

# SECTION 2 — ENGINE

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# Specifications

GENERAL		SPECIFICATION
Model		AB06A1
Type		2 Cycle, Air-Cooled
No. of Cylinders		1
Lubrication		Gas/Oil Mix
Starter System		Manual Recoil
Bore x Stroke	— mm (in.)	41 x 45 (1.614 x 1.772)
Displacement	— cc (cu in.)	59 (3.60)
Compression Ratio		6.6:1
Piston Ring End Gap Range	— mm (in.)	0.20-0.80 (0.008-0.031)
Piston Skirt/Cylinder Clearance Range	— mm (in.)	0.05-0.13 (0.0020-0.005)
Piston Pin Diameter Range	— mm (in.)	11.990-12.000 (0.4720-0.4724)
Piston-Pin Bore Diameter Range	— mm (in.)	12.000-12.010 (0.4724-0.4728)
Connecting Rod Small End Diameter	— mm (in.)	15.99-16.00 (0.6295-0.6303)
Crankshaft Runout	— mm (in.)	0.05 (0.002)
Crankshaft End Play Range	— mm (in.)	0.05-0.10 (0.002-0.004)

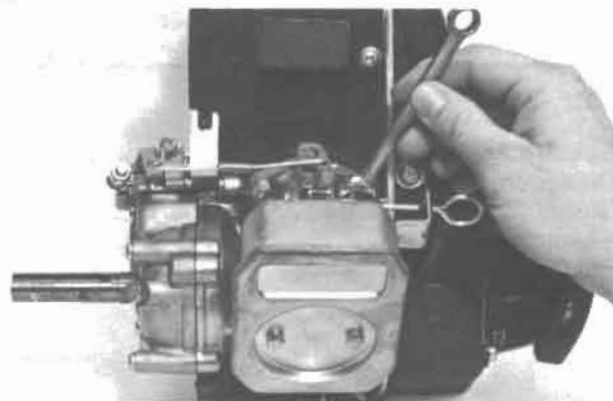
TORQUE	kg·m	ft·lb
Cylinder Head Nut	0.8-1.2	6-9
Crankcase Bolts	0.6-0.9	4.5-6.5
Flywheel Nut	4.0-5.0	29-36
Intake and Exhaust Nuts	0.8-1.1	6-8

# Disassembly

## Fan/Power Head

1. Remove gas tank; then disconnect fuel lines from carburetor.
2. Remove the nuts and lock washers securing carburetor. Slide carburetor off intake studs;

Fig. 2-1



A779

then disconnect carburetor rod and rod spring.

3. Slide gasket, insulator, and gasket off intake studs.
4. Remove the nuts and lock washers securing muffler. Slide muffler off exhaust studs; then remove exhaust gasket.

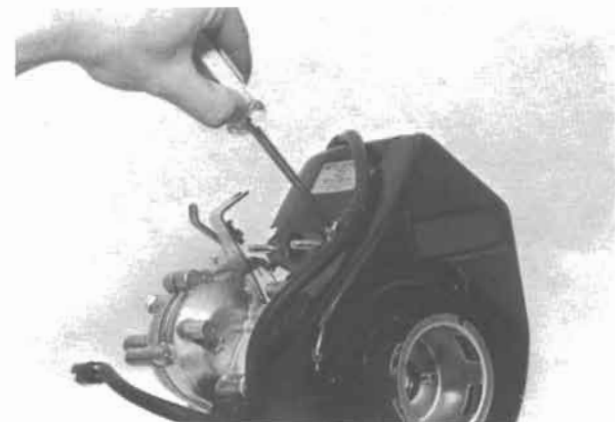
Fig. 2-2



A778

5. Remove recoil starter.
6. Remove screws securing fan cover; then remove cover.

Fig. 2-3



A775

7. Remove cylinder head cowling.

Fig. 2-4



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8. Remove the cylinder head nuts and washers; lift head off cylinder studs.

9. Slide head gasket off cylinder studs.

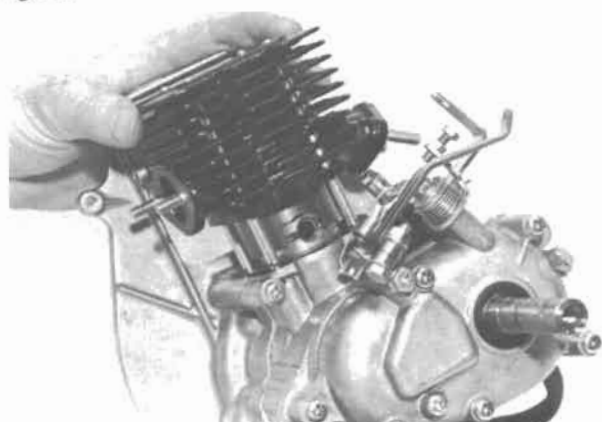
Fig. 2-5



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10. Slide cylinder straight upward until free of piston. Remove base gasket.

Fig. 2-6



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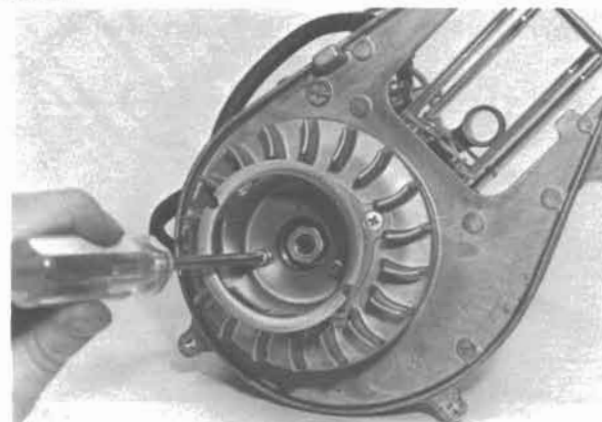
11. Remove piston pin circlips. Remove piston pin using the Arctic piston pin puller.

