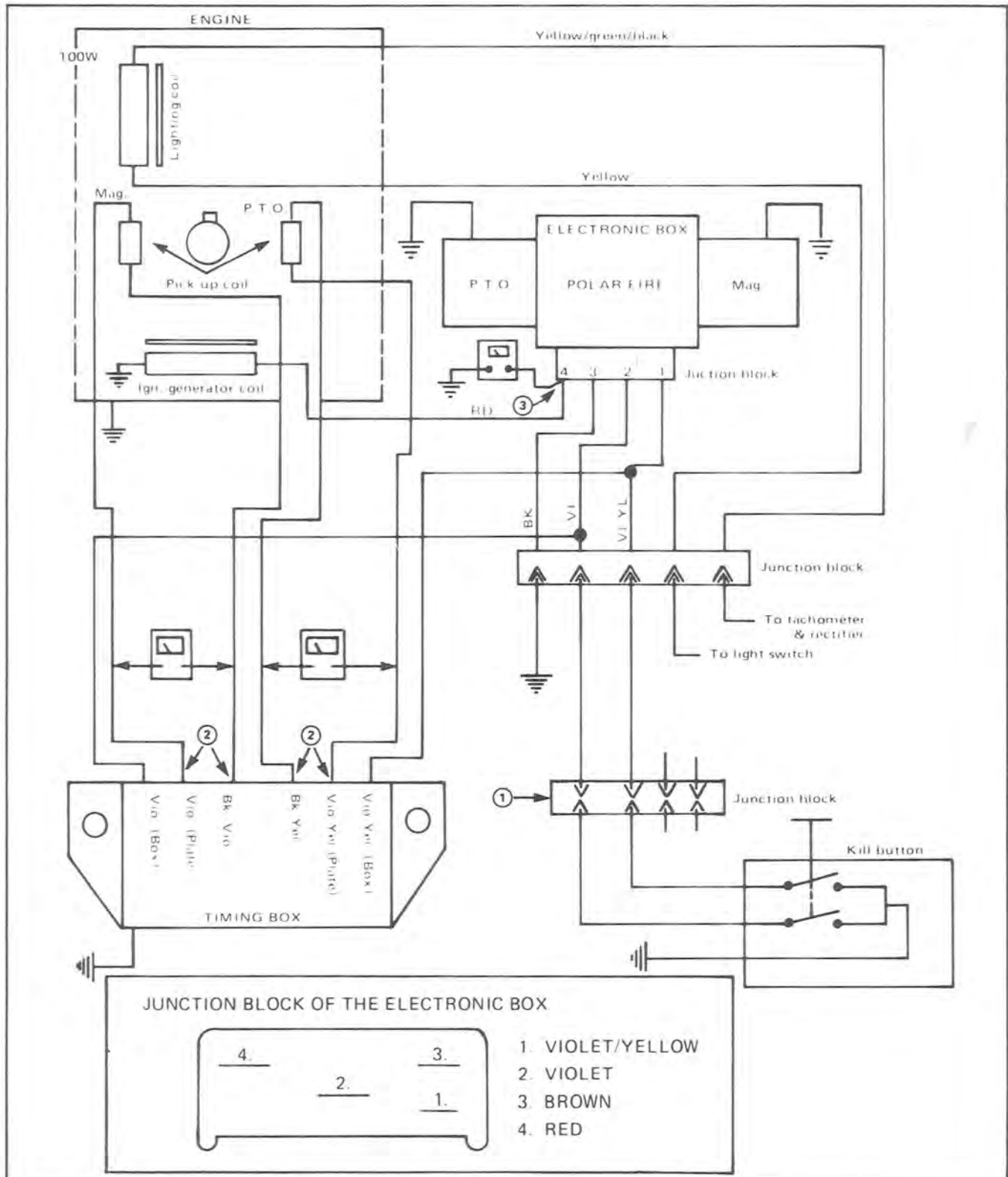
#### **SYMPTOM: Not firing on either side**

Check cut-out button and pick-up coils as described in preceding tests ① and ②. If trouble persists, continue with the following test.

③ Disconnect electronic box junction block. Connect an ohmmeter between ground and point ③ (point ③ is in the junction block, not in the electronic box). Reading must be between 325 and 365 ohms. If not, replace ignition generator coil. If reading is within limits, the electronic box is defective and must be replaced.



C.D.I. WITH TIMING BOX





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**SYMPTOM: Firing on one cylinder only**

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Before checking circuit, make sure high tension wires and spark plugs are in working order.

① Check cut-out button by disconnecting junction block ① and by starting engine. If both cylinders are firing, replace defective cut-out button. If not, proceed with following test.

② Disconnect violet and black/violet wires from timing box and check pick-up coil (MAG.) by connecting an ohmmeter between violet and black/violet wires. Repeat procedure for P.T.O. pick-up coil (Black/Yellow and Violet/Yellow wires).

Readings must be between 55 to 60 ohms. If not, armature plate assembly should be replaced.

*Note: While performing this test, make sure cut-out button is in release upper position.*

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**SYMPTOM: Not firing on either side**

---

Check cut-out button and pick-up coils as described in preceding tests ① and ②. If trouble persists, continue with the following test.

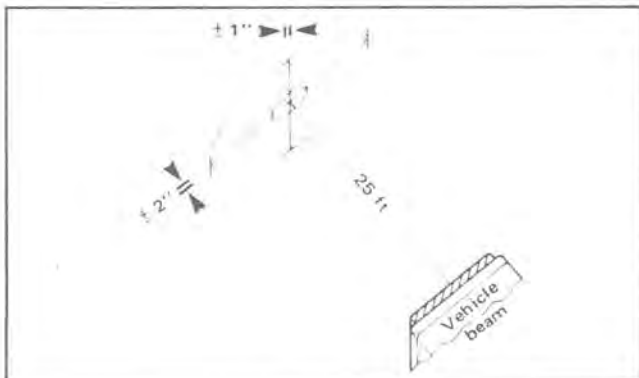
③ Disconnect electronic box junction block and connect an ohmmeter between ground and point ③ (point ③ is in the junction block, not in the electronic box). Reading must be between 325 and 365 ohms. If not, replace ignition generator coil. If reading is within limits, the electronic box is defective and must be replaced.



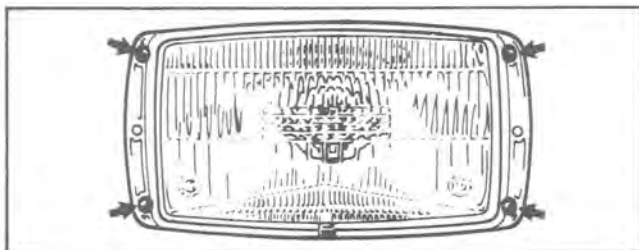
BODY & FRAME

BEAM AIMING

Place vehicle on a flat surface, twenty five (25) feet (7.6m) from a wall or screen. Turn Hi beam on. Beam aiming is correct when beam center is equal with horizontal beam line, within a maximum horizontal deviation of 2 inches (5 cm) and a maximum vertical deviation of 1 inch (2.5 cm).



To adjust, remove headlamp chrome ring and turn upper or lower adjustment screws to obtain specified beam position.



DECALS

To remove decal, pull.

Clean surface.

Apply liquid soap on new decal. Position decal and pass a sponge over decal to remove air bubbles and water. Allow to air dry.

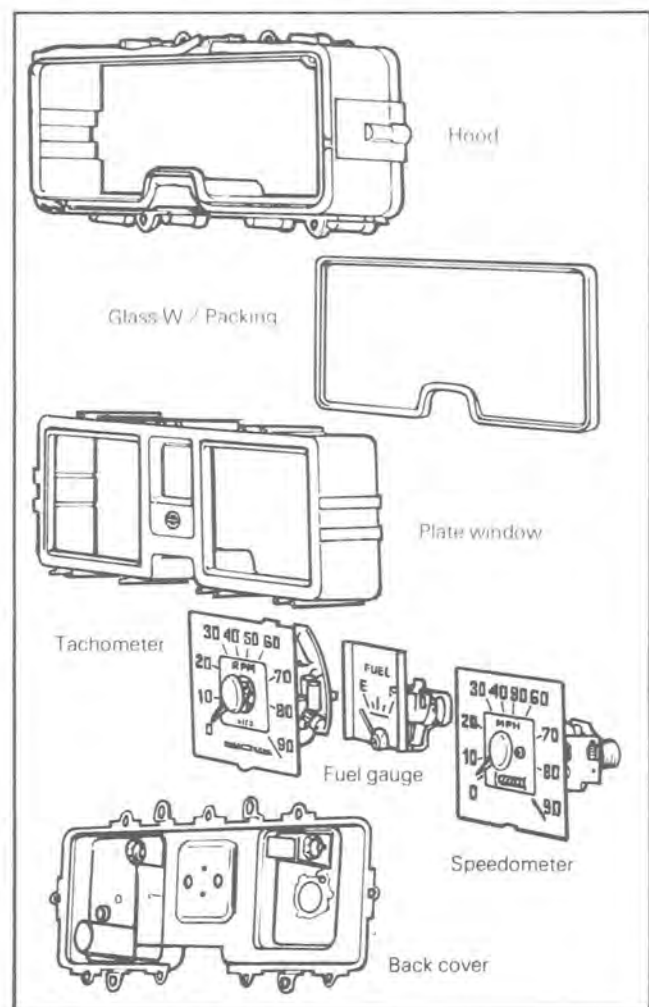
SHEET MOLDED COMPOUND

To repair sheet molded cabs, use appropriate resin compound.

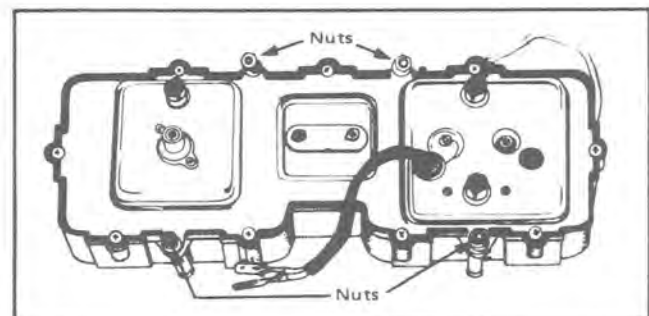
WINDSHIELD (ELITE)

Position windshield and insert screws. Using a soft face hammer, gently tap on screw heads until square section of screw bites into the windshield. Install washers and nuts. Work from center, outward.

DASHBOARD (NORDIC & ELITE)



Disconnect electrical connections and speedometer cable. Remove the four (4) nuts and spacers securing dash to console. (Lower fasteners must be held for removal, however, the dashpanel decal must first be removed). Remove dash, two (2) long spacers and two (2) hooks.



## SECTION 06

### SUB-SECTION 01 (BODY)

When installing dash make sure new gaskets are used. The back cover must be sealed with windshield sealant. Install dash and new decal.

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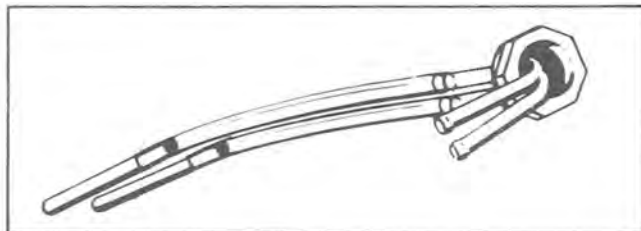
#### FUEL TANK CONNECTOR

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Remove gear clamp. Disconnect fuel lines and unscrew male connector.

Install new fuel lines on connector. One (1) of the fuel lines must be two (2) inches shorter than the other.

Apply pipe thread compound on connector threads and screw the connector into gas tank. Install gear clamp and connect fuel lines.



