

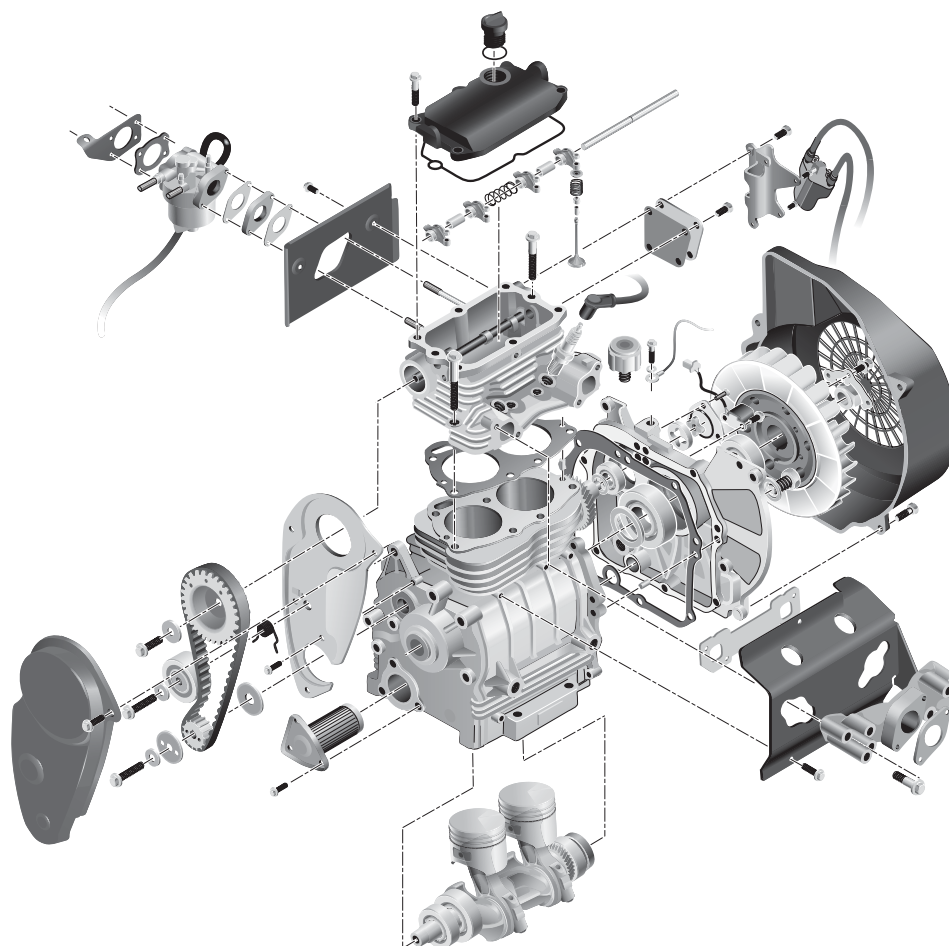


A Textron Company

27615-G01



ENGINE SHOP REBUILD & SERVICE PARTS MANUAL



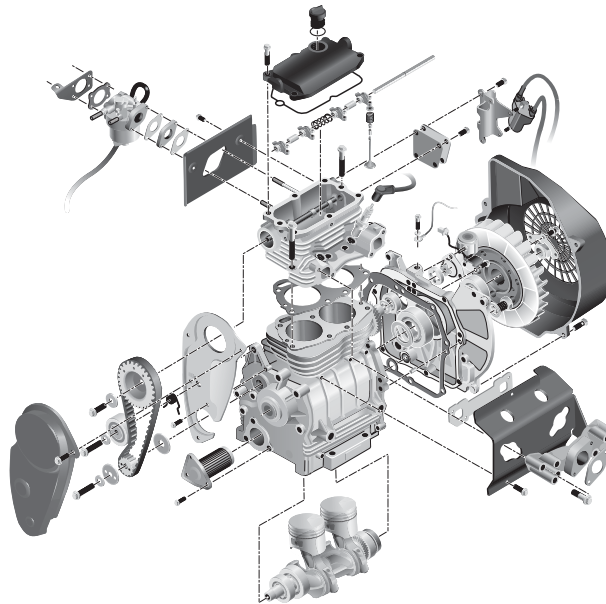
295cc and 350cc 4 CYCLE ENGINE

STARTING MODEL YEAR: 1992

REVISED: 08/04

ENGINE SHOP REBUILD & SERVICE PARTS MANUAL

295cc and 350cc ENGINE



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E-Z-GO DIVISION OF TEXTRON, INC., 1451 MARVIN GRIFFIN RD., AUGUSTA, GEORGIA USA 30906



NOTES

TO OBTAIN A COPY OF THE LIMITED WARRANTY THAT IS APPLICABLE TO THE VEHICLE, CALL OR WRITE THE LOCAL DISTRIBUTOR, E-Z-GO BRANCH OR E-Z-GO WARRANTY DEPARTMENT WITH VEHICLE SERIAL NUMBER AND MANUFACTURER'S CODE.

THE USE OF NON E-Z-GO PARTS AND HARDWARE MAY VOID THE WARRANTY.

TAMPERING WITH OR ADJUSTING GOVERNOR TO PERMIT VEHICLE TO OPERATE AT ABOVE FACTORY SETTINGS WILL VOID THE VEHICLE WARRANTY.

IF APPLICABLE, REFER TO BACK COVER FOR CALIFORNIA AND/OR FEDERAL EMISSIONS CONTROL WARRANTY STATEMENT.



Engine exhaust from this product contains chemicals known, in certain quantities, to cause cancer, birth defects, or other reproductive harm.

NOTE

The exhaust emissions of this vehicle's engine complies with regulations set forth by the Environmental Protection Agency (EPA) of the United States of America (USA) at time of manufacture. Significant fines could result from modifications or tampering with the engine, fuel, ignition or air intake systems.

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HOW TO USE THIS MANUAL

This manual is designed to suit the needs of mechanics at all levels of experience with the E-Z-GO 4-cycle engine. The outline format will allow the mechanic to choose the level of instructional detail needed to completely disassemble, diagnose, repair/overhaul and reassemble the engine.

The manual is divided into four major operational sections, which are each divided into smaller operational sections. At the beginning of each major section is a list of tools that will be required to perform the operations desired in that section. ***Do not use non-specified tools (vise grips®, hammers, adjustable wrenches etc.). The use of these tools could cause permanent damage to the engine components.***

WE STRONGLY RECOMMEND that no matter what your experience level, you use this manual as a guide when disassembling, repairing/overhauling and reassembling the engine. Before working on the engine, ***read and understand the text and in particular each NOTE, CAUTION and WARNING.***

Some illustrations may show components that differ from your engine. This is the result of ongoing improvements to the engine design.

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ENGINE DISASSEMBLY

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CYLINDER HEAD REMOVAL

Tool List	Qty. Required
Extension, 3/8" drive, 4"	1
Mallet, medium wood or rubber	1
Puller, seal	1
Ratchet, 3/8" drive.....	1
Screwdriver, small flat blade	1
Screwdriver, medium flat blade	1
Socket, 8 mm, 3/8" drive	1
Socket, 10 mm, 3/8" drive	1
Socket, 12 mm, 3/8" drive	1
Socket, 13/16" spark plug, 3/8" drive	1

NOTE Keep your work area clean and well organized while performing the operations described in this manual. This will help prevent accidents and reduce the possibility of mistakes that could damage or impair the performance of the engine.

NOTE Crankshaft and balancer shaft bearings should be cleaned and inspected; and removed only if they appear to be damaged or excessively worn. Remove bearings that are pitted, nicked, burred, discolored or that rotate roughly or noisily.

CAUTION Because some mating parts with wear surfaces were machined together when the engine was manufactured, or have established wear patterns during operation, the reassembly of engine parts in their original positions and orientations, with their original mating parts, is critical to the performance and life expectancy of the engine. Mark and sort all parts as they are disassembled so that they will be reassembled and installed in their original positions.

Remove the Air Cleaner

A variety of air cleaner configurations exist. Refer to the Technician's Repair and Service Manual for removal/installation instructions that are appropriate to the model and year of your vehicle.

Remove the Carburetor

(See Fig. A-1 "Engine" on page A-4)

- Remove the choke cable bracket plate (ITEM 12). (DETAIL A)
- Slide the carburetor (ITEM 11) off of its mounting studs.
- Remove the plastic carburetor insulator (ITEM 13).

Remove the Coil Mounting Bracket and Coil

(See Fig. A-1 "Engine" on page A-4)

- Remove the spark plug wires (ITEM 1) from the plugs.
- Using a spark plug wrench, remove the spark plugs (ITEM 2).
- Using a 10mm socket, remove the nut (ITEM 3) and the bolt (ITEM 4) attaching the coil bracket (ITEM 5) to the engine.

Remove the Blower Housing

(See Fig. A-1 "Engine" on page A-4)

- Using a 10mm socket, remove the three (3) remaining bolts (ITEM 7) and remove the blower housing (ITEM 6) from the engine.

Remove the Exhaust Manifold

(See Fig. A-1 "Engine" on page A-4)

(Later models have exhaust manifold as part of the head)

- Using a 12mm socket, remove the four (4) bolts (ITEM 9) or nuts that attach the exhaust manifold (ITEM 8) and gasket (ITEM 10) to the cylinder head.

Remove the Rear Cylinder Baffle

(See Fig. A-1 "Engine" on page A-4)

- Using a 10mm socket, remove the four (4) bolts (ITEM 12) that attach the baffle (ITEM 11) to the engine. Lift the baffle from the engine.

Remove the Timing Belt Cover

(See Fig. A-1 "Engine" on page A-4)

- Using a 10mm socket, remove the three (3) bolts (ITEM 14) that attach the timing belt cover (ITEM 13) to the engine.

Remove the Idler, Timing Belt, Drive and Cam Pulleys

(See Fig. A-1 "Engine" on page A-4)

CAUTION Do not twist, crimp or turn the belt inside out. This will cause the belt to fail.

- Using a 12mm socket, loosen the idler and cam pulley retaining bolts (ITEMS 15 AND 16).
- Using a 10mm socket, loosen the drive pulley retaining bolt (ITEM 17).
- Remove the idler retaining bolt (ITEM 15), idler (ITEM 18), and idler spring (ITEM 19).

ENGINE DISASSEMBLY

- D. Remove the timing belt (ITEM 20). *Do not twist the belt or turn it inside out.*
- E. Remove the drive pulley retaining bolt (ITEM 17), front belt retainer (ITEM 21), drive pulley (ITEM 22). Rear belt retainer (ITEM 23) was present on early production engines.
- F. Remove the cam pulley retaining bolt (ITEM 16) and the cam pulley (ITEM 24).
 - 1. Remove the pulley alignment key. Using a non-ferrous (non-steel) punch, drive the back end of the key down into the keyway, which will push the front end up.
 - 2. With the punch, gently drive the upraised key out of the keyway.

Remove the Rear Timing Belt Cover

(See Fig. A-1 "Engine" on page A-4)

- A. Using a 10mm socket, remove the two (2) bolts (ITEM 26) that attach the rear timing belt cover (ITEM 25) to the engine.

Remove the Front Cylinder Baffle

(See Fig. A-1 "Engine" on page A-4)

- A. Using a 10mm socket, remove the two (2) bolts (ITEM 28) that attach the baffle (ITEM 27) to the engine.

Remove the Valve Cover and Gasket

(See Fig. A-2 "Cylinder Head Components" on page A-5)

- A. Using a 10mm socket, remove the six (6) bolts (ITEM 3) that attach the rocker cover (ITEM 1) to the cylinder head. Remove the rocker cover and gasket (ITEM 2).

Remove the Rocker Assembly and Camshaft

(See Fig. A-2 "Cylinder Head Components" on page A-5)

NOTE The rocker shafts in some early engines were manufactured with a threaded hole in the end, into which a blot is placed in order to pull the shaft from the cylinder head.

CAUTION Do not allow the camshaft lobes or bearing surfaces to scrape against the cylinder head. Because these parts have established wear patterns during operation, mark and sort them as they are disassembled so that they will be reassembled in their original positions.

- A. Remove the camshaft cover (ITEM 4).

- 1. Using a 10mm socket, remove the three (3) bolts (ITEM 5) and one (1) stud (ITEM 6).

(Later models have four (4) bolts and no stud)

- 2. Using a rubber or wooden mallet, gently tap loose the protruding edge of the camshaft cover and pull it away from the engine.

- B. Using a 10mm socket, loosen the four (4) rocker arm nuts (ITEM 7).

- C. With a medium flat blade screwdriver, turn the four (4) rocker adjustment screws (ITEM 8) counterclockwise until they no longer exert any force on the camshaft (ITEM 9) and it can rotate freely.

- D. Remove the rocker assembly.

- 1. Insert a small flat blade screwdriver into the groove in the center of the rocker shaft (ITEM 10) and push the shaft toward the fan side of the engine. Tap lightly if required.

- 2. As the end of the rocker shaft slides out of the cylinder head, remove the four (4) rocker arms (ITEM 11), two (2) spacers (ITEM 12), and one (1) spring (ITEM 13) from the other end of the shaft. **Mark or sort parts as they are disassembled. Wear parts must be reassembled in their original positions.**

- E. Carefully pull the camshaft out through the fan side of the cylinder head. *Do not allow the wear surfaces of the camshaft to scrape against the cylinder head, or any part of the camshaft to scrape against the cylinder head bearing surfaces.*

Remove the Cylinder Head and Gasket from the Crankcase

(See Fig. A-2 "Cylinder Head Components" on page A-5)

CAUTION Because this is an aluminum cylinder head, it is important that the clamping pressure of the mounting bolts be released evenly. Remove them in the order shown in detail A (Ref Fig. A-2 on page A-5) by loosening only 1/8 turn at a time.

- A. Using a 12mm socket and extension, remove six (6) cylinder head bolts (ITEM 16) in the sequence shown. Remove the cylinder head (ITEM 14), gasket (ITEM 15) and dowel pins (ITEM 19) from crankcase.

VALVE REMOVAL

Remove the Valves from the Cylinder Head

(See Fig. A-3 "Valves" on page A-6)

- A. While supporting the valve (ITEM 1) from the bottom to prevent its downward motion, push the valve spring retainer (ITEM 2) down so that the valve stem keys (ITEM 6) are released from the retainer. It may be necessary to remove valve stem keys using a pair of needle nose pliers. (DETAIL A)
- B. Remove the spring retainer and spring (ITEM 3). Then push the valve down and remove it from the bottom of the cylinder head.
- C. Repeat steps A and B to remove the remaining valves.
- D. Use a small flat blade screwdriver to *GENTLY* pry the valve stem seals (ITEM 4) free. Remove them from the valve guides. (DETAIL B)

Valve Guide Removal

- A. If the valve guides (ITEM 5) are to be replaced, a hydraulic press with an appropriate adaptor must be used to remove them from cylinder head.

ENGINE DISASSEMBLY

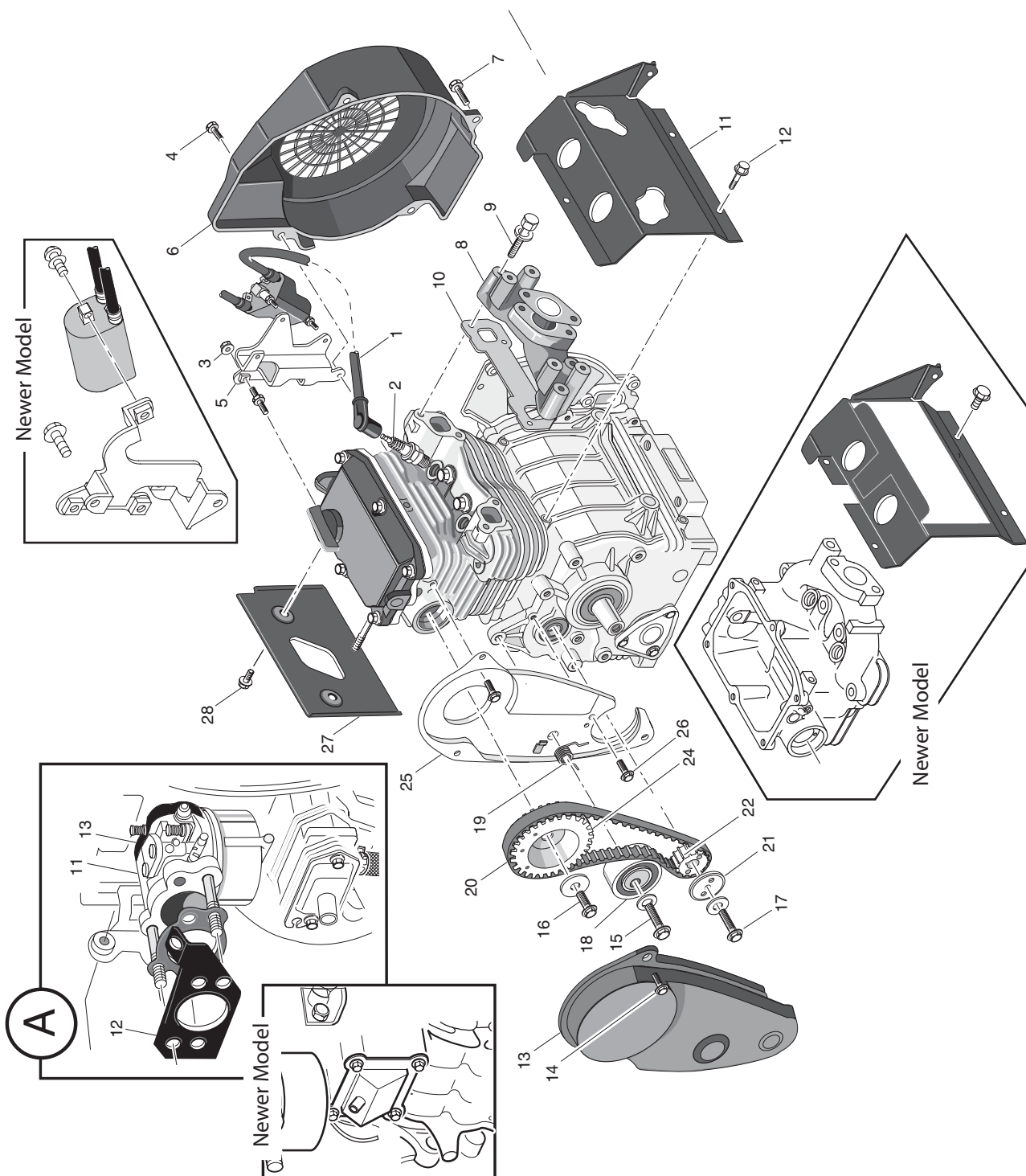


Fig. A-1 Engine

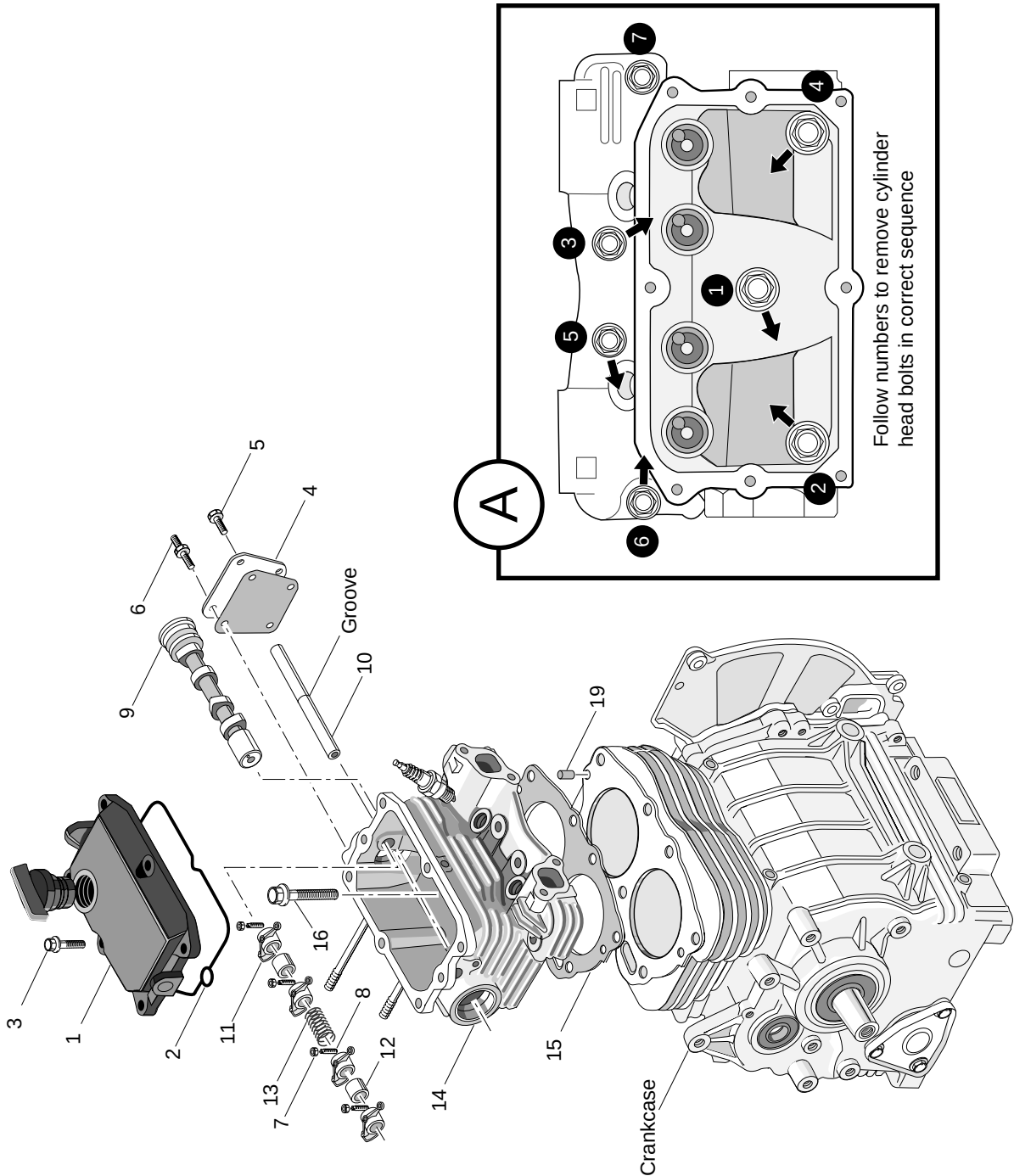


Fig. A-2 Cylinder Head Components

ENGINE DISASSEMBLY

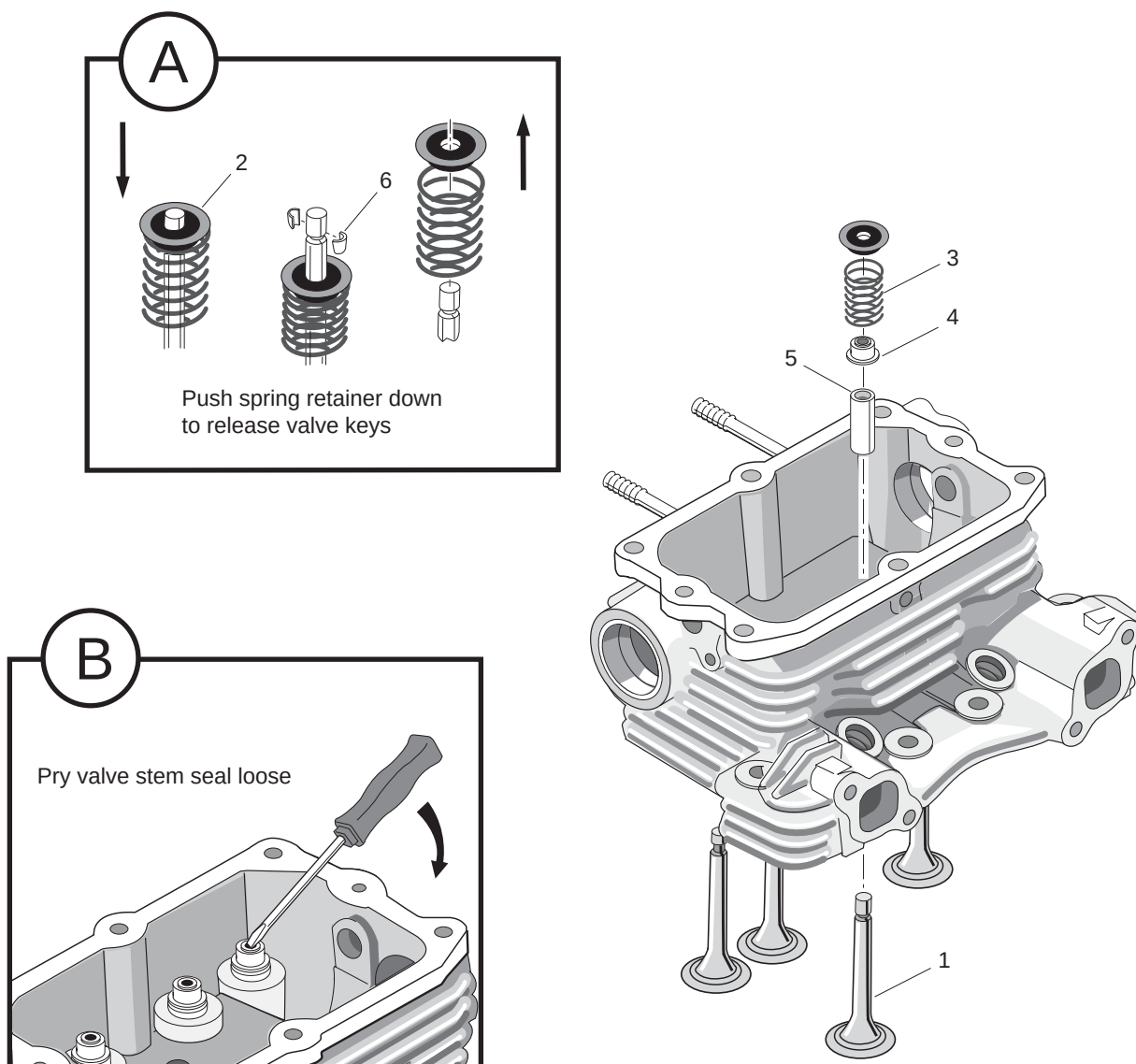


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ENGINE DISASSEMBLY

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CRANKCASE DISASSEMBLY

Tool List	Qty. Required
Extension, 3/8" drive, 4"	1
Extension, 3/8" drive, 6"	1
Mallet, medium wood or rubber	1
Puller, (E-Z-GO P/N 27111-G01)	1
Puller, seal	1
Punch, non-ferrous	1
Ratchet, 3/8" drive	1
Screwdriver, small flat blade	1
Screwdriver, medium flat blade	1
Screwdriver, #2 phillips	1
Screwdriver, #3 phillips	1
Socket, 8 mm, 3/8" drive	1
Socket, 10 mm, 3/8" drive	1
Socket, 12 mm, 3/8" drive	1
Socket, Impact, 26 mm, 1/2" impact drive	1
Socket, oil pressure switch	1
Wrench, 7 mm combination	1
Wrench, 10 mm combination	1
Wrench 12 mm combination	1

Remove the Oil Filter

(See Fig. B-1 "Engine Components" on page B-4)

- Using a 10mm socket, remove the three (3) bolts (ITEM 2) securing oil filter (ITEM 1) to the crankcase.
- With a twisting motion, slowly pull the filter from the crankcase and drain oil.
- Remove the O-ring (ITEM 3).
- Inspect filter for debris that could indicate an excessive wear problem or contamination.

Remove the Fan Hub

(See Fig. B-1 "Engine Components" on page B-4)

(See Fig. B-2 "Engine Components cont" on page B-5)

CAUTION Do not exert pressure against the crankshaft or fan.

- Using an impact wrench and 30 mm (Later models 26MM) impact socket, remove the fan hub nut (ITEM 5)
- Using an E-Z-GO Fan Hub Puller, remove the fan hub (ITEM 4). (**Later models do not require a puller**)

NOTE Some models of puller have a sharp point that could damage the crankshaft oil passage plug. Modify per Fig. B-2, detail A.

- Inspect puller. The end of the threaded portion should not be pointed. Grind off 1/8" to provide a taper. If desired, a nut may be used as a spacer between the puller and crankshaft. Lubricate the tip and threads of the puller shaft (ITEM 6) and place it in the indentation in the end of the crankshaft. (DETAIL A)
- Install the three (3) puller bolts (ITEM 7) through the puller collar (ITEM 8) and into the threaded holes in the fan hub. Tighten the puller bolts until each is snug against the puller collar, and the collar face is at 90° to the crankshaft axis. This will insure that the hub is pulled straight and does not bind. (DETAIL A)
- Insert a large screwdriver under the puller collar and between two of the puller bolts as shown. Insert another large screwdriver through the hole in the top of the puller shaft. (DETAIL B)
- Hold the first screwdriver **against the two puller bolts** while turning the second screwdriver clockwise until the fan hub breaks free from the crankshaft. **Do not exert pressure against the crankshaft or fan blades.**
- Remove the fan hub and puller from the crankshaft.
- Remove the puller from the fan hub.

Remove the Pulser Coil

(See Fig. B-1 "Engine Components" on page B-4)

- Using an 8mm socket, remove two (2) bolts (ITEM 10) and the pulser coil (ITEM 9).

Remove the Oil Pressure Switch

(See Fig. B-1 "Engine Components" on page B-4)

(Later models may or may not have an oil pressure switch)

- Use a 7mm socket to remove the bolt (ITEM 12) and the wire (ITEM 13).
- Use an automotive oil pressure switch socket to remove the switch (ITEM 11)

Remove the Oil Pump

(See Fig. B-1 "Engine Components" on page B-4)

- Using a 10mm socket, remove three (3) bolts (ITEM 14) and the oil pump cover (ITEM 15).
- Remove the oil pump O-ring (ITEM 16).
- Carefully remove the oil pump rotors (ITEMS 17 and 18).

ENGINE DISASSEMBLY

Remove the Crankcase End Cover

(See Fig. B-1 "Engine Components" on page B-4)

(See Fig. B-2 "Engine Components cont" on page B-5)

NOTE Do not lose the crankshaft and balancer shaft end-play spacers. These are individually fitted to each engine, and are likely to fall from the engine when the cover is removed.

CAUTION If the end cover must be tapped loose, use a wooden or rubber mallet. Gently tap only the place shown in Detail D.