Fig. 2-7



12. Remove recoil starter pulley and spacer.

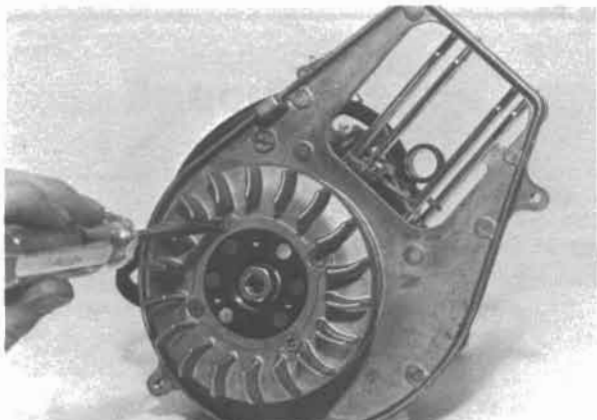
Fig. 2-8



A766

13. Remove four countersunk screws securing fan; then remove fan.

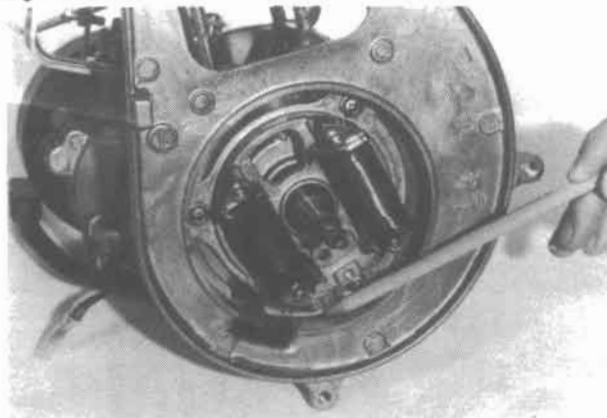
Fig. 2-9



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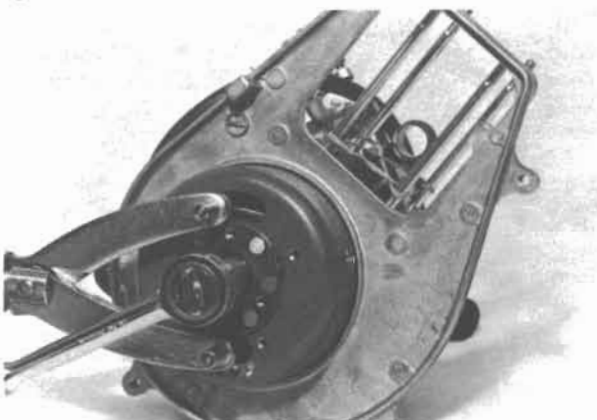
14. Using a flywheel holder (or equivalent), remove the flywheel nut.

Fig. 2-12



17. Remove the three screws securing stator plate to crankcase.

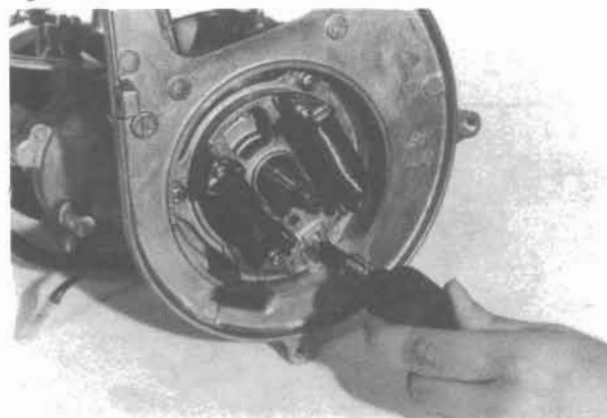
Fig. 2-10



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15. Using a flywheel puller, remove the flywheel. Account for the flywheel key.

Fig. 2-13



18. Remove the screws securing ignition coil; then remove coil.

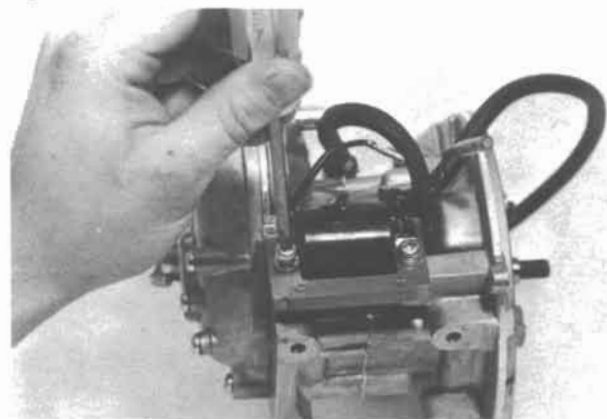
Fig. 2-11



A761

16. Scribe a line on the stator plate and the crankcase. Use these marks during assembly.

Fig. 2-14

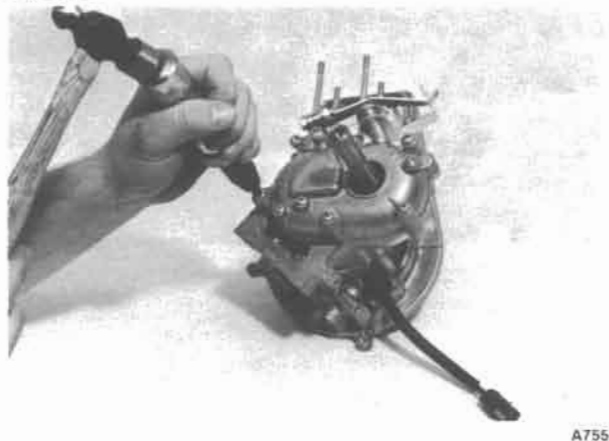


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## Gear Case/Crankcase

1. Using an impact screwdriver, remove the screws securing gear case cover. Lift cover off crankcase.

Fig. 2-15



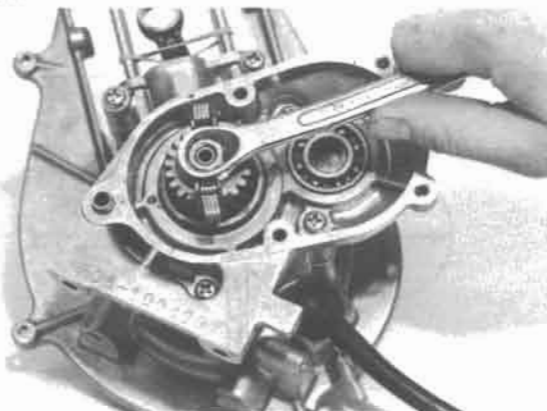
2. Remove cover gasket.
3. Remove primary driven shaft and gear from gear case.