*Note: The carburetor return fuel line should be connected to the adaptor of the shorter fuel line.*

FRAME

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**FRAME WELDING**

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- Steel Frame:
- Electric Welding
  - Amperage: 70-110 Amp.
  - Voltage: 20-24 volts
  - Rod: E-7014 (.332")
- Aluminum Frame:
- Oxygen / acetylen welding
  - Rod: ER-4043 (.332")

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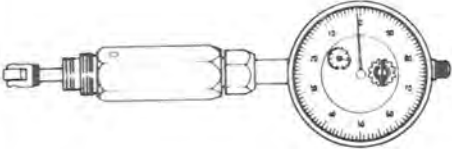
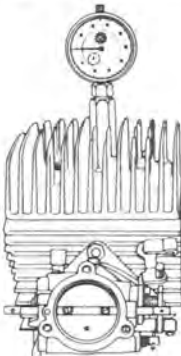

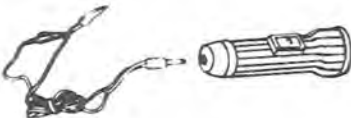
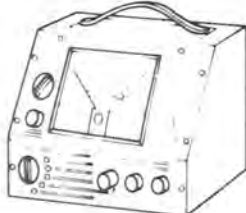
**ALUMINUM FRAME CLEANER**

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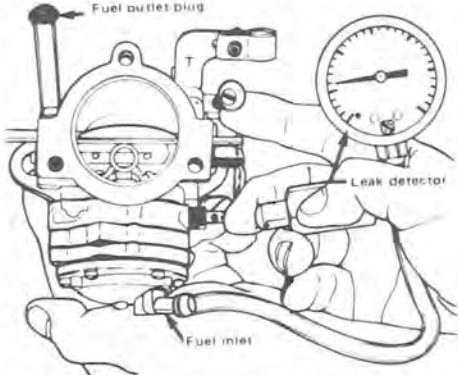
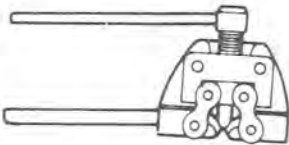
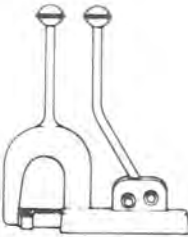
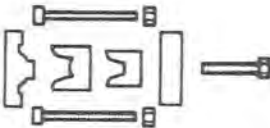
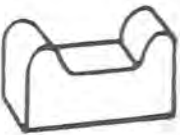
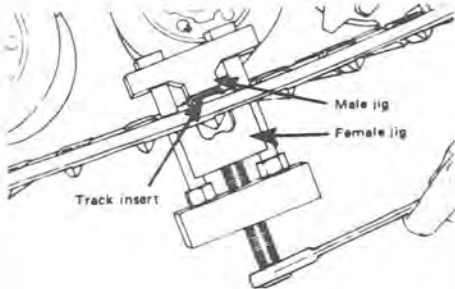
Aluminum cleaner only. Such as Dursol Cleaner or equivalent.


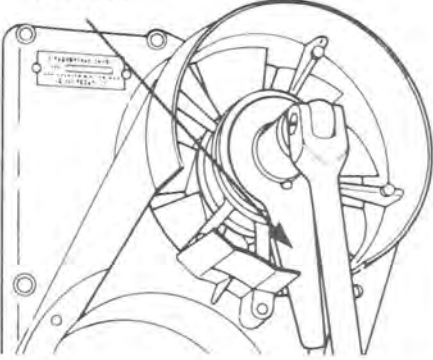
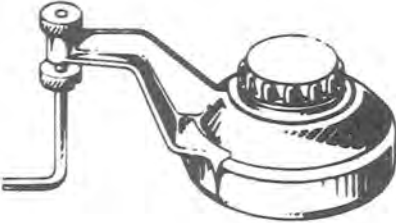
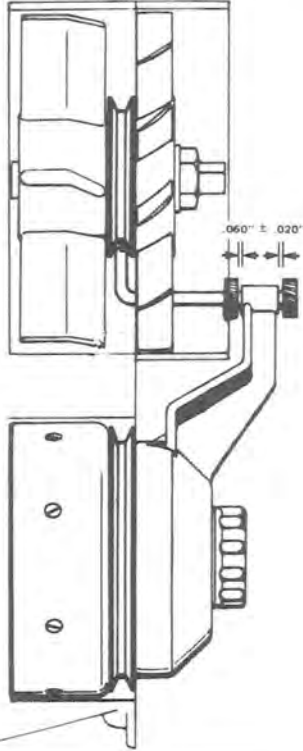
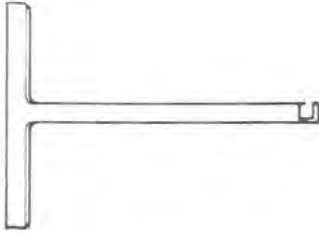
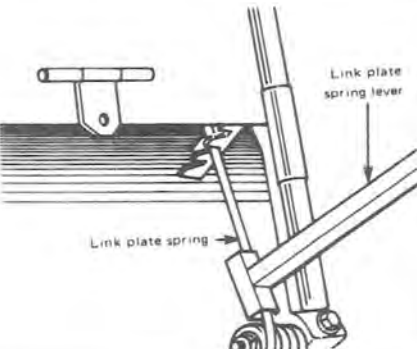




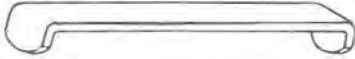
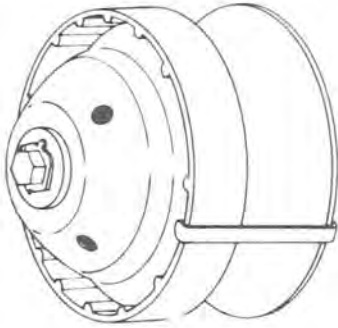
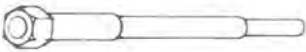
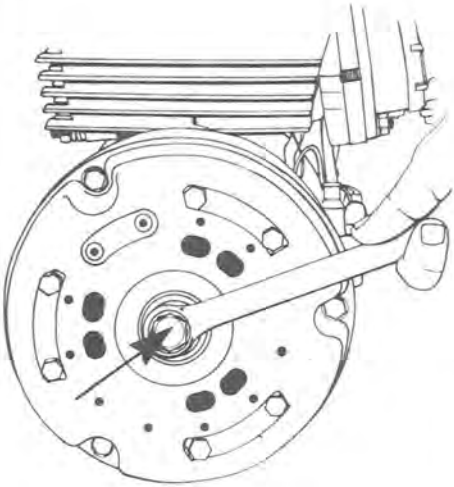

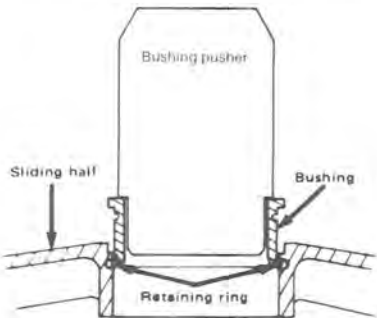
ITEM	USE	APPLICABLE TO
<p>Dial Indicator (414 1047) (T.D.C. gauge)</p> 	<p>Engine timing, to determine T.D.C.</p> 	<p>All Engine types.</p>
<p>Tone Timer (414 0990)</p> 	<p>Engine timing (static)</p>	<p>All Engine types.</p>
<p>Circuit Tester (414 0122) (continuity light)</p> 	<p>Engine timing (static). Continuity tests.</p>	<p>All Engine types.</p>
<p>Magneto Ignition Analyser (Merc-O-Tronic) (414 0192)</p> 	<p>Engine electrical components tests.</p>	<p>All Engine types.</p>



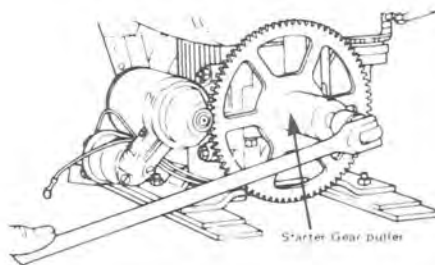
<p>Carburetor Leak Detector (404 0163)</p> 		<p>All Tillotson carburetors.</p>
<p>Chain Breaking Tool (414 0148)</p> 		<p>All types of chain.</p>
<p>Track Insert Installer (414 0678)</p>  <p>Heavy Duty (414 0027)</p>  <p>Insert Block (529 0003)</p> 		<p>All types of track.</p>

<p>Fan Holder (420 977 880)</p> 	<p>Fan holder</p> 	<p>All twin cylinders.</p>
<p>Fan Pulley Aligning Tool (420 876 440)</p> 		<p>248-249-294 engine types.</p>
<p>Link Plate Spring Lever (529 0006)</p> 		<p>All models with link plate springs.</p>

SECTION 07  
(TOOLS)

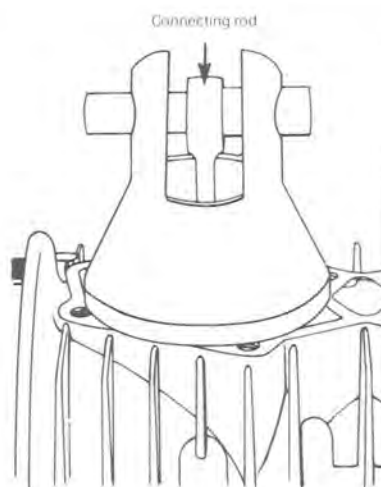
<p>Drive Pulley Retainer (529 0017)</p> 	<p>For indexation of governor cup.</p> 	<p>Square shaft drive pulley.</p>
<p>Drive Pulley Puller (529 0018)</p> 	<p>To remove drive pulley from crankshaft.</p> 	<p>High performance drive pulley.</p>
<p>Bushing Pusher (529 0019)</p> 	<p>To install bushing in sliding half.</p> 	<p>High performance drive pulley.</p>

Starter Gear Puller  
(420 876 145)



All twin cylinders  
electric start engines.

Connecting Rod Holder  
(420 977 900)  
(420 977 738)

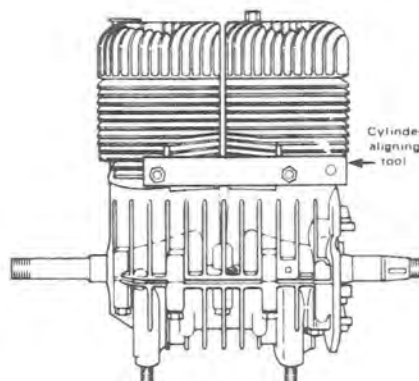


(420 977 900)  
All single cylinder models.  
(420 977 738)  
370 engine type.

Cylinder Aligning Tool  
(420 876 170)

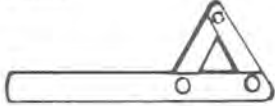

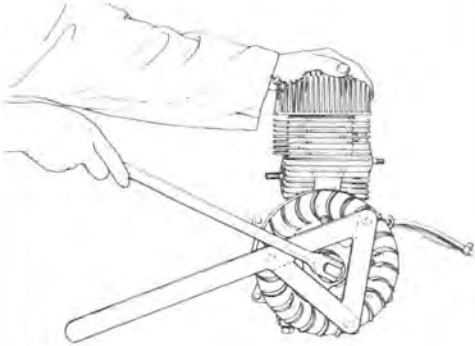


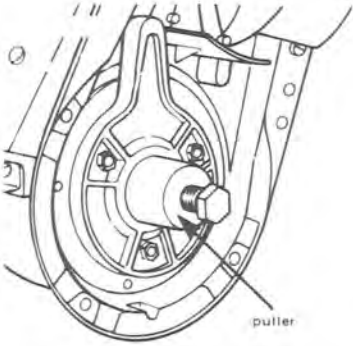




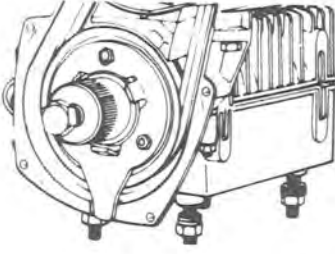


(420 842 160)



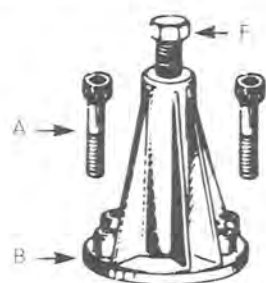
All twin cylinders since  
1970 except 248-249-294  
engine types.