- A. Remove the fan hub alignment key (ITEM 20). (DETAIL C) **(Later models do not have a hub key)**
 1. Using a non-ferrous (non-steel) punch, drive the back end of the key down into the keyway, which will push the front end up.
 2. With the punch, gently drive the upraised key out of the keyway.
- B. Using a 12mm socket, remove two (2) bolts (ITEM 21).
- C. Using a 10mm socket, remove the six (6) remaining bolts (ITEM 22) attaching the cover to the crankcase.
- D. Using a wooden or rubber mallet, *lightly* tap the cover to break it loose from the crankcase. **TAP ONLY THE PLACE SHOWN.** (DETAIL D)
- E. Remove the cover from the crankcase. *Do not lose the crankshaft and balancer shaft spacers* (ITEMS 23 and 24) *that could fall from the engine when the cover is removed.*
- F. Drain any remaining oil from the crankcase. *Note any unusual debris that might identify a problem.*
- G. Remove dowel pins (ITEM 30).
- H. Remove the end cover gasket (ITEM 25) and the oil feed O-ring (ITEM 26).

Remove the Balancer Shaft

(See Fig. B-1 "Engine Components" on page B-4)

- A. While pushing the shaft from the PTO (clutch) side of the engine, gently work the balancer shaft gear free from the crankshaft balancer gear and remove the shaft (ITEM 27) from the crankcase.

Remove the Pistons

(See Fig. B-3 "Crankshaft" on page B-6)

NOTE Remove any carbon deposits from the top of the cylinder wall. These might damage the piston or prevent it from being removed.

CAUTION Because the pistons, rods, and caps were machined and have established wear patterns as assemblies, it is critical to the life expectancy and performance of the engine that they are reassembled with their original mates and in their original positions. Mark and sort mating parts as they are disassembled.

- A. Rotate the crankshaft until the pistons (ITEM 1) are at bottom dead center, or are positioned to allow best access to the connecting rod bolts (ITEM 2).
- B. Using a 10mm socket, remove the connecting rod bolts and cap (ITEM 3) from the fan side piston assembly.
- C. Reposition the crankshaft at top dead center and push the piston and rod out through the top of the block. *Reattach the connecting rod cap to the rod to insure correct match of mating parts.*
- D. Repeat steps A., B., and C. to remove the PTO (clutch) side piston assembly.

Remove the Crankshaft

(See Fig. B-3 "Crankshaft" on page B-6)

NOTE On engines with many hours of operation, it may be necessary to gently tap the crankshaft on the PTO (clutch) end to dislodge it. Use a light wooden or rubber mallet handle only.

Remove the Balancer Shaft Seal and the Crankshaft Seal

(See Fig. B-3 "Crankshaft" on page B-6)

CAUTION Do not scratch or score the seal bore.

- A. Using a seal puller, pry the shaft seal (ITEM 5) and crankshaft seal (ITEM 6) from the block. (DETAIL A)

Inspect the Balancer Shaft Bearing and Crankshaft Bearing

(See Fig. B-4 "Balancer Shaft Bearing, Crankshaft Bearing and PCV Valve" on page B-7)

- A. Remove the balancer shaft bearing (ITEM 1) and crankshaft bearing (ITEM 2) **only** if they appear to be worn or damaged.

CAUTION Do not use direct heat, flame, or hot liquid to expand parts. Parts must be heated evenly in an oven.

- B. Clean the bearings and inspect for damage: blue discoloration, pitting, rough or noisy rotation, etc. If there is any doubt about a bearing, remove it and discard.

- C. To remove a bearing, turn the crankcase on its side, PTO (clutch) side up, and gently tap the bearing out with a brass drift (DETAIL A). Discard the bearing. The bearings can also be removed by heating the crankcase to 200°+ Fahrenheit. This will expand the aluminum crankcase and release the bearings. *Crankcase must be heated evenly in an oven. DO NOT USE DIRECT HEAT, FLAME OR HOT LIQUID.*

Remove the PCV Valve

(See Fig. B-4 "Balancer Shaft Bearing, Crankshaft Bearing and PCV Valve" on page B-7)

NOTE It may be necessary to gently pry the valve cover and valve free before they can be removed from the crankcase.

- A. Using a 10mm socket, remove two (2) bolts (ITEM 3).
(Later models have four (4) bolts)
B. Remove the PCV cover, valve, gaskets and hose (ITEMS 4 - 10).

Disassemble the Crankcase End Cover

(See Fig. B-1 "Engine Components" on page B-4)

- A. Using a seal puller, remove the crankshaft seal (ITEM 2) from the fan side of the cover (ITEM 1). (DETAIL A)
B. Remove the oil pump check valve from the engine side of the cover.
1. Using a 10mm socket, remove the bolt (ITEM 3) and check valve cover (ITEM 4).
2. Remove the spring (ITEM 5) and check ball (ITEM 6).

- C. Clean and inspect the crankshaft bearing (ITEM 7) and the balancer shaft bearing (ITEM 8) for damage. If there is any doubt about a bearing, remove it.

1. If a bearing is to be removed, tap it out with a brass drift and discard or use an oven to evenly heat the end cover to 200° + Fahrenheit. This will expand the aluminum cover and release the bearings. *Crankcase must be heated evenly in an oven. DO NOT USE DIRECT HEAT, FLAME OR HOT LIQUID.*

Remove the Piston From Connecting Rod

(See Fig. B-1 "Engine Components" on page B-4)

- A. Remove two (2) wrist pin retaining clips (ITEM 3).
1. Insert a small flat blade screwdriver into one of the slots as shown. Push in and up to dislodge the clip from the connecting rod (ITEM 2). (DETAIL A)
B. Remove the wrist pin (ITEM 4).
1. Use a suitable mandrel to carefully push the wrist pin out of the piston (ITEM 1). (DETAIL B)
C. Remove the piston rings (ITEMS 5, 6, and 7).

Removal of Crankshaft Bearing

(See Fig. B-1 "Engine Components" on page B-4)

- A. If the bearing (ITEM 1) is to be removed from the crankshaft, use a mechanical press or bearing puller to remove it. Discard bearing. (DETAIL B)

ENGINE DISASSEMBLY

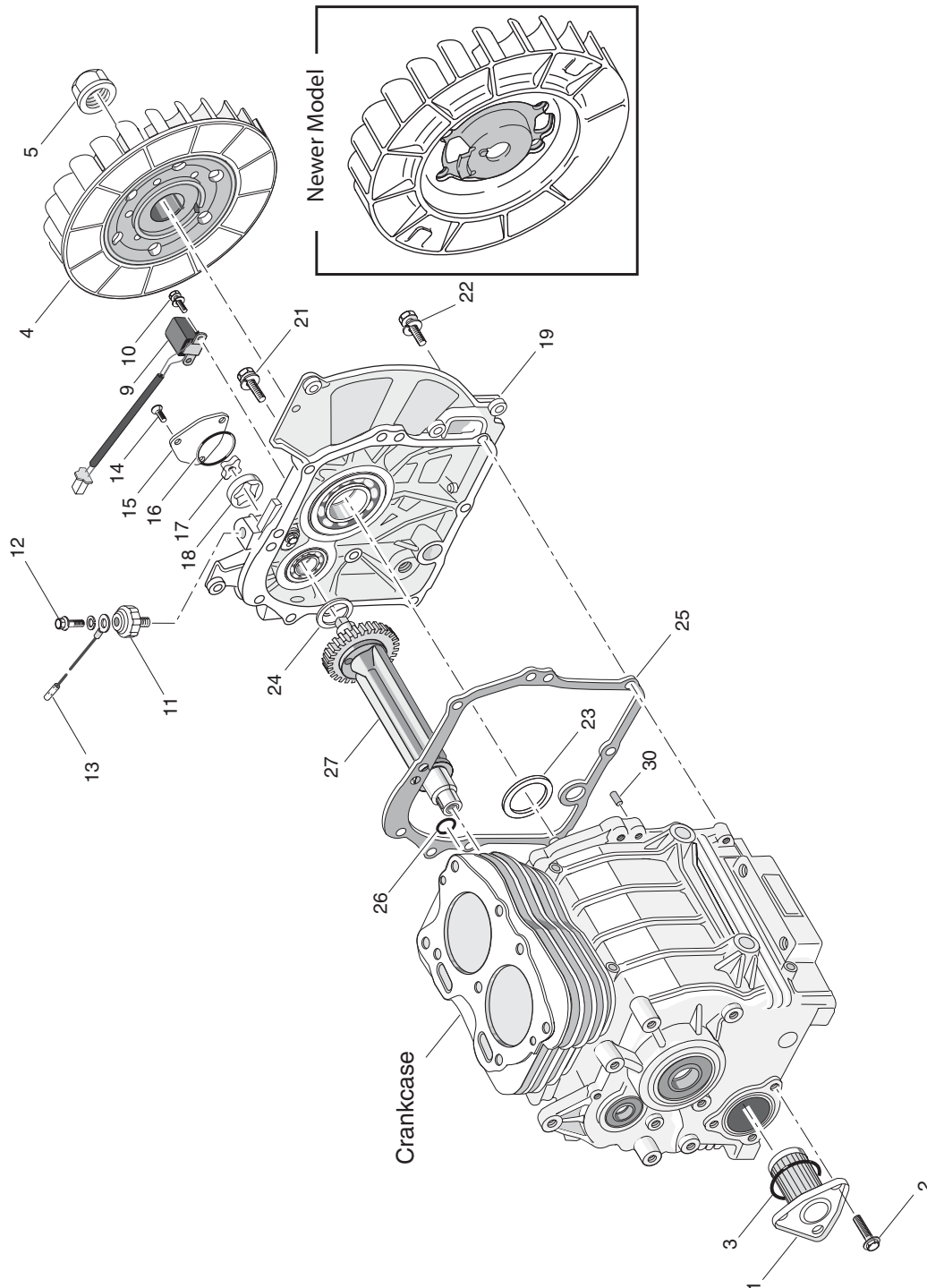


Fig. B-1 Engine Components

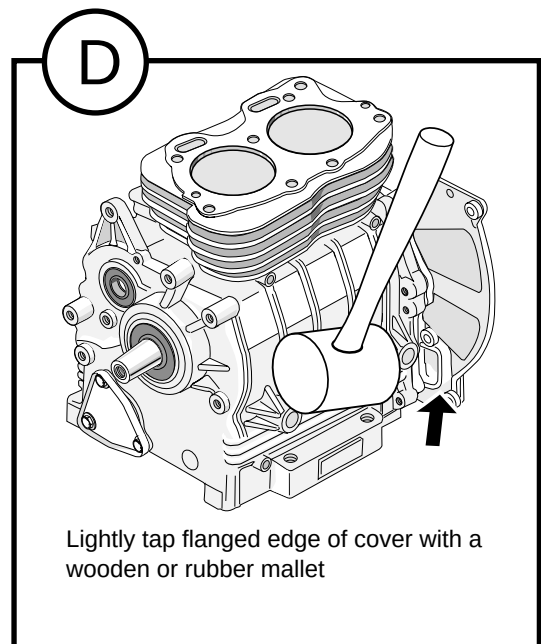
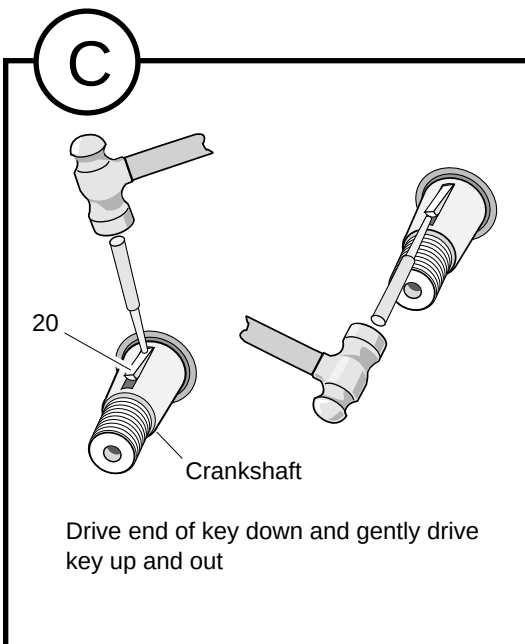
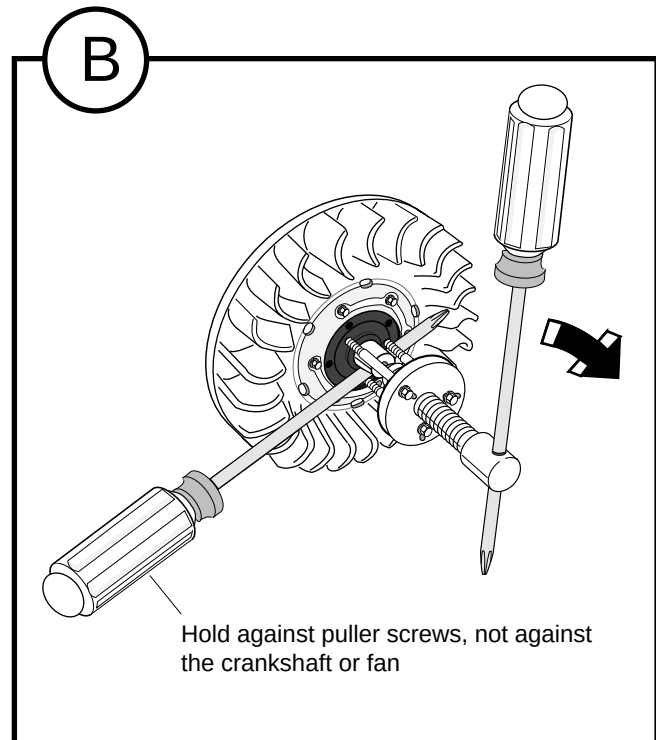
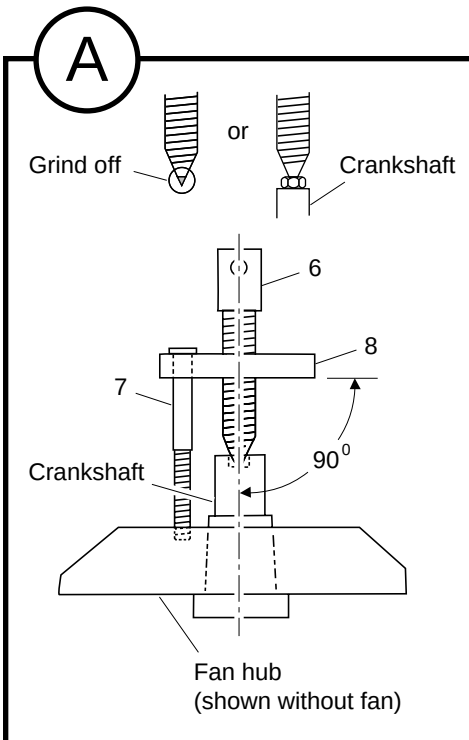


Fig. B-2 Engine Components can't

ENGINE DISASSEMBLY

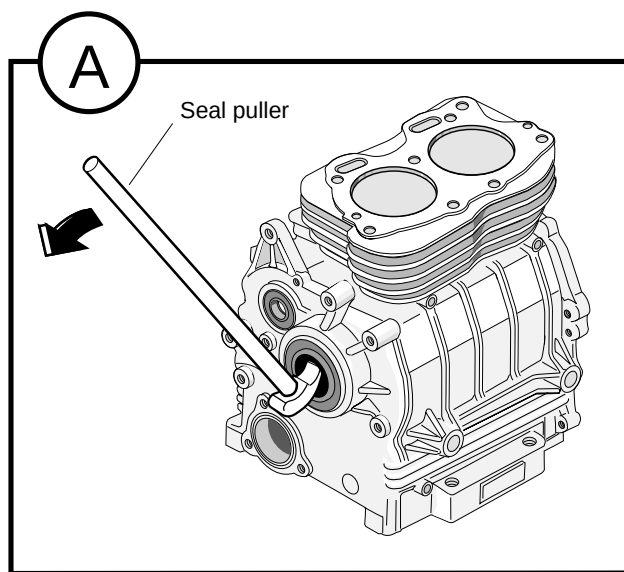
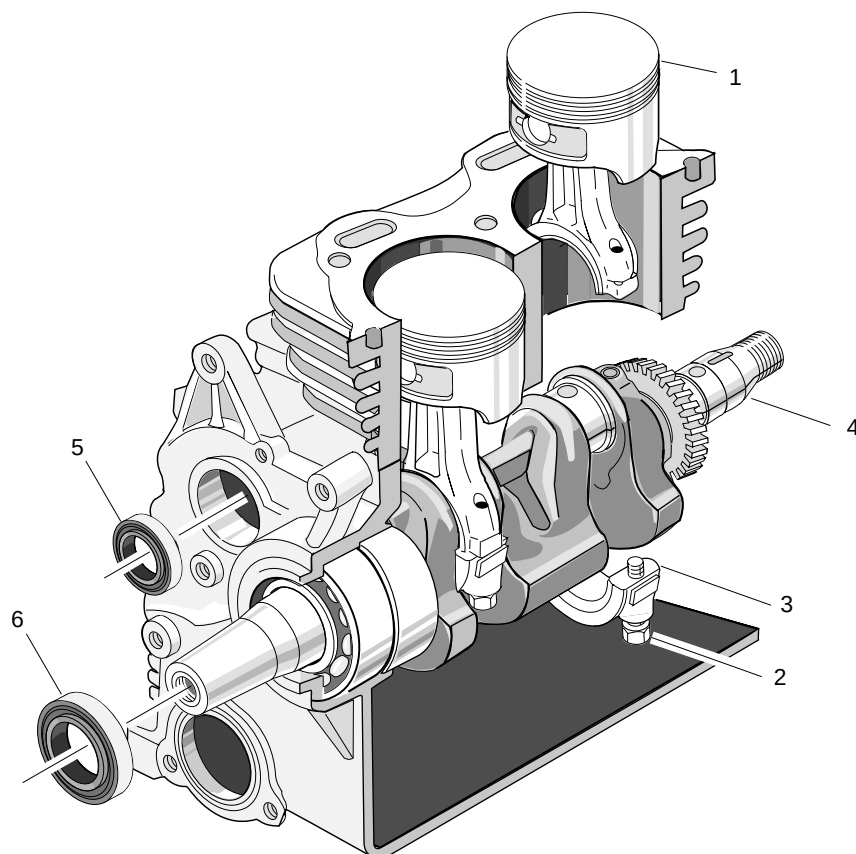


Fig. B-3 Crankshaft

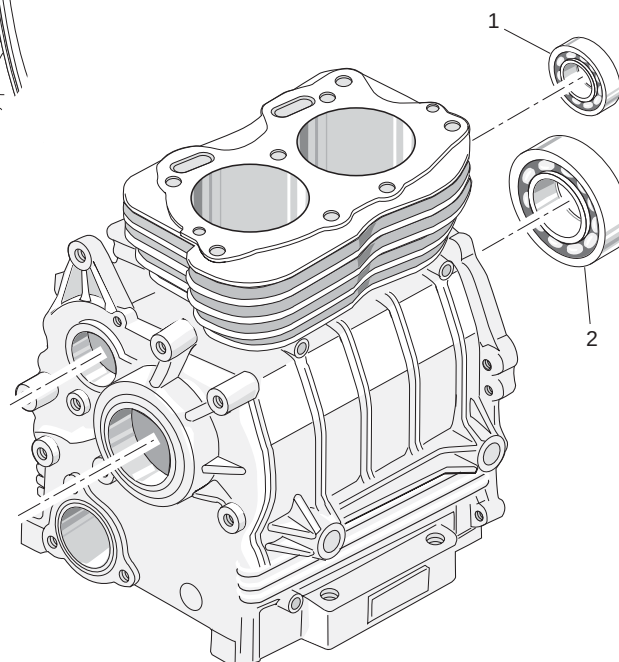
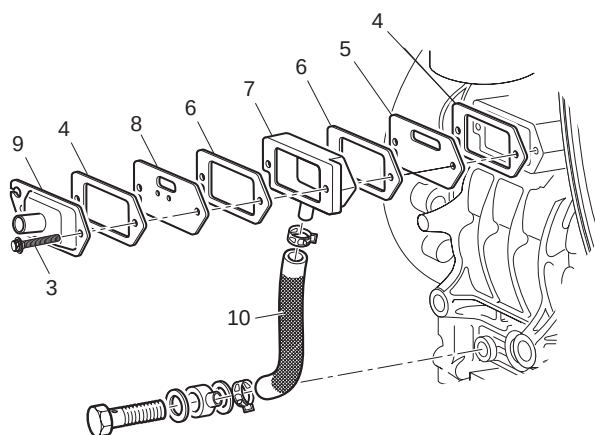
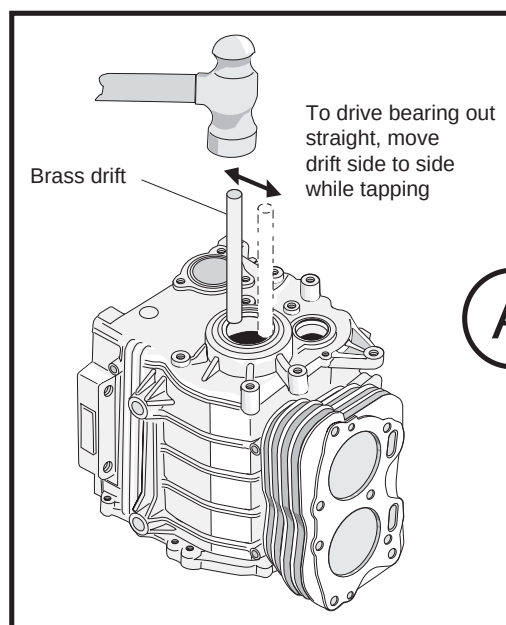
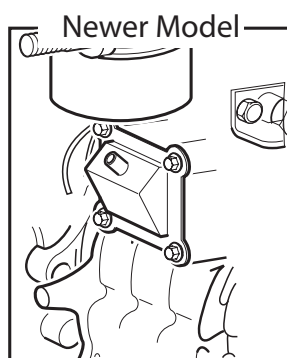


Fig. B-4 Balancer Shaft Bearing, Crankshaft Bearing and PCV Valve

ENGINE DISASSEMBLY

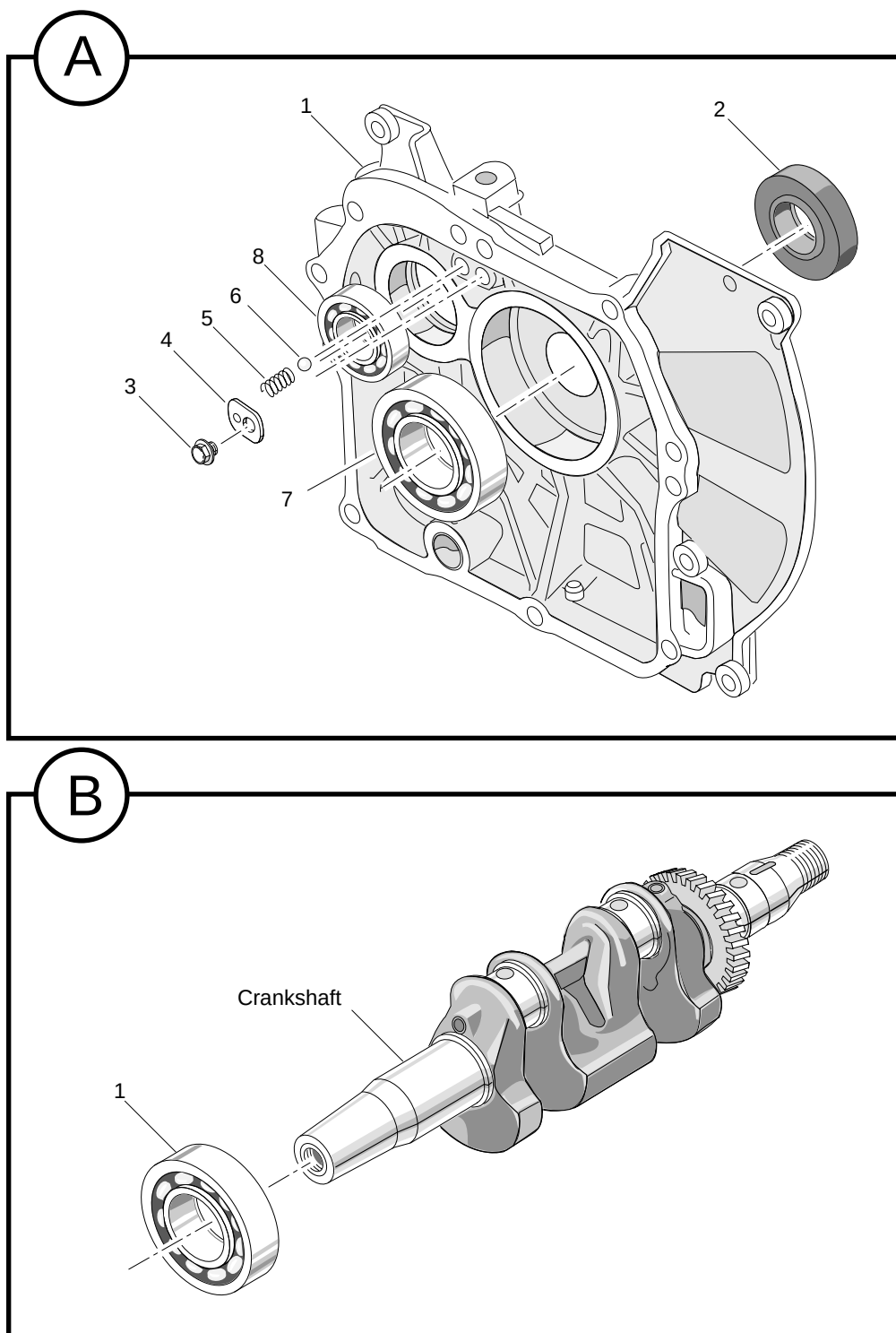
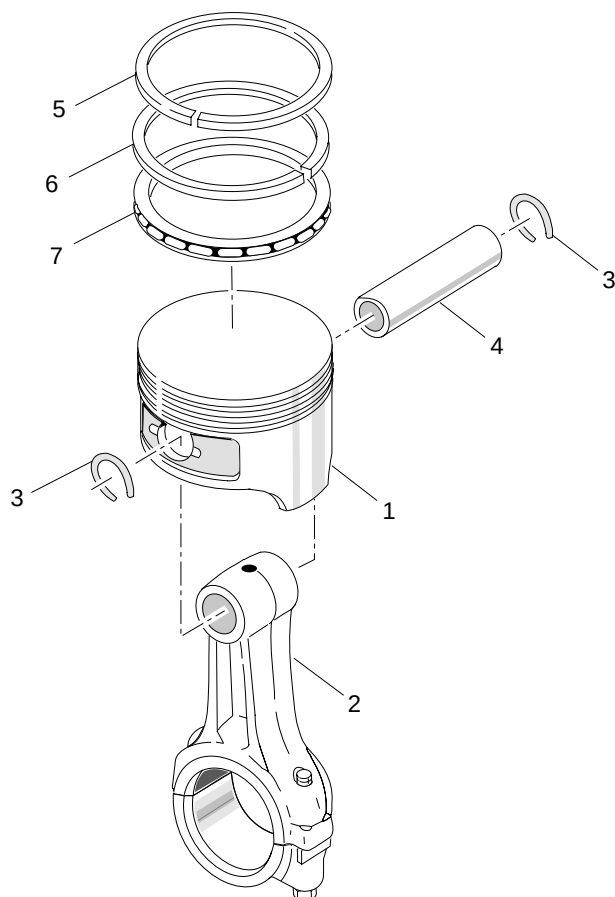
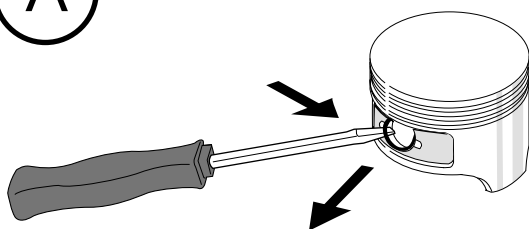


Fig. B-5 Crankcase End Cover and Crankshaft Bearing

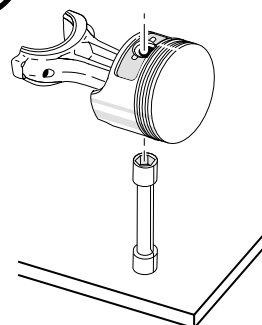


A

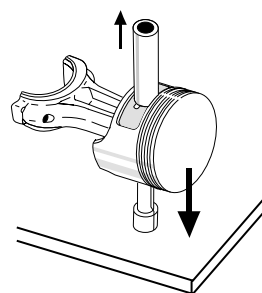


Insert screwdriver into slot and push to compress ring. Pry ring up and out of the retainer groove

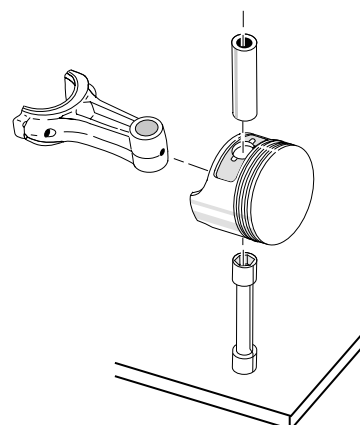
B



Insert a suitable mandrel into the pin bore of the piston



Press the piston down onto the mandrel, pushing the wrist pin out



Remove the piston from the connecting rod

Fig. B-6 Piston

ENGINE DISASSEMBLY

[illegible]

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ENGINE MEASUREMENTS

Notes:

ENGINE MEASUREMENTS AND SPECIFICATIONS

Tool List	Qty. Required
Calipers, dial	1
Gauge, depth	1
Gauge Set, feeler	1
Gauge Set, telescoping	1
Micrometer, 1"	1
Micrometer, 2"	1
Micrometer, 3"	1
Surface plate	1

CAUTION All engine parts must be thoroughly cleaned, and free of all dirt, oil, grease, carbon deposits or residue of any kind before beginning this section. It is especially important that your work area be clean and well organized while performing the operations described in this section.

NOTE In some cases, time may be saved by setting measuring instruments at limit specifications and using them as "go-no-go" fixtures. Check preset instrument fit in bores, on shafts, etc. to determine part acceptability. We recommend that parts bound to be acceptable but near limits be replaced if the engine will see high usage.

NOTE Check micrometers for proper calibration before beginning the operations described in this section.