Fig. 2-16



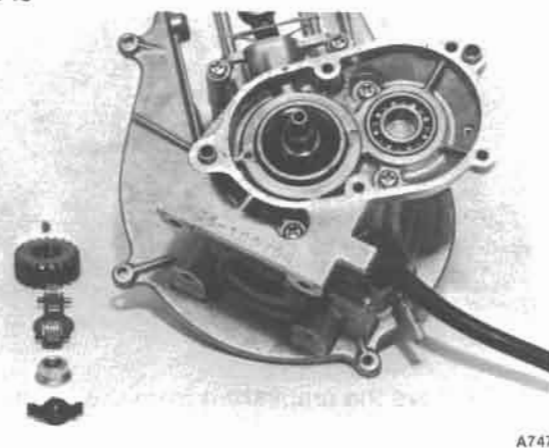
4. Remove shifter from end of engine crankshaft.
5. Remove the nut securing primary drive gear and centrifugal to the crankshaft.

Fig. 2-17



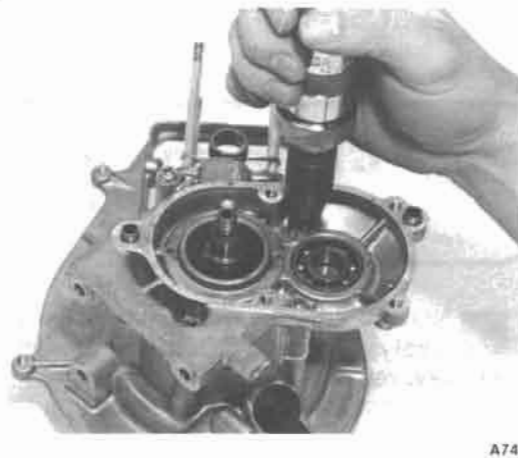
6. In order, remove the centrifugal weight assembly, primary drive gear, and key from the crankshaft.

Fig. 2-18



7. Using an impact screwdriver, remove the five screws securing crankcase halves.

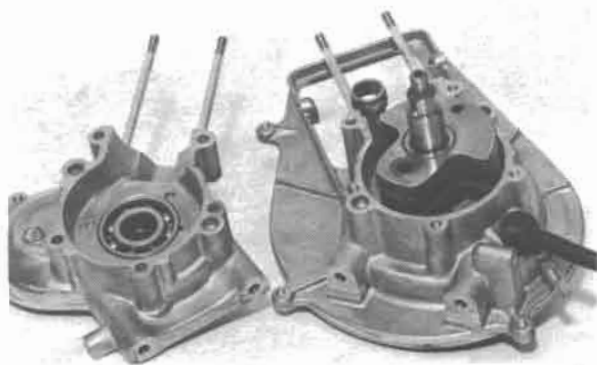
Fig. 2-19



8. Carefully separate the crankcase halves.

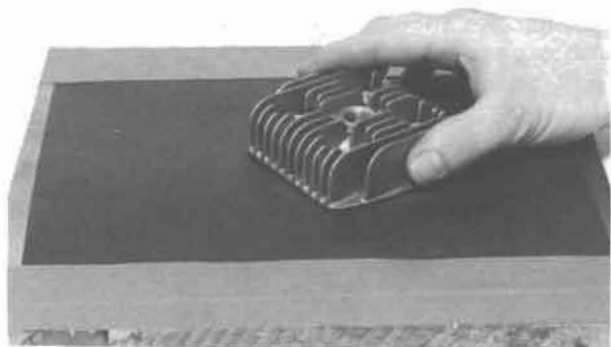
### ● CAUTION ●

DO NOT use chisels, screwdrivers, or any other instruments to pry cases apart. Any damage to the crankcase sealing area will result in an air leak resulting in severe engine damage.



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9. Remove the crankshaft from the crankcase.
10. Thoroughly wash all engine components.



A737

## Cleaning and Inspection

**NOTE:** Whenever a part is worn excessively, cracked, defective, or damaged in any way, replacement is necessary.

### Cylinder Head

1. Remove any carbon buildup which has collected in the combustion chamber.

#### CAUTION

Use a non-metallic tool to prevent scratching and scoring of the combustion chamber.

2. Thoroughly clean the cylinder head in cleaning solvent.
3. Inspect spark plug threaded area for any damage.
4. Place the cylinder head on a surface plate covered with 400 grit "Wetordry" sandpaper. Move the head in a figure eight motion to check sealing area for trueness. High spots can be noted by evidence of a shiny portion on one area of the sealing area. The entire surface must have a uniform appearance.

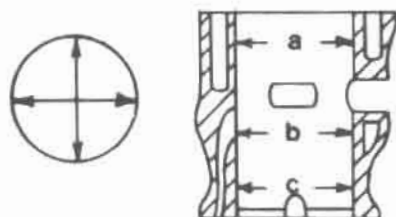
### Cylinder

1. Remove carbon buildup from the exhaust port.

**NOTE:** Use a non-metallic carbon removal tool.

2. Wash the cylinder in clean solvent.
3. Inspect cylinder for pitting, scoring, scuffing, or corrosion. Replace if damaged.
4. To remove minor imperfections or marks in the cylinder, use a flex hone with 500 grit stones to clean the bore. Use honing oil for lubrication. Move hone back and forth so a "crosshatch" pattern will result.
5. Inspect all threaded areas for damaged or stripped threads.
6. Insert an inside micrometer, cylinder gauge, or snap gauge into the cylinder bore and take six measurements of the bore. Measure front to back and side to side at points below intake port, above exhaust port, and 1 cm (0.375 in.) below the top of the cylinder. If measurements vary by more than 0.05 mm (.002 in.), the cylinder is tapered or out-of-round and must be replaced.

Fig. 2-22



0725-586

## Piston

1. Remove carbon buildup from dome of piston using a non-metallic carbon removal tool.
2. Examine the sides of the piston for evidence of excessive "blow-by." Excessive "blow-by" will indicate worn piston rings or an out-of-round cylinder.
3. Check the sides and skirts for evidence of scuffing. To remove minor marks, use 400 grit "Wetordry" sandpaper and lightly sand the affected area.