SECTION 07  
(TOOLS)

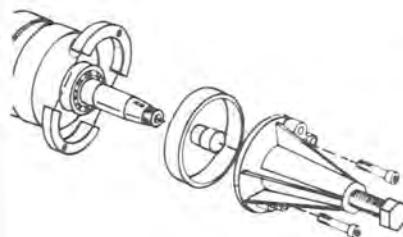
<p>Magneto Housing Holder &amp; Flywheel Puller</p> <p>(Electric engines 420 876 025) (420 976 550)</p>  <p>(420 976 235)</p> 		<p>All single cylinder engines.</p>
<p>(420 876 080)</p>  <p>(420 876 065)</p> 		<p>All twin cylinders F.C. except 248-249-294 engine types.</p>
<p>(420 876 085)</p>  <p>(420 876 065)</p> 		<p>ALL F / A engines.</p>
<p>(420 876 350)</p>  <p>(420 876 065)</p> 		<p>248-249-294 twin cylinders engine types.</p>



Bearing Puller



- A) Ring Screw
- B) Puller
- C) Ring for puller
- D) Ring half for ball bearing
- E) Ring half for roller bearing
- F) Puller Screw



A) (420 840 680)

B) (420 876 295)

- All single cylinder models except for 247 in 1974.
- All twin cylinders up to 1973. 640 in 1973.

(420 876 296)

- 247 since 1974.
- 248, 249, 294.
- 338, 343, 401, 434, 435, since 1973.
- All F.A. since 1973.
- 440, 640 since 1974.

C) (420 977 480)

- All single cylinder models since 1971.
- All twin cylinders except 640, 641, 775 since 1971.

(420 977 490)

- 292, 337, 640, 641, 775 since 1971.

D) (420 977 460)

- Since 1971.
- 247, 302, 338, 343, 401, 434, 435, 440.
- All F / A.

(420 977 470)

- Since 1971.
- 292, 337, 640, 641, 775.

(420 876 330)

- Since 1971.
- 248, 249, 294.

E) (420 876 300)

- Since 1971.
- 292, 337.

(420 232 450)

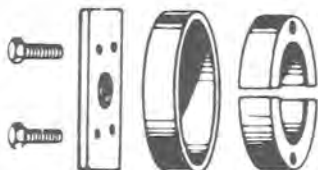
- 1969-1970.
- 292, 300, 320, 335, 340.

F) (420 940 755)

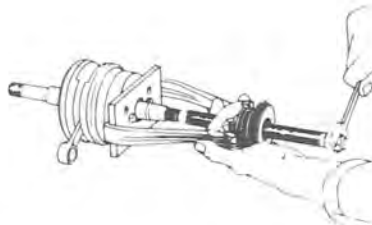
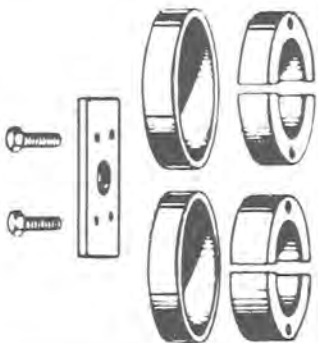
## SECTION 07 (TOOLS)

### Bearing Puller

(420 977 415)  
(420 977 417)



(420 876 035)



(420 977 415)

Up to 1971.

250, 292, 300, 335, 340, 371, 399,  
400, 401.

For bearing 402 1005.

(420 977 417)

Up to 1971.

669, 640, 641, 775.

(420 876 035)

370

### Bearing Simulator

(420 876 150)  
(420 876 160)  
(420 876 380)



When adjusting crankshaft play.

(420 876 150)

338, 343, 400, 401.

(420 876 160)

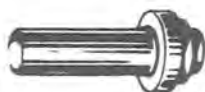
640, 641, 775.

(420 876 380)

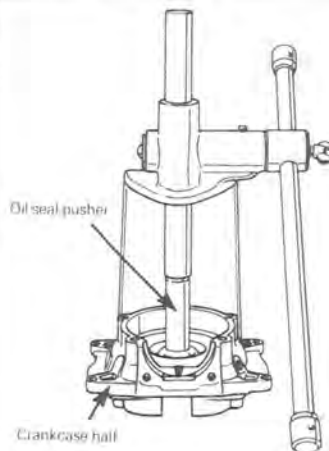
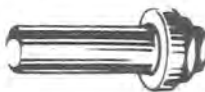
248, 249, 294.

### Oil Seal Pusher

(420 977 920)



P.T.O. Side  
(420 876 040)



(420 977 920)





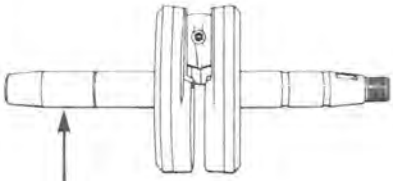


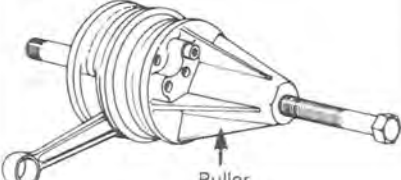
All single cylinder models.

Up to 1971.

247, 302 since 1971.

(420 876 040)

292, 337, 370.

<p>Mag. Side (420 876 310)</p> 		<p>(420 876 310) 292, 337.</p>
<p>Oil Seal Sleeve (420 876 010)</p>  <p>Mag. Side (420 276 900)</p>  <p>P.T.O. Side (420 977 910)</p> 	<p>To avoid oil seal damage during crankshaft installation.</p>  <p>Oil seal sleeve (on crankshaft)</p>	<p>(420 876 010) 370 type.</p> <p>(420 276 900) All single cylinder models.</p> <p>(420 977 910) All single cylinder models. Up to 1971. 247-302 since 1971.</p>
<p>Protection Cap (420 876 145) 18 mm (420 976 880) 14 mm (420 876 390) (420 876 400) 22 mm</p> 	<p>Protect crankshaft end, when using bearing puller.</p> <p>Protective cap</p>   <p>Puller</p>	<p>(420 876 145) — All models F / C. — 250, 300 in 1968. — 248, 249, 294, 440 &amp; 640 in 1974.</p> <p>(420 976 880) 250, 300 in 1968.</p> <p>(420 876 390) 248, 249, 294.</p> <p>(420 876 400) — All F / A models. — 440, 640 since 1974.</p>



1974 TRACK TENSION SPECIFICATIONS (BOGIE WHEEL SYSTEM)

MODEL		From the middle set of bogie wheels, distance between top inside edge of track and bottom of footboard must be:
ELAN	250	$1\frac{3}{8}'' \pm 1/8''$
	250E	$1\frac{3}{8}'' \pm 1/8''$
	250T	$1\frac{3}{8}'' \pm 1/8''$
	250 Deluxe	$1\frac{3}{8}'' \pm 1/8''$
OLYMPIQUE	300	$2\frac{1}{4}'' \pm 1/8''$
	340	$2\frac{1}{4}'' \pm 1/8''$
	340E	$2\frac{1}{4}'' \pm 1/8''$
	400	$2\frac{1}{4}'' \pm 1/8''$
	400E	$2\frac{1}{4}'' \pm 1/8''$
	440	$2\frac{1}{4}'' \pm 1/8''$
NORDIC	640ER	$2\frac{1}{4}'' \pm 1/8''$
ALPINE	440ER	$2\frac{1}{4}'' \pm 1/8''$
	640ER	$2\frac{1}{4}'' \pm 1/8''$ (From second set of bogie wheels from rear)
ELITE	440ER	$2\frac{1}{4}'' \pm 1/8''$





**SECTION 08**  
**SUB-SECTION 02-03 (DRIVE PULLEY)**

**1974 DRIVE PULLEY SPECIFICATIONS**

MODEL	SPRING COLOR	SPRING CONSTANT IN.-LBS.	PULLEY TYPE °	COUNTERWEIGHT IDENTIFICATION	BOLT TORQUE FT.-LBS.
Elan 250, 250E	Bronze	32	R.R.S.	E-4	37-54
Elan 250 Deluxe	Blue	65	R.R.S.	D-4	37-54
Elan 294SS	Yellow	62	R.S.S.	B-1-K	83-92†
Olympique (all models)	Black	40	P.L.	No hole	37-54
T'NT 300SM	Yellow	62	R.S.S.	B-1-K	83-92†
T'NT 340SM, 340SE	Light blue	39	R.S.S.	C-3-L	83-92†
T'NT 440SM, 440SE, Everest	Light blue	39	R.S.S.	C-4-L	83-92†
T'NT F/A 340	White	50	H.P.	A-8	**58-68
T'NT F/A 400, 440	White	50	H.P.	A-9	**58-68
Nordic 640ER	Pink	26	R.S.S.	C-8	83-92†
Alpine 440ER	Brown	55	P.L.	1 rivet, 1 washer	37-54
Alpine 640ER	Brown	55	P.L.	1 rivet, 3 washers	37-54
Elite 440ER	Light blue	39	R.S.S.	C-8-M	83-92†

° R.R.S.: Roller Round Shaft  
R.S.S.: Roller Square Shaft  
P.L.: Pressure Lever  
H.P.: High Performance

\*\* After bolt is torqued, start engine and repeatedly apply throttle and brake. Stop engine and retorque.

† Torque retaining bolt to specification then loosen and retorque to specific value.



1974/1975 DRIVEN PULLEY SPRING TENSION

MODEL		1974 SPRING TENSION	1975 SPRING TENSION
ELAN	250	8 lbs $\pm$ 2 lbs	8 lbs $\pm$ 2 lbs
	250E	8 lbs $\pm$ 2 lbs	
	250T	8 lbs $\pm$ 2 lbs	
	250 Deluxe	8 lbs $\pm$ 2 lbs	8 lbs $\pm$ 2 lbs
	294SS	8 lbs $\pm$ 2 lbs	
	300SS		8 lbs $\pm$ 2 lbs
OLYMPIQUE	300	8 lbs $\pm$ 2 lbs	8 lbs $\pm$ 2 lbs
	300E		8 lbs $\pm$ 2 lbs
	340	8 lbs $\pm$ 2 lbs	8 lbs $\pm$ 2 lbs
	340E	8 lbs $\pm$ 2 lbs	8 lbs $\pm$ 2 lbs
	400	8 lbs $\pm$ 2 lbs	
	400E	8 lbs $\pm$ 2 lbs	
	440	8 lbs $\pm$ 2 lbs	
NORDIC	640ER	8 lbs $\pm$ 2 lbs	
T'NT	300SM	8 lbs $\pm$ 2 lbs	
	340SM	8 lbs $\pm$ 2 lbs	8 lbs $\pm$ 2 lbs
	340SE	8 lbs $\pm$ 2 lbs	8 lbs $\pm$ 2 lbs
	440SM	8 lbs $\pm$ 2 lbs	8 lbs $\pm$ 2 lbs
	440SE	8 lbs $\pm$ 2 lbs	8 lbs $\pm$ 2 lbs
T'NT EVEREST	440SL	8 lbs $\pm$ 2 lbs	8 lbs $\pm$ 2 lbs
	440E		8 lbs $\pm$ 2 lbs
T'NT F/A	340	13 lbs $\pm$ 2 lbs	13 lbs $\pm$ 2 lbs
	400	13 lbs $\pm$ 2 lbs	
	440	13 lbs $\pm$ 2 lbs	13 lbs $\pm$ 2 lbs
ALPINE	440ER	8 lbs $\pm$ 1 lb	
	640ER	8 lbs $\pm$ 1 lb	12 lbs $\pm$ 1 lb
ELITE	440ER	8 lbs $\pm$ 1 lb	8 lbs $\pm$ 1 lb



1974 PULLEY ALIGNMENT SPECIFICATIONS

MODEL		OFFSET * (Simulator rod dia.)	DISTANCE ** (Between pulleys)
ELAN	250	9/16"	1 7/8"
	250 E	9/16"	1 7/8"
	250T	9/16"	1 7/8"
	250 Deluxe	9/16"	1 7/8"
	294 SS	1/2"	1 1/2"
OLYMPIQUE	300	9/16"	1 7/8"
	340	9/16"	1 7/8"
	340 E	9/16"	1 7/8"
	400	9/16"	1 7/8"
	400 E	9/16"	1 7/8"
	440	9/16"	1 7/8"
NORDIC	640 ER	1/2"	1 5/8"
T'NT	300 SM	1/2"	1 3/8"
	340 SM	1/2"	1 3/8"
	340 SE	1/2"	1 3/8"
	440 SM	1/2"	1 3/8"
	440 SE	1/2"	1 3/8"
T'NT EVEREST	440 SL	1/2"	1 3/8"
T'NT F/A	340	self adjusting	1 1/4" (non-adjustable)
	400	self adjusting	1 1/4" (non-adjustable)
	440	self adjusting	1 1/4" (non-adjustable)