Using Telescoping Gauges and Hole Gauges

(See Fig. C-1 "Using Telescoping and Hole Gauges" on page C-1)

Telescoping gauges and hole gauges are "transfer-type" measuring instruments. They are not calibrated and are used to record a distance which is then transferred to a micrometer for measurement.

Position the gauge in the hole or bore and "set" the telescoping arms or ball to its true diameter. Make sure that the handle of the gauge is in line with the centerline of the hole or bore.

Lock and remove the gauge. Measure its setting with a micrometer.

Check flatness of Crankcase, End Cover and Cylinder Head

(See Fig. C-1 "Using Telescoping and Hole Gauges" on page C-1)

CAUTION If flatness of a surface is found to be out of tolerance, the part must be machined or replaced. No more than .010 may be machined from

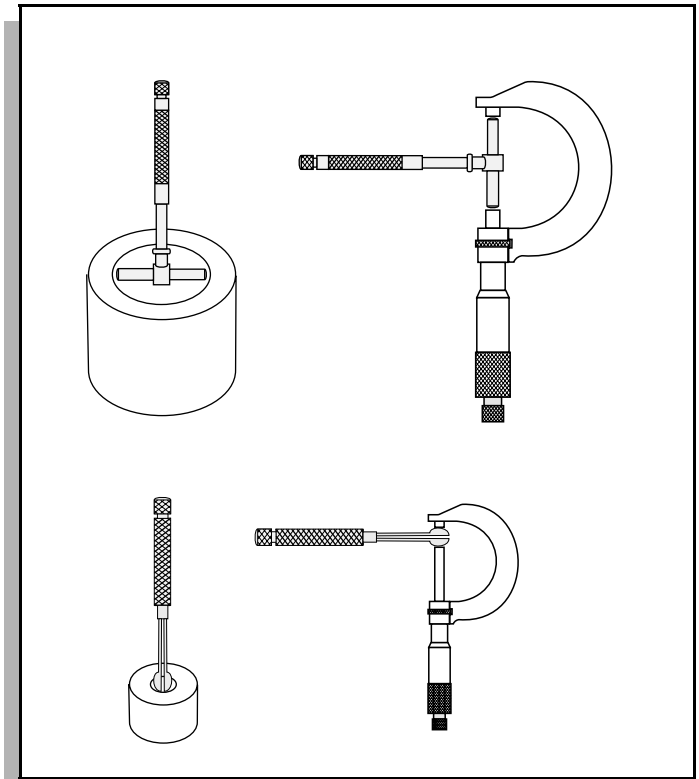


Fig. C-1 Using Telescoping and Hole Gauges

a surface. If warpage is in excess of .004, the part must be replaced.

- Place the crankcase on a surface plate with the mating surface for the end cover down. Be sure that all gasket material and dowel pins are removed.
- Use a .004 feeler gauge to determine if surface is within tolerance.
 - Try inserting the feeler gauge into all visible gaps between the crankcase and surface plate. If the gauge can be inserted, the surface is out of tolerance and must be machined or replaced. **No more than .010 may be machined from the surface. If warpage is in excess of .004, the crankcase must be replaced.**
- Turn the crankcase so that the mating surface for the cylinder head rests on the surface plate and check for flatness in the same manner.
- Place the crankcase end cover on the surface plate with the gasket surface down, and check for flatness.
- Place the cylinder head on the surface plate with the crankcase mating surface down, and check for flatness.

ENGINE MEASUREMENTS

- F. Turn the cylinder head so that the valve cover gasket surface rests on the surface plate. Check for flatness.

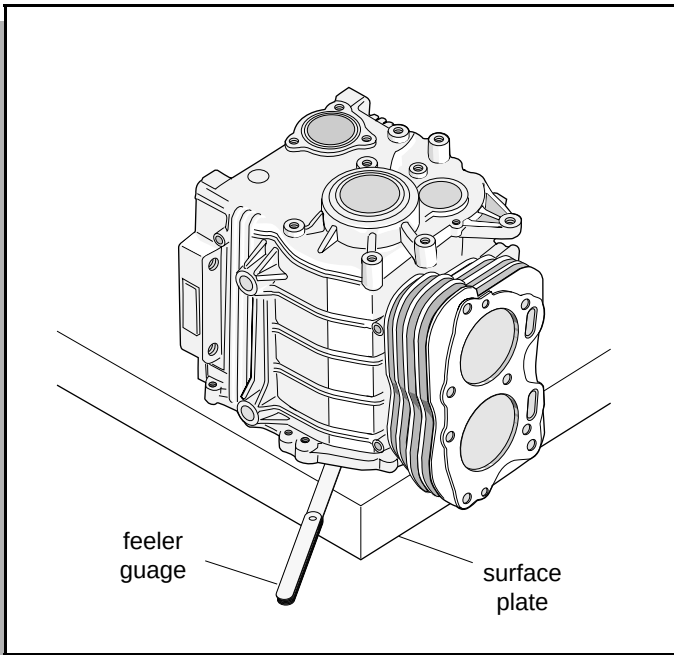


Fig. C-2 Flatness of Mating Surfaces

Crankcase Cylinder Bores

(See Fig. C-3 "Crankcase Cylinder Bores" on page C-4)

- Use a telescoping gauge to measure each cylinder bore at three (3) positions (DIMENSIONS A, B, AND C), in two (2) places each, 90° apart as shown.
- Inspect the cylinder wall surfaces for proper cross-hatched finish. (DETAIL A)

Crankcase and End Cover Crankshaft Bearing Bores

(See Fig. C-4 "Crankshaft Journals and Gear, and Bearing Bores" on page C-5)

- Using a telescoping gauge, measure the crankshaft bearing bores in the crankcase (DIMENSION A,B) in two (2) places, 90° apart.
- Using a telescoping gauge, measure the crankshaft bearing bore in the end cover (DIMENSION C) in two (2) places, 90° apart.

Crankshaft Journals and Gear

(See Fig. C-4 "Crankshaft Journals and Gear, and Bearing Bores" on page C-5)

NOTE

Measure crankshaft rod journals away from the oil holes in the journals.

- Measure the rod and bearing journal diameters (DIMENSIONS A, B, C, D, E, AND G), in two (2) places each, 90° apart. If rod journals are excessively rough, scored or out of round, replace the crankshaft. Minor scratches on journals can be carefully polished using extra fine emery cloth. Thoroughly clean crankshaft after polishing and reinspect journal diameters.
- Measure the oil seal surface diameters (DIMENSIONS H AND J) in two places each, 90° apart. Inspect for wear, roughness, or pitting. Replace crankshaft if below specified limit.
- If the bearing was removed from the crankshaft, measure the bearing journal (DIMENSION F) in two places, 90° apart.
- Inspect gear teeth and oil seal areas for excessive wear or damage.
- Inspect oil passage plug in end of crankshaft for damage.

Crankcase and End Cover Balancer Shaft Bearing Bores

(See Fig. C-6 "Balancer Shaft Journals, Gear and Bearing Bores" on page C-7)

- Use a telescoping gauge to measure the balancer shaft bearing bore in the crankcase (DIMENSION A) in two (2) places, 90° apart.
- Use a telescoping gauge to measure the balancer shaft bearing bore in the end cover (DIMENSION B) in two places, 90° apart.

Balancer Shaft Journals and Gear

(See Fig. C-6 "Balancer Shaft Journals, Gear and Bearing Bores" on page C-7)

- Measure the bearing journal diameters (DIMENSIONS A AND B) in two places each, 90° apart. Inspect gear teeth and oil seal areas for excessive wear or damage.

Piston

(See Fig. C-5 "Piston, Wrist Pin and Connecting Rod" on page C-6)

- Measure wrist pin bore (DIMENSION A) at two (2) places, 90° apart.
- Measure piston skirt (DIMENSION B) as shown.
- Measure piston ring grooves (DIMENSIONS C AND D) at several positions around the piston.

Wrist Pin

(See Fig. C-5 "Piston, Wrist Pin and Connecting Rod" on page C-6)

- A. Measure wrist pin outside diameter at three (3) positions (DIMENSIONS E, F AND G), in two (2) places each, 90° apart.

Connecting Rod

(See Fig. C-5 "Piston, Wrist Pin and Connecting Rod" on page C-6)

CAUTION Do not measure connecting rod wrist pin bore at oil hole, measure at each end of bore. Do not measure crankshaft journal at rod cap joint.

- A. Measure connecting rod pin bore (DIMENSION J) at each end, in two (2) places each, 90° apart.
- B. Tighten the rod cap bolts to specified torque, and measure the crankshaft journal (DIMENSION K) in two (2) places, 120° apart, as shown.

Cylinder Head Cam and Rocker Shaft Bores

(See Fig. C-7 "Cylinder Head Cam and Camshaft" on page C-8)

(See Fig. C-10 "Rocker Shaft, Arms, and Bearing Bores" on page C-11)

- A. Measure the camshaft bores at four (4) positions (DIMENSIONS A, B, C, and D), in two (2) places each, 90° apart.
- B. Measure the rocker shaft bores (DIMENSIONS E AND F) in two (2) places each, 90° apart.

Valve Guides and Seats

(See Fig. C-8 "Valve Guides and Seats" on page C-9)x

NOTE It is recommended that the cylinder head be carefully inspected before removing the valve guides. If other parts in the head show excessive wear, it may be more cost effective to replace the entire head than to replace parts. If the valve guides are to be replaced, the valve seats must be resurfaced with an appropriate cutter. A total difference of 1° between the finish angles of the valve and valve seat is desirable.

- A. Measure the inside diameter at each end of the valve guides (DIMENSIONS A AND B), in two (2) places each, 90° apart. If a valve guide is worn beyond service limits, it may be removed with a mechanical press. See NOTE above.
- B. Measure angle (DIMENSION C) and width (DIMENSION D) of the valve seat contact surface. If valve seats are worn beyond service limits, they may be resurfaced with an appropriate cutter.

Valves and Valve Springs

(See Fig. C-8 "Valve Guides and Seats" on page C-9)x

- A. Measure the valve stem at three (3) positions (DIMENSIONS A, B, and C), in two (2) places each, 90° apart.
- B. Measure angle (D) and widths (DIMENSION E AND F) of the valve face.
- C. Measure valve spring free length (DIMENSION G).

Camshaft

(See Fig. C-7 "Cylinder Head Cam and Camshaft" on page C-8)

- A. Measure the camshaft diameter at four (4) positions (DIMENSIONS A, B, G, AND H), in two (2) places each.
- B. Measure the height of all four cam lobes (DIMENSIONS C, D, E AND F).

Rocker Shaft and Rocker Arms

(See Fig. C-10 "Rocker Shaft, Arms, and Bearing Bores" on page C-11)

- A. Measure the rocker arm shaft bore in two (2) places, 90° apart, at each end of the bore (DIMENSION A).
- B. At positions along its length, including the rocker arm contacts, measure the outside diameter of the rocker shaft (DIMENSIONS B AND J) in two (2) places, 90° apart.
- C. Replace shaft if there are any signs of wear or abrasion.

Piston Ring Gap

(See Fig. C-11 "Piston Ring Gap" on page C-12)

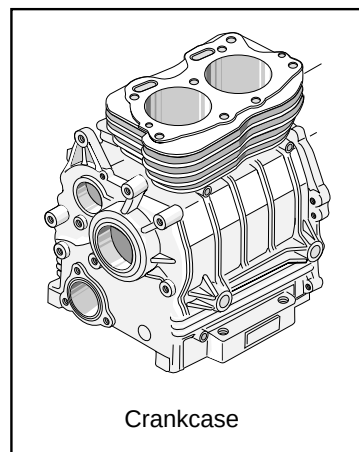
- A. Place the compression (top) ring in the cylinder bore as shown.
- B. Use an inverted piston to push the ring approximately one inch into the cylinder; make sure the ring is flat against its top before withdrawing the piston. This will leave the ring at 90° to the axis of the cylinder.
- C. Use a feeler gauge to measure the ring gap as shown.
- D. Measure each of the remaining rings in the same manner.

Torque Specifications (Wet)

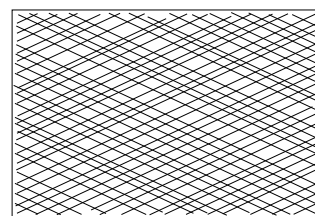
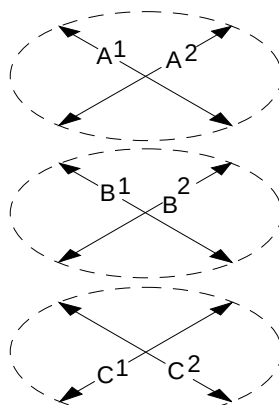
(See Fig. C-12 "Torque Specifications" on page C-13)

NOTE The torque table provided on Page 5 specifies "lubricated" torque figures. Fasteners that are plated or are lubricated when installed are considered "wet" and require approximately 80% of the torque required for "dry" fasteners.

ENGINE MEASUREMENTS

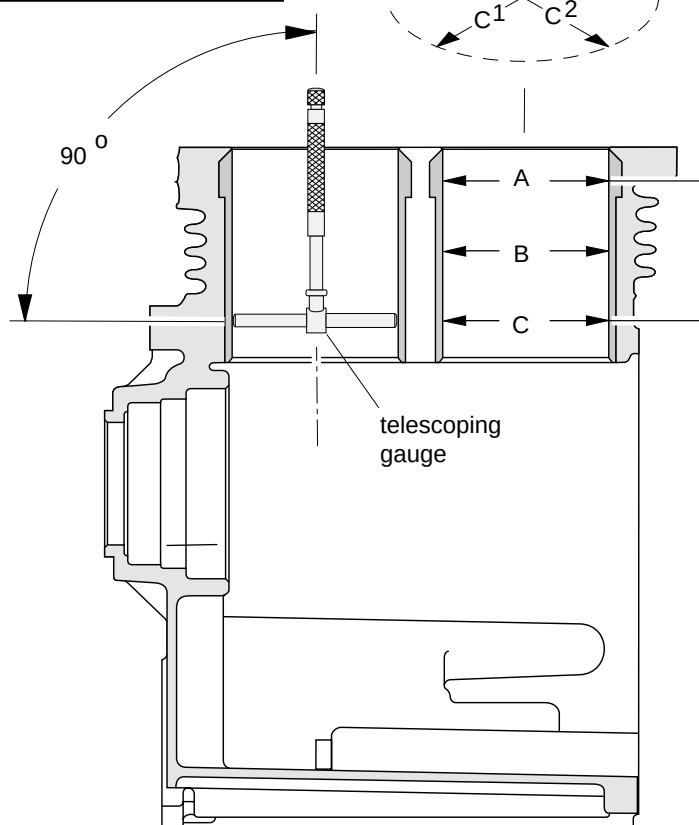


Measure each position in the cylinder bore at 2 places



A fine cross-hatched surface is the proper finish for a cylinder bore.

Detail A



If "A¹" exceeds "C¹", or if "A²" exceeds "C²" by 0.004" (.1mm), rebore the cylinder.

295cc	350cc
2.519"~2.520" STD. (64.000mm~64.019mm)	2.6378"~2.6385" STD. (67.000mm~67.019mm)

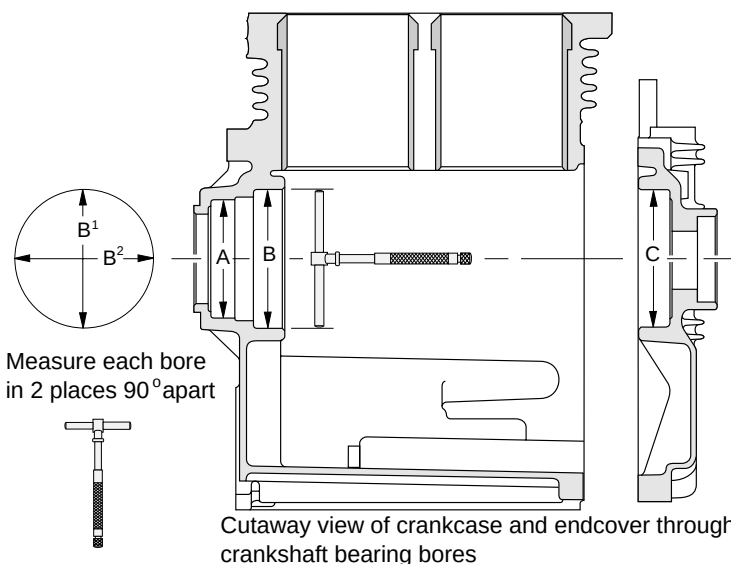
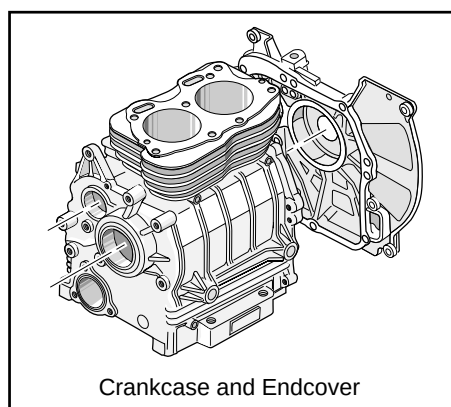
Cylinder bore dimension is determined by size of the piston to be used. If over size piston is used, "C" represents specified bore for that piston. Relative dimension for "A" remains valid.

.25mm and .50mm oversize pistons are available.

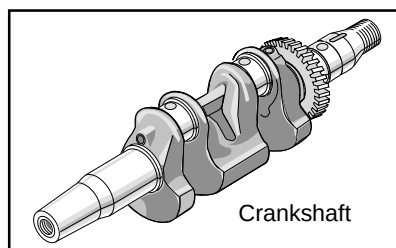
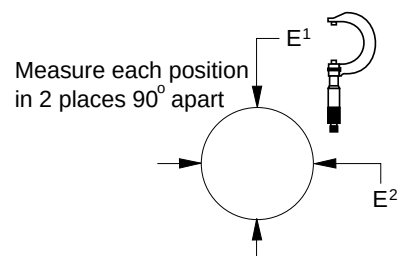
Cutaway view of crankcase at cylinder bores

Fig. C-3 Crankcase Cylinder Bores

ENGINE MEASUREMENTS



Recommended press fits:		Ball bearings onto crankshaft	Ball bearings into crankcase
(in)		(0.00024~0.00067)	(0.00067~0.0024)
(mm)		(0.006~0.017)	(0.017~0.060)
SPECS	A	B	C
STD. (in)	2.4386~2.4398	2.8347~2.8359	2.8322~2.8334
(mm)	(61.940~61.970)	(72.002~72.032)	(71.938~71.968)
LIMIT (in)	2.4405	2.8370	2.8340
(mm)	(61.99)	(72.06)	(71.985)



SPECS	A	B	C	D	E	G	F
STD. (in)	1.3767~1.3774	1.3774~1.3778	1.3774~1.3778	1.3782~1.3786	1.3767~1.3774	1.3774~1.3778	1.3782~1.3786
(mm)	(34.968~34.985)	(34.986~34.997)	(34.986~34.997)	(35.006~35.017)	(34.968~34.985)	(34.986~34.997)	(35.006~35.017)
LIMIT (in)	1.3757	1.3771	1.3771	1.3779	1.3757	1.3771	1.3779
(mm)	(34.945)	(34.980)	(34.980)	(35.001)	(34.945)	(34.980)	(35.001)

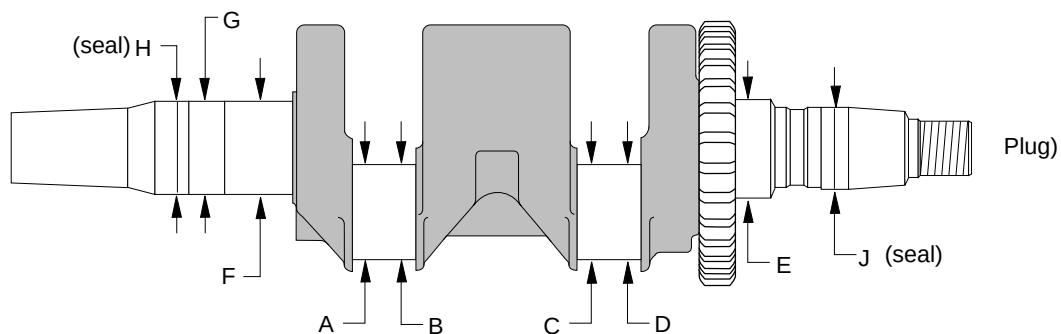
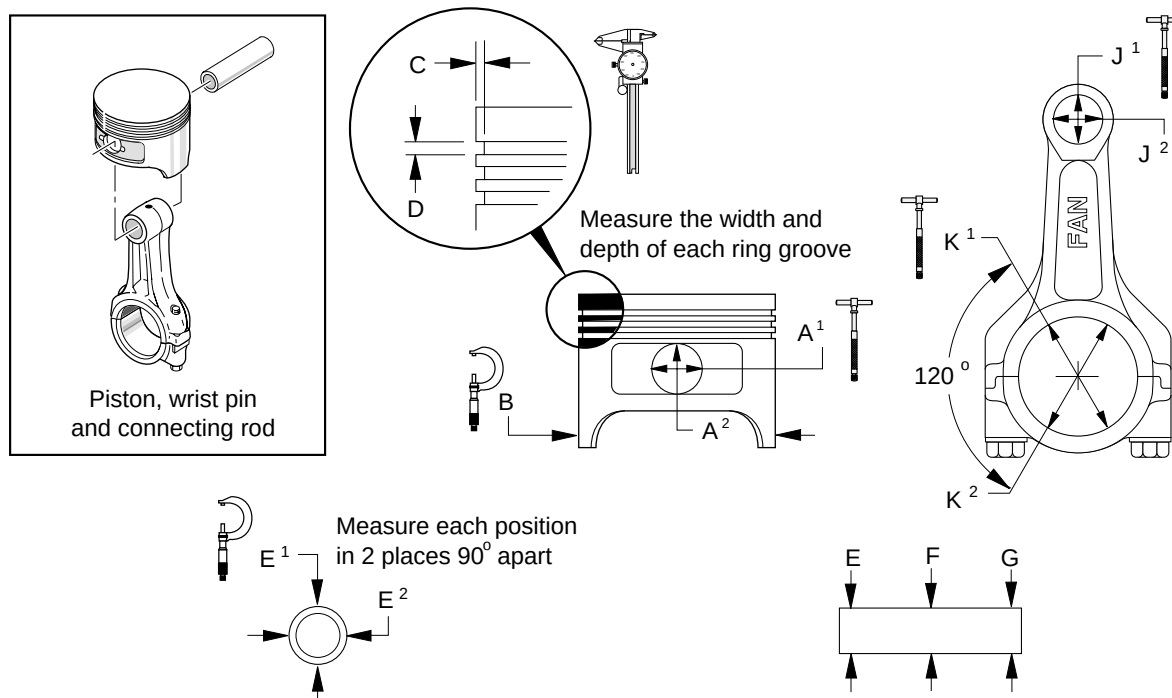


Fig. C-4 Crankshaft Journals and Gear, and Bearing Bores

ENGINE MEASUREMENTS

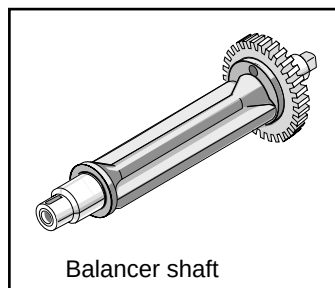
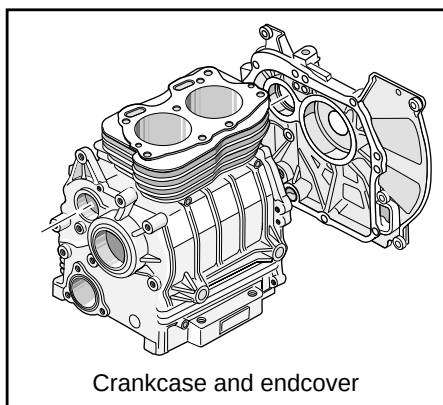


Recommended clearance for piston to cylinder wall (in) (mm)	New engine (0.0008 ~ 0.0023) (0.020 ~ 0.059)	Maximum wear limit (0.0039) (0.100)
Recommended clearance for connecting rod to crankshaft (in) (mm)	(.0006 ~ .0019) (0.015 ~ 0.047)	(0.0039) (0.100)
Recommended press fit for piston wrist pin (in) (mm)	(.00039 Loose ~ .00035 Tight) (0.010 Loose ~ 0.009 Tight)	(0.0019 Loose) (0.050 Loose)

SPECS	A	B (295 cc)	B (350 cc)	C			E F G	J	K
				ALL	TOP, MIDDLE	BOTTOM (OIL)			
STD. (in) (mm)	0.6296~0.6300 (15.991~16.002)	2.518~2.519 (63.960~63.980)	2.6362~2.6370 (66.960~66.980)	0.1043~0.1122 (2.65~2.85)	0.0598~0.0608 (1.520~1.545)	0.0988~1.0000 (2.510~2.540)	0.6296~0.6299 (15.992~16.000)	0.6303~0.6307 (16.010~16.021)	1.3780~1.3786 (35.000~35.016)
LIMIT (in) (mm)	0.6313 (16.035)	2.515 (63.870)	2.6327 (66.870)	—	0.0650 (1.65)	0.1043 (2.65)	0.6283 (15.960)	0.6331 (16.080)	1.3819 (35.100)
1 ST O/S (in) (mm)	0.6296~0.6300 (15.991~16.002)	2.528~2.529 (64.210~64.230)	2.6461~2.6469 (67.210~67.230)						
LIMIT (in) (mm)	0.6313 (16.035)	2.525 (64.120)	2.6425 (67.120)						
2 ND O/S (in) (mm)	0.6296~0.6300 (15.991~16.002)	2.538~2.539 (64.460~64.480)	2.6559~2.6567 (67.460~67.480)						
LIMIT (in) (mm)	0.6313 (16.035)	2.535 (64.370)	2.6524 (67.370)						

Fig. C-5 Piston, Wrist Pin and Connecting Rod

ENGINE MEASUREMENTS



SPECS		A B	C D
STD.	(in) (mm)	1.6516~1.6526 (41.950~41.975)	0.7869~0.7873 (19.988~19.997)
LIMIT	(in) (mm)	1.6531 (41.990)	0.7864 (19.975)

Recommended press fit for balance shaft bearing	
(in)	(0.0006~0.0020)
(mm)	(0.014~0.050)

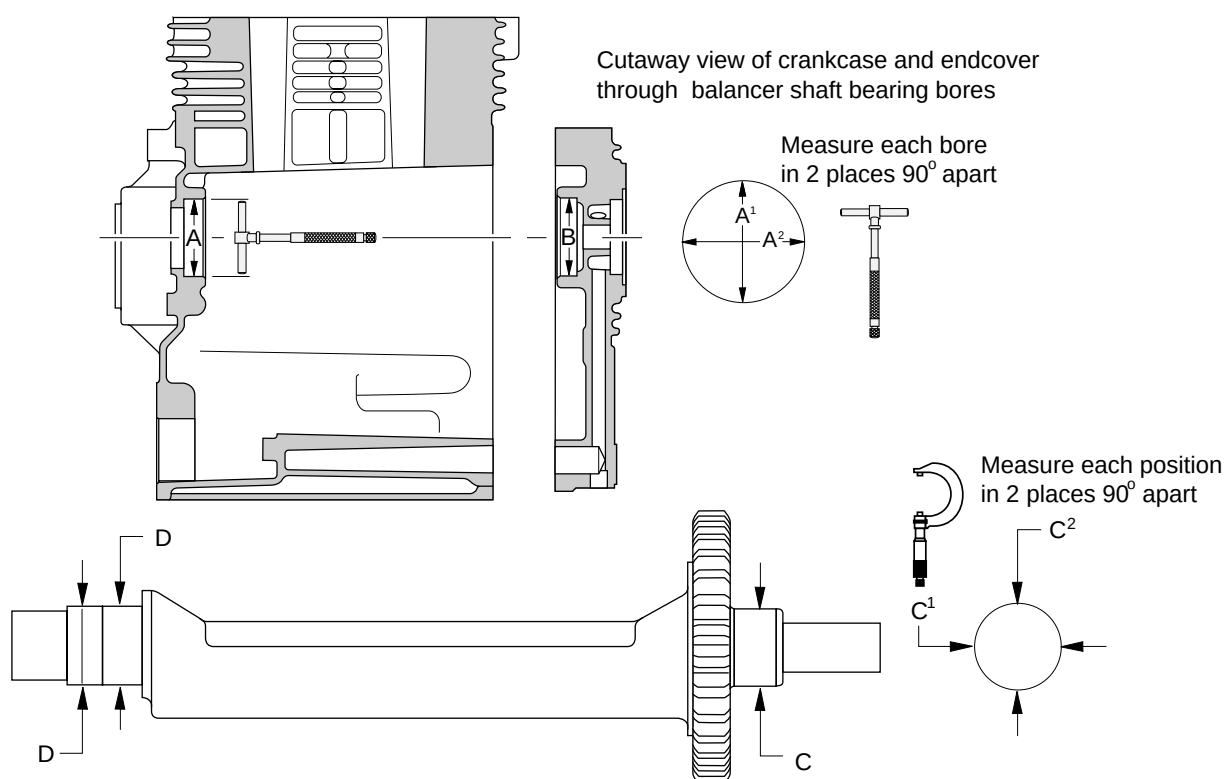
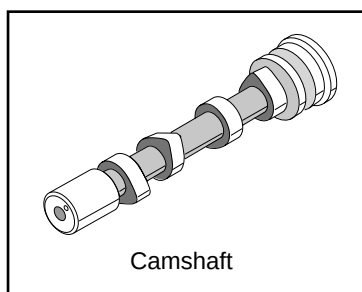
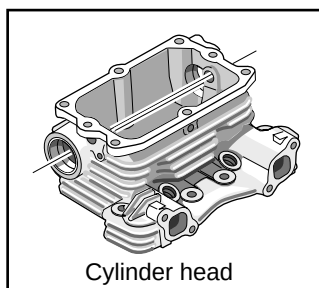


Fig. C-6 Balancer Shaft Journals, Gear and Bearing Bores

ENGINE MEASUREMENTS

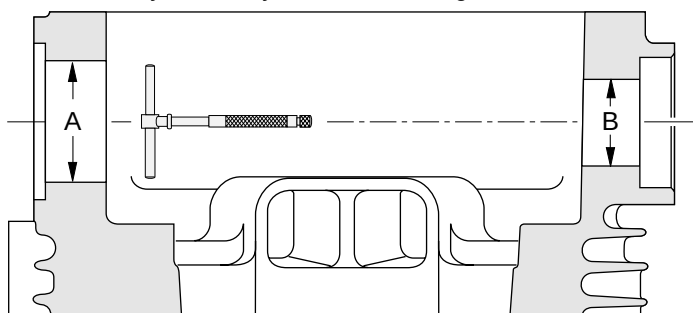


Recommended clearance for camshaft to cylinder head:

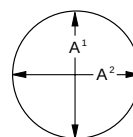
	Fan side	PTO Side
(in)	(0.00098~0.0030)	(0.00079~0.0024)
(mm)	(0.025~0.075)	(0.020~0.062)

SPECS	A	B	C D	E	F
STD. (in)	1.3780~1.3789	0.9843~0.9851	1.3760~1.3770	1.048~1.052	0.9826~0.9835
(mm)	(35.000~35.025)	(25.000~25.021)	(34.950~34.975)	(26.620~26.720)	(24.959~24.980)
LIMIT (in)	1.3805	0.9865	1.375	1.040	0.9816
(mm)	(35.065)	(25.057)	(34.925)	(26.420)	(24.935)

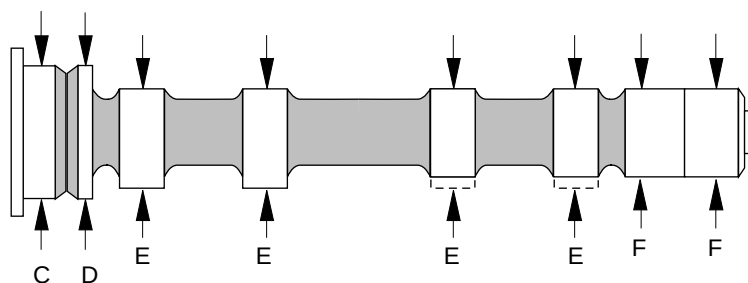
Cutaway view of cylinder head through camshaft



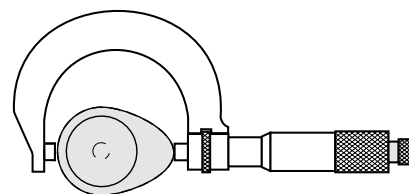
← Fan side



Typical: measure each bore
in 2 places 90° apart



← Fan side



Measure cam lobes as shown

Fig. C-7 Cylinder Head Cam and Camshaft

SPECS		A B	C	D
STD.	(in) (mm)	0.2165~0.2172 (5.500~5.518)	90°	0.0118~0.0295 (0.30~0.75)
LIMIT	(in) (mm)	0.2175 (5.525)	*	0.0591 (1.5)

* A total difference of 1° between the finish angles of the valve and valve seat is required.