Fig. 2-23



A732

4. Check the pistons for signs of cracks in the piston pin and skirt areas. Replace piston if damage is found.
5. Use a piece of an old ring to clean the ring grooves. Make sure ring retaining pin is correctly positioned and is in good condition.
6. Insert an inside snap gauge about 6 mm (0.250 in.) from the outside of the piston pin bore. Carefully remove the snap gauge.

Fig. 2-24



A733

7. Measure the snap gauge with a micrometer. Piston pin bore must be 12.00-12.01 mm (0.4724-0.4728 in.).

8. Measure the piston pin approximately 6 mm (0.250 in.) from each end. Piston pin diameter must be between 11.99-12.00 mm (0.4720-0.4724 in.).

Fig. 2-25



A734

**NOTE:** If piston pin is not within specifications, replace the piston pin and bearing as a set.

## Piston Skirt Clearance

1. Insert an inside micrometer or snap gauge into the cylinder just above the intake port. Take measurement from front to back.

Fig. 2-26



A729

2. Measure the piston skirt 1 cm (0.375 in.) above the bottom of the piston skirt.



A731

3. Subtract the measurement in step 2 from measurement in step 1. The difference is the piston skirt clearance and must be 0.05-0.13 mm (0.0020-0.005 in.).

**NOTE:** If the clearance exceeds the wear limit the piston must be replaced to bring clearance into acceptable range. However, if clearance is still excessive, the cylinder will have to be replaced.

### Piston Ring End Gap

1. Insert the piston ring about 1 cm (0.375 in.) into the top of the cylinder bore. Position the ring horizontally in cylinder by pressing the dome of the piston against the ring.
2. Slide a feeler gauge between the ends of the ring.

Fig. 2-28

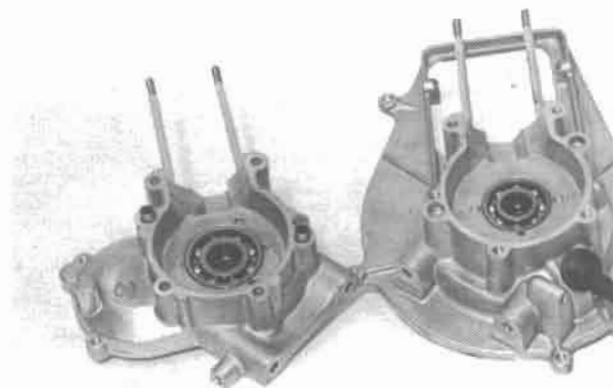


A735

3. Piston ring end gap must be 0.20-0.80 mm (0.008-0.031 in.). Since the amount of wear at the ends and center of the piston ring affects the end gap, replace the ring set if the ring end gap is excessive.

1. Thoroughly wash halves using cleaning solvent.
2. Inspect halves for scoring, pitting, scuffing, or any imperfections in the casting.
3. Inspect all threaded areas for damaged or stripped threads.

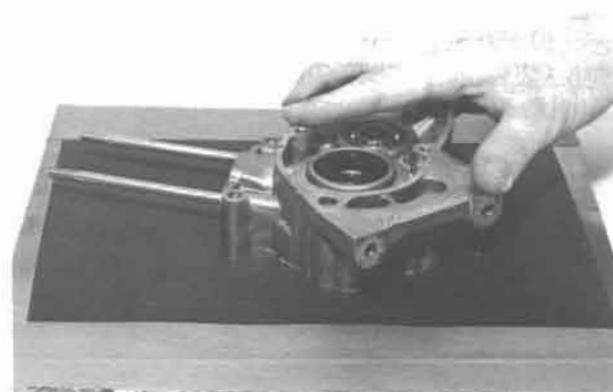
Fig. 2-29



A721

4. Check the bearing areas for signs of cracking or bearing movement; then check dowel pins for wear.
5. Examine the crankcase sealing area. If any nicks or scratches are found in the sealing area, correct the surface with the use of a surface plate covered with 400 grit "Wetordry" sandpaper. Rotate the crankcase in a figure eight motion until a uniform finish is noted.

Fig. 2-30



A740

### Crankshaft

1. Thoroughly wash crankshaft w/bearing in cleaning solvent.
2. Inspect edges of bearing for external wear, scoring, and scuffing. Rotate the bearings by hand to ensure free turning without binding or roughness.



3. Check the connecting rod using the same method. If binding or roughness is noted, the connecting rod, bearing, and crank pin will have to be replaced.

4. Measure the rod small end diameter using a snap gauge. Lock the gauge and carefully remove it.

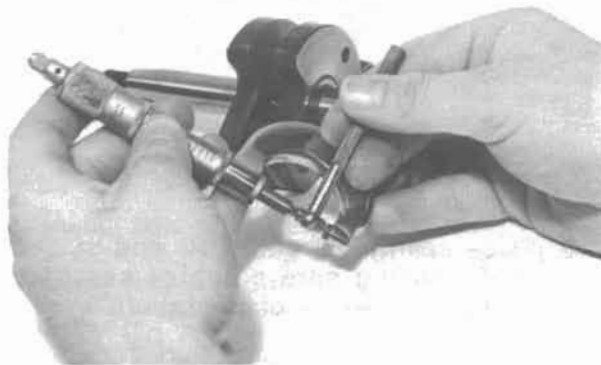
Fig. 2-31



A726

5. Measure the snap gauge with a micrometer. The diameter must be 15.99-16.00 mm (0.6295-0.6303 in.). If diameter is not within specifications, the connecting rod must be replaced.

Fig. 2-32



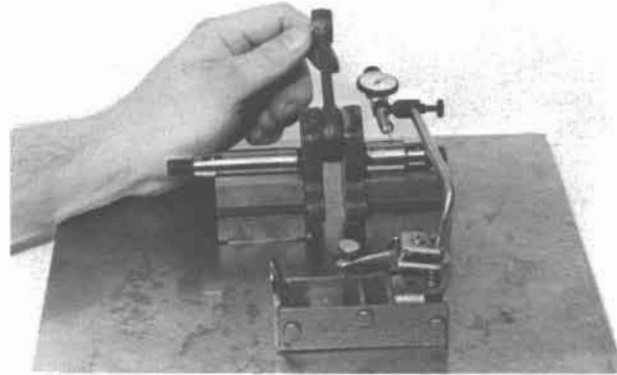
A727

6. Check the crankshaft runout on a setup as shown using a surface plate, V-blocks, and a dial indicator with a mounting base.