SECTION 08  
SUB-SECTION 02-05

ALPINE	440 ER	9/16"	1 7/8" (non-adjustable)
	640 ER	9/16"	1 7/8" (non-adjustable)
ELITE	440 ER	9/16"	1 1/2" (non-adjustable)

\* Offset tolerance  $\pm 1/32"$

\*\* Distance tolerance  $+ 0 - 1/16"$



1974 SPROCKET AND CHAIN SPECIFICATIONS

1974 SPROCKET AND CHAIN SPECIFICATIONS			
MODEL		UPPER/LOWER	CHAIN PITCH
ELAN	250	10/25	1/2" SINGLE
	250E	10/25	1/2" SINGLE
	250T	14/35	3/8" DOUBLE
	250 Deluxe	14/35	3/8" DOUBLE
	294SS	15/34	3/8" DOUBLE
OLYMPIQUE	300	15/35	3/8" DOUBLE
	340	15/34	3/8" DOUBLE
	340E	15/34	3/8" DOUBLE
	400	16/34	3/8" DOUBLE
	400E	16/34	3/8" DOUBLE
	440	16/33	3/8" DOUBLE
NORDIC	640ER	18/33	3/8" TRIPLE
T'NT	300SM	14/34	3/8" DOUBLE
	340SM	15/34	3/8" DOUBLE
	340SE	15/34	3/8" DOUBLE
	440SM	19/38	3/8" TRIPLE
	440SE	19/38	3/8" TRIPLE
T'NT EVEREST	440SL	19/38	3/8" TRIPLE
T'NT F/A	340	*14-15-16/44	3/8" TRIPLE
	400	*15-16-17/44	3/8" TRIPLE
	440	*15-16-17/44	3/8" TRIPLE
ALPINE	440ER	17/46	3/8" TRIPLE
	640ER	17/38	3/8" TRIPLE
ELITE	440ER	17/46	3/8" TRIPLE
*Maximum engine revolutions 8300 RPM.			



STEERING SYSTEM TORQUE SPECIFICATIONS (inch pounds)

MODEL		HANDLE ASS'Y (handlebar)	STEERING ARM	TIE ROD END	STEERING BRACKET
ELAN	250	Welded	260-320	225-265	60-75
	250E	Welded	260-320	225-265	60-75
	250T	Welded	260-320	225-265	60-75
	250 Deluxe	Welded	260-320	225-265	60-75
	294SS	Welded	260-320	225-265	60-75
OLYMPIQUE	300	390-420	500-680	225-265	60-75
	340	390-420	260-320	225-265	60-75
	340E	390-420	260-320	225-265	60-75
	400	390-420	260-320	225-265	60-75
	400E	390-420	260-320	225-265	60-75
	440	390-420	260-320	225-265	60-75
NORDIC	640ER	390-420	260-320	225-265	60-75
T'NT	300SM	390-420	260-320	225-265	60-75
	340SM	390-420	260-320	225-265	60-75
	340SE	390-420	260-320	225-265	60-75
	440SM	390-420	260-320	225-265	60-75
	440SE	390-420	260-320	225-265	60-75
T'NT EVEREST	440SL	390-420	260-320	225-265	60-75
T'NT F/A	340	390-420	260-320	225-265	60-75
	400	390-420	260-320	225-265	60-75
	440	390-420	260-320	225-265	60-75
ALPINE	440ER	390-420	260-320	225-265	250-300
	640ER	390-420	260-320	225-265	250-300
ELITE	440ER	390-420	240-300	225-265	60-75



SKI SYSTEM TORQUE SPECIFICATIONS (inch pounds)

MODEL		LEAF SPRING/ SPRING COUPLER	RUNNER SHOE	SHOCK	SKI COUPLER BOLT & NUT
ELAN	250	420-480	60-70	390-420	TIGHTEN SKI COUPLER BOLT MOVE SKI BY HAND TO CHECK THAT IT PIVOTES EASILY ON SKI-LEG. THEN TIGHTEN SKI COUPLER LOCKING NUT TO 480 in / lb
	250E	420-480	60-70	390-420	
	250T	420-480	60-70	390-420	
	250 Deluxe	420-480	60-70	390-420	
	294SS	420-480	60-70	390-420	
OLYMPIQUE	300	420-480	125-150	390-420	
	340	420-480	125-150	390-420	
	340E	420-480	125-150	390-420	
	400	420-480	125-150	390-420	
	400E	420-480	125-150	390-420	
	440	420-480	125-150	390-420	
NORDIC	640ER	420-480	200-240	390-420	
T'NT	300SM	420-480	200-240	390-420	
	340SM	420-480	200-240	390-420	
	340SE	420-480	200-240	390-420	
	440SM	420-480	200-240	390-420	
	440SE	420-480	200-240	390-420	
T'NT EVEREST	440SL	420-480	200-240	390-420	
T'NT F/A	340	420-480	200-240	390-420	
	400	420-480	200-240	390-420	
	440	420-480	200-240	390-420	
ALPINE	440ER	420-480	200-240	390-420	
	640ER	420-480	200-240	390-420	
ELITE	440ER	420-480	200-240	390-420	





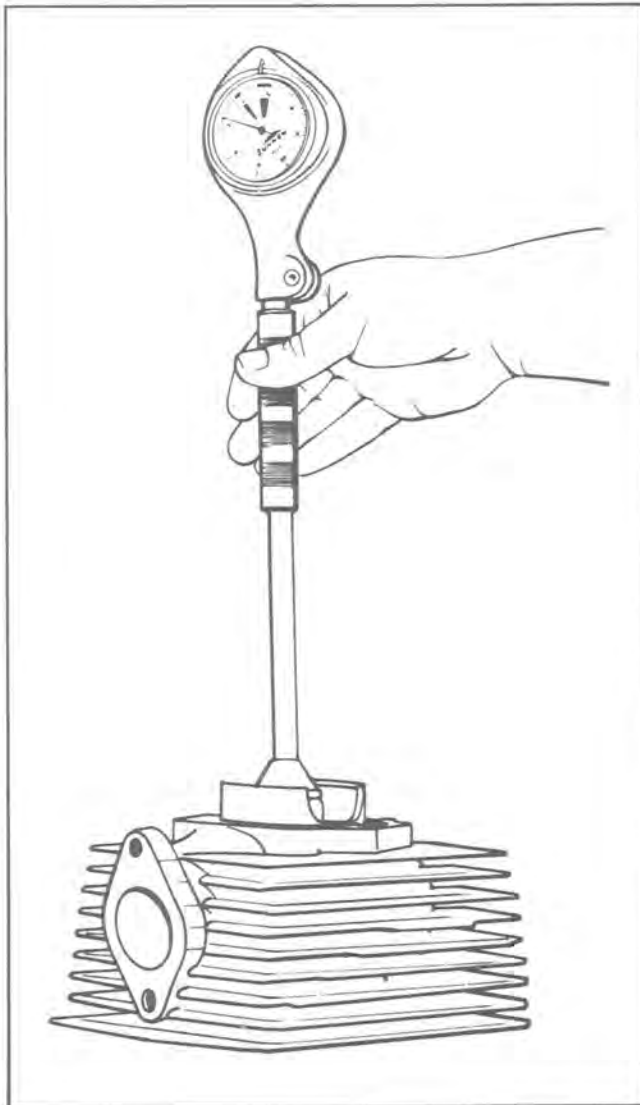
## 1974 ONE CYLINDER ENGINE TECHNICAL DATA

### Nominal dimension of cylinder bore

Engine Type	Standard	1st oversize	2nd oversize
247	2.7165" (69 mm)	2.7362" (69.5 mm)	—
302	2.9921" (76 mm)	3.0118" (76.5 mm)	3.0315" (77 mm)

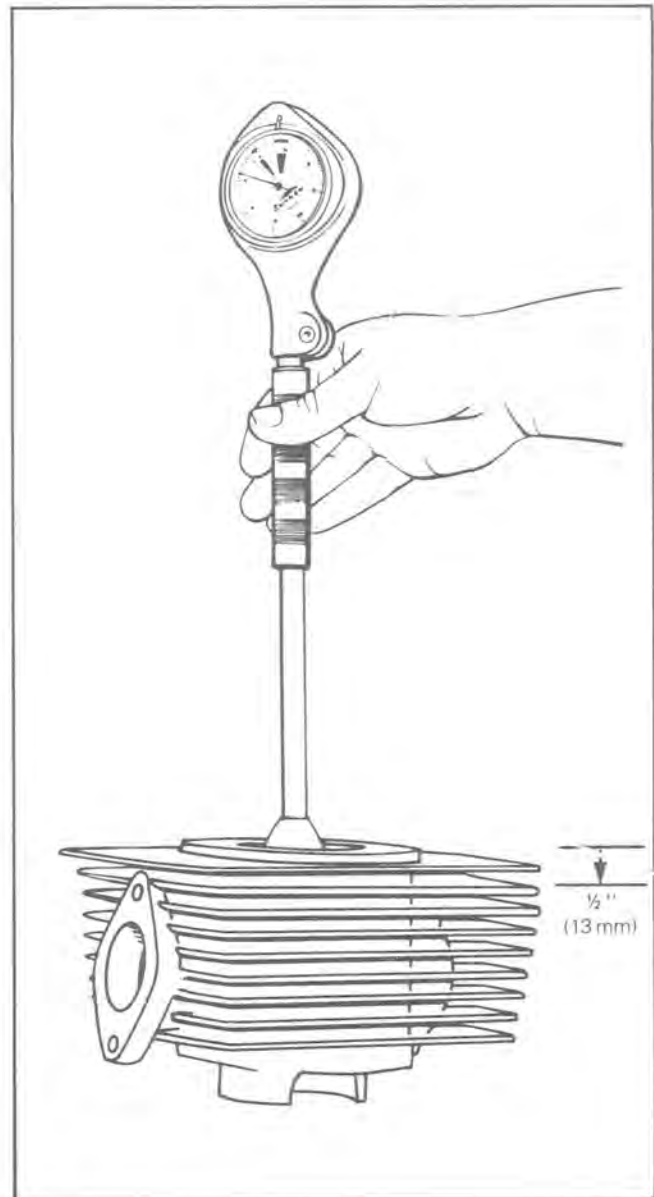
### Cylinder taper

Measure cylinder diameter 5 / 8" (16 mm) from top of cylinder and down to just below the intake port. If the difference between each measurement exceed .0032" (0.08 mm) the cylinder should be rebored and honed or should be replaced.



### Cylinder out of round

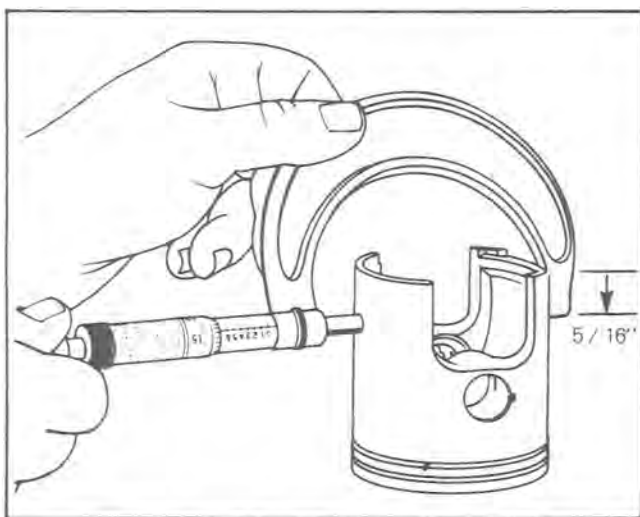
Measuring 1/2" (13 mm) from top of cylinder with a cylinder gauge, check if the cylinder out of round is more than .002" (0.05 mm). If larger, cylinder should be rebored and honed or should be replaced.