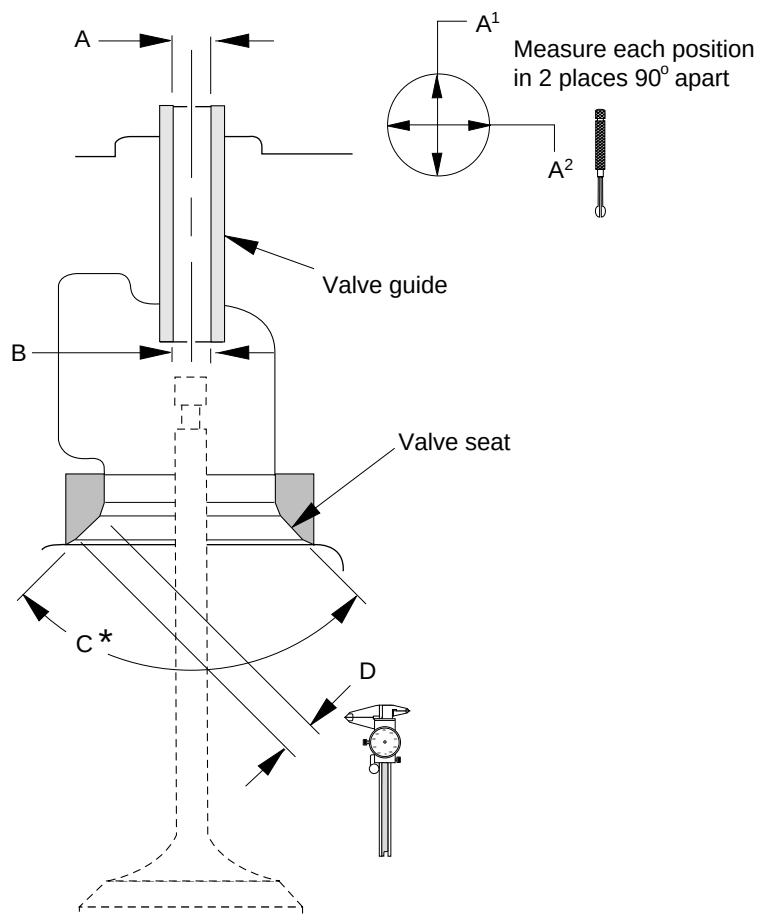
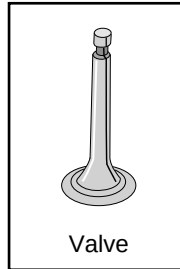


Fig. C-8 Valve Guides and Seats

ENGINE MEASUREMENTS



Recommended clearance for valve to valve guide		
	Intake	Exhaust
(in)	(0.0018~0.0030)	(0.0022~0.0036)
(mm)	(0.045~0.075)	(0.056~0.092)

SPECS		A B C		D	E	F
		Intake	Exhaust			
STD.	(in) (mm)	0.2143~0.2148 (5.443~5.455)	0.2136~0.2143 (5.426~5.444)	90°	0.0891~0.1281 (2.263~3.253)	0.0276~0.0354 (0.7~0.9)
LIMIT	(in) (mm)	0.2125 (5.40)	0.2125 (5.40)	*	0.1392 (3.536)	0.0197 (0.5)

* A total difference of 1° between the finish angles of the valve and valve seat is required.

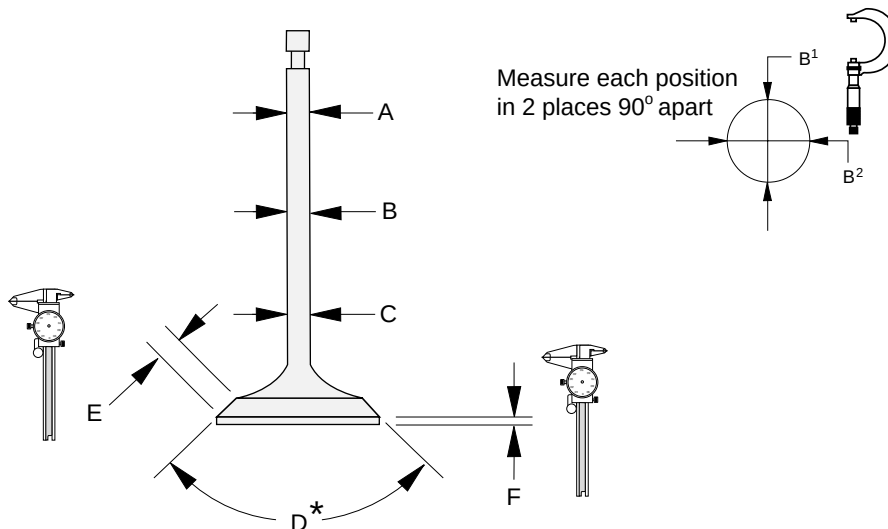
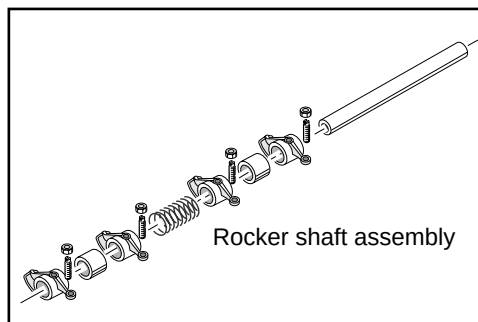
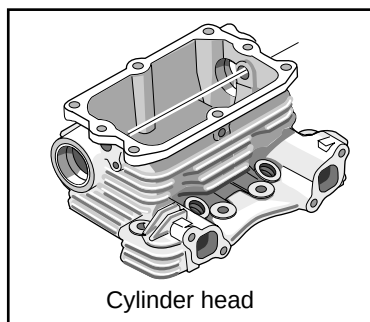
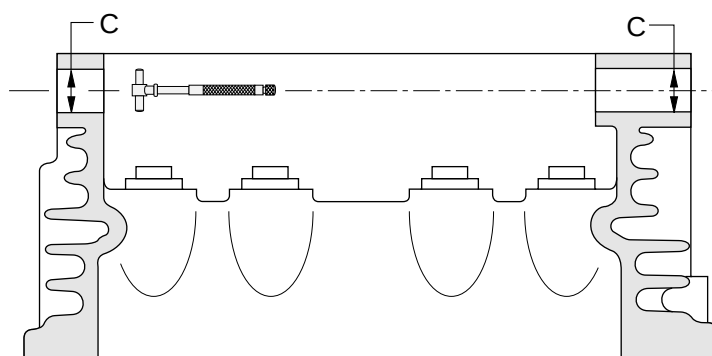


Fig. C-9 Valve and Valve Springs

ENGINE MEASUREMENTS

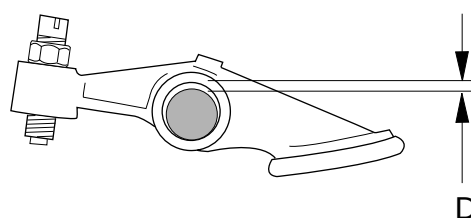
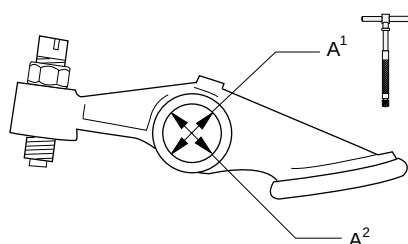
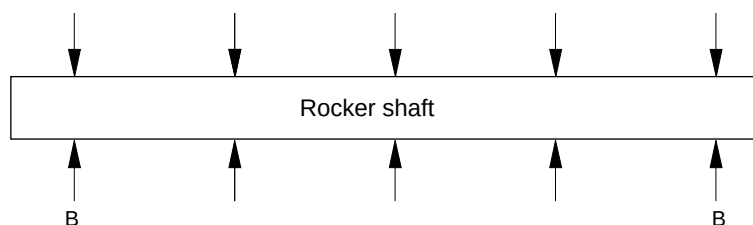
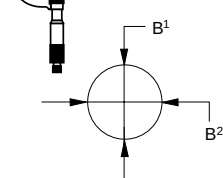


SPECS		A	B	C	D Clearance	Shaft to head Clearance
STD.	(in) (mm)	0.4724~0.4731 (12.000~12.018)	0.4711~0.4718 (11.966~11.984)	0.4724~0.4731 (12.000~12.018)	0.0006~0.0020 (0.016~0.052)	0.0006~0.0020 (0.016~0.052)
LIMIT	(in) (mm)	0.4748 (12.060)	0.4704 (11.950)	0.4746 (12.055)	0.0039 (0.100)	0.0041 (0.105)



Fan side →

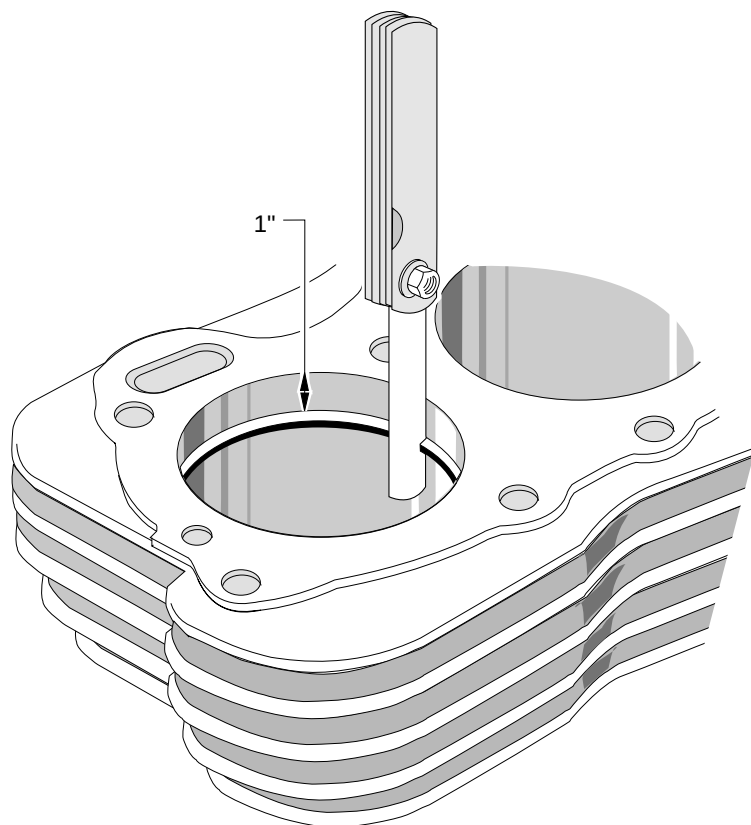
Measure each position
in 2 places 90° apart



(Shaft/arm clearance)

Fig. C-10 Rocker Shaft, Arms, and Bearing Bores

ENGINE MEASUREMENTS



Recommended clearances for piston ring end gap		EH29C 295 CC (64 MM BORE)	EH35C 350 CC (67 MM BORE)	
Top ring	(in) (mm)	(0.008~0.016) (0.20~0.40)	(0.006~0.010) (0.15~0.25)	
2nd Ring	(in) (mm)	(0.008~0.016) (0.20~0.40)	(0.006~0.012) (0.15~0.30)	
Oil ring				
3 Piece	(in) (mm)	(0.008~0.028) (0.20~0.70)	(0.004~0.024) (0.10~0.60)	
1 Piece	(in) (mm)	(0.008~0.016) (0.20~0.40)	—	

Ring end gap		Compression (Top)	Wiper (Middle)	* Oil (Bottom)	
				3 Piece	1 Piece
STD.	(in) (mm)	0.008~0.016 (0.2~0.4)	0.008~0.016 (0.2~0.4)	0.008~0.028 (0.2~0.7)	0.008~0.016 (0.2~0.4)
LIMIT	(in) (mm)	0.040 (1.0)	0.040 (1.0)	0.040 (1.0)	0.040 (1.0)

* Note: Engines are shipped from the factory with three piece oil rings.
Rebuild rings are special one piece design for convenience.

Fig. C-11 Piston Ring Gap

ENGINE MEASUREMENTS

DESCRIPTION		TIGHTENING TORQUE		
		ft / lb	kg / cm	N / m
Cylinder head bolts		16.6~19.5	230~270	22.5~26.5
Connecting rod cap bolts		12.3~14.5	170~200	16.7~19.6
Fan hub nut		43.4~47.0	600~650	58.8~63.7
Crankcase end-cover bolts	6mm	5.8~7.2	80~100	7.8~9.8
	8mm	12.3~13.7	170~190	16.7~18.6
Spark plug	New plug	8.7~10.9	120~150	11.8~14.7
	Retightening	16.6~19.5	230~270	22.5~26.5
Oil drain plug		14.5~16.6	200~230	19.6~22.5
Drive gear bolt		5.8~7.2	80~100	7.8~9.8
Cam gear bolt		16.6~19.5	230~270	22.5~26.5
Rocker arm nut		5.8~7.2	80~100	7.8~9.8
Others	6mm	4.3~5.8	60~80	5.9~7.8
	8mm	10.1~13.0	140~180	13.7~17.6

Fig. C-12 Torque Specifications

ENGINE MEASUREMENTS

Notes:

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ENGINE REASSEMBLY

[illegible]

'CRANKCASE ASSEMBLY

Tool List	Qty. Required
Compressor, piston ring	1
Drill, electric	1
Gauge, feeler (E-Z-GO P/N 72525-G01)	1
Gauge, wire spark plug	1
Flex Hone, ball, 240 grit, 2 1/2 "cylinder (E-Z-GO P/N 72517-G01)	1
Installer, piston ring (E-Z-GO P/N 72521-G01)	1
Engine assembly lube, 8 oz. (E-Z-GO P/N 72515-G01	AR
Brush, cylinder cleaning, 2 1/2" (E-Z-GO P/N 72519-G01)	1
Oil, cylinder honing (E-Z-GO P/N 72518-G01)	1
Extension, 3/8" drive, 4"	1
Extension, 3/8" drive, 6"	1
Mallet, medium wood or rubber	1
Cam pulley alignment tool (E-Z-GO P/N 27851-G01)	1
Punch, non-ferrous	1
Ratchet, 3/8" drive.....	1
Screwdriver, small flat blade	1
Screwdriver, medium flat blade	1
Screwdriver, #2 phillips	1
Screwdriver, #3 phillips	1
Socket, 8 mm, 3/8" drive	1
Socket, 10 mm, 3/8" drive	1
Socket, 12 mm, 3/8" drive	1
Socket, oil pressure switch	1
Socket, 13/16" spark plug, 3/8" drive	1
Wrench, 7 mm combination	1
Wrench, 10 mm combination	1
Wrench 12 mm combination	1
Wrench, torque, Inch and Ft. Lbs.....	1

NOTE If the engine is not going to be put back into service immediately, completely coat all internal engine components with assembly lube. Tape intake and exhaust openings.

CAUTION

Prior to engine reassembly, all parts must be thoroughly cleaned; free of dirt, oil, grease, carbon deposits, or residue of any kind; free of nicks, burrs, or damage of any kind to wear surfaces; and inspected for excessive wear. Parts that are damaged or are not within dimensional specifications should be replaced (or machined if applicable). We recommend that parts found to be acceptable but near limits be replaced if the engine will see high usage.

Because some mating parts with wear surfaces were machined together when the engine was manufactured, or have established wear patterns during operation, the reassembly of engine parts in their original positions and orientations with their original mating parts is critical to the performance and life expectancy of the engine.

When tightening (torquing) a number of screws or bolts in a given pattern, tighten them in two stages. Tighten them to 1/2 of specified torque in one pass through the pattern, and then to specified torque on the second pass.

NOTE

All 4-cycle engine fasteners are plated, and some are lubricated when installed. They are considered "wet" and require approximately 80% of the specified torque of dry fasteners.

Hone the Crankcase Cylinder Bore

(See Fig. D-1 "Crankcase Cylinder" on page D-6)

- A. Hone the cylinder bores only if new piston rings are to be installed.

CAUTION

Make sure that all carbon residue has been removed from the cylinder walls before honing.

- B. Install the crankcase end cover as shown in Fig. D-9.
C. Secure the crankcase to the work surface.
D. Lightly coat the cylinder bore with honing oil.
E. Insert the hone and adjust the speed and stroke rate until a 30 - 50 cross hatch angle is achieved.
F. Allow the hone to stop within the bore before removing the hone
G. Clean the bore with a brush and shop solvent.
H. Measure the bore.

Reassemble the Pistons and Connecting Rods

(See Fig. D-2 "Piston and Connecting Rods" on page D-7)

CAUTION

It is critical to the performance and life expectancy of the engine that parts be assembled in their original positions with their original mating parts.

ENGINE REASSEMBLY

- A. Apply a coat of assembly lube to the exterior surface of the wrist pin (ITEM 1) and to the wrist pin bores in the connecting rod (ITEM 2) and piston (ITEM 3).
- B. Insert the wrist pin through the pin bore on one side of the piston, allowing it to protrude slightly into the interior of the piston.
- C. *With the word "FAN" on the connecting rod oriented toward the letters "DF" on the top of the piston*, slide the rod onto the end of the wrist pin protruding into the interior of the piston. Continue pushing the wrist pin through the piston and into the opposing bore.
- D. Install the wrist pin retaining rings (ITEM 4).
 1. Insert a portion of a wrist pin retaining ring into the groove at the mouth of the wrist pin bore in the piston. Use a flat blade screwdriver to push the remainder of the ring into the groove. (DETAIL A)
 2. Use a suitable mandrel to push the wrist pin against the retaining ring from the opposite side of the piston. (DETAIL B)
 3. Repeat step 1 to install the second wrist pin retaining ring.

Install the Piston Rings

(See Fig. D-2 "Piston and Connecting Rods" on page D-7)

(See Fig. D-3 "Pistons and Connecting Rods con't" on page D-8)

NOTE Original oil rings are three piece design. A single oil ring is provided as a service replacement.

CAUTION Piston ring grooves must be clean. Reassemble the pistons with new piston rings. Position the top ring gap at 45° to the axis of the wrist pin.

- A. Apply a light coat of engine oil to the piston rings, and lands.
- B. Install the oil ring (ITEM 5).
 1. If desired, use piston ring installer or insert one end of the oil ring into the bottom groove on the piston, leaving the other end resting on top of the piston. Work the rest of the ring into the groove while rotating the piston. (DETAIL D)
- C. Install the "wiper" ring (ITEM 6), with the "N" facing up, in the middle groove with the ring gap at 120° to the top scraper of the oil ring. (DETAIL C)

- D. Install the compression ring (ITEM 7), with the "N" facing up, in the top groove with the ring gap at 120° Fahrenheit to the wiper ring. (DETAIL C)

Reassemble the Crankcase End Cover

(See Fig. D-4 "Crankcase End Cover, PCV Valve and Oil Filter" on page D-9)

CAUTION Reassemble the end cover with new balancer shaft and crankshaft bearings if the original bearings were removed. If the bearings can be installed in the end cover by hand, without heating the end cover, the end cover and crankcase must be replaced.

- A. If the original crankshaft bearing (ITEM 2) and balancer shaft bearing (ITEM 3) have been removed, install *NEW* ones. (DETAIL A)
 1. Use an oven to evenly heat the end cover to 200°+ Fahrenheit.
 2. Before the end cover (ITEM 1) cools, install a *new* crankshaft bearing (ITEM 2) and *new* balancer shaft bearing (ITEM 3) into the cover.
 3. Allow the cover to cool, then lubricate the bearing races with assembly lube.
- B. Reassemble the oil pump check valve.
 1. Coat the check ball (ITEM 4) with engine oil and install it into the cover.
 2. Install the spring (ITEM 5) over the check ball.
 3. Set the valve cover plate (ITEM 6) in place with the bleed hole over the spring. Hold the plate down and install and tighten the bolt (ITEM 7, M6x1.0x8L, 10mm socket) to specified torque. Use 262 Loctite on the bolt; do not allow any to get on the ball or spring.
- C. Using a seal installation tool, install a *NEW* crankshaft seal (ITEM 8).

Install New Crankcase Bearing

(See Fig. D-5 "Crankshaft, Pistons and Balancer Shaft" on page D-10)

CAUTION If the bearings can be installed by hand, without a press or heating the crankcase, the crankcase and end cover must be replaced.

- A. If the original bearings were removed, use a mechanical press or heat the crankcase in an oven to 200° Fahrenheit to install a new crankshaft bearing (ITEM 1) and new balancer shaft bearing (ITEM 2) into the crankcase (ITEM 3).

Install New Crankshaft Bearing

(See Fig. D-6 "Crankshaft, Pistons and Balancer Shaft con't" on page D-11)

CAUTION Press only against the inner race of the bearing when installing it on the shaft.

- A. If the bearing (ITEM 4) was removed from the crankshaft (ITEM 5), use a mechanical press to install a new bearing. (DETAIL A)

Install New Crankshaft Seal

(See Fig. D-5 "Crankshaft, Pistons and Balancer Shaft" on page D-10)

- A. Using a seal installation tool, install a **new** crankshaft seal (ITEM 6) and **new** balancer shaft seal (ITEM 7) into the crankcase. Lubricate the rubber inside diameters of the seals with engine oil.

Install Crankshaft into Crankcase

(See Fig. D-6 "Crankshaft, Pistons and Balancer Shaft con't" on page D-11)

CAUTION Be careful not to damage the seal while installing crankshaft.

- A. Insert the crankshaft, PTO end first, through the interior of the crankcase, into the bearing, and through the seal. **DO NOT DAMAGE THE SEAL.** Seat the shaft bearing in the bearing bore, and make sure that the shaft rotates freely.
- B. Lubricate the crankshaft journals and gear with engine oil, use a "squirt" type oil can to fill the crankshaft oil passages with engine oil. (DETAIL A)

Install the Pistons in the Crankcase

(See Fig. D-3 "Pistons and Connecting Rods con't" on page D-8)

(See Fig. D-5 "Crankshaft, Pistons and Balancer Shaft" on page D-10)

(See Fig. D-6 "Crankshaft, Pistons and Balancer Shaft con't" on page D-11)

CAUTION It is critical that piston assemblies are properly oriented and installed in their original positions on the crankshaft.

- A. Remove the cap (ITEM 9) from the PTO (clutch) side connecting rod (ITEM 10). Apply a coat of assembly lube to the rod and cap bearing surfaces, and lightly oil the sides of the piston, rings, (ITEM 8) and cylinder bore. **KEEP LUBRICANT OFF OF THE MATING SURFACES OF THE ROD AND ROD CAP.**
- B. Make sure that the piston ring gaps are correctly positioned on the piston. (DETAIL C)

- C. Install a piston ring compressor on the piston, leaving enough of the piston skirt protruding below the compressor to start into the cylinder. (DETAIL B)
- D. With the word "FAN", on the connecting rod, oriented toward the open side of the crankcase, and the crankshaft at bottom dead center, insert the piston into the PTO (clutch) side cylinder.
- E. Reach into the crankcase and guide the rod onto the crankshaft journal while lightly tapping the piston head through the ring compressor and into the cylinder with a small *wooden or rubber* mallet.
- F. Seat the rod on the crankshaft journal, and attach the rod cap (ITEM 9).
 - 1. Lubricate the wear surface of the cap with assembly lube.
 - 2. With the alignment notch on the cap facing out, snap the cap onto the rod.
 - 3. Install and tighten to specified torque two (2) bolts (ITEM 11, 10mm socket).
- G. Repeat steps A - F to install the second piston.

Install the Balancer Shaft

(See Fig. D-6 "Crankshaft, Pistons and Balancer Shaft con't" on page D-11)

CAUTION The crankshaft and balancer shaft gears must be aligned properly when assembled in order to set engine valve timing.

- A. Lubricate the balancer shaft gear with assembly lube.
- B. Insert the keyway end of the balancer shaft into the balancer shaft bearing in the crankcase. *Position the single dot on the crankshaft gear face between the two dots on the balancer gear face before meshing the gears and seating the balancer shaft in the balancer shaft bearing.* (DETAIL C)

Set the Crankshaft and Balancer Shaft Endplay

(See Fig. D-7 "Crankshaft and Balancer Shaft Endplay" on page D-12)

- A. Position the crankcase, with the open end up, on a box or other surface that will leave the PTO (clutch) end of the crankshaft free from any contact or pressure.
- B. Make sure the crankshaft and balancer shaft are completely seated, and that their gear faces are perfectly flush.

ENGINE REASSEMBLY

- C. Using a depth gauge and straight edge, measure the distance from the gasket surface of the crankcase to the faces of both the crankshaft and balancer shaft gears close to the shafts, then subtract the width of the straight edge from each measurement.
- D. Using a depth gauge and straight edge, measure the distance from the gasket surface of the end cover to the inner races of both end cover bearings, then subtract the width of the straight edge from each measurement.
- E. Add the figures from steps C. and D., plus .005 (gasket thickness) for each shaft. Subtract from each figure the thickness of its spacer to find the clearance for each shaft. If either clearance is not between .003 and .015, replace the spacer to achieve correct endplay.

Install Crankshaft Endplay Spacer and Balancer Endplay Spacer

(See Fig. D-5 "Crankshaft, Pistons and Balancer Shaft" on page D-10)

- A. Place the Crankshaft endplay spacer (ITEM 13) on the crankshaft, and the balancer endplay spacer (ITEM 14) on the balancer shaft.

Install Alignment Dowel Pins

(See Fig. D-8 "Oil Pump Gear Rotors, Oil Pressure Switch, Pulser Coil and Fan Hub" on page D-13)

Install alignment dowel pins (ITEM 25).

Install New Oil Feed O-Ring

(See Fig. D-8 "Oil Pump Gear Rotors, Oil Pressure Switch, Pulser Coil and Fan Hub" on page D-13)

- A. Install a new oil feed O-ring (ITEM 1).

Install Crankcase End Cover Gasket

(See Fig. D-8 "Oil Pump Gear Rotors, Oil Pressure Switch, Pulser Coil and Fan Hub" on page D-13)

- A. Place a **new** crankcase end cover gasket (ITEM 2) on the end cover alignment dowel pins (ITEM 25).

Install the Crankcase End Cover

(See Fig. D-8 "Oil Pump Gear Rotors, Oil Pressure Switch, Pulser Coil and Fan Hub" on page D-13)

(See Fig. D-9 "Oil Pump Gear Rotors, Oil Pressure Switch, Pulser Coil and Fan Hub con't" on page D-14)

- A. Lift the crankcase end cover into position, and with the balancer shaft and crankshaft started into their bearings in the cover, place the end cover on the crankcase alignment dowels and gently work it down until it rests against the crankcase. Be careful not to damage oil seals.

- B. Install the end cover mounting bolts.

1. Start two (2) bolts (ITEM 4, M8x1.25x30L, 12mm socket) with lock washers (ITEM 5) and six (6) bolts (ITEM 6, M6x1.0x30L, 10mm socket) with lock washers (ITEM 7), and snug them in the order shown. (DETAIL A)
2. In the same order, tighten the bolts to 1/2 of specified torque. Repeat the sequence, tightening the bolts to specified torque.

Install the Oil Pump Gear Rotors

(See Fig. D-8 "Oil Pump Gear Rotors, Oil Pressure Switch, Pulser Coil and Fan Hub" on page D-13)

- A. Coat the internal gear rotor (ITEM 8) with engine oil and place it on the rotor shaft in the pump bore.
- B. Lubricate the external gear rotor (ITEM 9) with engine oil and place it in the pump bore.
- C. Install a new O-ring (ITEM 10) in the ring groove.
- D. Hold the oil pump cover (ITEM 11) in place. Install and tighten three (3) mounting bolts with lock washers (ITEM 12, M6x1.0x12L, 10mm socket) to specified torque.

Install the Oil Pressure Switch

(See Fig. D-8 "Oil Pump Gear Rotors, Oil Pressure Switch, Pulser Coil and Fan Hub" on page D-13)

- A. Apply a small amount of pipe sealer or teflon tape to the switch threads.
- B. Use an oil pressure switch socket to install and snug the switch.
- C. Use a 7mm socket to attach the switch wire (ITEM 14) and mounting screw (ITEM 15, M4x.4x6L) with lock washer (ITEM 16).