7. Support the crankshaft on the bearings or the shaft itself.

8. Mount the dial indicator against the crankshaft at the area of the oil seals. Be sure that the crankshaft is clean.

Fig. 2-33



A741

9. Slowly rotate the crankshaft and observe the "total" crankshaft runout. This is the difference between the highest and lowest readings. Maximum runout must not exceed 0.05 mm (0.002 in.). If runout exceeds specifications, the crankshaft must be straightened or replaced.

## Assembly

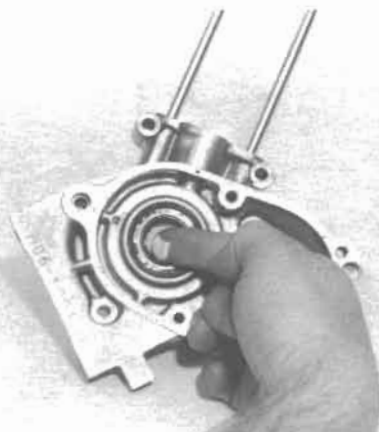
### Crankcase/Gear Case

1. If bearings were removed, install bearings into crankcase halves.
2. Using a seal installing tool, insert seals in crankcase halves.

**NOTE:** Make sure spring side of seal is positioned toward center of crankshaft.

3. Apply grease to the inner lips of the seals.

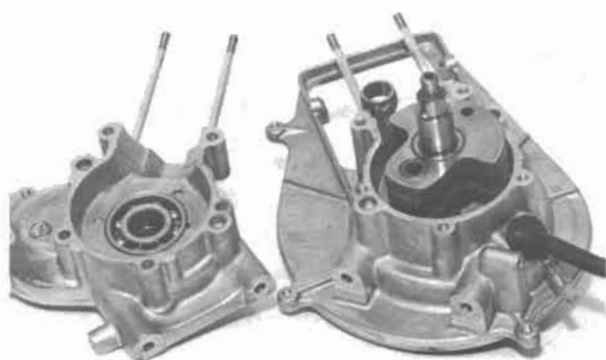
Fig. 2-34



A744

4. Press crankshaft into magneto side of case.

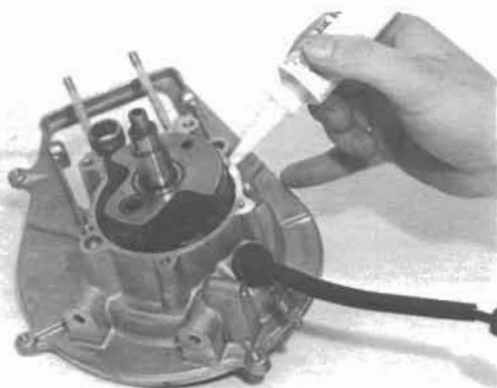
Fig. 2-35



A742

5. Apply RTV to both halves of the crankcase.

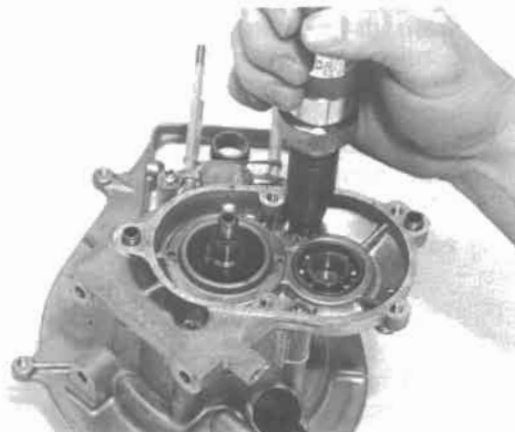
Fig. 2-36



A743

6. Install crankcase dowel pins if they were removed.
7. Apply blue Loc-Tite to the five screws that secure crankcase; assemble cases; then tighten screws using an impact screwdriver.

Fig. 2-37

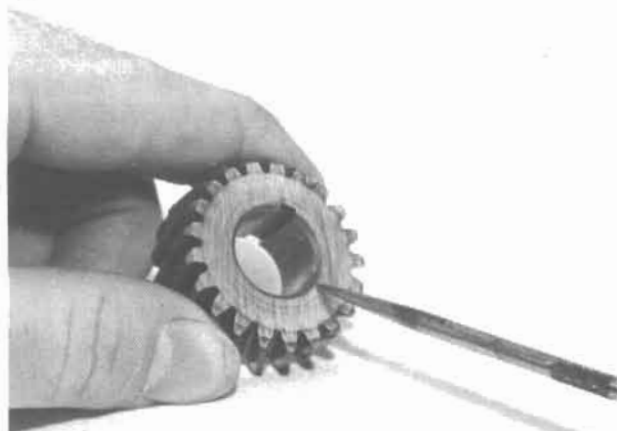


A745

**NOTE:** Place rubber band over connecting rod to prevent rod from damaging cases if engine is accidentally rotated.

8. Install a woodruff key in the PTO end of the engine crankshaft. Slide drive gear onto crankshaft so the large beveled edge is positioned inward.