### Piston to cylinder wall clearance

To determine this clearance, the piston should be measured 5 / 16" above its bottom edge and the cylinder should be measured 1 / 2" below its top edge.

**SECTION 08**  
**SUB-SECTION 04-01 (ONE CYLINDER ENGINE)**



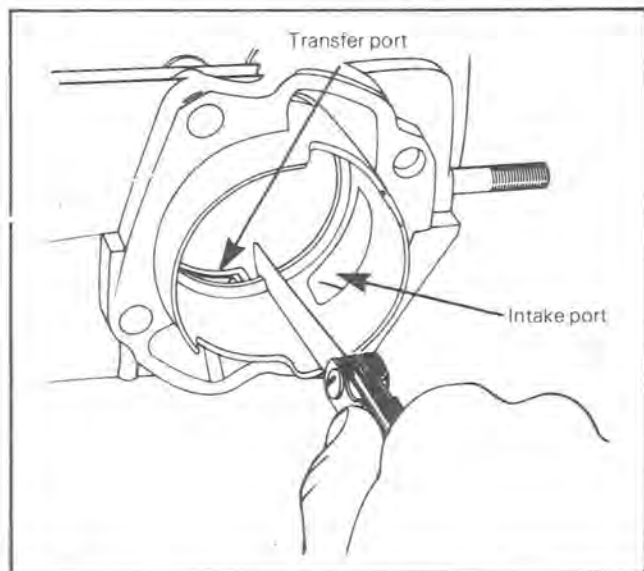
The difference between these two measurements should be within:

Engine Type	Fitted Tolerance	Wear Limit
247	.0026"-.0039" (0.066 mm-0.099 mm)	.065" (0.165 mm)
302	.0031"-.0045" (0.080 mm-0.115 mm)	.0076" (0.195 mm)

*Note: If cylinder diameter is .004" (0.1 mm) larger than nominal, the cylinder should be rebored.*

### Ring end gap

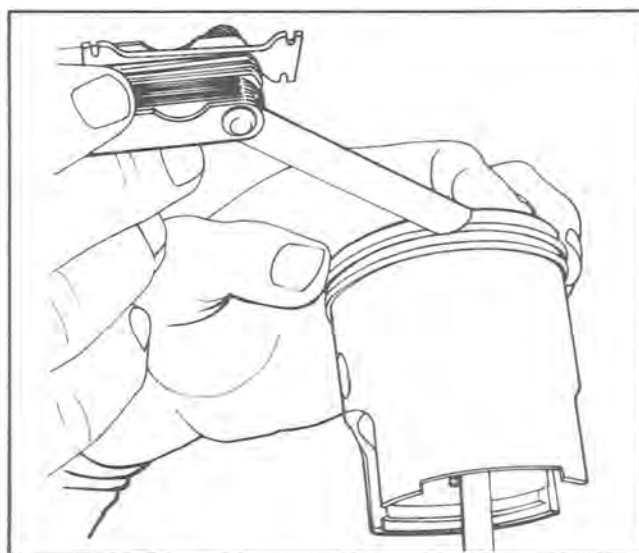
Position ring half way between transfer port and intake port. Using a feeler gauge, check ring end gap. If gap exceed .062" (1.59 mm) the ring should be replaced.



### Piston ring / groove clearance

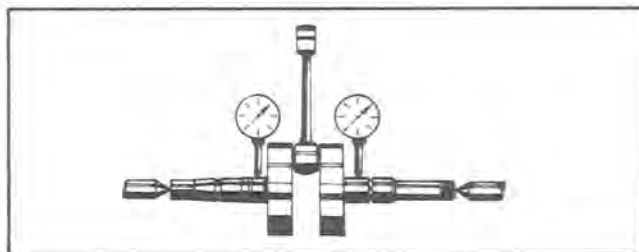
Using a feeler gauge check clearance between ring and groove. If clearance exceed .0078" (0.20 mm), replace piston.

(ONE CYLINDER ENGINE), PAGE 2



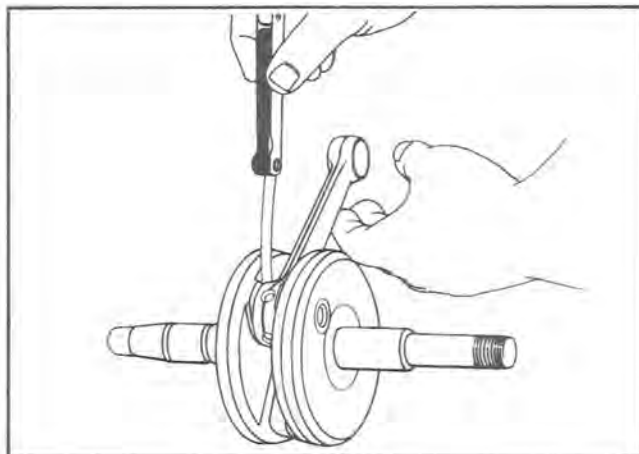
### Crankshaft deflection

With the crankshaft position between a center lathe, install a dial indicator as close as possible to crankshaft blade then measure deflection on each side. If deflection exceed .0032" (0.08 mm) the crankshaft should be repaired by a specialized shop or it should be replaced.



### Connecting rod big end axial play

Using a feeler gauge measure distance between connecting rod and trust washer. If axial play exceed .020" (0.5 mm), the crankshaft should be replaced.



### Crankshaft end-play

Engine Type	End-Play
247, 302	.004" to .016" (0.1 mm to 0.4 mm)

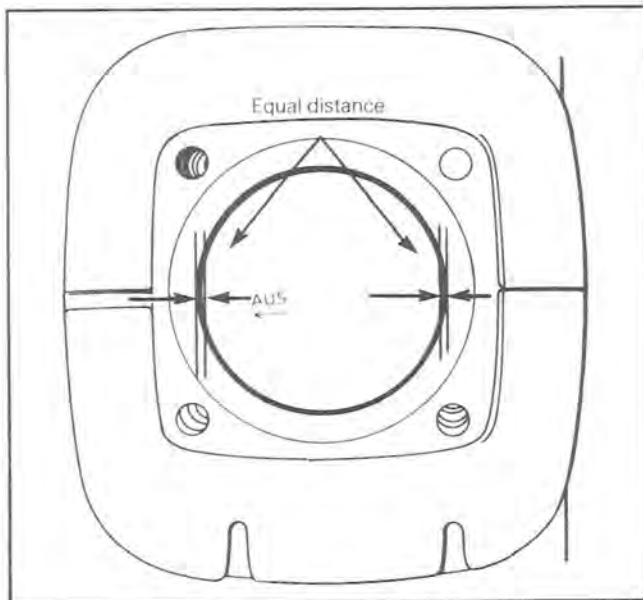
### Connecting rod alignment

Check if connecting rod is bent as follows:

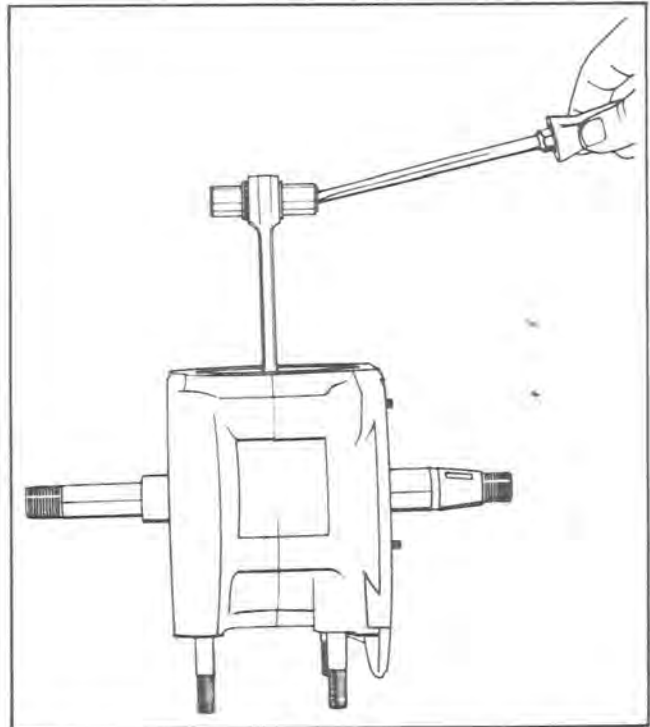
- Once engine crankcase is assembled with the piston mounted on connecting rod without its piston rings, position cylinder on piston.

*Note: The cylinder Crankcase gasket must not be installed.*

- Rotate crankshaft slowly and at the same time observe piston movement within the cylinder. If piston bears against one side (PTO or mag. side), the connecting rod is bent.



- To correct, position needle bearing and gudgeon pin on connecting rod then pry connecting rod as illustrated.





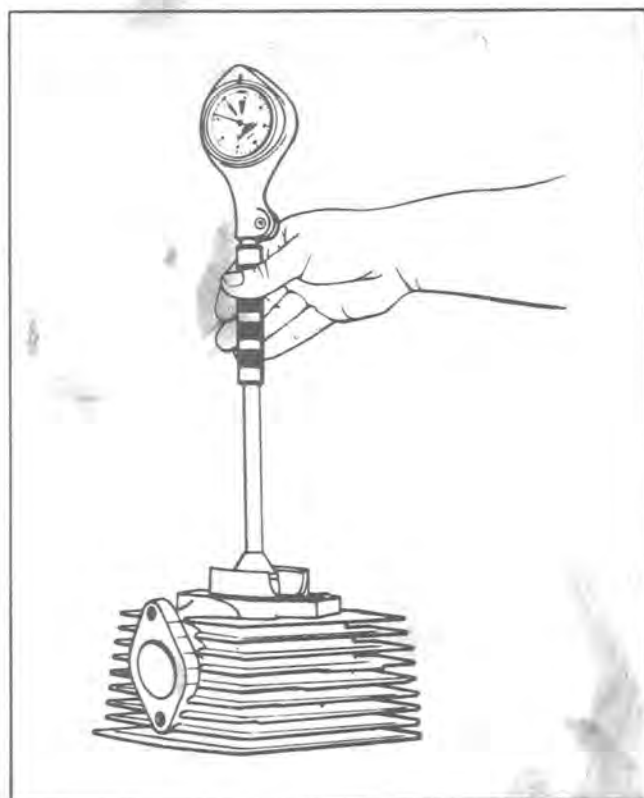
## TWO CYLINDER ENGINE TECHNICAL DATA

### Nominal dimension of cylinder bore

ENGINE TYPE	STANDARD	OVERSIZE
248	2.1260" (54.0 mm)	2.1457" (54.5 mm)
294	2.2441" (57.0 mm)	2.2638" (57.5 mm)
305	2.1850" (55.5 mm)	2.2047" (56.0 mm)
338	2.3425" (59.5 mm)	2.3622" (60.0 mm)
343	2.3425" (59.5 mm)	2.3622" (60.0 mm)
346	2.3425" (59.5 mm)	2.3524" (59.75 mm)
396	2.5394" (64.5 mm)	2.5492" (64.75 mm)
401	2.5394" (64.5 mm)	2.5591" (65.0 mm)
434	2.6575" (67.5 mm)	2.6772" (68.0 mm)
436	2.6575" (67.5 mm)	2.6673" (67.75 mm)
440	2.6575" (67.5 mm)	—
640	2.9921" (76.0 mm)	3.0118" (76.5 mm)

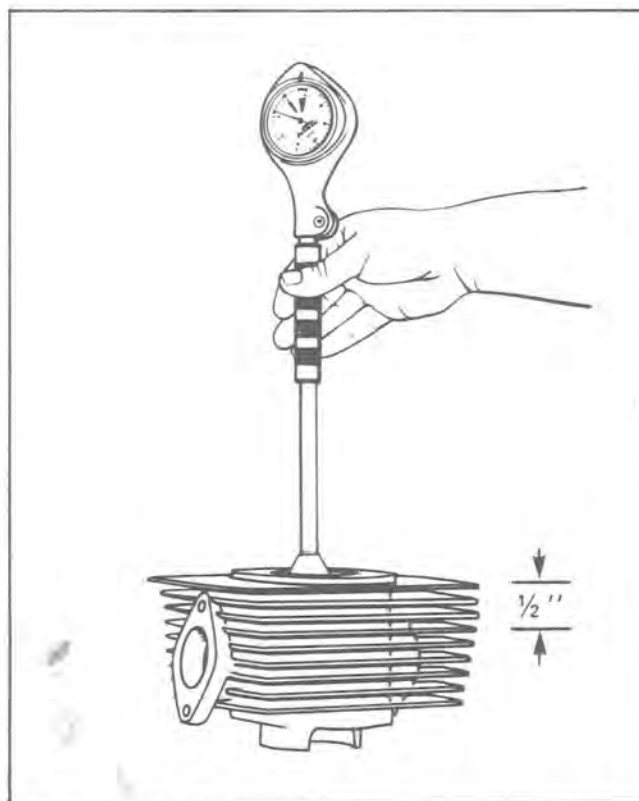
### Cylinder taper

Measure cylinder diameter  $5/8"$  (16 mm) from top of cylinder and down to just below the intake port. If the difference between each measurement exceed .0032" (0.08 mm) the cylinder should be rebored and honed or should be replaced.