Install the Pulser Coil

(See Fig. D-8 "Oil Pump Gear Rotors, Oil Pressure Switch, Pulser Coil and Fan Hub" on page D-13)

- A. Hold the pulser coil (ITEM 17) in place and start the two (2) mounting screws (ITEM 18, M5x0.8x10L, 8mm socket) with lock washers (ITEM 19).
- B. Snug the mounting screws using an 8mm socket.

Install the Fan Hub

(See Fig. D-8 "Oil Pump Gear Rotors, Oil Pressure Switch, Pulser Coil and Fan Hub" on page D-13)

(See Fig. D-9 "Oil Pump Gear Rotors, Oil Pressure Switch, Pulser Coil and Fan Hub con't" on page D-14)

- A. Install the fan hub alignment key (ITEM 21).

1. Place key in the keyway on the crankshaft spindle. Use a brass drift to tap it into position. (DETAIL B)
- B. Align the slot in the fan hub with the key and slide the fan hub onto the crankshaft.
- C. Install the fan hub nut (ITEM 22, M22x1.5). Tighten the nut to specified torque using a 30mm socket.

Set the Pulser Coil Air Gap

(See Fig. D-10 "Pulser Coil Air Gap" on page D-15)

- A. Insert a #2 phillips screwdriver through the one of the holes in the fan as shown, and loosen the pulser coil mounting screws.
- B. From the side, insert a long .020 - .039 feeler gauge between the pulser coil and fan hub.
- C. Press the pulser coil lightly until the feeler gauge is snug between it and the fan hub. Hold the pulser coil in this position and tighten the mounting screws.

Install the PVC Valve

(See Fig. D-4 "Crankcase End Cover, PCV Valve and Oil Filter" on page D-9)

- A. Install the gaskets, PCV plate, valve and PCV cover (ITEMS 4 - 9) into the PCV port in the crankcase. Match the contour of the plate with the contour of the port for correct orientation.
- B. Hold the PCV cover (ITEM 9) in place and start two (2) bolts (ITEM 3, M6x10x18L). Tighten the bolts to specified torque using a 10mm socket. Install return hose (ITEM 10).

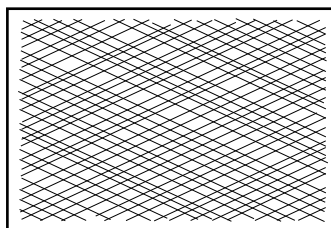
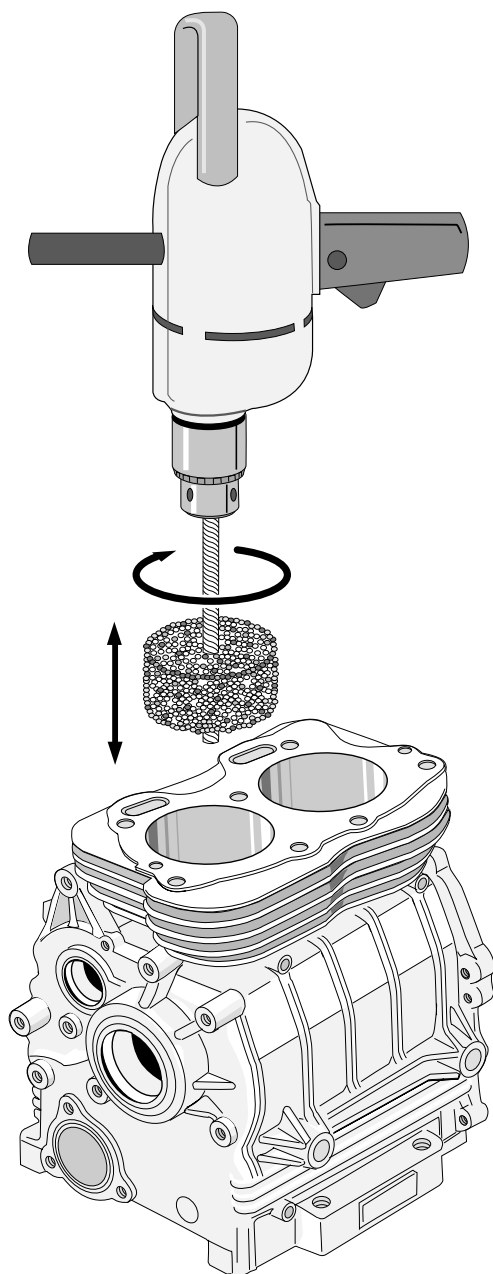
Install the Oil Filter

(See Fig. D-4 "Crankcase End Cover, PCV Valve and Oil Filter" on page D-9)

(Later models have a new mesh design for the oil filter, it is not necessary to replace the oil filter unless damage has occurred to the existing filter)

- A. Lubricate the small O-ring in the tip of the filter with engine oil.
- B. Install a new O-ring (ITEM 6) in the ring groove.
- C. Insert the filter (ITEM 5), and with a twisting motion, gently push the tip onto the guide boss inside the crankcase until the plate is flush against the crankcase. **Do not use the mounting bolts to pull it into position against the crankcase.**
- D. Align the mounting holes with the holes in the crankcase and start three (3) bolts with washers (ITEM 7, M6x1.0x12L). Tighten the bolts to specified torque with 10mm socket.

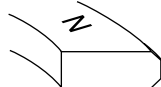
ENGINE REASSEMBLY



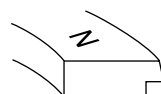
An electric drill is used to rotate the honing tool while steadily moving it up and down inside the cylinder. Generally, the faster the rpm of tool, the faster the up and down motion in the cylinder. Beads should not be permitted to extend out of the cylinder, as uneven wearing of the beads may occur. The desired result is a finely cross-hatched surface pattern as shown above.

Fig. D-1 Crankcase Cylinder

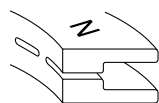
Service piston rings
profile view at gap



Compression ring
(TOP)

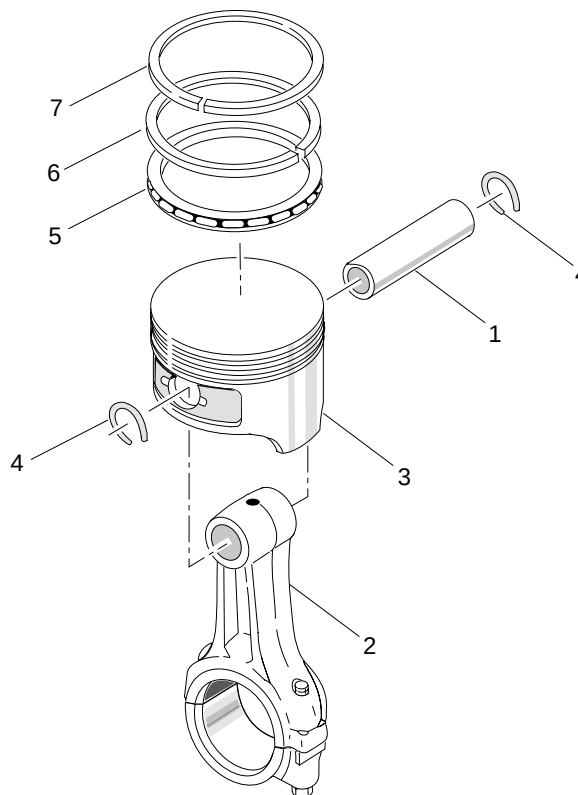


Wiper ring
(MIDDLE)

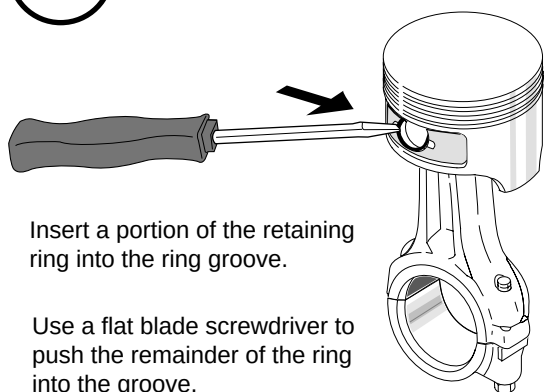


Oil ring
(BOTTOM)

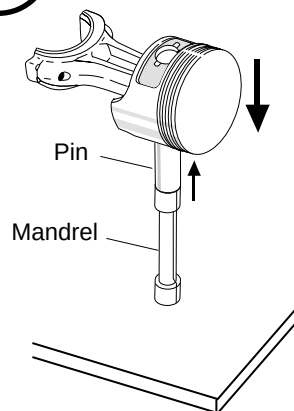
"N" Faces up
when installed



A



B



Press the piston down onto the mandrel,
pushing the wrist pin in

Fig. D-2 Piston and Connecting Rods

ENGINE REASSEMBLY

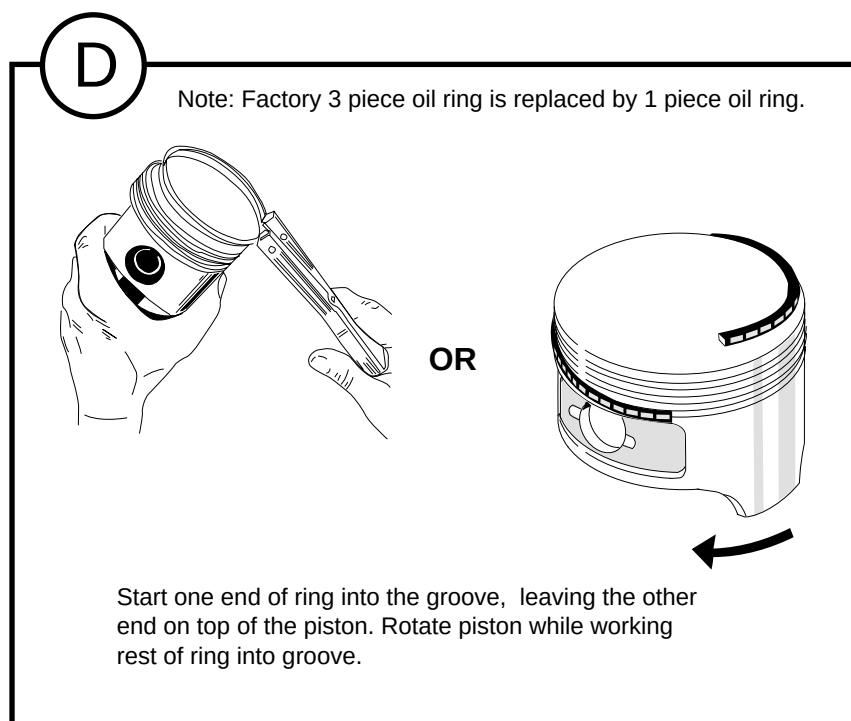
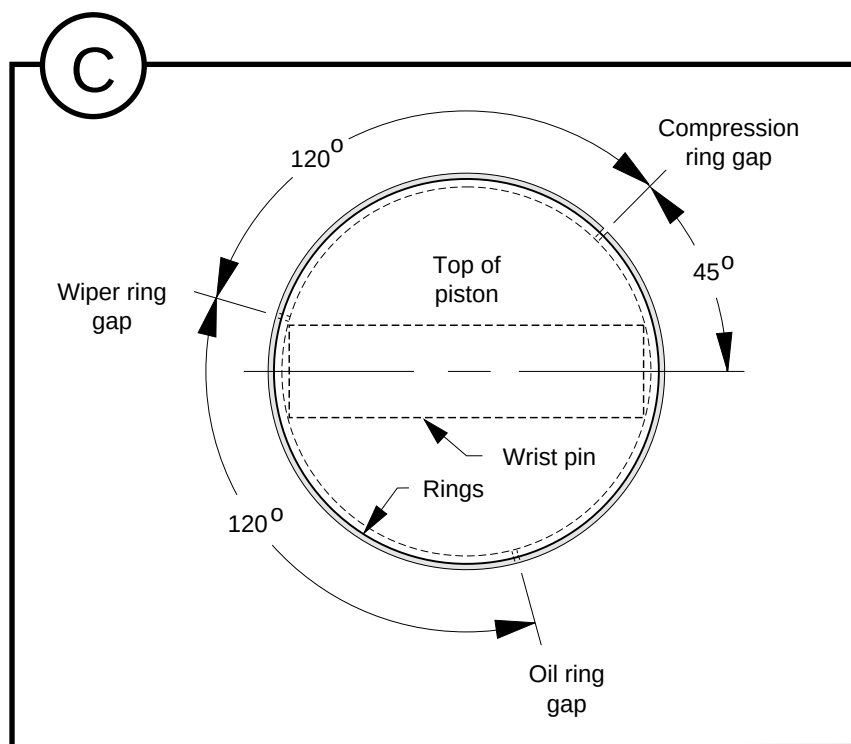


Fig. D-3 Pistons and Connecting Rods can't

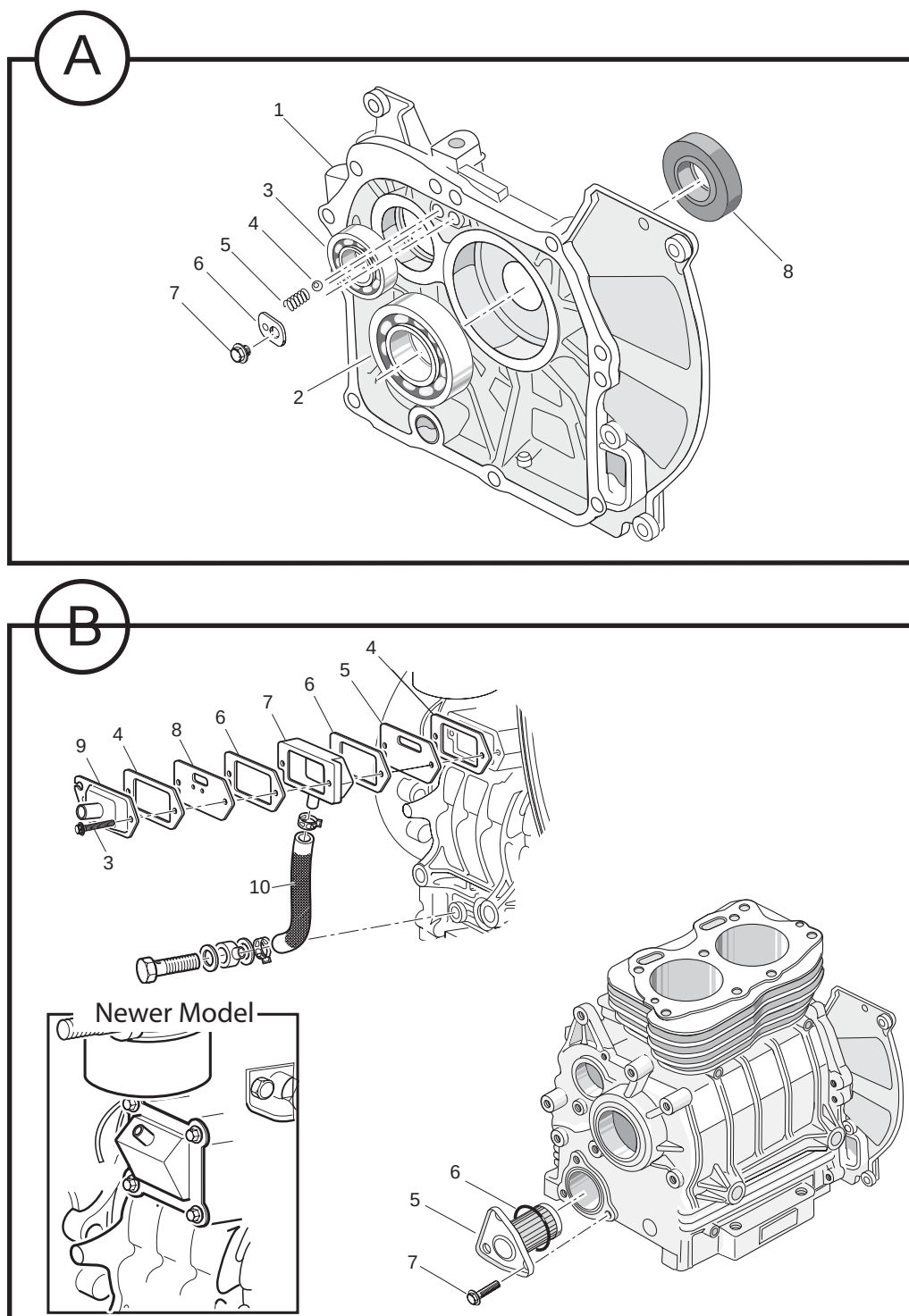


Fig. D-4 Crankcase End Cover, PCV Valve and Oil Filter

ENGINE REASSEMBLY

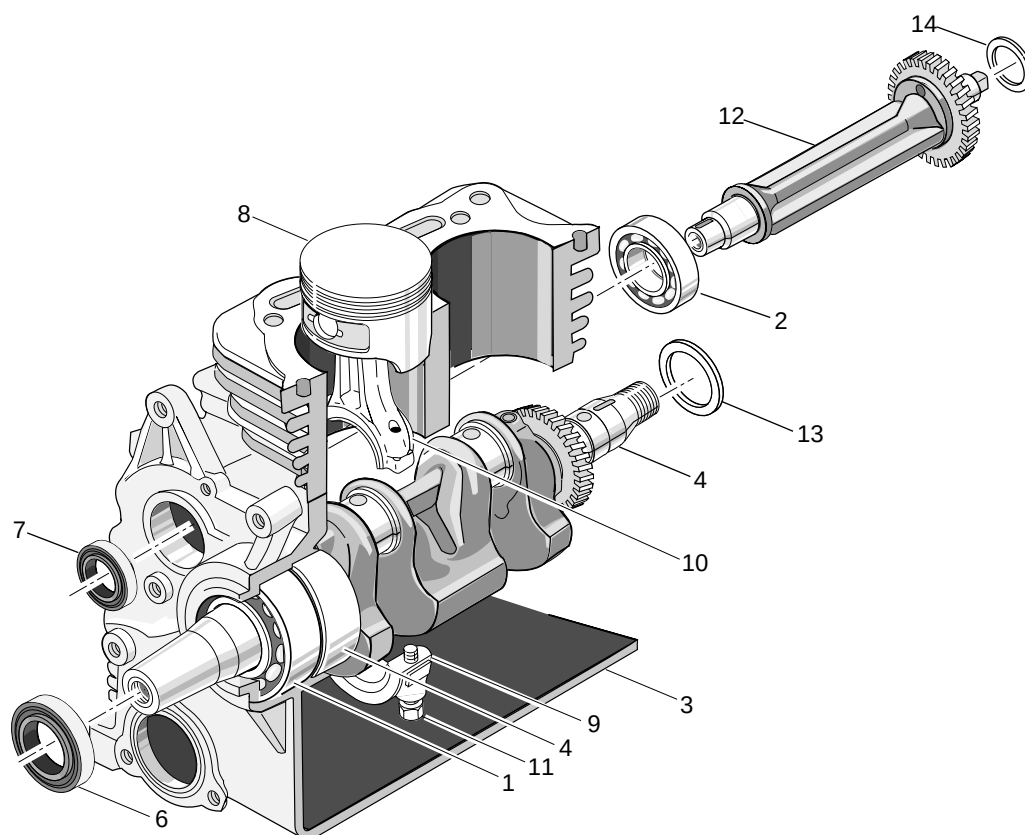
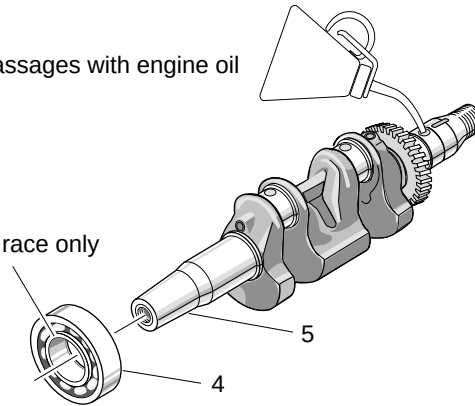


Fig. D-5 Crankshaft, Pistons and Balancer Shaft

A

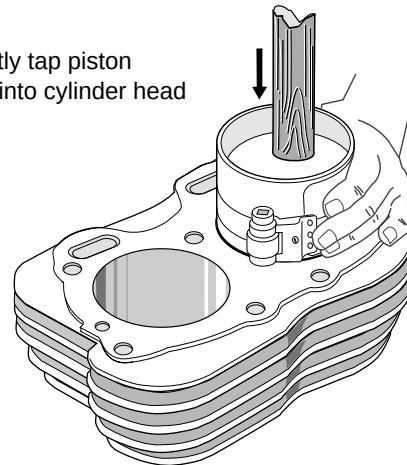
Fill crankshaft oil passages with engine oil

Press against inner race only



B

Use mallet handle to gently tap piston through compressor and into cylinder head



C

Align single dot on crankshaft gear with two dots on balancer shaft gear

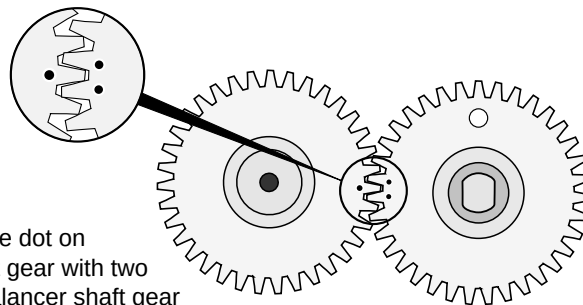


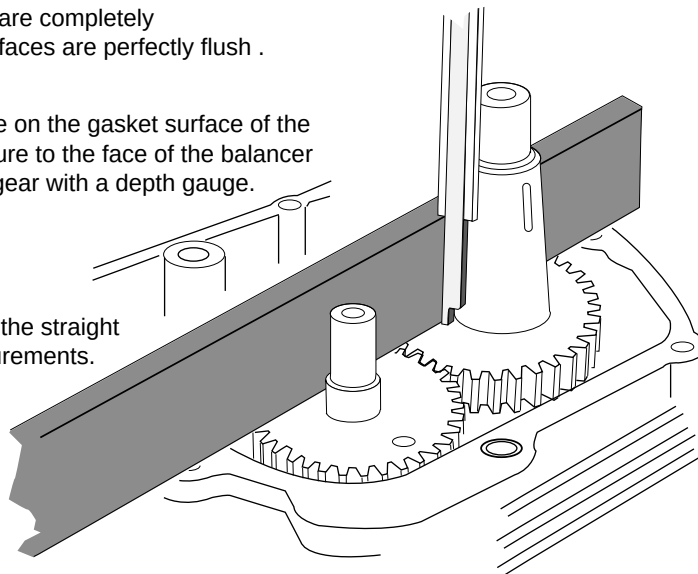
Fig. D-6 Crankshaft, Pistons and Balancer Shaft con't

ENGINE REASSEMBLY

Make sure the gears are completely seated and that their faces are perfectly flush .

Rest the straight edge on the gasket surface of the crankcase and measure to the face of the balancer gear and crankshaft gear with a depth gauge.

Subtract the width of the straight edge from the measurements.



Rest the straight edge on the gasket surface of the end cover, and across the centers of the bearings. The straight edge should sit solidly on the gasket surface without rocking.

Measure to the face of the balancer and crankshaft bearing inner races, then subtract the width of the straight edge from the measurements.

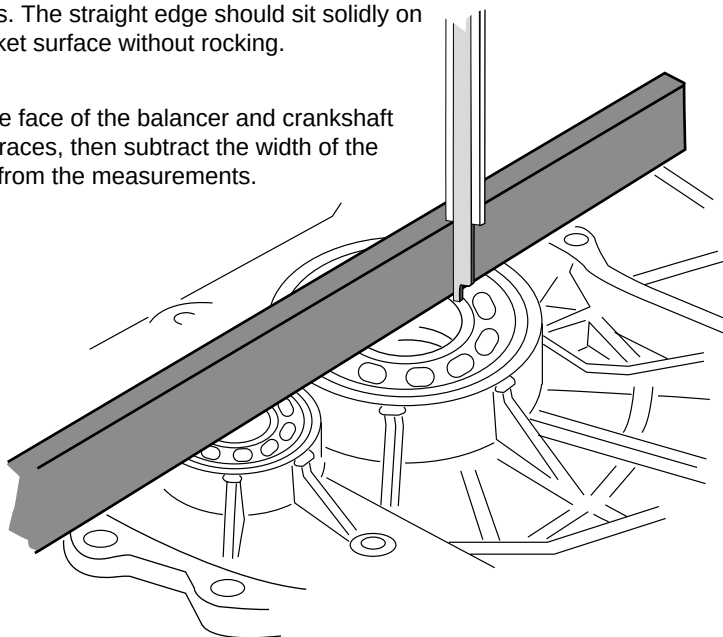


Fig. D-7 Crankshaft and Balancer Shaft Endplay

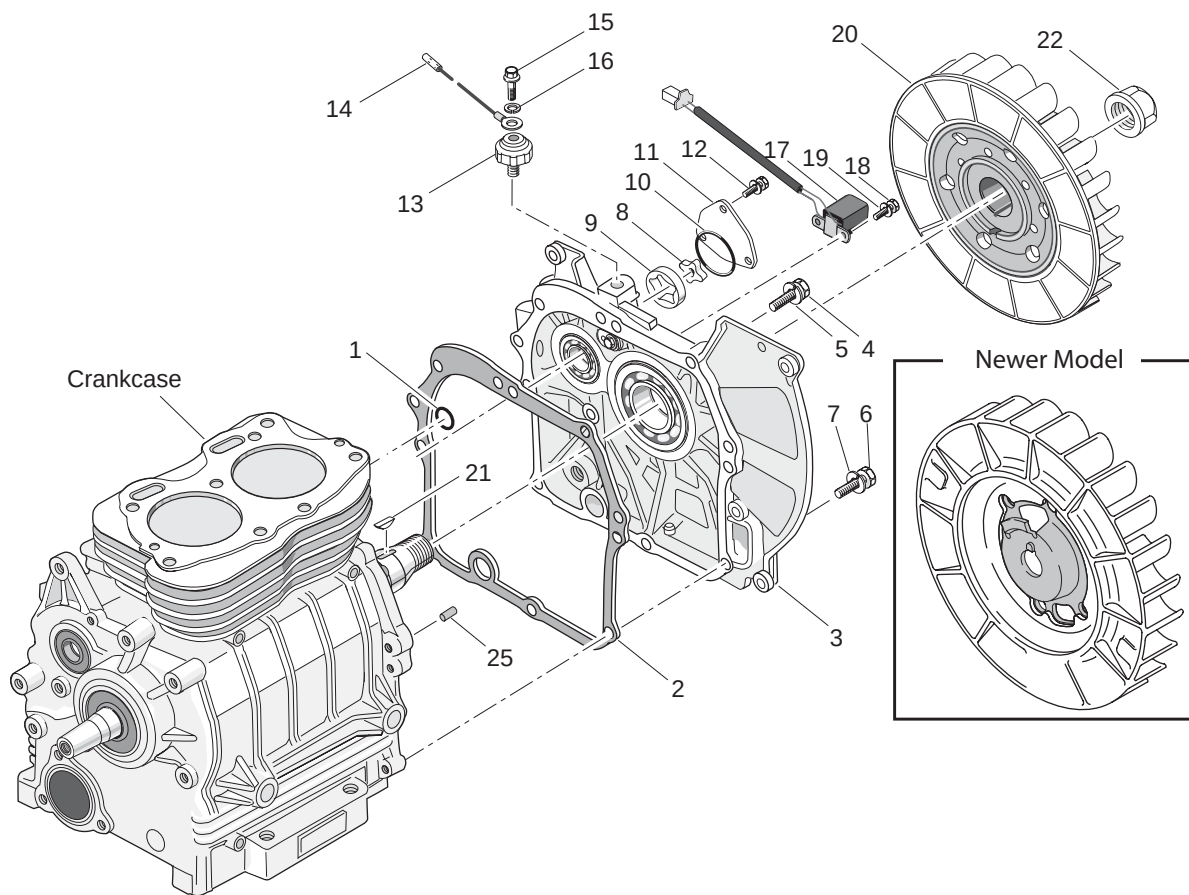


Fig. D-8 Oil Pump Gear Rotors, Oil Pressure Switch, Pulser Coil and Fan Hub

ENGINE REASSEMBLY

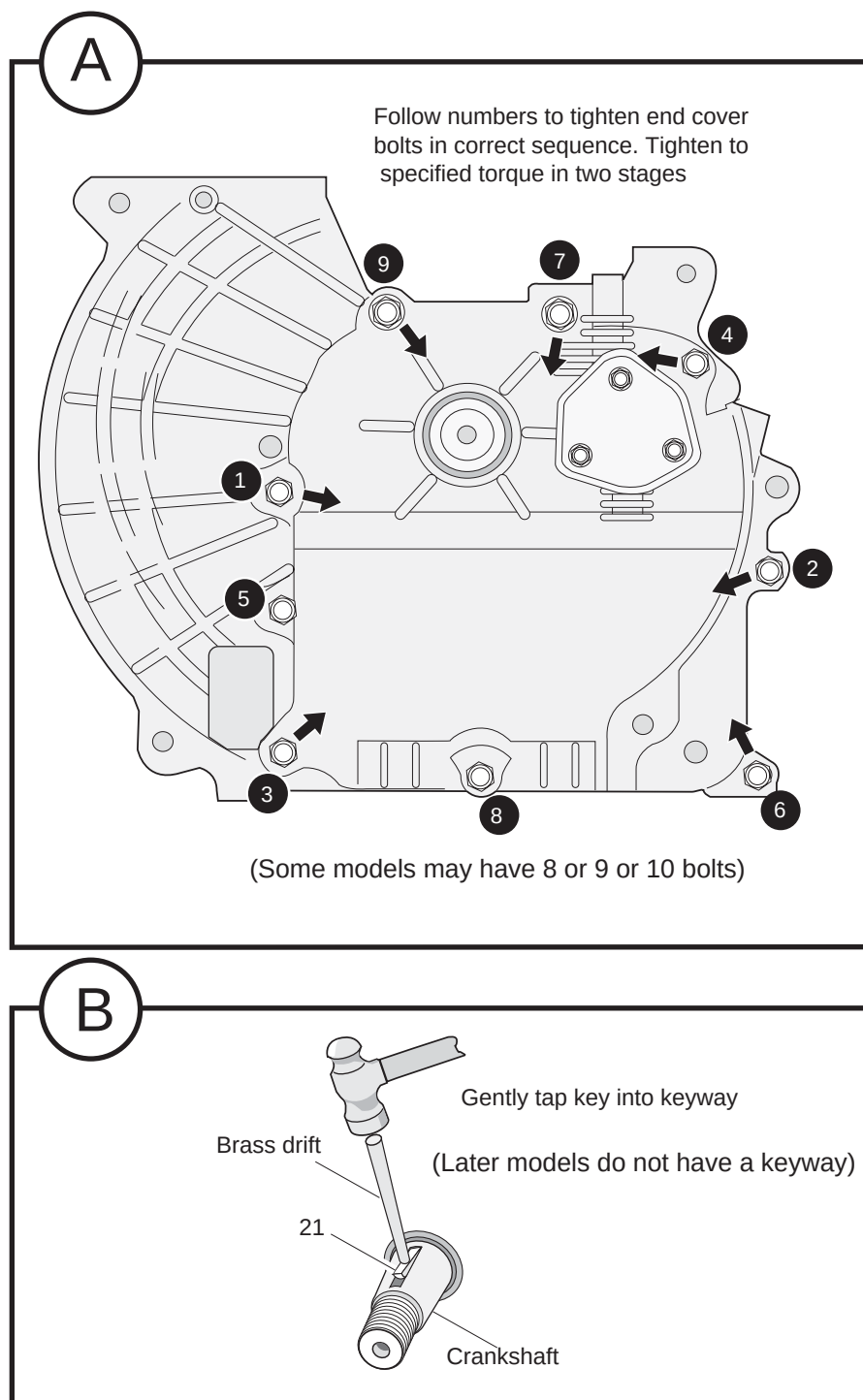


Fig. D-9 Oil Pump Gear Rotors, Oil Pressure Switch, Pulser Coil and Fan Hub con't

NOTE:

For clarity, the fan is shown pulled away from the hub, and the fan hub is partially cut-a-way. It is not necessary to remove the fan or hub to set the air gap. Use the access holes provided.