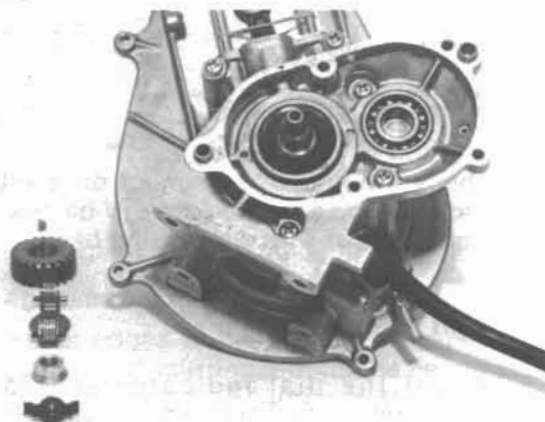
Fig. 2-38



A746

9. Place centrifugal onto PTO end of crankshaft making sure notch of centrifugal aligns with keyway of crankshaft.

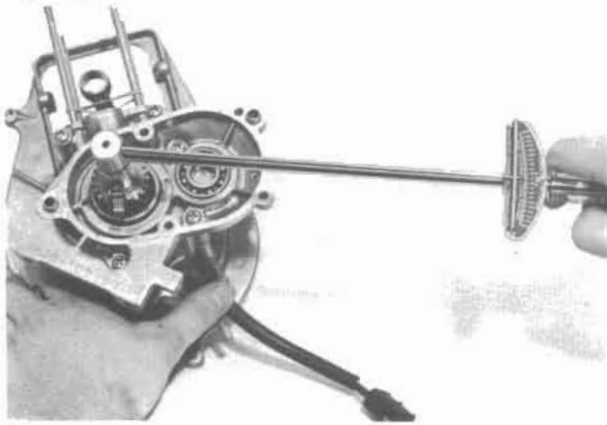
Fig. 2-39



A747

10. Secure PTO end crankshaft components by applying Loc-Tite to the nut, installing the nut, and tightening nut to 30-40 n-m (22-29 ft-lb).

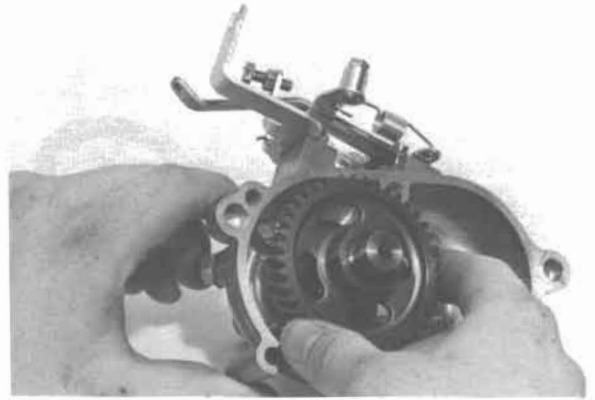
Fig. 2-40



A749

13. Install the primary driven shaft.

Fig. 2-43



A752

11. Install shifter so centrifugal weights are positioned against shifter arms.

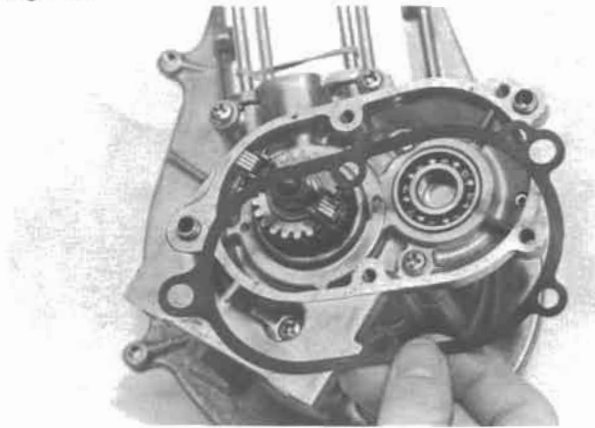
Fig. 2-41



A750

14. Apply RTV to both sides of the gear case gasket. Place gasket against crankcase.

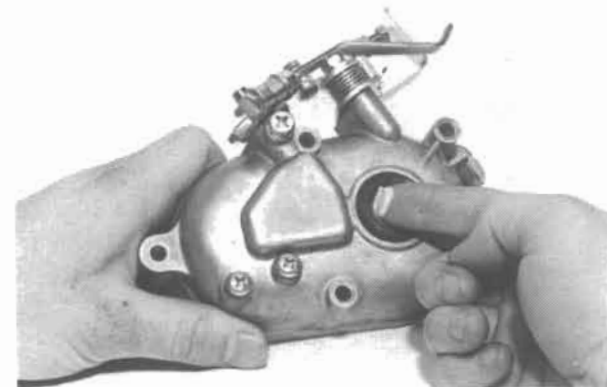
Fig. 2-44



A753

12. Install bearing in gear case housing. Apply grease to the inner lips of the seal; then place seal in position.

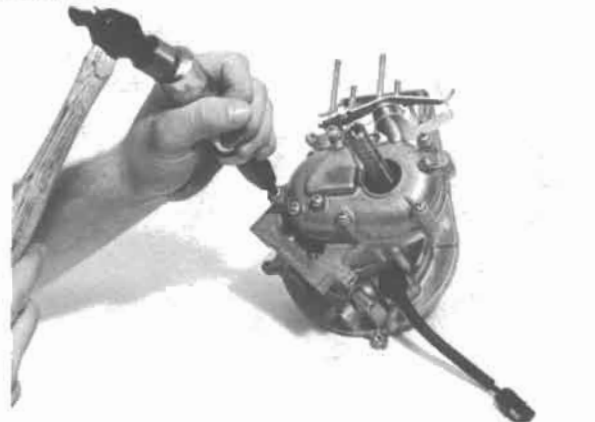
Fig. 2-42



A751

15. Install cover w/output shaft. Install five screws; then tighten screws with impact screwdriver. Fill gear case.

Fig. 2-45

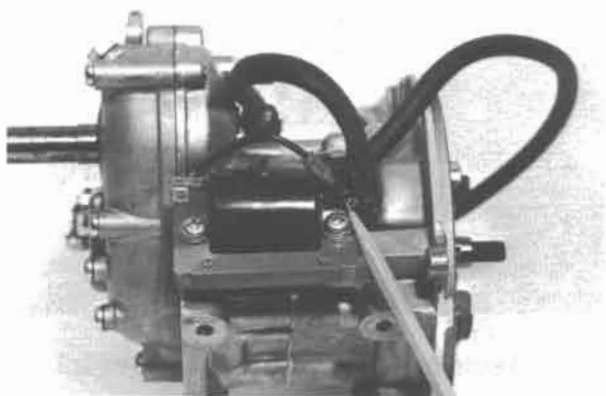


A755

## Electrical System

1. Move ignition coil into position; then secure with two screws and lock washers. Connect coil lead to lead from magneto.