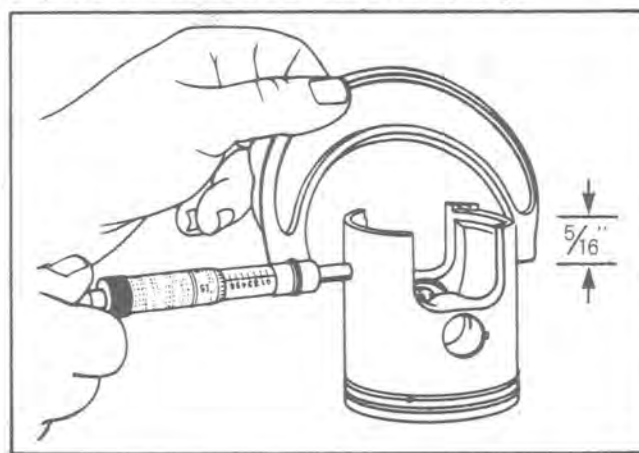
### Cylinder out of round

Measuring  $1/2"$  (13 mm) from top of cylinder with a cylinder gauge, check if the cylinder out of round is more than .002" (0.05 mm). If larger, cylinder should be rebored and honed or should be replaced.



### Piston to cylinder wall clearance

To determine this clearance, the piston should be measured  $5/16"$  above its bottom edge and the cylinder should be measured  $1/2"$  below its top edge.



## SECTION 08

### SUB—SECTION 04-02 (TWO CYLINDER ENGINE)

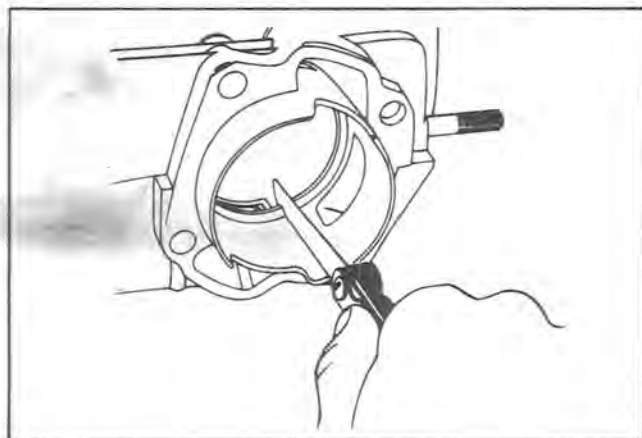
The difference between these two measurements should be within:

Engine type	Fitted tolerance	Wear limit
248, 294, 338, 343, 401, 434,	.0020"-.0034" (0.050 mm-0.085 mm) .0031"-.0045" (0.080 mm-0.115 mm)	.0054" (0.135 mm) .0076" (0.195 mm)
396, 640, 436,	.0035"-.0049" (0.090 mm-0.125 mm)	.0084" (0.215 mm)
348, 440,	.0039"-.0053" (0.100 mm-0.135 mm) .0037"-.0048" (0.093 mm-0.123 mm)	.0092" (0.235 mm) .0085" (0.216 mm)

*Note: If cylinder diameter is .004" (0.1 mm) larger than nominal, the cylinder should be rebored.*

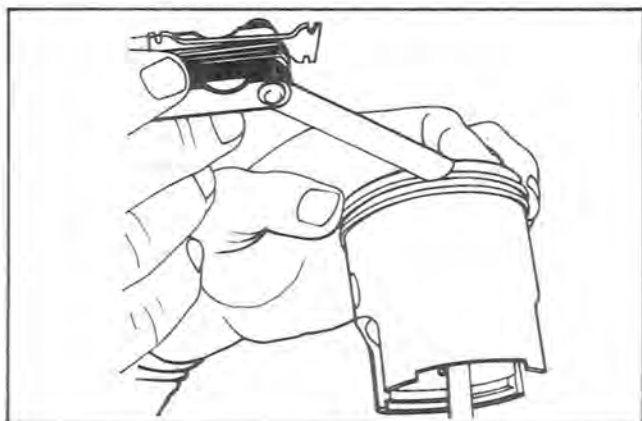
#### Ring end gap

Position ring half way between transfer port and intake port. Using a feeler gauge, check ring end gap. If gap exceed .062" (1.59 mm) the ring should be replaced.



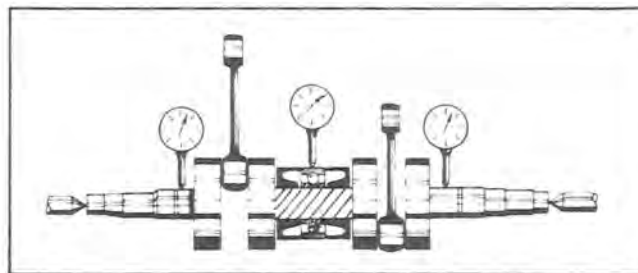
#### Piston ring / groove clearance

Using a feeler gauge check clearance between ring and groove. If clearance exceed .0078" (0.20 mm), replace piston.



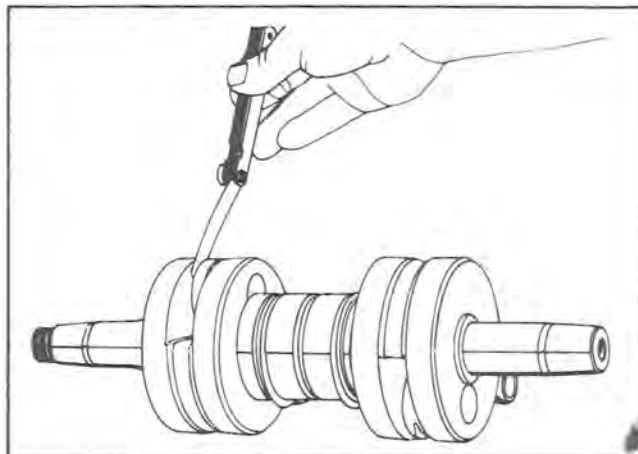
#### Crankshaft deflection

With the crankshaft position between a center lathe, install a dial indicator as close as possible to crankshaft blade, then measure deflection on each side. If deflection exceed .0032" (0.99 mm) the crankshaft should be repaired by a specialized shop or it should be replaced.



#### Connecting rod big end axial play

Using a feeler gauge measure distance between connecting rod and trust washer. If axial play exceed .020" (0.5 mm) the crankshaft should be replaced.



#### Crankshaft end-play

Engine type	End-play
248, 294, 338, 343, 401, 640,	.004"-.016" (0.1 mm-0.4 mm)

#### Connecting rod alignment

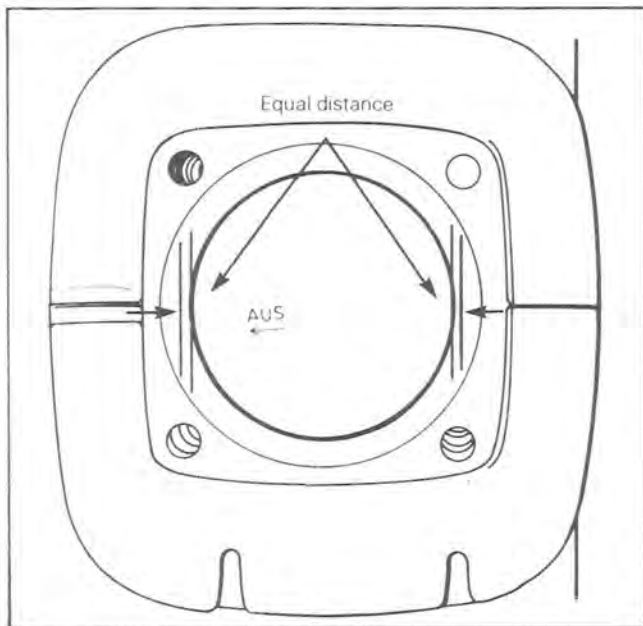
Check if connecting rod is bent as follows:

- Once engine crankcase is assembled with the piston mounted on connecting rod without its piston rings, position cylinder on piston.

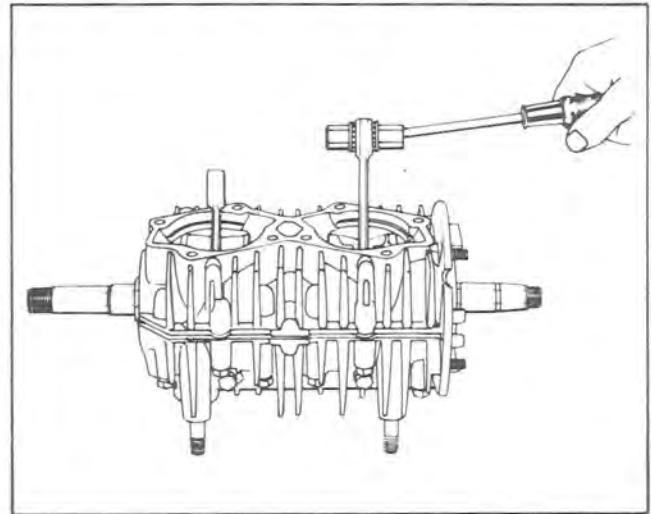
*Note: The cylinder / crankcase gasket must not be installed.*

- Rotate crankshaft slowly, and at the same time observe piston movement within the cylinder. If piston bears against one side (PTO or mag. side), the connecting rod is bent.






— To correct, position needle bearing and gudgeon pin on connecting rod then pry connecting rod as illustrated.