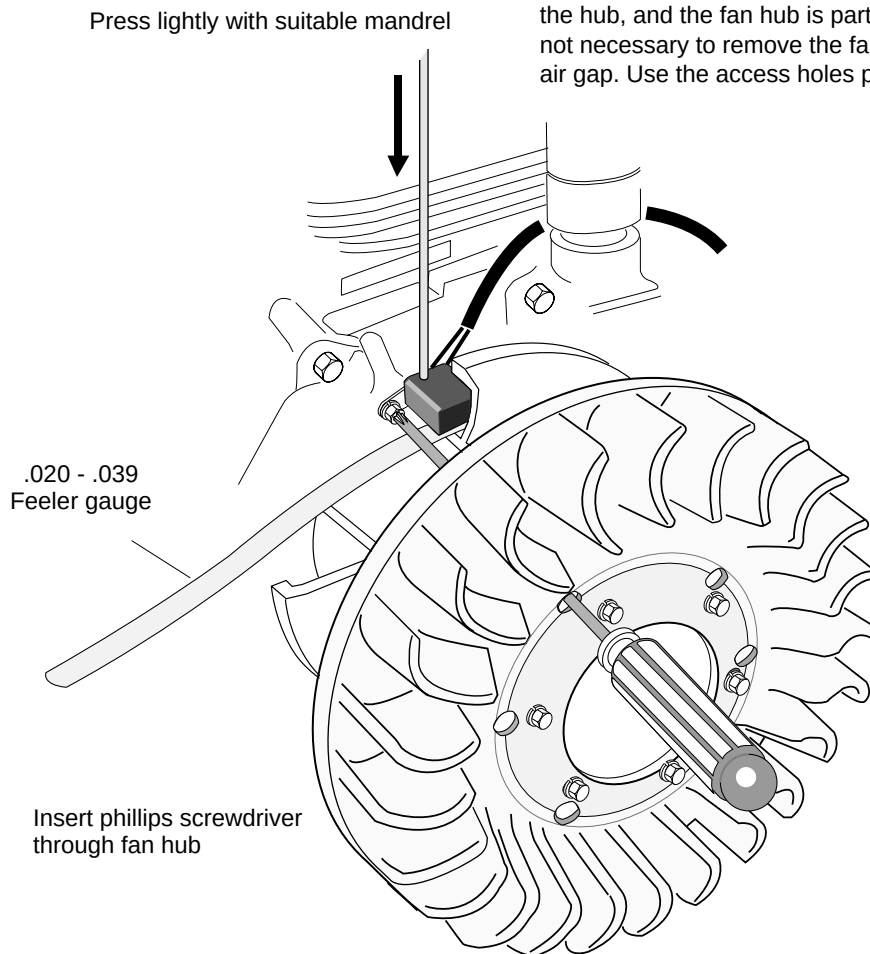


Fig. D-10 Pulser Coil Air Gap

ENGINE REASSEMBLY

Notes:

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ENGINE REASSEMBLY

[illegible]

CYLINDER HEAD ASSEMBLY

Tool List	Qty. Required
Compressor, piston ring	1
Drill, electric	1
Gauge, feeler (E-Z-GO P/N 72525-G01)	1
Gauge, wire spark plug	1
Valve seat cutter (E-Z-GO P/N 72516-G01)	1
Installer, piston ring (E-Z-GO P/N 72521-G01)	1
Grinder, valve, cup type (E-Z-GO P/N 72522-G01)	1
Compound, 4 oz. valve grinding (E-Z-GO P/N 72523-G01)	AR
Extension, 3/8" drive, 4"	1
Extension, 3/8" drive, 6"	1
Mallet, Medium wood or rubber	1
Cam pulley alignment tool (E-Z-GO P/N 26850-G01)	1
Punch, nonferrous.....	1
Ratchet, 3/8" drive.....	1
Screwdriver, small flat blade	1
Screwdriver, medium flat blade	1
Screwdriver, #2 phillips	1
Screwdriver, #3 phillips	1
Socket, 8 mm, 3/8" drive	1
Socket, 10 mm, 3/8" drive	1
Socket, 12 mm, 3/8" drive	1
Socket, oil pressure switch	1
Socket, 13/16" spark plug, 3/8" drive	1
Wrench, 7 mm combination	1
Wrench, 10 mm combination	1
Wrench 12 mm combination	1
Wrench, torque, Inch and Ft. Lbs.....	1

Install Valve Guides

(See Fig. E-1 "Valves and Valve Clearance" on page D-6)

- A. If the valve guides (ITEM 1) were removed from the cylinder head (ITEM 2), use a mechanical press to install new over size valves guides. [If valve guides are replaced, valve seats must be resurfaced. (See Valve Guides and Seats in section C)]. (DETAIL A)

Cutting Valve Seats

- A. Using the E-Z-GO valve seat cutter, insert the reamer pilot tool in the valve guide and rotate in a clockwise direction only using firm consistent pressure.
- B. Remove no more material than is necessary to clean the valve seat.
- C. Refer to additional instructions included with cutter.

Lap the Valves

(See Fig. E-1 "Valves and Valve Clearance" on page D-6)

(See Fig. E-2 "Valves con't" on page D-7)

- A. Turn the cylinder head upside down.
- B. Lightly lubricate the stem of one of the intake valves (ITEM 4) with engine oil and insert it into one of the middle (intake) valve guides. The heads of the intake valves are larger in diameter than the heads of the exhaust valves (ITEM 5). (If the original valves are used, place them in the guides from which they came.)
- C. Moisten the suction cup on the valve lapping tool and attach it to the valve.
- D. Apply a small amount of valve grinding compound evenly around the valve seat.
- E. Grind the valve face against the seat by applying slight downward pressure on the lapping tool and rotating it back and forth between the palms of your hands five or six times. Lift the tool, turn it about 90° and repeat until both the valve and seat show even polished contact surfaces of .040 to .050 wide.
- F. Repeat this process for each of the valves.
- G. Thoroughly clean the valves and the cylinder head to remove all of the lapping compound.
- H. Test the valve seat seal by installing the springs and keys. Stand the cylinder head on the exhaust port and pour a few ounces of clean solvent into the intake ports. Check the valve seats for any sign of wetness. If solvent seeps out, repeat the lapping process and retest. Pour out solvent, turn over, and repeat for the exhaust valves.

ENGINE REASSEMBLY

Install New Valve Stem Seals

(See Fig. E-2 "Valves con't" on page D-7)

- A. Place a *new* seal on a valve guide, large diameter down, and push until it snaps into place. Repeat to install the remaining guides. (DETAIL B)

Install the Valves

(See Fig. E-1 "Valves and Valve Clearance" on page D-6)

(See Fig. E-2 "Valves con't" on page D-7)

- A. Lightly coat the valve stems with engine oil.
- B. From the bottom of the head, insert one of the valves into its mating seat and guide.
- C. Install the valve spring (ITEM 6), spring retainer (ITEM 7) and keys (ITEM 8). (DETAIL C)
 1. While supporting the valve from the bottom, place the valve spring over the valve stem from the top.
 2. Place the spring retainer over the spring. Push the retainer down, and install the keys. It may be necessary the install keys using a pair of needle nose pliers. (DETAIL C)
- D. Install the remaining valves in the same manner.

Install the Cylinder Head on the Crankcase

(See Fig. E-3 "Cylinder Head, Cam Shaft and Rocker Assembly" on page D-8)

(See Fig. E-4 "Cylinder Head, Cam Shaft, Rocker Assembly con't" on page D-9)

CAUTION Because this is an aluminum cylinder head, it is important that the clamping pressure of the mounting bolts be applied evenly. Install and tighten the bolts to specified torque as directed.

- A. Install the two (2) cylinder head alignment dowels (ITEM 2).
- B. Install a *new* head gasket (ITEM 3).

NOTE The head gasket is specially coated for the aluminum cylinder head. Do not use additional sealants or other material on gasket mating surfaces.

1. Match the contours of the gasket to the contours of the gasket boss surrounding the cylinders (ITEM 1). The word "UP" is cut into the gasket.
2. Place the gasket on the alignment dowels on the crankcase.
- C. Match the features on the bottom of the head to the features of the crankcase gasket surface. Position the head on the alignment dowels and lower it gently onto the crankcase.

- D. Install and hand tighten seven (7) cylinder head mounting bolts (ITEM 4, 1 each, M8x1.25x60L; ITEM 5, 4 each, M8x1.25x50L; and ITEM 6, 2 each, M8x1.25x40L) tighten to specified torque *in two stages, in the order shown*. (DETAIL A)

Install the Camshaft

(See Fig. E-3 "Cylinder Head, Cam Shaft and Rocker Assembly" on page D-8)

CAUTION Do not allow the wear surfaces of the camshaft to scrape against the cylinder head during installation.

- A. Lubricate the camshaft lobes and journals with engine oil.
- B. Insert the camshaft (ITEM 7), small end first, into the head through the camshaft bore in the fan side of the cylinder head. Seat the shaft journals in the bores in each side of the head. *Do not allow the lobes or journals of the shaft to scrape against the head.*

Install the Rocker Assembly

(See Fig. E-3 "Cylinder Head, Cam Shaft and Rocker Assembly" on page D-8)

(See Fig. E-4 "Cylinder Head, Cam Shaft, Rocker Assembly con't" on page D-9)

CAUTION It is critical to the performance and life expectancy of the engine that mating parts that have established wear patterns are reassembled in their original positions.

- A. If the rocker adjustment screws (ITEM 8) and lock-nuts (ITEM 9) were removed from the rocker arms (ITEM 10), re-install them. (DETAIL B)
- B. Lubricate the rocker shaft (ITEM 11) and rocker arm bearing surfaces with engine oil.
- C. Rotate the camshaft until all of the lobes are positioned so that they will not interfere with the motion of the rocker arms. (DETAIL C)
- D. Install the rocker shaft through the bore on the fan side of the engine, with the ends of the shaft oriented as they were originally.
- E. Install the four (4) rocker arms, two (2) spacers (ITEM 12), and spring (ITEM 13) on the leading end of the shaft, *in their original positions*, as the shaft is inserted into the head. Seat the shaft in the bore on the PTO side of the head.

F. Install the camshaft cover (ITEM 14) and new gasket (ITEM 15).

1. With the flanged side of the cover oriented away from the engine, hold the cover and gasket in place and install three (3) bolts (ITEM 16, M6x1.0x12L) and one (1) stud (ITEM 17, M6x1.0). The stud is mounted in the top right corner of the cover.
2. Tighten the mounting bolts and stud to specified torque.

Install the Rear Timing Belt Cover

(See Fig. E-5 "Timing Belt Covers, Drive and Cam Pulleys, Idler and Timing Belt" on page D-10)

(See Fig. E-6 "Timing Belt Covers, Drive and Cam Pulleys, Idler and Timing Belt con't" on page D-11)

- A. Hold the cover in place and install two (2) bolts (ITEM 2, M6x1.0x8L, 10mm socket). **(Later models have only one (1) bolt)**
- B. Tighten the mounting bolts to specified torque.

Install the Drive and Cam Pulleys, Idler and Timing Belt

(See Fig. E-5 "Timing Belt Covers, Drive and Cam Pulleys, Idler and Timing Belt" on page D-10)

NOTE A special tool for holding the drive and cam pulleys in proper timing position while installing the timing belt is available from the E-Z-GO Service Parts Department (See Tool list).

CAUTION Do not twist, crimp or turn the belt inside out. This will cause the belt to fail.

- A. Install the drive pulley (ITEM 3).
1. If the key (ITEM 4) in the crankshaft does not align with the crankcase mark, rotate the fan hub until it is aligned.
 2. Align the key slot in the rear belt retainer (ITEM 5) with the key in the crankshaft and install it onto the shaft.
 3. Align the keyslot in the drive pulley (ITEM 3) with the key in the crankshaft and slide the pulley onto the shaft, flange side toward the engine.
- B. Install the cam pulley (ITEM 6).
1. Align the notch on the rear of the cam pulley with the pin on the cam shaft and slide the pulley onto the shaft.

2. Rotate the cam pulley until the smallest of the three holes on the face of the gear aligns with the notch at the top of the rear timing belt cover.

3. Install the mounting bolt with lock washer (ITEM 7, M8x1.25x20L) and washer (ITEM 8, 8.5x28x2.3t). Do not tighten the bolt. *(If the E-Z-GO CAM PULLEY TOOL is being used, position it on the drive and cam pulleys. See NOTE above.)*

C. Install the idler (ITEM 9).

1. Insert the short extension of the idler spring (ITEM 10) into the small hole on the rear face of the idler and position the spring on the raised surface of the face. (DETAIL A)
2. Place the washer (ITEM 11, 8.5x16x1.2t) on the idler mounting bolt (ITEM 12, M8x1.25x30L), and insert the bolt through the idler. While holding the short spring extension in place, position the idler against the crankcase. Hand tighten the bolt into the crankcase. Rotate the spring into the spring stop.

D. Install a new timing belt (ITEM 13). (DETAIL A)

1. *If the E-Z-GO CAM PULLEY TOOL is not being used, check that the drive and cam pulleys are aligned with their marks.*
2. Position the belt on the drive pulley. *Do not twist, crimp or turn the belt inside out.*
3. Rotate the idler counterclockwise until it the belt can be placed on the cam pulley. Place the belt on the cam pulley, then snug the bolt. *(If the E-Z-GO CAM PULLEY TOOL is being used, remove it.)*
4. Install the drive pulley front belt guide (ITEM 14), washer (ITEM 15, 6.5x22x2t) and retaining bolt with lock washer (ITEM 16, M6x1.0x16L). Torque to specification.
5. Loosen the idler bolt and allow the idler to tension the belt. Rotate the crankshaft two turns and tighten the bolt to specified torque.

ENGINE REASSEMBLY

Install the Front Timing Belt Cover

(See Fig. E-5 "Timing Belt Covers, Drive and Cam Pulleys, Idler and Timing Belt" on page D-10)

- A. Hold the cover (ITEM 17) in place and install three (3) bolts (ITEM 18, M6x1.0x12L, 10mm socket). Tighten the bolts to specified torque.

Install the Front Cylinder Baffle

(See Fig. E-5 "Timing Belt Covers, Drive and Cam Pulleys, Idler and Timing Belt" on page D-10)

- A. Hold the baffle (ITEM 19) in place and install and tighten two (2) bolts (ITEM 20, M6x1.0x8L, 10mm socket) to specified torque.

Install the Rear Cylinder Baffle

(See Fig. E-5 "Timing Belt Covers, Drive and Cam Pulleys, Idler and Timing Belt" on page D-10)

- A. Hold the baffle (ITEM 21) in place and install and tighten four (4) bolts (ITEM 22, M6x1.0x8L, 10mm socket) to specified torque. **(Later models have five (5) bolts)**

Install the Exhaust Manifold and Gasket

(See Fig. E-5 "Timing Belt Covers, Drive and Cam Pulleys, Idler and Timing Belt" on page D-10)

(See Fig. E-7 "Timing Belt Covers, Drive and Cam Pulleys, Idler and Timing Belt con't" on page D-12)

(Later models have exhaust manifold as part of head)

NOTE Some early model engines were assembled with two small gaskets. These have been replaced with a one-piece gasket.

- A. Insert four (4) bolts (ITEM 25, M8x1.25x50L, 12mm socket) through the manifold and position the gasket over the bolts.
- B. Hold the manifold in place and start the bolts into the cylinder head. Tighten the bolts to specified torque in two stages, in the order shown. (DETAIL B)

Install the Blower Housing

(See Fig. E-5 "Timing Belt Covers, Drive and Cam Pulleys, Idler and Timing Belt" on page D-10)

(See Fig. E-7 "Timing Belt Covers, Drive and Cam Pulleys, Idler and Timing Belt con't" on page D-12)

- A. Hold the housing in place and route the oil pressure switch wire and pulser coil wire from behind the housing through the groove as shown. (DETAIL C)
- B. Install three (3) mounting bolts (ITEMS 27, 28, AND 29, M6x1.0x18L, 10mm socket). Do not tighten them at this time.

Install the Coil Mounting Bracket and Coil Assembly

(See Fig. E-5 "Timing Belt Covers, Drive and Cam Pulleys, Idler and Timing Belt" on page D-10)

(Later models have a slightly different mounting)

- A. Position the bracket (ITEM 30) on the mounting stud as shown.
- B. Install the bracket/blower housing mounting bolt (ITEM 31, M6x1.0x23L, 10mm socket) and nut (ITEM 32, M6x10, 10mm socket).
- C. Tighten the bolts (ITEMS 27, 28, 29, and 31) and nut (ITEM 32) to specified torques.

Adjust the Valves

(See Fig. E-1 "Valves and Valve Clearance" on page D-6)

- A. Rotate the camshaft so that the intake and exhaust cam lobes for one cylinder are oriented downward and the rocker arms rest on the heels of the lobes as shown. (DETAIL B)
- B. Adjust the exhaust valve clearance.
 1. Insert a .004 feeler gauge between the cam lobe heel and the rocker arm.
 2. Using a medium flatblade screwdriver, turn the adjusting screw until the feeler gauge slides between the lobe heel and rocker arm with very slight resistance.
 3. Hold the adjusting screw at this position and tighten the rocker arm locknut to specified torque with a 10mm box end wrench.
 4. Check the valve with the feeler gauge again, and readjust if necessary.
- C. Adjust the intake valve clearance the same as the exhaust valve clearance.
- D. Rotate the camshaft so that the cam lobes for the second cylinder are oriented downward for adjustment.
- E. Adjust the intake and exhaust valve clearances.
- F. Recheck rocker arm locknut torque.

Install the Spark Plugs

(See Fig. E-5 "Timing Belt Covers, Drive and Cam Pulleys, Idler and Timing Belt" on page D-10)

- A. With a wire gauge, set the spark plug gaps at .030 and install them in the engine. Tighten them to specified torque.
- B. Install the plug wires (ITEM 34) on the plugs.

Install the Rocker Cover

(See Fig. E-8 "Rocker Cover" on page D-13)

- A. Install a *new* rocker cover gasket (ITEM 2) in the cover. Match the shape of the gasket to the shape of the cover for proper orientation.
- B. Match the shape of the rocker cover (ITEM 1) to the shape of the mounting surface for proper orientation, and position the cover on the cylinder head. Make certain that the six (6) spacers sleeves (ITEM 4) are installed in rocker cover. (DETAIL A)
- C. Using a 10mm socket, install and tighten six (6) bolts (ITEM 3, M6x1.0x23L) to specified torque in two stages, in the order shown.

Install the Carburetor

(See Fig. E-9 "Carburetor" on page D-14)

- A. Install the gasket (ITEM 2), plastic insulator (ITEM 3), and gasket (ITEM 4) on the carburetor mounting studs.
- B. Place the carburetor on the mounting studs with the choke side out.
- C. Insert one carburetor vent hose (ITEM 5) through the hole in the PCV cover plate. Be certain that it is not crimped or blocked in any way.
- D. Install *new* gasket (ITEM 6) and the air cleaner/carburetor seal plate (ITEM 7).

ENGINE REASSEMBLY

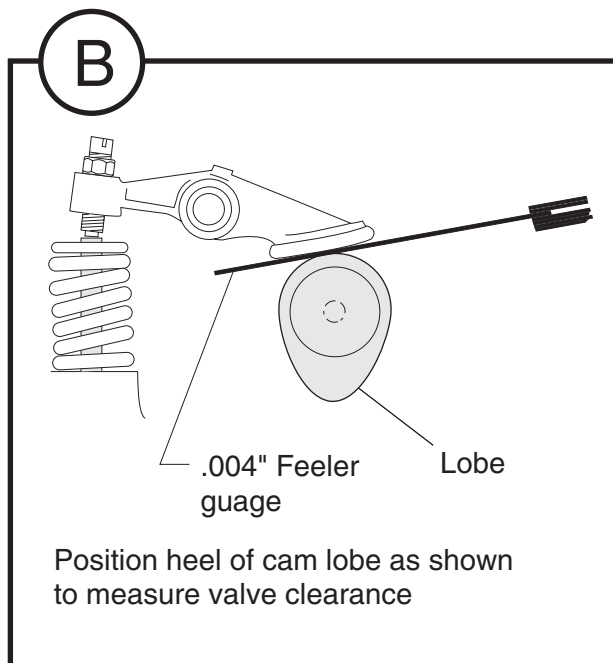
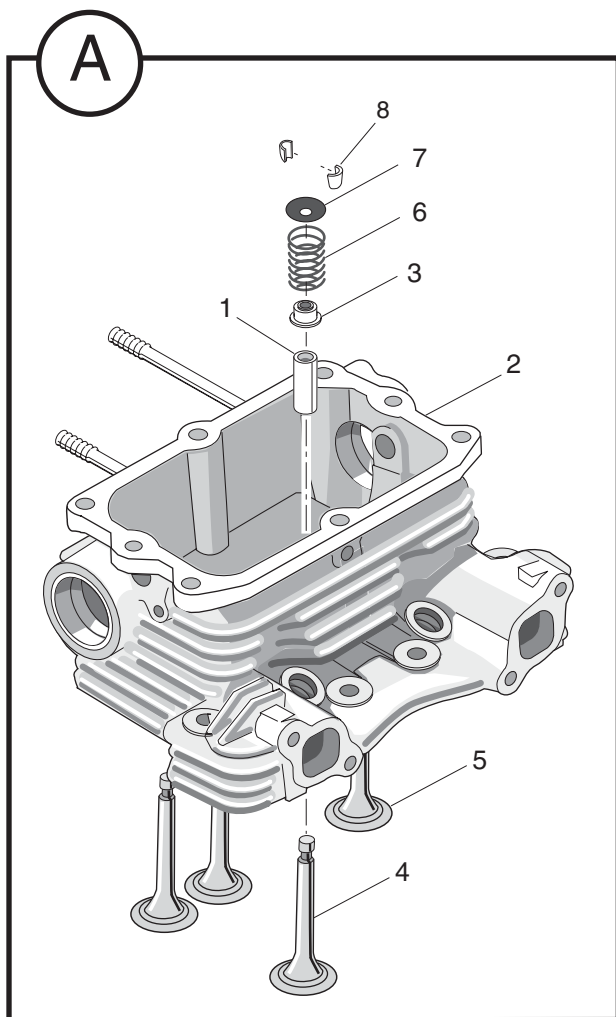