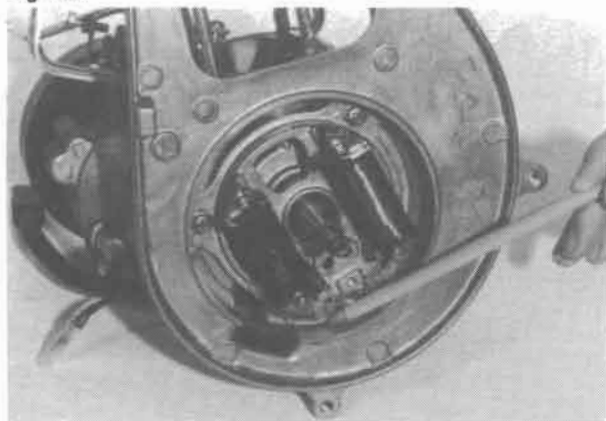
Fig. 2-46



A757

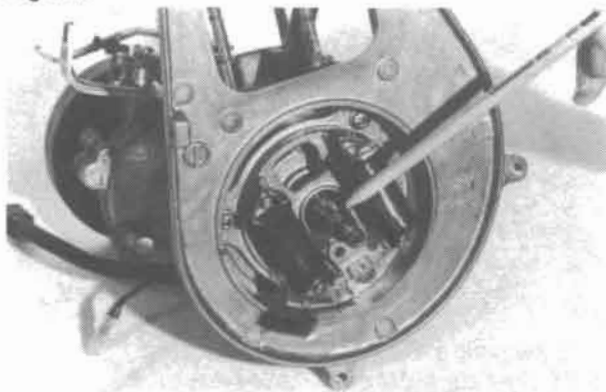
2. To install magneto baseplate, align the scribe marks made during assembly. Apply Loc-Tite to the three screws; then tighten screws securely.

Fig. 2-47



3. Place flywheel key in position.

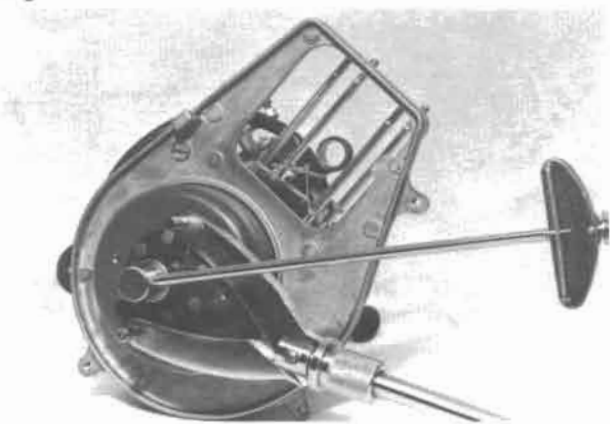
Fig. 2-48



4. Make sure flywheel magnets are clean. Align keyway of flywheel with key in crankshaft. Place flywheel on crankshaft.

5. Install flywheel flat washer, lock washer, and nut. Using a flywheel holder, tighten nut to 4.0-5.0 kg-m (29-36 ft-lb).

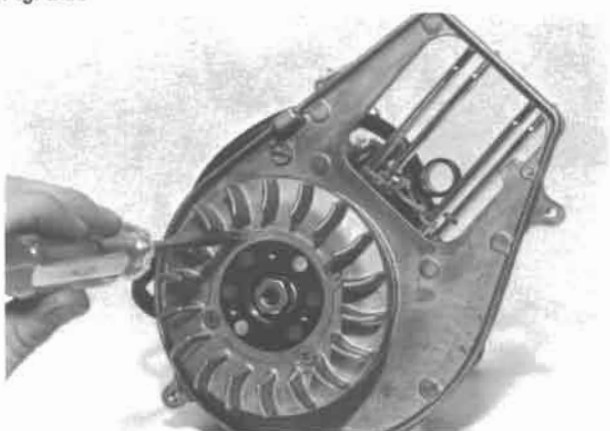
Fig. 2-49



A763

6. Move flywheel fan into position. Apply Loc-Tite to the four mounting screws; then tighten screws using an impact screwdriver.

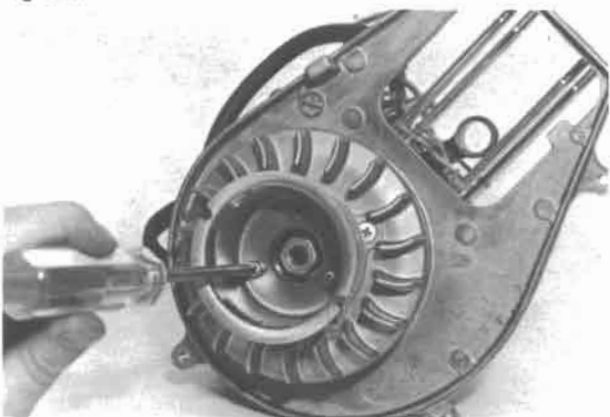
Fig. 2-50



A764

7. Install starter pulley and spacer. Secure with three screws and tighten securely.

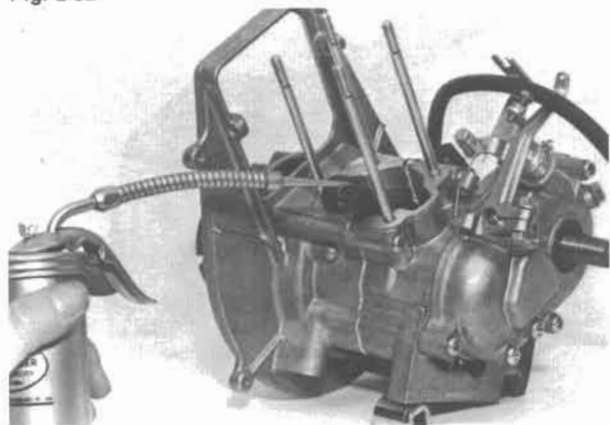
Fig. 2-51



A766

1. Place the bearing in the connecting rod small end. Apply engine assembly oil to the bearing.

Fig. 2-52



A767

2. Install the piston rings. The letter near the ring end must be positioned upward. Make sure ring ends are positioned correctly over piston ring keepers.