1974 IGNITION TIMING SPECIFICATION

Engine Type	Ignition Type	Direct measurement B.T.D.C. 	Indirect measurement B.T.D.C. 	Edge gap 
247	Bk-Pt	.147" - .167" (3.73 mm - 4.23 mm)	—	.200" - .320" (5 mm - 8 mm)
248	Bk-Pt	.077" - .097" (1.97 mm - 2.47 mm)	.079" - .100" (2.0 mm - 2.54 mm)	.270" - .430" (7 mm - 11 mm)
294	Bk-Pt	.084" - .104" (2.14 mm - 2.64 mm)	.087" - .110" (2.21 mm - 2.79 mm)	.270" - .430" (7 mm - 11 mm)
302	Bk-Pt	.147" - .167" (3.73 mm - 4.23 mm)	.212" - .244" (5.38 mm - 6.2 mm)	.200" - .320" (5 mm - 8 mm)
338	Bk-Pt	.111" - .131" (2.82 mm - 3.32 mm)	.132" - .153" (3.35 mm - 3.89 mm)	.200" - .320" (5 mm - 8 mm)
343	Bk-Pt	.111" - .131" (2.82 mm - 3.32 mm)	.135" - .159" (3.43 mm - 4.04 mm)	.200" - .320" (5 mm - 8 mm)
346	C.D.I.	.071" - .091" (1.82 mm - 2.32 mm)	—	not applicable
396	C.D.I.	.071" - .091" (1.82 mm - 3.32 mm)	—	not applicable
401	Bk-Pt	.111" - .131" (2.82 mm - 3.32 mm)	.135" - .159" (3.43 mm - 4.04 mm)	.200" - .320" (5 mm - 8 mm)
434	Bk-Pt	.111" - .131" (2.82 mm - 3.32 mm)	.118" - .144" (3.0 mm - 3.66 mm)	.200" - .320" (5 mm - 8 mm)
436	C.D.I.	.071" - .091" (1.82 mm - 2.32 mm)	—	not applicable
440	Bk-Pt	.111" - .131" (2.82 mm - 3.32 mm)	.118" - .144" (3.0 mm - 3.66 mm)	.200" - .320" (5 mm - 8 mm)
640	C.D.I.	.122" - .142" (3.10 mm - 3.61 mm)	—	not applicable
640	Bk-Pt	.146" - .166" (3.71 mm - 4.22 mm)	.155" - .172" (3.94 mm - 4.37 mm)	.200" - .320" (5 mm - 8 mm)



SPARK PLUG CHART 71-72-73-74

ENGINE TYPE & MODEL	74		73		72		71	
	①	②	①	②	①	②	①	②
ELAN (247) 250 247E	M175T1	M145T1	M175T1	M145T1	M175T1	M145T1	M175T1	M145T1
ELAN (248) 250T 250 Deluxe	W240T1	W255T1	W240T1	W225T1				
ELAN (249) 250SS (294) 294SS	W260T1	W260T1	W260T1	W260T1				
OLYMPIQUE (302) 300	M175T1	M145T1	M175T1	M145T1	M175T1	M145T1	M175T1	M145T1
OLYMP (337) 335 SKAN. 337E 335			M225T1	M175T1	M225T1	M175T1	M225T1 (same on 1970)	M175T1
OLYMP. (338) 340	W240T1	W225T1	W240T1	W225T1				
OLYMP. (401) 399	W240T1	W240T1	W240T1	W240T1	W240T1	W225T1	W240T1	W225T1
OLYMP. (434) 440	M225T1	M175T1	M225T1	M175T1				
T'NT (292) 1 cyl. 290/292					M280T31	M260T1	M280T31	M260T1
T'NT (294) 2 cyl. 300 294	W260T1	W260T1	W260T1	W240T1				
T'NT (342) 1 cyl. 340							M280T31	M280T31
T'NT (343) 2 cyl. 340	W260T1	W260T1	W280M1	W260T1	W280M1	W260T1		
T'NT (435) 440 440 (74) T'NT & EVEREST	M260T1	M260T1	M280T31	M280T31	M280T31	M280T31	M260T1	M260T1
T'NT (641) 640					M280T31	M260T1	M280T31	M260T1
T'NT (775) 775					M310T31S	M280T1	M310T31S	M280T1
T'NT F.A. (346) 340 436 440	W280M2	W280M2	W280M2	W280M2				
T'NT F.A. (396) 400 (398)	W280M2	W280M2	W280M2	W280M2	TYPE: 398 W280T30	W280T30		
NORDIC (401) 399 (434) 440					(440) M240T1	M225T1	(401) W240T1	W225T1
NORDIC 640	M225T1	M225T1	M225T1	M225T1	M225T1	M225T1	M225T1	M225T1
ALP. VAL. 401 399							(401) W240T1	W225T1
ALP. VAL. (434) 440	M225T1	M175T1	M225T1	M175T1	M240T1	M225T1		
ALP. VAL. 640	M225T1	M175T1	M225T1	M175T1	M225T1	M175T1	M225T1	M175T1
ELITE (434) 440	M240T1	M225T1	M225T1	M175T1				

① Engine Full Load

② Engine Part Load





IGNITION GENERATING COIL, LIGHTING COIL & BRAKE LIGHT COIL RESISTANCE CHART

FOR '74 MODELS					
MODEL		ENGINE TYPE	IGNITION GENERATING COIL	LIGHTING COIL	BRAKE LIGHT COIL
ELAN	250	247	3.4	.45	1.85
	250T	248	1.15	.45	1.90
	250DL	248	1.15	.45	1.90
	294SS	294	1.15	.45	1.90
OLYMPIQUE	300	302	3.4	.45	1.85
	340	338	2.35	.40	1.70
	400	401	2.35	.40	1.70
	440	434	2.35	.40	1.70
T'NT F / C	300	294	1.15	.45	1.90
	340	343	3.4	.40	
	440	440	3.4	.40	
NORDIC	640	640		.14	
ALPINE	440	434	2.35	.40	1.70
	640	640	2.35	.14	
ELITE	440	434	2.35	.14	1.70
T'NT F / A	340	346		.23	
	400	396		.23	
	440	436		.23	
ALL VALUES ARE GIVEN IN OHMS, WITH A TOLERANCE OF $\pm 20\%$ .					

IGNITION GENERATING COIL, LIGHTING COIL & BRAKE LIGHT COIL RESISTANCE CHART

FOR '75 MODELS					
MODEL		ENGINE TYPE	IGNITION GENERATING COIL	LIGHTING COIL	BRAKE LIGHT COIL
ELAN	250	247	3.4	.45	1.85
	250DL	248	1.15	.45	1.90
	300SS	294	1.15	.45	1.90
OLYMPIQUE	300	305	3.3	.23	
	300E	305	3.3	.23	
	340	343	3.3	.23	
	340E	343	3.3	.23	
T'NT F / C	340	343	3.3	.23	
	340E	343	3.3	.23	
	440	440	3.3	.23	
	440E	440	3.3	.23	
T'NT EVEREST	440	440		.23 <sup>①</sup>	2.15 <sup>②</sup>
	440E	440		.23 <sup>①</sup>	2.15 <sup>②</sup>
ALPINE	640ER	640	3.3	.23	
ELITE	440ER	434	2.35	.14	1.70
T'NT F / A	340	346		.23	
	440	436		.23	
T'NT F / A RV	250	245		.23	
<p>ALL VALUES ARE GIVEN IN OHMS, WITH A TOLERANCE OF <math>\pm 20\%</math>.</p> <p>① <math>\pm .025</math> OHMS.</p> <p>② ADDITIONAL LIGHTING COIL 30W.</p>					

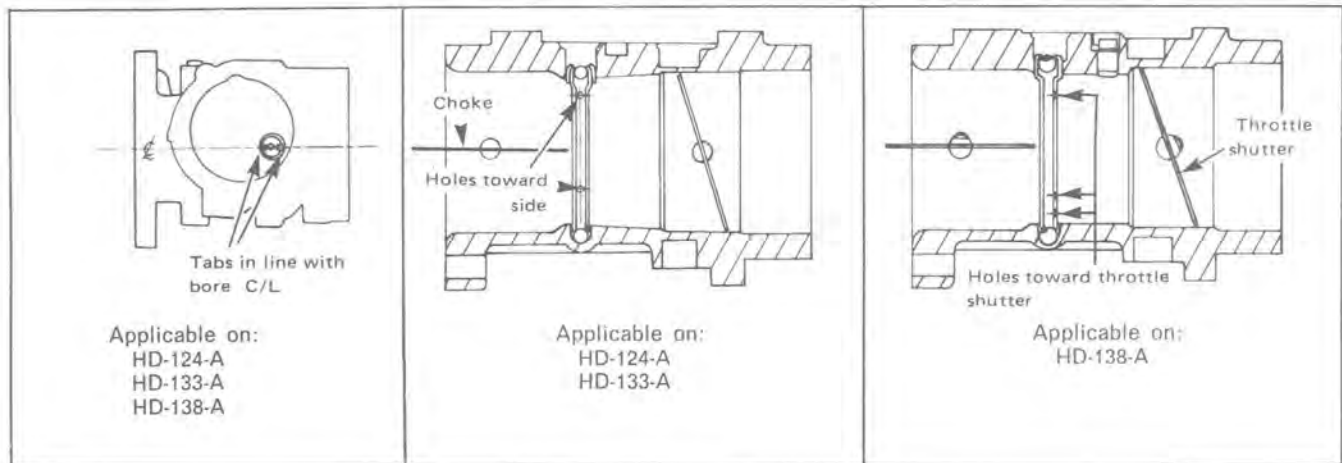
1974 CARBURETOR SPECIFICATION

MODEL	ENGINE TYPE	CARBURETOR	MAIN FUEL JET DIA.	LOW SPEED ADJ. + $\frac{1}{8}$ — 0	HIGH SPEED ADJ. + $\frac{1}{8}$ — 0	IDLE SPEED R.P.M.
Elan 250	247	HR-133-A	.042"	$\frac{3}{4}$	fixed	1800-2200
Elan 250T	248	HR-155-A	.044"	1	fixed	1800-2200
Elan 250DL	248	HR-155-A	.044"	1	fixed	1800-2200
Elan 294SS	294	HR-161-A	.051"	$\frac{3}{4}$	fixed	1800-2200
Olym. 300	302	HR-132-A	—	$\frac{3}{4}$	1	1800-2200
Olym. 340	338	HR-131-A	.050"	$\frac{3}{4}$	fixed	1800-2200
Olym. 400	401	HR-134-A	.052"	$\frac{3}{4}$	fixed	1800-2200
Olym. 440	434	HR-135-A	.045"	$\frac{7}{8}$	fixed	1800-2200
T'NT 300	294	HR-164-A	—	1	1	1800-2200
T'NT 340	343	HD-134-A	—	1	1	1800-2200
T'NT 440°	440	HD-138-A	—	1	1	1800-2200
Nordic 640	640	HD-133-A	.067"	1	fixed	1800-2200
Alpine 440	434	HD-108-A	.054"	$\frac{3}{4}$	fixed	1800-2200
Alpine 640	640	HD-124-A	.073"	$\frac{3}{4}$	fixed	1800-2200
Elite 440	434	HD-140-A	.058"	1	fixed	1800-2200
T'NT 340 F/A	346	2XHR-149-A	—	1	$1\frac{1}{8}$	1800-2200
T'NT 400 F/A	396	2XHD-123-A	—	1	$\frac{5}{8}$	1800-2200
T'NT 440 F/A	436	2XHRM-3A	—	1	$1\frac{1}{4}$	1800-2200

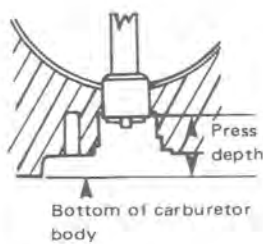
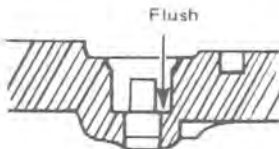
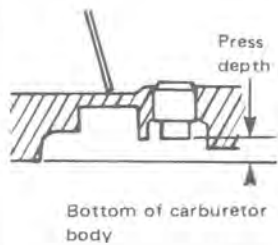
° Everest included

SECTION 08  
SUB-SECTION 04-05

NOZZLE CHECK VALVE INSTALLATION POSITION



NOZZLE CHECK VALVE PRESS DEPTH SPECIFICATIONS

			
MODEL	Main Nozzle/ Discharge Tube	Main Nozzle	Intermediate Nozzle
HD-108-A HD-134-A HD-123-A	Not applicable	Nozzle shoulder flush with well floor	Not applicable
HD-124-A HD-133-A	.343" <sup>°</sup>	Not applicable	Not applicable
HD-138-A	.343" <sup>°</sup>	Not applicable	.156"

<sup>°</sup> Measurement taken between lowest point of nozzle and bottom of carburetor body.

All measurements  $\pm .005"$

SPARK PLUG CHART '75

ENGINE TYPE & MODEL	75	
	①	②
ELAN 250 (247) 250T (248) 300SS (294)	M175T1 W240T1 W260T1	M145T1 W225T1 W240T1
OLYMPIQUE 300 (305) 340 (343)	W240T1 W260T1	W225T1 W260T1
T'NT FC 340 (343) 440 (440)	W260T1 M260T1	W260T1 M260T1
EVEREST 440 (440)	M260T1	M260T1
T'NT FA 340 (346) 440 (436)	W280M2 W280M2	W280M2 W280M2
ALPINE 640 (640)	M225T1	M225T1
ELITE 440 (434)	M240T1	M225T1

① Engine Full Load

② Engine Part Load

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## 1974 SKI-DOO® WARRANTY

Bombardier Limited (Bombardier) as manufacturer, warrants every 1974 Ski-Doo® snowmobile, (except T'NT® F/A, Ski-Boose® or Carry-Boose® tow sled), SOLD AS A NEW VEHICLE BY AN AUTHORIZED SKI-DOO DEALER, to be free from defects in material, and workmanship under normal use and service, for a period of 12 consecutive months from first date of sale. If defective, repair and/or replacement is valid only at an authorized dealer in Canada or in the United States.