Fig. E-1 Valves and Valve Clearance

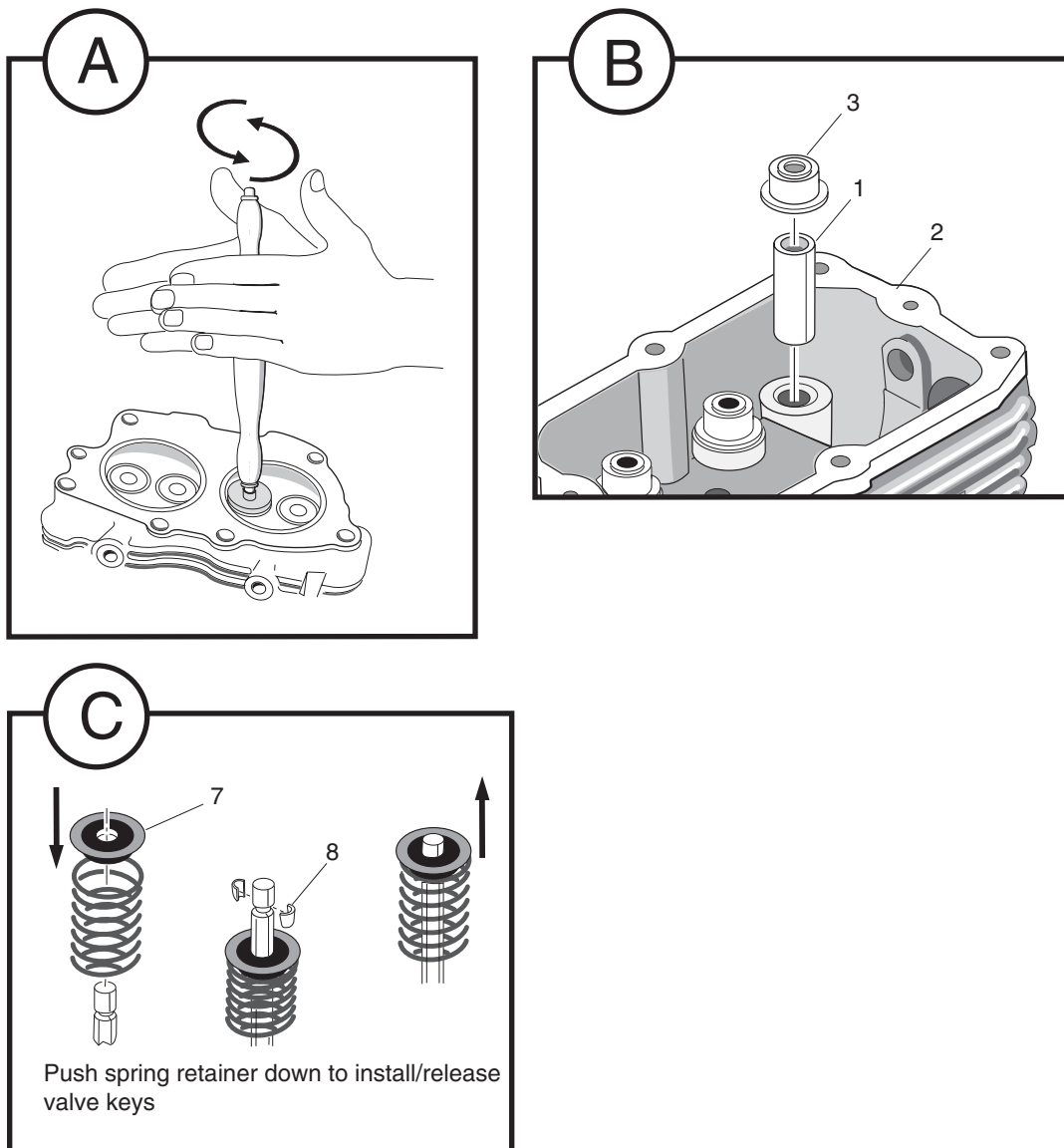


Fig. E-2 Valves con't

ENGINE REASSEMBLY

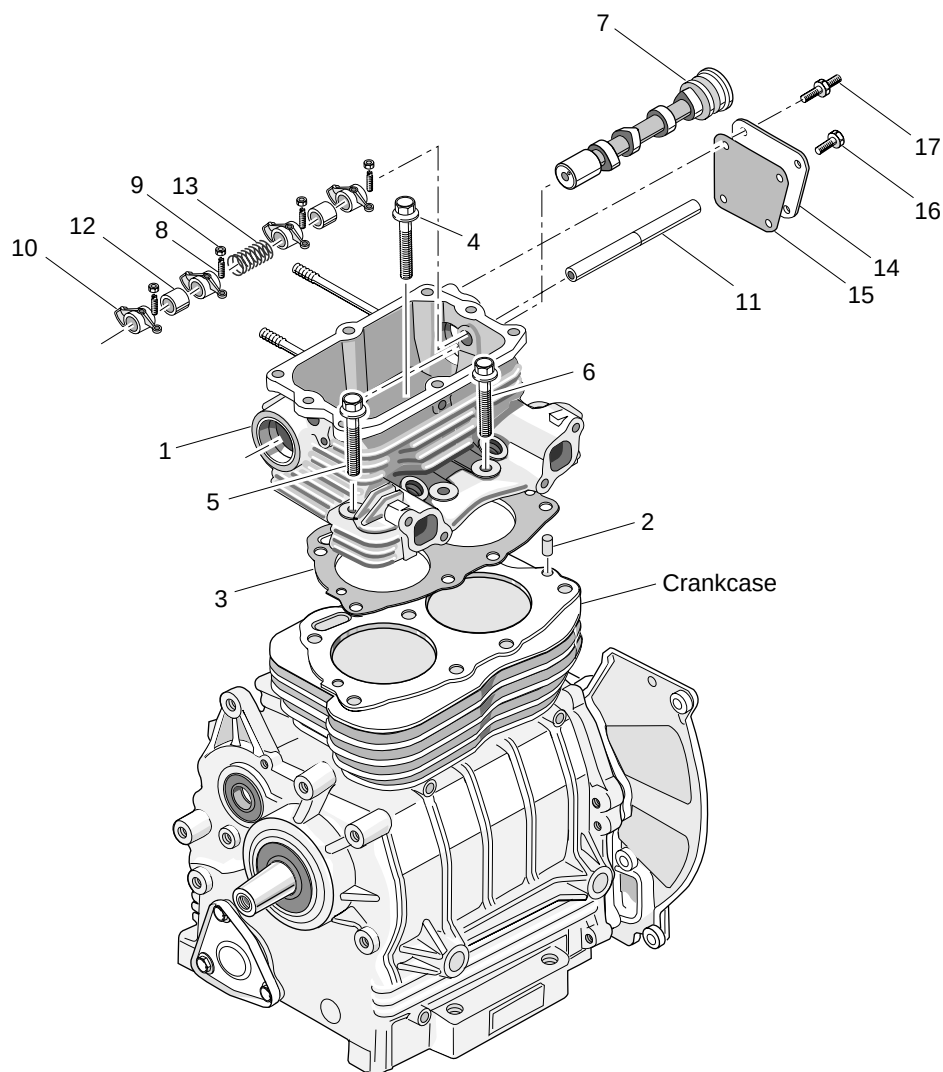


Fig. E-3 Cylinder Head, Cam Shaft and Rocker Assembly

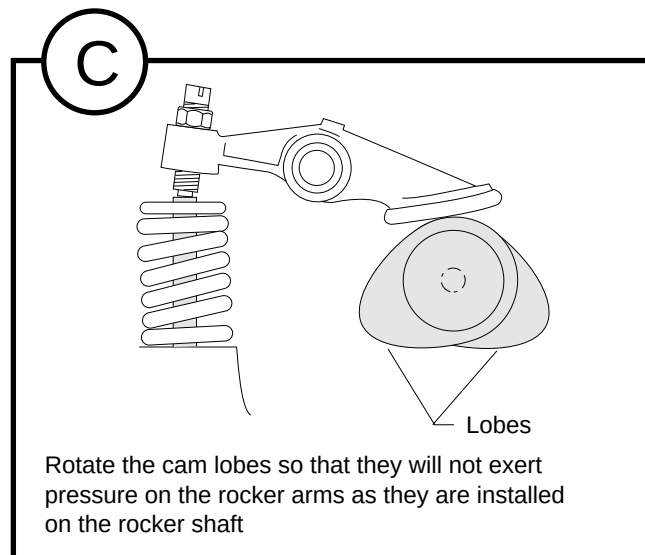
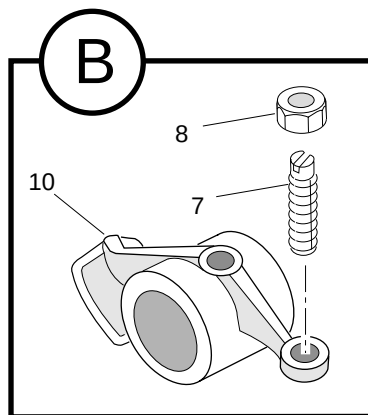
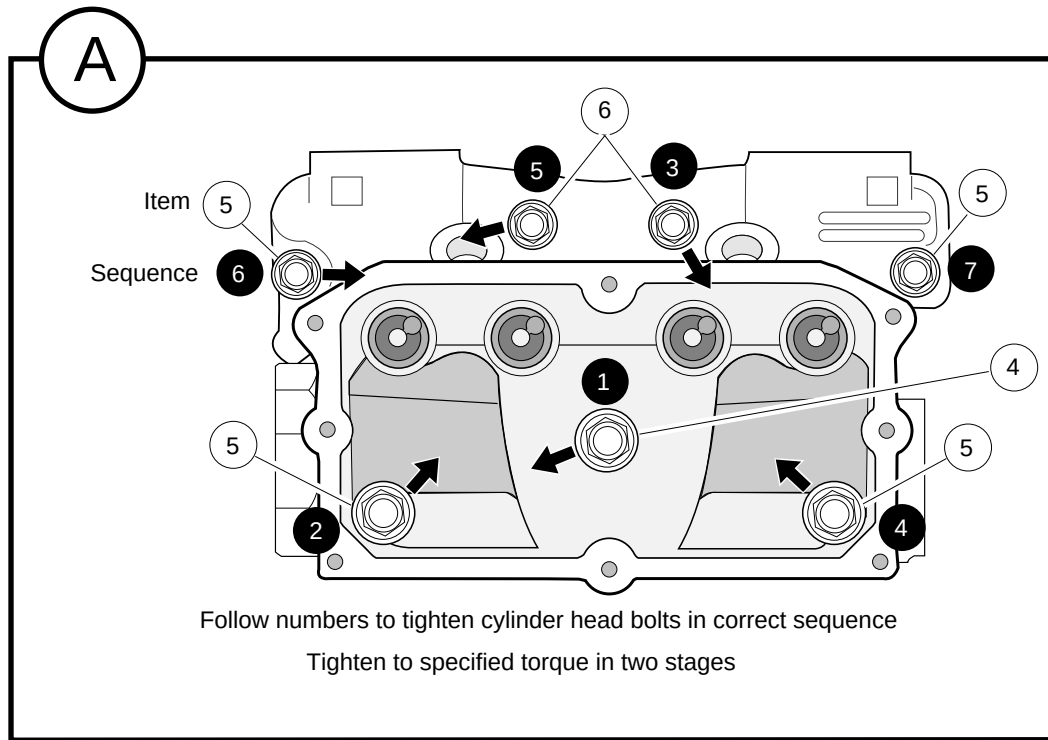


Fig. E-4 Cylinder Head, Cam Shaft, Rocker Assembly con't

ENGINE REASSEMBLY

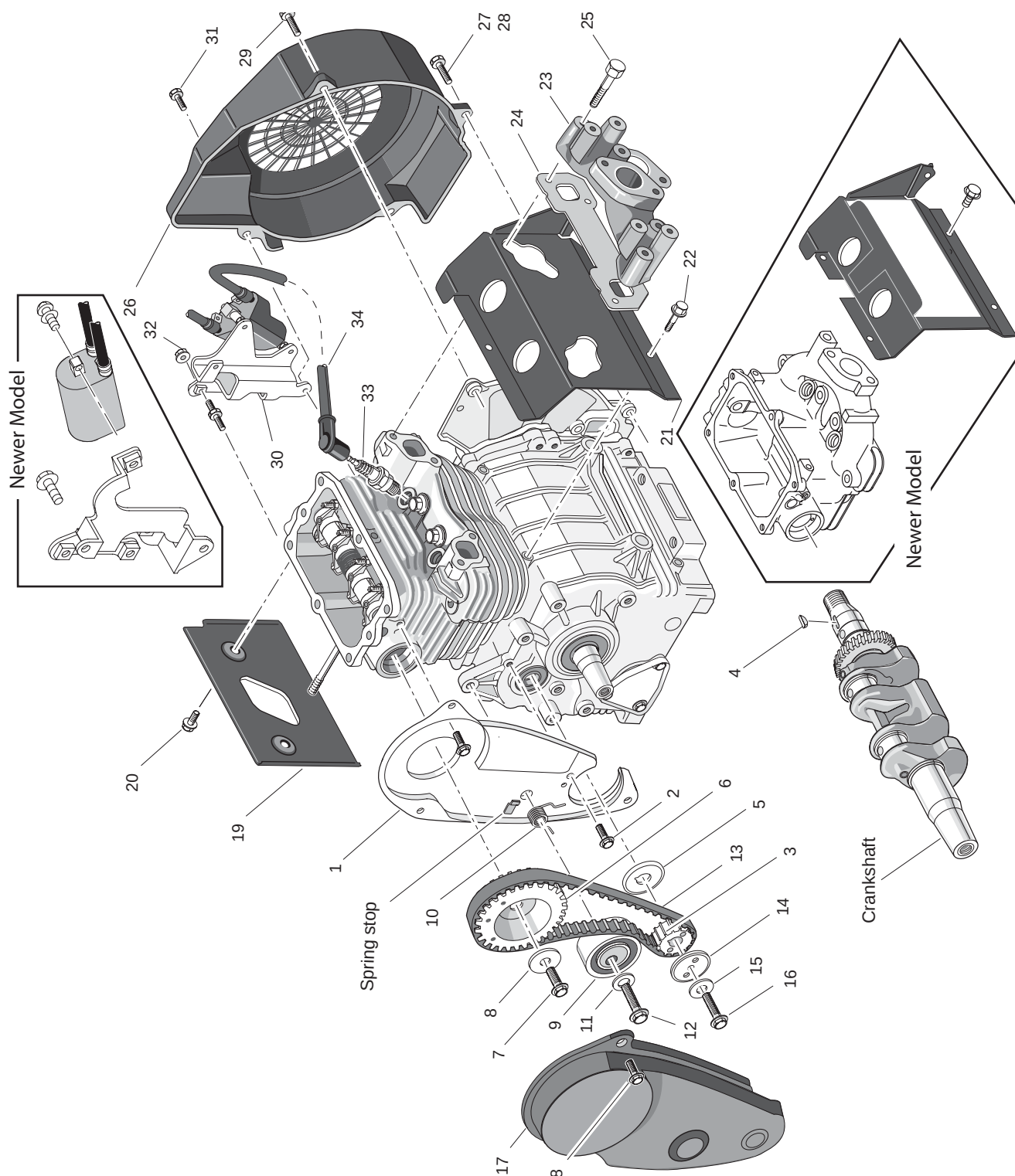


Fig. E-5 Timing Belt Covers, Drive and Cam Pulleys, Idler and Timing Belt

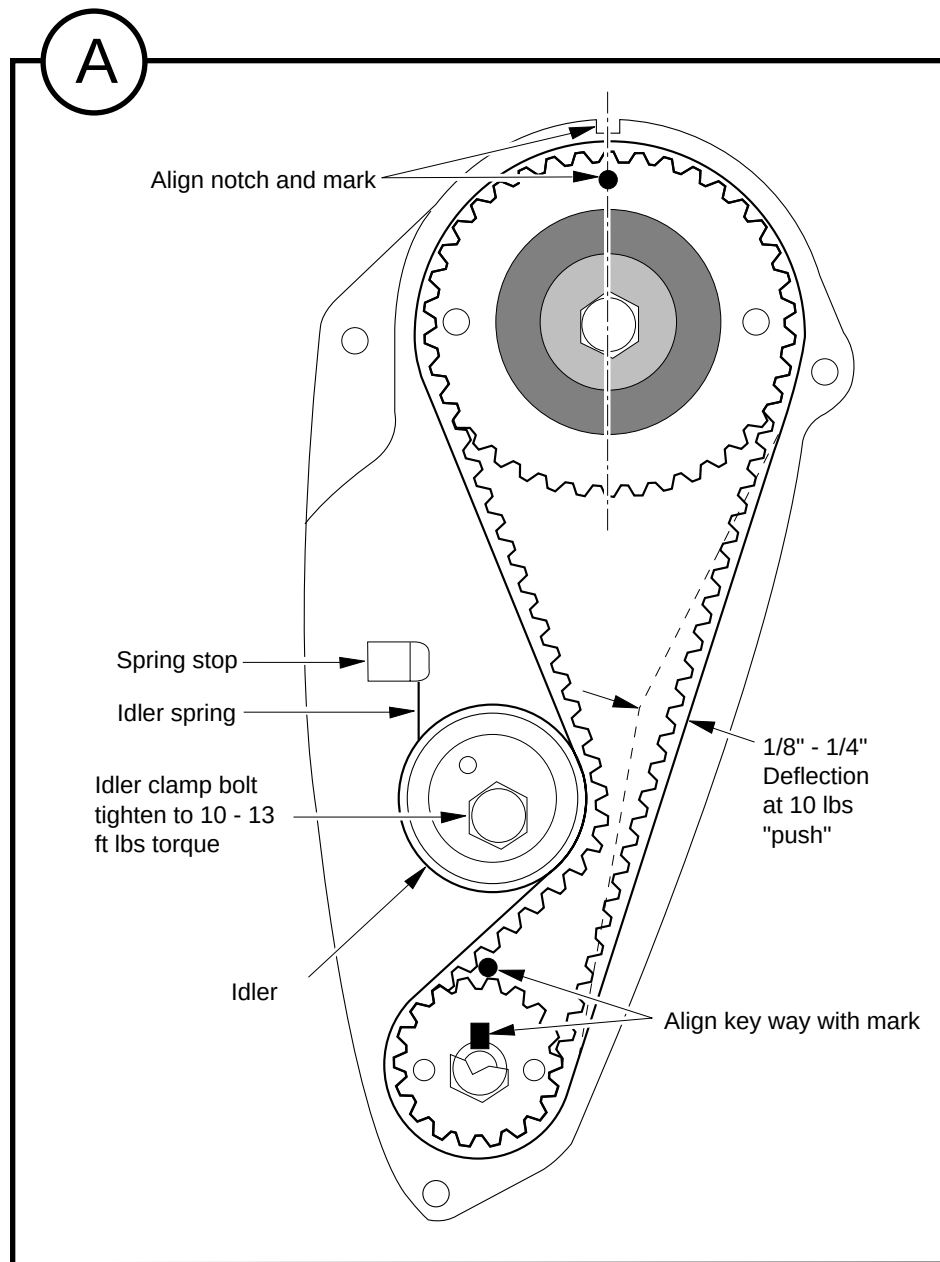


Fig. E-6 Timing Belt Covers, Drive and Cam Pulleys, Idler and Timing Belt con't

ENGINE REASSEMBLY

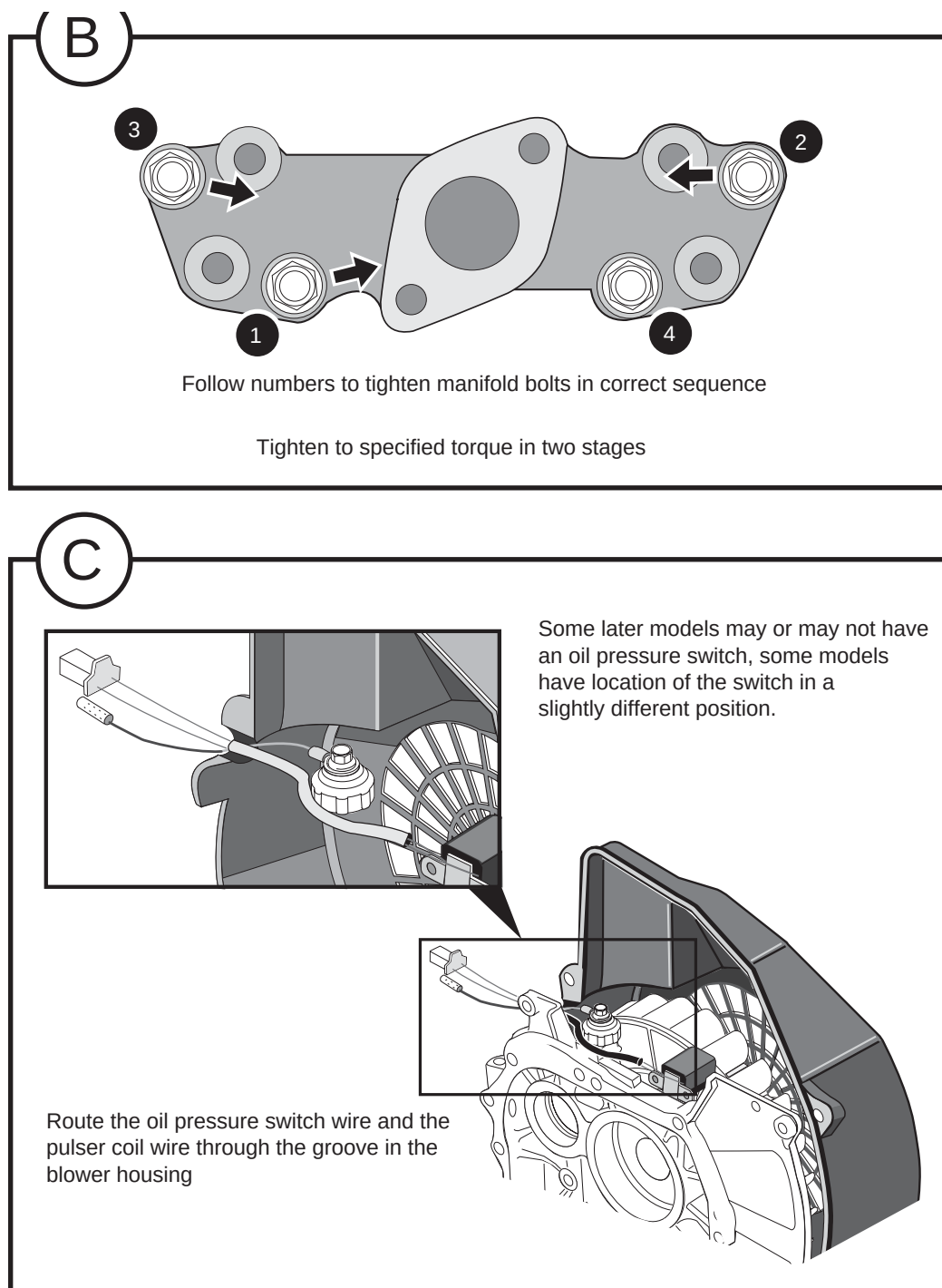


Fig. E-7 Timing Belt Covers, Drive and Cam Pulleys, Idler and Timing Belt con't

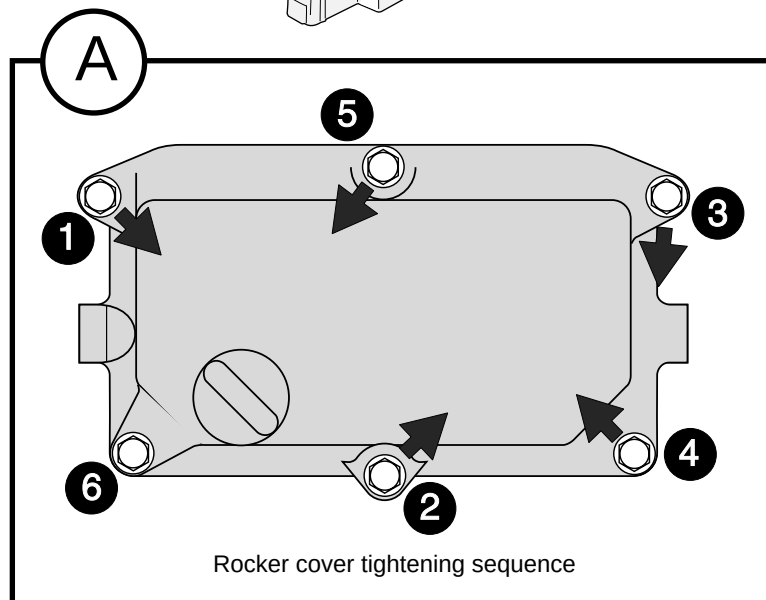
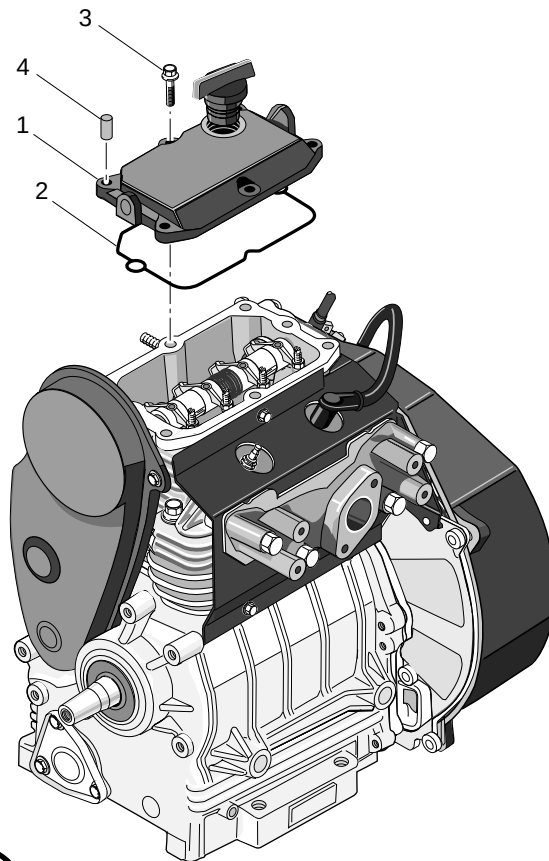


Fig. E-8 Rocker Cover

ENGINE REASSEMBLY

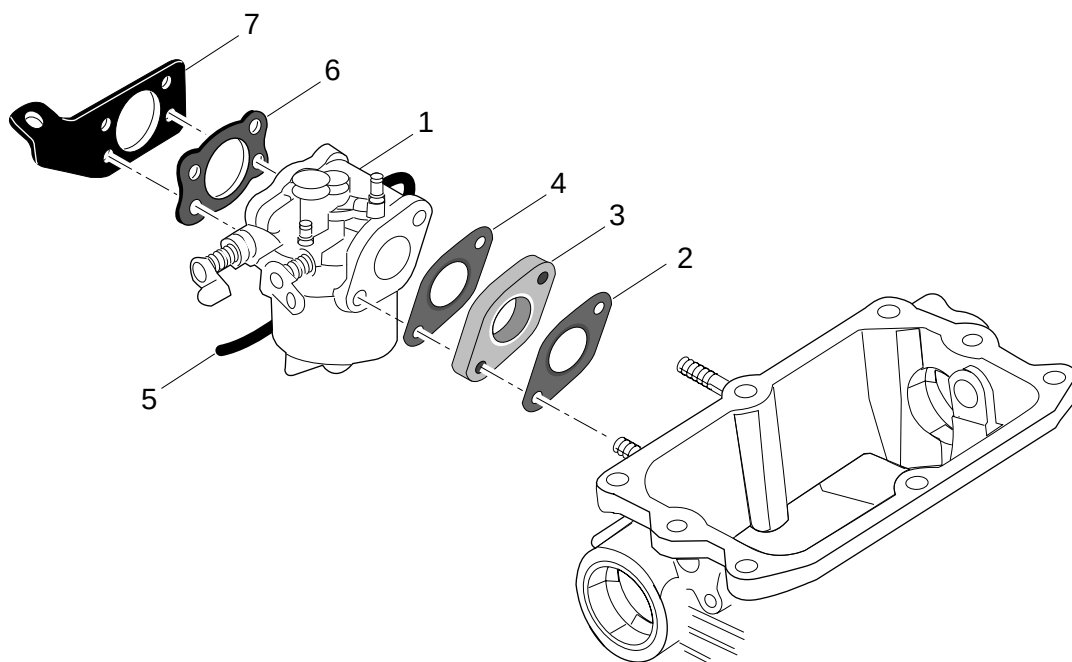
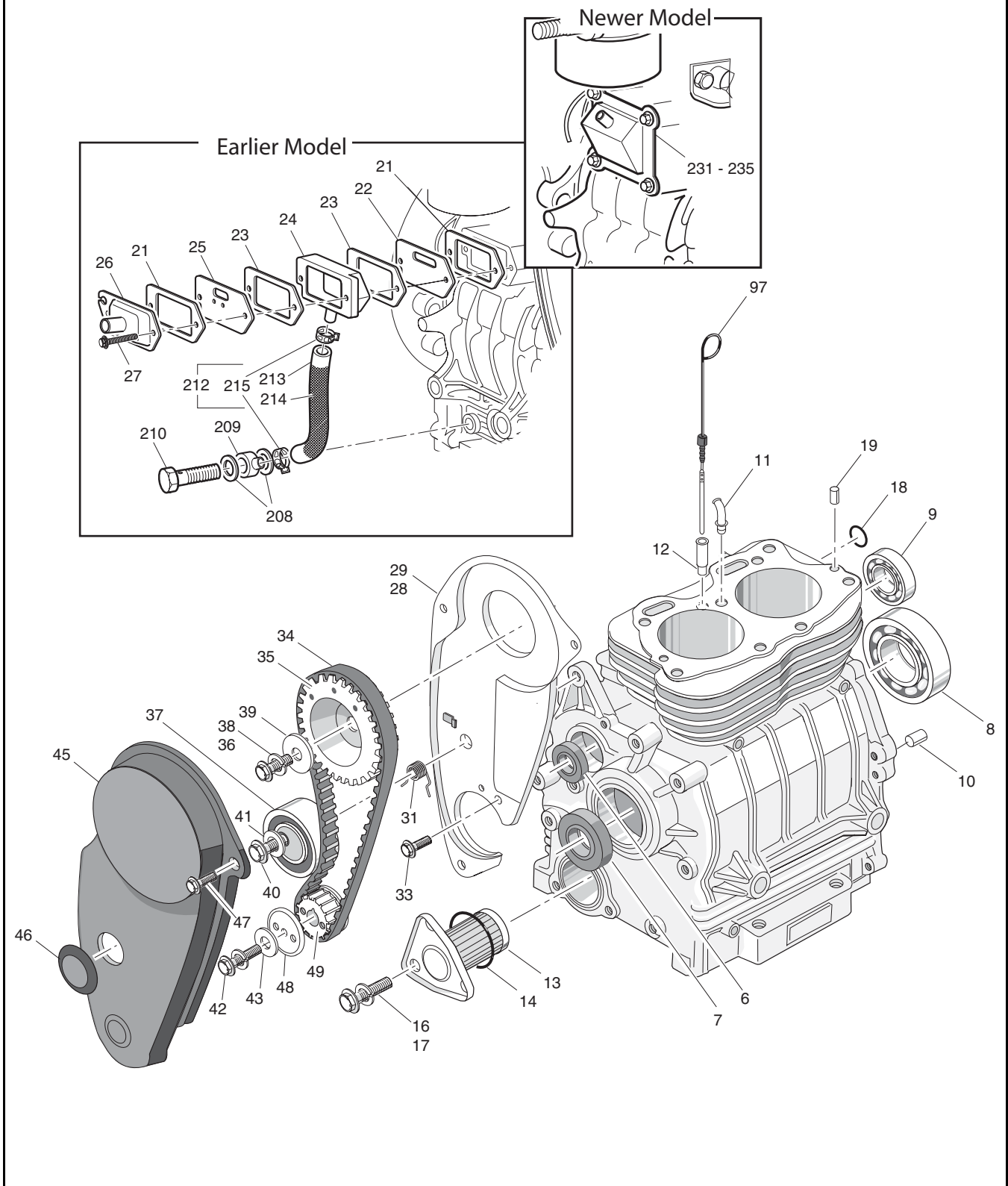
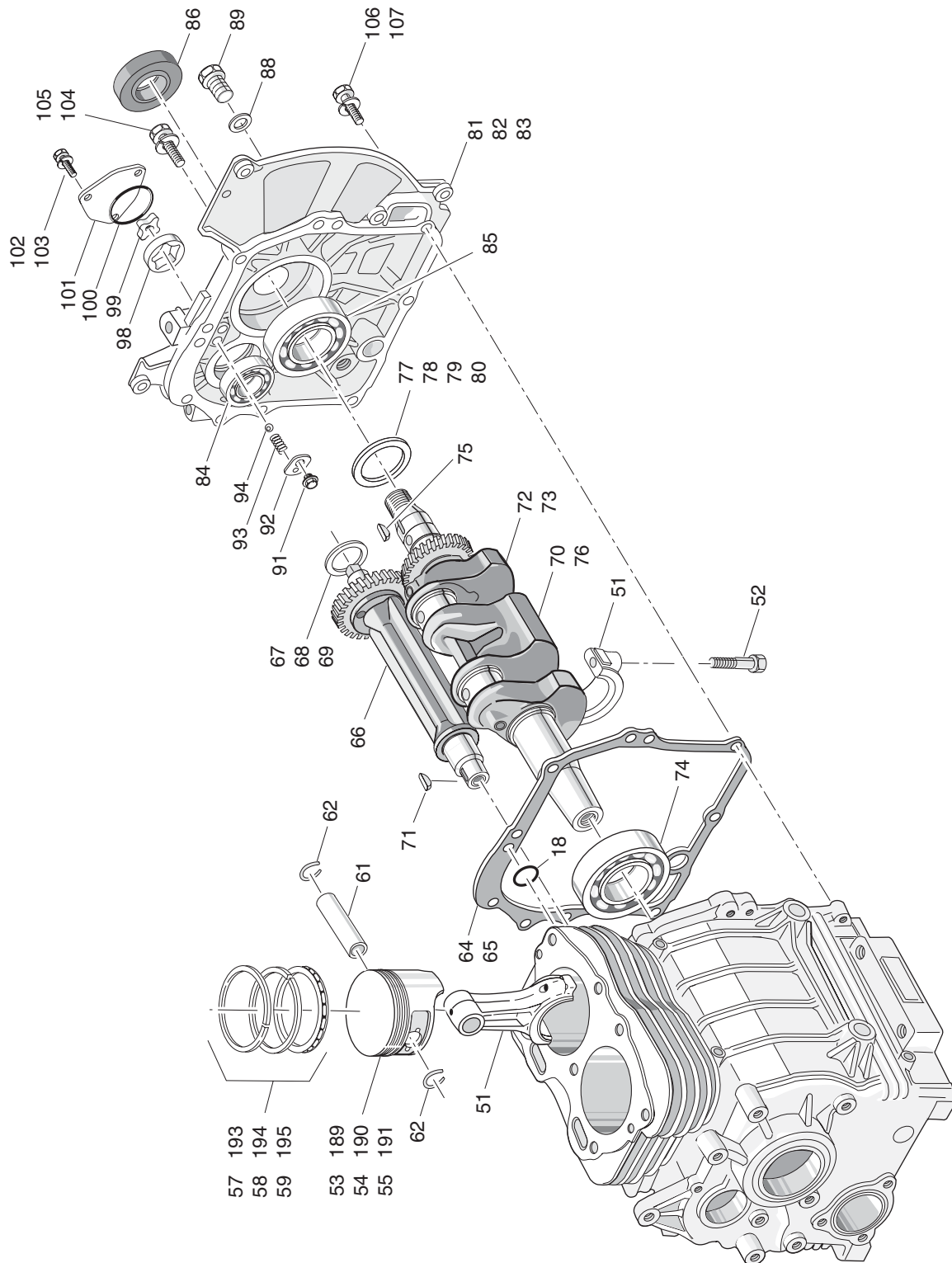
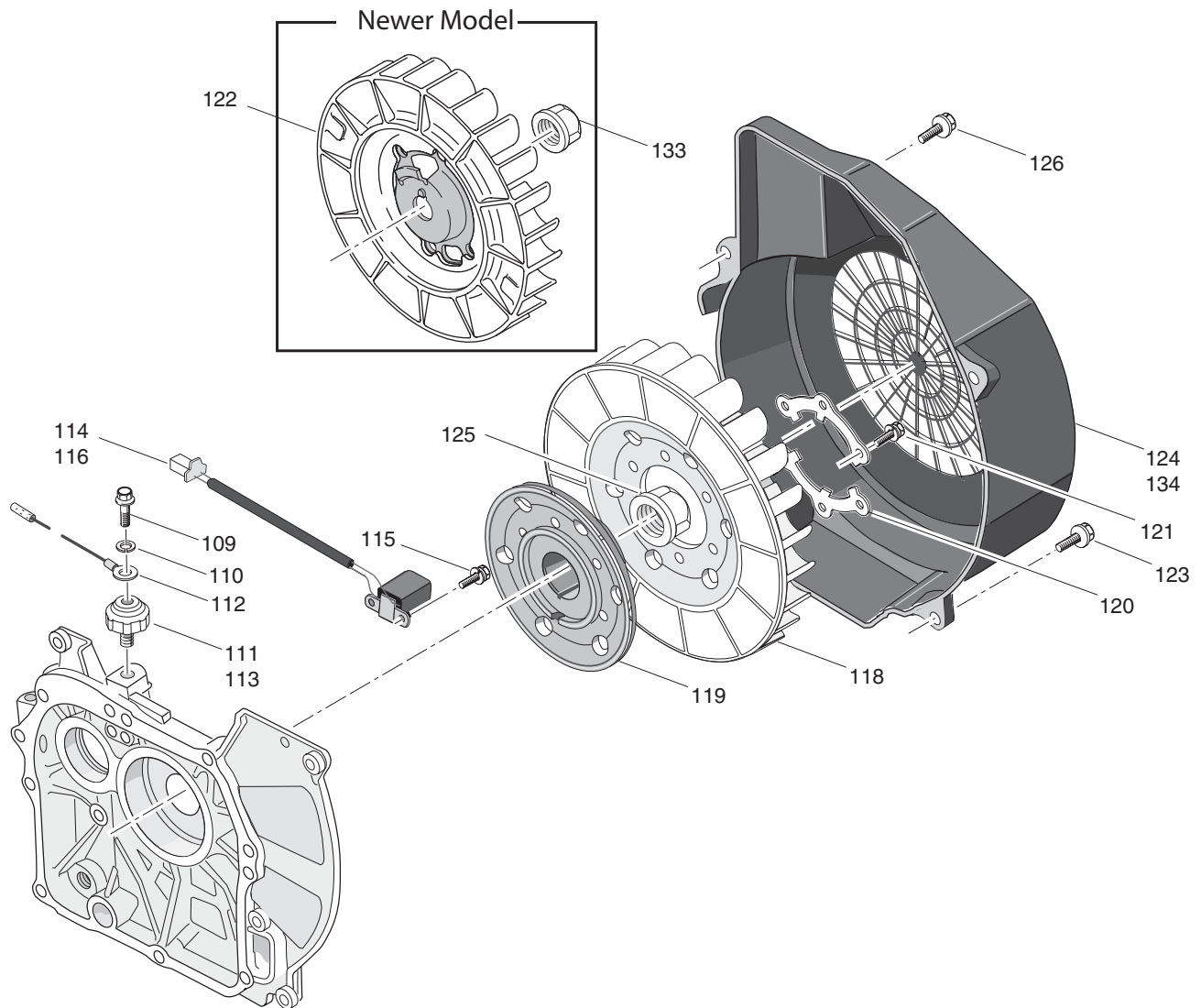


Fig. E-9 Carburetor

ILLUSTRATED PARTS BREAKDOWN









When ordering parts, please specify the model and serial number of the product.

