CYLINDER DISASSEMBLY (Fig. H-5 and H-6)

Tools Required:
- 10 mm wrench
- 13/16" spark plug socket,
- 14 mm open end wrench
- 12 mm deep wall socket,
  3/8" drive
- Drive ratchet 3/8"
  Quantity 1
  Quantity 1
  Quantity 1

Remove the spark plug (1).
Remove the 4 cylinder nuts (3) and lock washers (4) securing the cylinder to the crankcase and slide the cylinder off the piston.
Remove the 6 bolts securing the head to the cylinder and remove the head. Note the location of the special head bolts (5) and the regular head bolts (2). They must be reinstalled in the correct location.

Remove cooling fan housing. Remove the eight (4 on top, 4 on bottom) screws securing the cylinder baffle (see Fig. H-5) and remove the baffle from the engine.

FIG. H-6 CYLINDER ASSEMBLY
PISTON REMOVAL (Fig. H-7 and H-8)

Tools Required:
- Snap ring pliers

Remove the 2 snap rings (1), one from each end of the piston pin (2). Push the piston pin out and remove the piston (3).

NOTE: Care should be taken not to damage pin and needle bearings (4).

FIG. H-7 PISTON AND CRANKSHAFT

FIG. H-8 REMOVING RETAINER RING

CYLINDER INSPECTION

Tools Required
- Bore gauge  Quantity 1
- 2"-3" Micrometer  Quantity 1
- Feeler gauge  Quantity 1

Clean the cylinder, cylinder head and piston in solvent. If there is a thick layer of carbon on the head or piston, it should be removed before washing with solvent. Extreme care must be taken to avoid damage to the aluminum of the piston or head. Carefully remove the carbon from the piston ring grooves.

NOTE: Break an old ring and use the broken end for removing ring groove carbon.

CAUTION: CHECK THE PISTON RING LOCATING PINS TO MAKE SURE THAT THEY ARE TIGHT IN THE PISTON. A LOOSE PIN COULD POSSIBLY COME OUT DURING ENGINE OPERATION AND WOULD NOT ONLY DAMAGE THE PISTON AND CYLINDER WALL, BUT THE RING WOULD TURN, CATCH ON ONE OF THE PORTS AND BREAK. IF THE PINS ARE LOOSE, REPLACE THE PISTON.
Inspect the piston and cylinder for cracks, burrs, or burned spots on the piston dome and for scoring on the piston skirt and cylinder wall. Replace with new parts if necessary.

NOTE: A scored (or grooved) piston or cylinder must be replaced.

NOTE: Piston ring end gap must be maintained as specified under Engine Specifications. (See Fig. H-10) Thoroughly clean cylinder and install ring approximately 1/2" from the top. Ring must be parallel to the top surface of the cylinder when measuring the end gap. Check with thickness gauge as shown. If ring gap exceeds .016 inch and cylinder bore is not scored or worn more than .003 inch, install new rings.

NOTE: Piston rings are upper side keystone type and must be installed with the bevel towards the top of the piston.

NOTE: When installing rings be sure they are positioned such that ring end gap is seated around the ring locating pins. (Fig. H-9)

The cylinder and piston must be measured to determine if they are worn to a point where the cylinder must be replaced.

Inside (Fig. H-11) and outside (Fig. H-12) micrometers used for measuring piston-cylinder fit should be calibrated at the same time to be sure they are adjusted to read exactly the same. Gauge blocks should be used.
The piston measurement is taken approximately 3/4" up from the bottom of the skirt, 90 degrees from centerline of the piston pin holes. (See Fig. H-12 Measuring Piston.)

The bore measurement is taken at the tightest area of the cylinder. (See Fig. H-11)

Determine the piston to bore clearance by subtracting the piston measurement from the bore measurement. Example: If the bore is 2.8366 inches and the piston is 2.8291 inches, the piston to bore clearance will be .0075 inch. In this example, the piston is worn and must be replaced. If the cylinder bore is scored or is worn more than .003 inch over 2.8357 inches or 2.8387, a new cylinder should be installed.

Inspect the piston pin bearings and spacers for wear. If they show wear, replace the bearings, spacers and pin.

NOTE: The piston pin should fit "finger tight" in the piston, if loose, a new piston is required.

Inspect the connecting rod lower bearings for excessive up and down movement or side play. If the bearings are worn or show heat discoloration, a new crankshaft and rod assembly is required. (See Crankcase Repairs.)

NOTE: This inspection must be made with the piston removed.

CYLINDER REASSEMBLY (Fig. H-13)

Tools Required:
- Snap ring pliers
- 10 mm wrench
- 13/16" spark plug socket
- 14 mm open end wrench
- 12 mm deep wall socket
- 3/8" drive
- Drive ratchet 3/8"
- Torque wrench 3/8" drive
- Ring compressor
- 14 mm socket

Install the piston pin bearing and spacers.

NOTE: Coat the bearings with oil to prevent damage during the first few minutes of operation.

Install piston pin into one side of piston.

NOTE: "F" on the top of the piston is to be positioned to the flywheel (fan) side of the engine.

NOTE: The rectangular hole in the side of the piston must be positioned 180° from the exhaust port. Align the piston and pin to the rod and install the pin.

Install the pin snap rings.

NOTE: The gap in the retaining rings should be located either at the top or the bottom of the ring land.

Install a new cylinder base gasket.

NOTE: Be sure the gasket is positioned correctly.

Using a suitable ring compressor, slide the cylinder over the piston and secure the crankcase. Be sure the exhaust port faces the correct way. (Fig. H-13)

NOTE: Check the position of the rings to be sure they are in position so that the ring gap is correctly seated around locating pins.
Tighten the cylinder securing nuts to 24-28 ft. lbs. torque.

NOTE: Tighten cylinder securing nuts using a crisscross pattern.

Install a new head gasket with the widest metal edge turned down against the cylinder. Position the head and install head bolts and tighten to 17-18 ft. lbs. torque. Use a crisscross pattern when tightening the head bolts.

NOTE: When installing head bolts, assure that the three tall head bolts (5) match the holes in the motor mount. (See Fig. H-6)

Install the cylinder baffle and spark plug. It is also recommended that a new gasket at the exhaust and carburetor connections be installed. Recheck all control adjustments when reinstalled.