### CONDITIONS:

- Proof of ownership submitted to the servicing dealer, by means of the Ski-Doo service card.
- Proper maintenance; to be performed at owner's expense.

Guidelines for proper use and maintenance are detailed in each owner's manual.

### EXCLUSIONS: Non-warrantable

- Variable speed drive belt, windshield, filters, ignition breaker points, condensers, spark plugs, light bulbs, protective lenses, brake linings, ski runner shoes, slider shoes on suspension and variable speed pulleys, fasteners, labels, soft trim, appearance items, lubricants and paints and all tune-ups and adjustments required.

**IMPORTANT:** IF VEHICLE IS UNDER WARRANTY, ALL WARRANTY CONDITIONS AND EXCLUSIONS SHOULD BE READ CAREFULLY BEFORE COMMENCING ANY PROCEDURE. UNRESTRICTED TAMPERING CAN INVALIDATE FURTHER WARRANTY COVERAGE.

- Repairs resulting from installation of parts other than genuine Bombardier parts.
- Blizzard® models and any vehicle used for racing purpose.
- Any losses incurred to the vehicle owner other than parts and labour.

This warranty is expressly in lieu of all other expressed or implied warranties of Bombardier, its distributors and the selling dealer, including any implied warranty of merchantability of fitness for any particular purpose. Neither Bombardier, its distributors nor the selling dealer shall be responsible, under any circumstances, for any loss or damage as a result of hidden defects, accidents, misuses or other faults.

Neither the distributor, the selling dealer nor any other person has been authorized to make any affirmation, representation or warranty other than those contained in this warranty and if made, such affirmation, representation or warranty shall not be enforceable against Bombardier or any other person.

**IMPORTANT:** Off-season storage and pre-season preparation are at the discretion and expense of the owner. However, any failure which occurs as a result of inadequate seasonal preparation shall not be covered under warranty.





## 1974 SKI-DOO® T'NT® F/A WARRANTY

Bombardier Limited (Bombardier) as manufacturer, warrants every 1974 Ski-Doo® T'NT® F/A, SOLD AS A NEW VEHICLE, BY AN AUTHORIZED SKI-DOO DEALER, to be free from defects in material, and workmanship under normal use and service, for a period of ninety (90) days from the first date of sale. If defective, Bombardier's obligation is strictly limited to the repair and/or replacement at its option, and such repair or replacement is valid only at an authorized dealer in Canada or in the United States.

Since snow is required for snowmobiling: all deliveries prior to **December 15th, 1973**, shall be covered under this warranty from **December 15th, 1973** to **March 15, 1974**.

All units delivered on or after **January 2nd, 1974**, but prior to **March 31st, 1974** shall have a warranty carry-over into the next season, starting on **December 15th, 1974** for the unused portion of the ninety (90) day warranty.

### CONDITIONS:

- Proof of ownership submitted to the servicing dealer, by means of the Ski-Doo service card.
- Proper maintenance; to be performed at owner's expense.

Guidelines for proper use and maintenance are detailed in each owner's manual.

### EXCLUSIONS: Non-warrantable

- Variable speed drive belt, windshield, filters, spark plugs, light bulbs, protective lenses, brake linings, ski runner

**IMPORTANT: IF VEHICLE IS UNDER WARRANTY, ALL WARRANTY CONDITIONS AND EXCLUSIONS SHOULD BE READ CAREFULLY BEFORE COMMENCING ANY PROCEDURE. UNRESTRICTED TAMPERING CAN INVALIDATE FURTHER WARRANTY COVERAGE.**

shoes, slider shoes on suspension and variable speed pulleys, fasteners, labels, soft trim, appearance items, lubricants and paints and all tune-ups and adjustments required.

- Defects resulting from accident and/or installation of parts other than genuine Bombardier Parts.
- If the vehicle is used for racing purpose.
- Any losses incurred to the vehicle owner other than parts and labour.

This warranty is expressly in lieu of all other expressed or implied warranties of Bombardier, its distributors and the selling dealer, including any implied warranty of merchantability of fitness for any particular purpose. Neither Bombardier, its distributors nor the selling dealer shall be responsible, under any circumstances, for any loss or damage as a result of hidden defects, accidents, misuses or other faults.

Neither the distributor, the selling dealer nor any other person has been authorized to make any affirmation, representation or warranty other than those contained in this warranty and if made, such affirmation, representation or warranty shall not be enforceable against Bombardier or any other person.

**IMPORTANT:** Off-season storage and pre-season preparation are at the discretion and expense of the owner. However, any failure which occurs as a result of inadequate seasonal preparation shall not be covered under warranty.





## 1974 WARRANTY ON GENUINE ACCESSORIES AND REPLACEMENT PARTS

Bombardier Limited (Bombardier) warrants to the original retail purchaser all genuine Bombardier accessories and replacement parts, which are normally covered under the 1974 Ski-Doo® and 1974 T'NT® F/A warranty, to be free from defects in material and workmanship, for a period of 90 consecutive days from the date of original retail purchase or from the date of the first snowfall in which case shall be deemed to be no later than December 1st 1973.

Bombardier's obligation under this warranty is strictly limited to the **repair or replacement at its option**. All parts repaired or replaced under the present warranty shall be returned to an authorized Ski-Doo dealer with the original bill of sale and being clearly established that the present warranty applies only to accessories or replacement parts which have been sold and installed when the case may be, by an authorized Ski-Doo dealer. **THE REPAIR OR REPLACEMENT OF DEFECTIVE PARTS UNDER THIS WARRANTY WILL BE MADE WITHOUT CHARGE FOR PARTS ONLY.**

### EXCLUSIONS:

Any of the said replacement parts replaced under the orig-

inal Ski-Doo warranty shall not be covered under the present warranty.

**This warranty does not apply to any accessories or replacement parts which have been subjected to any misuse, alteration, modification or accident.**

This warranty is expressly in lieu of all other expressed or implied warranties of Bombardier, its distributors and the selling dealer, including any implied warranty of merchantability of fitness for any particular purpose. Neither Bombardier, its distributors nor the selling dealer shall be responsible, under any circumstances, for any loss or damage as a result of hidden defects, accidents, misuses or other faults.

Neither the distributor, the selling dealer nor any other person has been authorized to make any affirmation, representation or warranty other than those contained in this warranty and if made, such affirmation, representation or warranty shall not be enforceable against Bombardier or any other person.

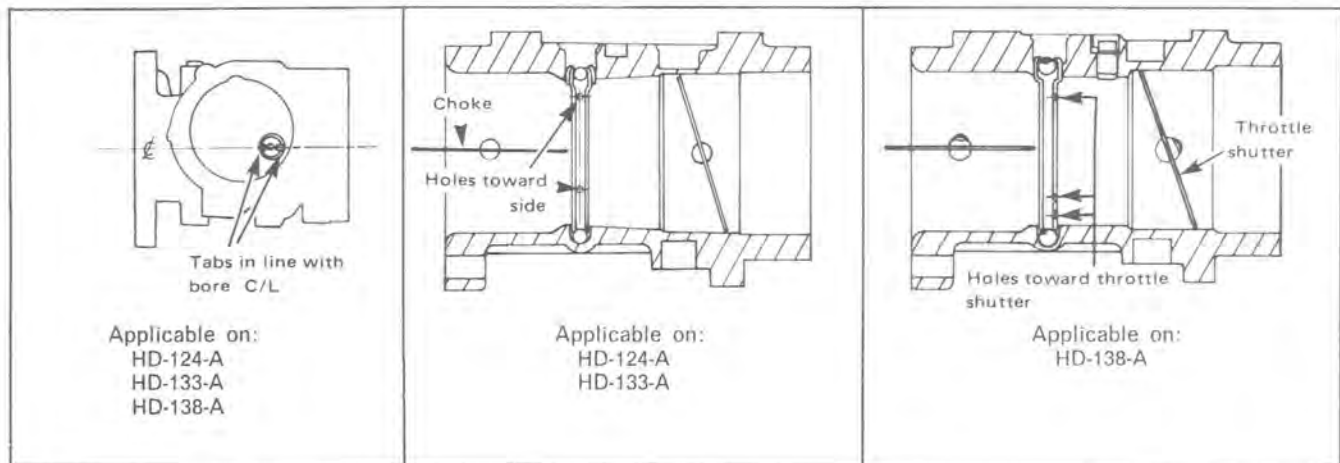
**IMPORTANT: IF VEHICLE IS UNDER WARRANTY, ALL WARRANTY CONDITIONS AND EXCLUSIONS SHOULD BE READ CAREFULLY BEFORE COMMENCING ANY PROCEDURE. UNRESTRICTED TAMPERING CAN INVALIDATE FURTHER WARRANTY COVERAGE.**



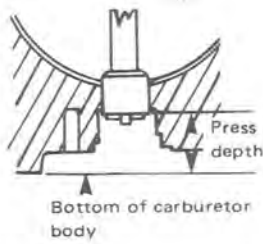
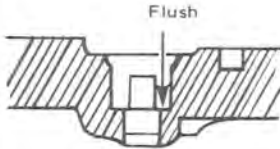
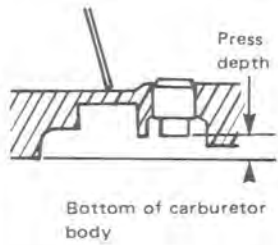


SECTION 08  
SUB-SECTION 04-05

NOZZLE CHECK VALVE INSTALLATION POSITION



NOZZLE CHECK VALVE PRESS DEPTH SPECIFICATIONS

			
MODEL	Main Nozzle/ Discharge Tube	Main Nozzle	Intermediate Nozzle
HD-108-A HD-134-A HD-123-A	Not applicable	Nozzle shoulder flush with well floor	Not applicable
HD-124-A HD-133-A	.343" °	Not applicable	Not applicable
HD-138-A	.343" °	Not applicable	.156"

° Measurement taken between lowest point of nozzle and bottom of carburetor body.

All measurements ± .005"

1974 CARBURETOR SPECIFICATION

MODEL	ENGINE TYPE	CARBURETOR	MAIN FUEL JET DIA.	LOW SPEED ADJ. + $\frac{1}{8}$ — 0	HIGH SPEED ADJ. + $\frac{1}{8}$ — 0	IDLE SPEED R.P.M.
Elan 250	247	HR-133-A	.042"	$\frac{3}{4}$	fixed	1800-2200
Elan 250T	248	HR-155-A	.044"	1	fixed	1800-2200
Elan 250DL	248	HR-155-A	.044"	1	fixed	1800-2200
Elan 294SS	294	HR-161-A	.051"	$\frac{3}{4}$	fixed	1800-2200
Olym. 300	302	HR-132-A	—	$\frac{3}{4}$	1	1800-2200
Olym. 340	338	HR-131-A	.050"	$\frac{3}{4}$	fixed	1800-2200
Olym. 400	401	HR-134-A	.052"	$\frac{3}{4}$	fixed	1800-2200
Olym. 440	434	HR-135-A	.045"	$\frac{7}{8}$	fixed	1800-2200
T'NT 300	294	HR-164-A	—	1	1	1800-2200
T'NT 340	343	HD-134-A	—	1	1	1800-2200
T'NT 440*	440	HD-138-A	—	1	1	1800-2200
Nordic 640	640	HD-133-A	.067"	1	fixed	1800-2200
Alpine 440	434	HD-108-A	.054"	$\frac{3}{4}$	fixed	1800-2200
Alpine 640	640	HD-124-A	.073"	$\frac{3}{4}$	fixed	1800-2200
Elite 440	434	HD-140-A	.058"	1	fixed	1800-2200
T'NT 340 F/A	346	2XHR-149-A	—	1	$1\frac{1}{8}$	1800-2200
T'NT 400 F/A	396	2XHD-123-A	—	1	$\frac{5}{8}$	1800-2200
T'NT 440 F/A	436	2XHRM-3A	—	1	$1\frac{1}{4}$	1800-2200

\* Everest included