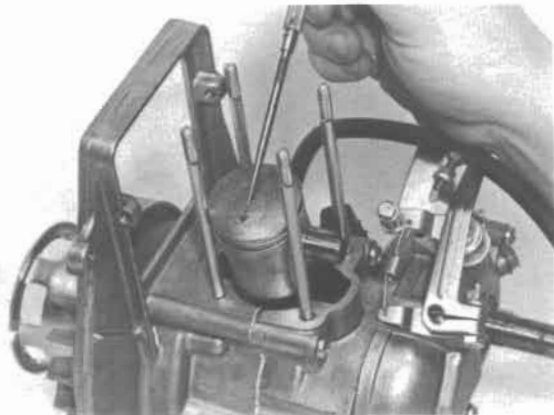
Fig. 2-53



A735

3. Place the piston assembly onto the connecting rod. Make sure arrow on dome of piston points to the exhaust side of the engine.

Fig. 2-54



A768

4. Install piston circlips.

Fig. 2-55

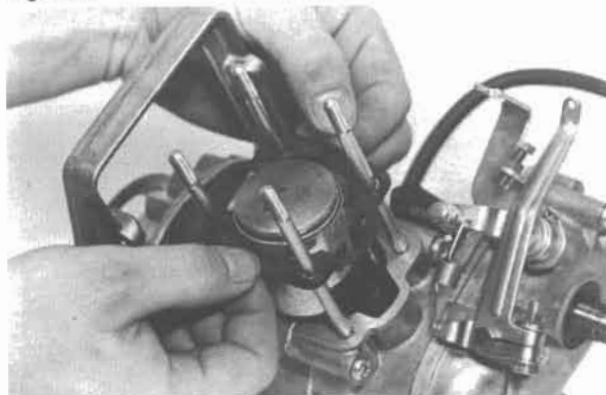


A769

**NOTE:** Make sure open end of both circlips is directed toward either the piston top or bottom.

5. Apply a thin coat of RTV to both sides of the cylinder base gasket; then install base gasket.

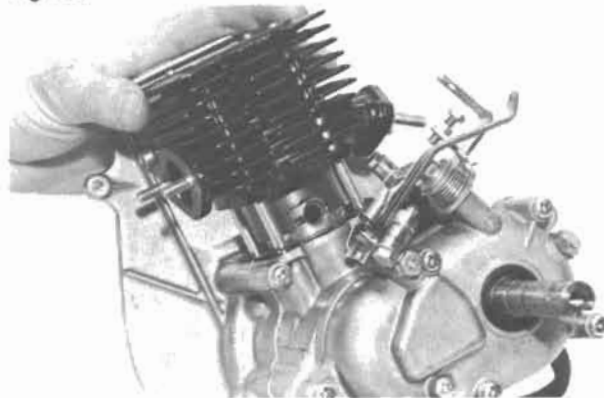
Fig. 2-56



A770

6. Using a piston holder to "square" the piston, compress the piston rings and install the cylinder. Do not force cylinder. If cylinder binds, remove, check piston rings, and install.

Fig. 2-57



A771

7. Place head gasket in position.

Fig. 2-58

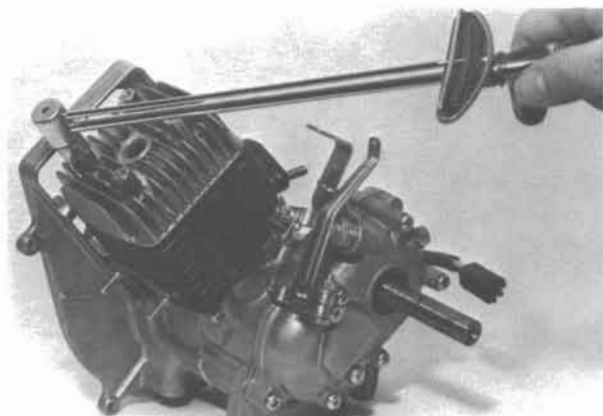


A772

8. Place cylinder head in position. Head must be positioned so the cooling air flow is parallel to fin pattern.

9. Tighten cylinder head nuts to 8-12 n-m (6-9 ft-lb).

Fig. 2-59



A773

10. Install head cowling and fasten securely.

Fig. 2-60



A774

11. Install fan cover and secure with four screws. Make sure high tension coil lead is secured by upper rear screw.

Fig. 2-61



A775

12. Install recoil starter. Just before tightening screws, pull recoil rope and hold to center recoil; then tighten screws securely.

Fig. 2-62



A776

13. Install exhaust gasket; then place muffler onto exhaust studs. Secure muffler with two nuts and lock washers; tighten nuts to 8-11 n-m (6-8 ft-lb).

Fig. 2-63



A778

14. Install spar  
(18-20 ft-lb)

15. In order, place a gasket, insulator, and gasket onto the intake studs.

Fig. 2-64

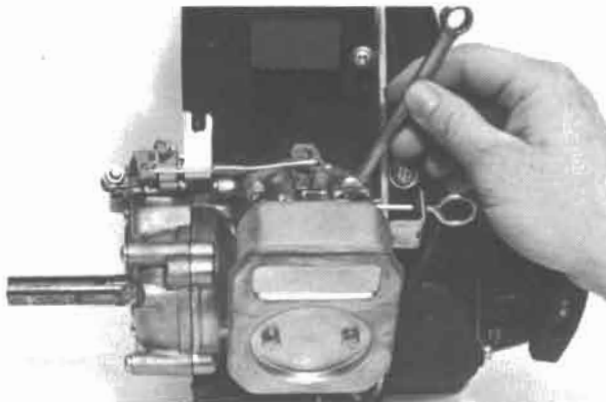


A777

16. Connect carburetor rod and rod spring to the throttle control lever and the carburetor throttle plate.

17. Slide carburetor onto the intake studs; then secure with two nuts and lock washers. Tighten nuts to 8-11 n-m (6-8 ft-lb).

Fig. 2-65



A779

## Fill Gear Case

1. Remove the oil fill plug located on the top of the gear case cover.
2. Remove the oil level screw from the lower side of the gear case cover.
3. Add SAE 10W-30 lubricant until fluid flows out oil level hole.

Fig. 2-66



A806

4. Install the oil level screw.
5. Install the oil fill plug.