* Indicates a component that is not available as an individual part.

G** Indicates consult Customer Service Department for additional information.

ITEM	PART NO.	1 2 3 4 5	DESCRIPTION	QTY.
1	72845-G01		SERVICE ENGINE, 295CC (INCLUDES ITEMS 5 - 197, 208 - 215).....	1
2	72846-G02		SERVICE ENGINE, 350CC (INCLUDES ITEMS 4,6 - 197, 208 - 215).....	1
3				
4	72875-G01		CRANKCASE ASSEMBLY (INCLUDES ITEMS 6 - 12), 350 cc ENGINE ONLY(1 PIECE MAN/EXH)	1
5	72884-G01		CRANKCASE ASSEMBLY (INCLUDES ITEMS 6 - 12), 295 cc ENGINE ONLY(1 PIECE MAN/EXH)	1
6	26743-G01		OIL SEAL, BALANCER SHAFT	1
7	26741-G01		OIL SEAL, CRANKSHAFT	1
8	26737-G01		BEARING, BALL	1
9	26738-G01		BEARING, CRANKCASE	1
10	26708-G01		DOWEL PIN	2
11	72539-G01		ELBOW	1
12	72559-G01		GUIDE, DIPSTICK	1
13	26591-G01		FILTER, OIL	1
14	26710-G01		O-RING, OIL FILTER	1
15				
16	26680-G01		BOLT AND WASHER ASSEMBLY, M6 X 1 X 12MM	3
17	26678-G01		FLANGED BOLT, M6 X 1 12MM (1 PIECE MAN/EXH)	3
18	26712-G01		O-RING, CYLINDER HEAD	1
19	26669-G01		DOWEL PIN	2
20				
21	72555-G01		BREATHER COVER GASKET (THICK)	2
22	72657-G01		INNER BREATHER PLATE (LONG SLOT)	1
23	72554-G01		BREATHER COVER GASKET (THIN)	2
24	72658-G01		BREATHER BOX	1
25	72676-G01		OUTER BREATHER PLATE (SHORT SLOT).....	1
26	72659-G01		BREATHER COVER	1
27	72680-G01		FLANGED BOLT, M6 X 1 X 40 MM LG	2
28				
29*	72860-G01		REAR BELT COVER	1

When ordering parts, please specify the model and serial number of the product.

* Indicates a component that is not available as an individual part.

G** Indicates consult Customer Service Department for additional information.

ITEM	PART NO.	1 2 3 4 5	DESCRIPTION	QTY.
30				
31	72536-G01		IDLER SPRING	1
32				
33	26681-G01		BOLT, FLANGED, M6 X 1 X 8MM.....	3
34	26626-G01		TIMING BELT	1
35	26627-G01		PULLEY, CAM	1
36	601554		BOLT, FLANGED	1
37	26628-G01		IDLER	1
38	26639-G01		BOLT AND WASHER ASSEMBLY, M8 X 1.25 X 20.....	1
39	26696-G01		WASHER, 8.5MM X 28MM X 2.3MM THK.	1
40	26640-G01		BOLT, IDLER PIVOT	1
41	26699-G01		WASHER, 8.5MM X 16MM X 1.2MM THK.	1
42	26638-G01		BOLT AND WASHER ASSEMBLY, M6 X 1 X 16MM.....	1
43	26695-G01		WASHER, 6.5MM X 22MM X 2MM THK.	1
44				
45*	72908-G01		COVER, FRONT TIMING BELT	1
46	26631-G01		GROMMET, TIMING BELT COVER.....	1
47	26678-G01		BOLT, FLANGED, M6 X 1 X 12MM..... 3(4)	
48	26613-G01		RETAINER, PULLEY	1
49	26614-G01		PULLEY, DRIVE	1
50				
51	26606-G01		CONNECTING ROD (2 MATCHED COMPONENTS).....	2
52	26683-G01		BOLT, CONNECTING ROD	4
53	72393-G01		PISTON (STANDARD), 295 cc ENGINE ONLY	2
54	72395-G01		PISTON (.25MM OVERSIZE), 295 cc ENGINE ONLY	2
55	72396-G01		PISTON (.50MM OVERSIZE), 295 cc ENGINE ONLY	2
56				
57	26608-G01		PISTON RING SET (STANDARD), 295 cc ENGINE ONLY	2
58	26662-G01		PISTON RING SET (.25MM OVERSIZE), 295 cc ENGINE ONLY.....	2

When ordering parts, please specify the model and serial number of the product.

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G** Indicates consult Customer Service Department for additional information.

ITEM	PART NO.	1 2 3 4 5	DESCRIPTION	QTY.
59	26663-G01		PISTON RING SET (.50MM OVERSIZE), 295 cc ENGINE ONLY	2
60				
61	26609-G01		PIN, PISTON.....	2
62	26610-G01		CLIP, PISTON PIN	2
63				
64	72861-G01		GASKET, BEARING COVER (1 PIECE MAN/EXH)	1
65	72553-G01		GASKET, BEARING COVER.....	1
66	26611-G01		BALANCER, SHAFT	1
67	26689-G01		SPACER, BLANCER SHAFT (1MM)	1
68	26690-G01		SPACER, BALANCER SHAFT (1.2MM).....	1
69	26688-G01		SPACER, BALANCER SHAFT (.8MM)	1
70	601550		CRANKSHAFT (INCLUDES ITEM 74) 350cc ONLY(1 PIECE MAN/EXH) ..	1
71	26693-G01		WOODRUFF KEY, BALANCER SHAFT	1
72	72503-G01		CRANKSHAFT (INCLUDES ITEM 74) 350 cc ENGINE ONLY	1
73	26605-G01		CRANKSHAFT (INCLUDES ITEM 74) 295 cc ENGINE ONLY	1
74	26739-G01		BEARING, BALL	1
75	26692-G01		WOODRUFF KEY, CRANKSHAFT	1
76	601551		CRANKSHAFT (INCLUDES ITEM 74) 295cc ONLY(1 PIECE MAN/EXH) ..	1
77	26684-G01		SPACER, CRANKSHAFT (.6MM)	1
78	26685-G01		SPACER, CRANKSHAFT (.8MM)	1
79	26686-G01		SPACER, CRANKSHAFT (1MM)	1
80	26687-G01		SPACER, CRANKSHAFT (1.2MM)	1
81	72886-G01		CRANKCASE END COVER ASSEMBLY (INCLUDES ITEMS 84 - 86) 295cc ONLY (1 PIECE MAN/EXH)	1
82	72858-G01		CRANKCASE END COVER ASSEMBLY (INCLUDES ITEMS 84 - 86) 350cc ONLY (1 PIECE MAN/EXH) (INCLUDES ITEMS 84 - 86).....	1
83	72513-G01		CRANKCASE END COVER ASSEMBLY, S/N 1074503 AND LATER WITHOUT DIPSTICK OPENING (INCLUDES ITEMS 84 - 86)	1
84	26738-G01		BEARING, BALL	1
85	26739-G01		BEARING, BALL	1
86	26742-G01		OIL SEAL	1

When ordering parts, please specify the model and serial number of the product.

* Indicates a component that is not available as an individual part.

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ITEM	PART NO.	1 2 3 4 5	DESCRIPTION	QTY.
87				
88	26713-G01		GASKET, PLUG	1
89	26666-G01		PLUG, CRANKCASE	1
90				
91	26681-G01		BOLT, FLANGED, M6 X 1 X 8MM.....	1
92	26597-G01		PLATE, RELIEF VALVE	1
93	26664-G01		SPRING, OIL PUMP RELIEF VALVE.....	1
94	26665-G01		STEEL BALL, OIL PUMP	1
95				
96				
97	72538-G01		DIPSTICK, STRAIGHT	1
98	26595-G01		ROTOR, OUTER OIL PUMP	1
99	26594-G01		ROTOR, INNER OIL PUMP	1
100	26711-G01		O-RING, OIL PUMP COVER.....	1
101	26596-G01		COVER, OIL PUMP	1
102	26680-G01		BOLT AND WASHER ASSEMBLY, M6 X 1 X 12MM.....	3
103	26678-G01		BOLT, FLANGED, M6 X 1 X 12MM (1 PIECE MAN/EXH)	3
104	601552		BOLT, FLANGED, M8 X 1.25 X 28MM (1 PIECE MAN/EXH)	2
105	72850-G01		BOLT AND WASHER ASSEMBLY, M8 X 1.25 X 30MM.....	2
106	26671-G01		BOLT AND WASHER ASSEMBLY, M6 X 1 X 30MM.....	6
107	601553		BOLT, FLANGED, M6 X 1.0 X 28MM (1 PIECE MAN/EXH)	6
108	26655-G01		OIL PRESSURE SWITCH ASSEMBLY (INCLUDES ITEMS 109 - 111)	1
109	*		BOLT	1
110	*		WASHER, LOCK.....	1
111	*		SWITCH, OIL PRESSURE	1
112	26656-G01		WIRE, OIL PRESSURE SWITCH.....	1
113	72863-G01		OIL PRESSURE SWITCH ASSEMBLY (INCLUDES ITEMS 109 - 111) (1 PIECE MAN/EXH)	1
114	26651-G02		PULSER COIL	1
115	26707-G01		BOLT AND WASHER ASSEMBLY, M5 X .8 X 10MM.....	2

When ordering parts, please specify the model and serial number of the product.

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ITEM	PART NO.	1 2 3 4 5	DESCRIPTION	QTY.
116	72865-G01		PULSER COIL (1 PIECE MAN/EXH)	1
117	72556-G01		BLOWER ASSEMBLY (INCLUDES ITEMS 118 - 121).....	1
118	26703-G01		FAN, COOLING BLOWER	1
119	72557-G01		FLYWHEEL	1
120	26705-G01		WASHER, LOCK.....	2
121	26638-G01		BOLT AND WASHER ASSEMBLY, M6 X 1 X 16MM.....	6
122	601548		FAN, COOLING BLOWER (1 PIECE MAN/EXH)	1
123	26704-G01		BOLT, FLANGED, M6 X 1 X 18MM.....	3
124	26641-G01		BLOWER HOUSING.....	1
125	26691-G01		NUT, FLANGED, M22 X 1.5	1
126	26676-G01		BOLT FLANGED, M6 X 1 X 23MM	1
127	72391-G01		CYLINDER HEAD ASSEMBLY (INCLUDES ITEMS 129 - 132) 350 cc ENGINE ONLY	1
128	72390-G01		CYLINDER HEAD ASSEMBLY (INCLUDES ITEMS 129 - 132) 295 cc ENGINE ONLY	1
129	26715-G01		OIL SEAL, CAMSHAFT	1
130*	72307-G01		STUD, M6 X 1 X 115MM LG.	2
131	26659-G01		VALVE GUIDE, (OVERSIZE).....	4
132	72392-G01		SEAL, VALVE STEM.....	4
133	601555		NUT, FLANGED, M18 x 1.5 (1 PIECE MAN/EXH)	1
134	72880-G01		BLOWER HOUSING (1 PIECE MAN/EXH)	1
135*	72882-G01		CYLINDER BAFFLE, INTAKE	1
136*	72851-G01		BOLT, FLANGED, M6 X 1 X 14MM.....	2
137	26600-G01		ROCKER COVER	1
138	26601-G01		CAP, OIL FILTER	1
139	26720-G01		O-RING, OIL FILTER	1
140	26676-G01		BOLT, FLANGED, M6 X 1 X 23MM.....	6
141	72848-G01		ROCKER COVER (1 PIECE MAN/EXH)	1
142*	72509-G01		RETAINER, VALVE SPRING	4
143	72510-G01		KEYS, VALVE (COLLET)	8
144				

When ordering parts, please specify the model and serial number of the product.

* Indicates a component that is not available as an individual part.

G** Indicates consult Customer Service Department for additional information.

ITEM	PART NO.	1 2 3 4 5	DESCRIPTION	QTY.
145	72511-G01		SPRING, VALVE	4
146	26719-G01		GASKET, ROCKER COVER	1
147	26624-G01		SPACER, ROCKER SHAFT	2
148	72876-G01		GASKET, ROCKER COVER (1 PIECE MAN/EXH)	1
149	26621-G01		ROCKER ARM ASSEMBLY (INCLUDES ITEMS 150, 151)	1
150	26622-G01		SCREW, M6 X .75 X 20MM	4
151	26623-G01		NUT, M6 X .75	4
152	26625-G01		SPRING, ROCKER SHAFT	1
153	72394-G01		CAMSHAFT	1
154	26709-G01		PIN, DOWEL	1
155	26620-G01		SHAFT, ROCKER	1
156	26718-G01		GASKET, CAMSHAFT COVER	1
157	26599-G01		COVER, CAMSHAFT	1
158	26678-G01		BOLT, FLANGED, M6 X 1 X 12MM	3
159	26679-G01		BOLT, M6 X 1	1
160	72866-G01		IGNITION COIL (1 PIECE MAN/EXH)	1
161	26657-G01		BRACKET, IGNITION COIL	1
162	26706-G01		NUT, FLANGED, M6 X 1	1
163	26652-G01		IGNITION COIL	1
164	13632-G1		NUT, M6 X 1	2
165	26733-G01		PLUG WIRE SET	2
166	26733-G02		PLUG WIRE SET, IGNITION SUPPRESSOR (OPTIONAL)	AR
167	25523-G3		SPARK PLUG (NGK BPR4ES) (295)	2
168	25523-G4		SPARK PLUG (NGK BPR5ES) (350)	2
169	26724-G01		GASKET, EXHAUST	1
170				
171	26633-G01		MANIFOLD, EXHAUST	1
172				
173	25531-G1		GASKET, MUFFLER	1
174	25532-G1		BOLT AND WASHER, M8 X 1.25 X 18MM	4

When ordering parts, please specify the model and serial number of the product.

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ITEM	PART NO.	1 2 3 4 5	DESCRIPTION	QTY.
175	601560		CYLINDER BAFFLE, EXHAUST (1 PIECE MAN/EXH)	1
176	26642-G01		CYLINDER BAFFLE, EXHAUST	1
177	26681-G01		BOLT, FLANGED, M6 X 1 X 8MM.....	6
178	26673-G01		BOLT, FLANGED, M8 X 1.25 X 50MM.....	4
179				
180	72507-G01		VALVE, INTAKE	2
181				
182	26675-G01		BOLT, FLANGED, M8 X 1.25 X 40MM.....	2
183	26673-G01		BOLT, FLANGED, M8 X 1.25 X 50MM.....	4
184	26674-G01		BOLT, FLANGED, M8 X 1.25 X 60MM.....	1
185				
186	26716-G01		GASKET, CYLINDER HEAD, 295 cc ENGINE ONLY	1
187	72512-G01		GASKET, CYLINDER HEAD, 350 cc ENGINE ONLY	1
188				
189	72540-G01		PISTON (STANDARD), 350 cc ENGINE ONLY	2
190	72541-G01		PISTON (.25MM OVERSIZE), 350 cc ENGINE ONLY	2
191	72542-G01		PISTON (.50MM OVERSIZE), 350 cc ENGINE ONLY	2
192				
193	72543-G01		PISTON RING SET (STANDARD), 350 cc ENGINE ONLY	2
194	72544-G01		PISTON RING SET (.25MM OVERSIZE), 350 cc ENGINE ONLY	2
195	72545-G01		PISTON RING SET (.50MM OVERSIZE), 350 cc ENGINE ONLY	2
196	72857-G01		VALVE, EXHAUST (1 PIECE MAN/EXH)	2
197	72508-G01		VALVE, EXHAUST	2
198	26728-G01		BRACKET, CHOKE CABLE.....	1
199	26727-G01		GASKET, AIR CLEANER.....	1
200	72840-G02		CARBURETOR (STANDARD), 295 cc ENGINE ONLY	1
201	72840-G03		CARBURETOR (STANDARD), 350 cc ENGINE ONLY	1
202	26706-G01		FLANGE NUT, M6 X 1.0.....	2
203*	72854-G01		INSULATOR, 350 cc ENGINE ONLY	1
204	26726-G01		GASKET, CARBURETOR.....	1

When ordering parts, please specify the model and serial number of the product.

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G** Indicates consult Customer Service Department for additional information.

ITEM	PART NO.	1 2 3 4 5	DESCRIPTION	QTY.
205	72883-G01		INSULATOR, 295 cc ENGINE ONLY	1
206	26726-G01		GASKET, ENGINE.....	1
207				
208	72656-G01		ALUMINUM GASKET	2
209	72655-G01		BANJO UNION.....	1
210	72654-G01		BANJO BOLT	1
211				
212	72653-G01		RUBBER RETURN HOSE (INCLUDES ITEMS 213 - 215)	1
213	72677-G01		RUBBER HOSE, 6 MM ID X 12 MM OD X 145 MM LG	1
214	72678-G01		MESH PROTECTIVE COVER.....	1
215	72679-G01		HOSE CLAMP	2
216				
217	601556		ROCKER ARM ASSEMBLY (INCLUDES ITEMS 218, 219) (1 PIECE MAN/EXH)	1
218	601557		SCREW, M5 X .5 X 18.5MM (1 PIECE MAN/EXH)	4
219	601558		NUT, M5 X .5 (1 PIECE MAN/EXH)	4
220				
221	601563		CAMSHAFT (1 PIECE MAN/EXH)	1
222	26599-G01		GASKET, CAMSHAFT COVER (1 PIECE MAN/EXH)	1
223				
224	72869-G01		BRACKET, IGNITION COIL 350CC (1 PIECE MAN/EXH)	1
225	72885-G01		BRACKET, IGNITION COIL, 295CC (1 PIECE MAN/EXH)	1
226	72870-G01		FLANGED BOLT, M6 X 1 X 12MM (1 PIECE MAN/EXH)	1
227	72871-G01		SCREW AND WASHER ASSEMBLY (1 PIECE MAN/EXH)	2
228				
229	601559		BRACKET, CHOKE CABLE (1 PIECE MAN/EXH)	1
230				
231	72863-G01		GASKET, BREATHER COVER, INNER (1 PIECE MAN/EXH)	1
232	72859-G01		PLATE, BREATHER (1 PIECE MAN/EXH)	1
233	72862-G01		GASKET, BREATHER COVER, OUTER (1 PIECE MAN/EXH)	1

G** Indicates consult Customer Service Department for additional information.

LIMITED WARRANTY



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LIMITED WARRANTY

Notes:

LIMITED WARRANTY - FEDERAL

FEDERAL EMISSIONS COMPONENT DEFECT WARRANTY

EMISSIONS COMPONENT DEFECT WARRANTY COVERAGE - This emission warranty is applicable in all States, except the State of California

Fuji Heavy Industries Ltd. and E-Z-GO Division of Textron Augusta, Georgia, (herein "E-Z-GO") warrant(s) to the initial retail purchaser and each subsequent owner, that this Non-road engine (herein "engine") has been designed, built, and equipped to conform at the time of initial sale to all applicable regulations of the U.S. Environmental Protection Agency (EPA), and that the engine is free of defects in materials and workmanship which would cause this engine to fail to conform with EPA regulations during its warranty period.

For the components listed under PARTS COVERED, the distributor, dealer, or service provider authorized by E-Z-GO will, at no cost to you, make the necessary diagnosis, repair, or replacement necessary to ensure that the engine complies with applicable U.S. EPA regulations.

EMISSION COMPONENT DEFECT WARRANTY PERIOD

The warranty period for this engine begins on the date of sale to the initial purchaser and continues for a period of 2 years.

PARTS COVERED

Listed below are the parts covered by the Emission Components Defect Warranty. Some of the parts listed below may require scheduled maintenance and are warranted up to the first scheduled replacement point for that part.

- 1) Fuel Metering System
 - (i) Carburetor and internal parts (and/or pressure regulator or fuel injection system)
 - (ii) Air/fuel ratio feedback and control system, if applicable.
 - (iii) Cold start enrichment system, if applicable.
 - (iv) Regulator assy (gaseous fuel, if applicable)
- 2) Air Induction System
 - (i) Intake manifold, if applicable
 - (ii) Air filter.
- 3) Ignition System
 - (i) Spark plugs.
 - (ii) Magneto or electronic ignition system.
 - (iii) Spark advance/retard system, if applicable.
- 4) Exhaust manifold, if applicable
- 5) Miscellaneous Items Used in Above Systems
 - (i) Electronic controls, if applicable
 - (ii) Hoses, belts, connectors, and assemblies.
 - (iii) Filter lock assy (gaseous fuel, if applicable)

OBTAINING WARRANTY SERVICE

To obtain warranty service, take your engine to the nearest authorized E-Z-GO distributor, dealer, or service provider. Bring your sales receipts indicating date of purchase for this engine. The distributor, dealer, or service provider authorized by E-Z-GO will perform the necessary repairs or adjustments within a reasonable amount of time and furnish you with a copy of the repair order. All parts and accessories replaced under this warranty become the property of E-Z-GO.

WHAT IS NOT COVERED

- Conditions resulting from tampering, misuse, improper adjustment (unless they were made by the distributor, dealer, or service provider authorized by E-Z-GO during a warranty repair), alteration, accident, failure to use the recommended fuel and oil, or not performing required maintenance services.
- The replacement parts used for required maintenance services.
- Consequential damages such as loss of time, inconvenience, loss of use of the engine or equipment, etc.
- Diagnosis and inspection charges that do not result in warranty-eligible service being performed.
- Any non-authorized replacement part, or malfunction of authorized parts due to use of non-authorized parts.

OWNER'S WARRANTY RESPONSIBILITIES

As the engine owner, you are responsible for the performance of the required maintenance listed in your owner's manual. E-Z-GO recommends that you retain all receipts covering maintenance on your engine, but E-Z-GO cannot



LIMITED WARRANTY - FEDERAL

deny warranty solely for the lack of receipts or for your failure to ensure the performance of all scheduled maintenance.

As the engine owner, you should however be aware that E-Z-GO may deny warranty coverage if your engine or a part has failed due to abuse, neglect, improper maintenance or unapproved modifications.

You are responsible for presenting your engine to the nearest distributor, dealer, or service provider authorized by E-Z-GO when a problem exists.

If you have any questions regarding your warranty rights and responsibilities, you should contact the E-Z-GO Warranty Department at 1-800-241-5855 for the information.

THINGS YOU SHOULD KNOW ABOUT THE EMISSION CONTROL SYSTEM WARRANTY

MAINTENANCE AND REPAIRS

You are responsible for the proper maintenance of the engine. You should keep all receipts and maintenance records covering the performance of regular maintenance in the event questions arise. These receipts and maintenance records should be transferred to each subsequent owner of the engine. E-Z-GO reserves the right to deny warranty coverage if the engine has not been properly maintained. Warranty claims will not be denied, however, solely because of the lack of required maintenance or failure to keep maintenance records.

MAINTENANCE, REPLACEMENT OR REPAIR OF EMISSION CONTROL DEVICES AND SYSTEMS MAY BE PERFORMED BY ANY REPAIR ESTABLISHMENT OR INDIVIDUAL; HOWEVER, WARRANTY REPAIRS MUST BE PERFORMED BY A DISTRIBUTOR, DEALER OR, SERVICE PROVIDER AUTHORIZED BY E-Z-GO. THE USE OF PARTS THAT ARE NOT EQUIVALENT IN PERFORMANCE AND DURABILITY TO AUTHORIZED PARTS MAY IMPAIR THE EFFECTIVENESS OF THE EMISSION CONTROL SYSTEM AND MAY HAVE A BEARING ON THE OUTCOME OF A WARRANTY CLAIM.

If other than the parts authorized by E-Z-GO are used for maintenance replacements or for the repair of components affecting emission control, you should assure yourself that such parts are warranted by their manufacturer to be equivalent to the parts authorized by E-Z-GO in their performance and durability.

HOW TO MAKE A CLAIM

All repair qualifying under this limited warranty must be performed by a distributor, dealer, or service provider authorized by E-Z-GO. In the event that any emission-related part is found to be defective during the warranty period, you shall notify E-Z-GO Warranty Department at 1-800-241-5855 and you will be advised of the appropriate warranty service providers where the warranty repair can be performed.

LIMITED WARRANTY - FEDERAL (2001)

EMISSION COMPONENT DEFECT WARRANTY COVERAGE - This emission warranty is applicable in all states, except the State of California.

Fuji Heavy Industries Ltd. and Textron Golf, Turf & Specialty Products Augusta, Georgia, (herein "Textron Golf, Turf & Specialty Products") warrant(s) to the initial retail purchaser and each subsequent owner, that this Nonroad engine (herein "engine") has been designed, built, and equipped to conform at the time of initial sale to all applicable regulations of the U.S. Environmental Protection Agency (EPA), and that the engine is free of defects in materials and workmanship which would cause this engine to fail to conform with EPA regulations during its warranty period.

For the components listed under PARTS COVERED, the distributor, dealer or service provider authorized by Textron Golf, Turf & Specialty Products will, at no cost to you, make the necessary diagnosis, repair, or replacement necessary to ensure that the engine complies with applicable U.S. EPA regulations.

EMISSION COMPONENT DEFECT WARRANTY PERIOD

The warranty period for this engine begins on the date of sale to the initial purchaser and continues for a period of 2 years.

PARTS COVERED

Listed below are the parts covered by the Emission Component Defect Warranty. Some of the parts listed below may require scheduled maintenance and are warranted up to the first scheduled replacement point for that part.

- 1) Fuel Metering System
 - (i) Carburetor and internal parts (and/or pressure regulator or fuel injection system)
 - (ii) Air/fuel ration feedback and control system, if applicable
 - (iii) Cold start enrichment system, if applicable
 - (iv) Regulator assembly (gaseous fuel, if applicable)
- 2) Air Induction System
 - (i) Intake manifold, if applicable
 - (ii) Air filter
- 3) Ignition System
 - (i) Spark plugs
 - (ii) Magneto or electronic ignition system.
 - (iii) Spark advance/retard system, if applicable
- 4) Exhaust Manifold, if applicable
- 5) Miscellaneous Items Used in Above Systems
 - (i) Electronic controls, if applicable
 - (ii) Hoses, belts, connectors and assemblies.
 - (iii) Filter lock assembly (gaseous fuel, if applicable)

OBTAINING WARRANTY SERVICE

To obtain warranty service, take your engine to the nearest authorized Textron Golf, Turf & Specialty Products distributor, dealer, or service provider. Bring your sales receipts indicating date of purchase for this engine. The distributor, dealer, or service provider authorized by Textron Golf, Turf & Specialty Products will perform the necessary repairs or adjustments within a reasonable amount of time and furnish you with a copy of the repair order. All parts and accessories replaced under this warranty become the property of Textron Golf, Turf & Specialty Products.

WHAT IS NOT COVERED

- Conditions resulting from tampering, misuse, improper adjustment (unless they were made by the distributor, dealer or service provider authorized by Textron Golf, Turf & Specialty Products during a warranty repair), alteration, accident, failure to use the recommended fuel and oil, or not performing required maintenance services.
- The replacement parts used for required maintenance services.
- Consequential damages such as loss of time, inconvenience, loss of use of the engine or equipment, etc.
- Diagnosis and inspection charges that do not result in warranty-eligible service being performed.
- Any non-authorized replacement part, or malfunction of authorized parts due to use of non-authorized parts.

OWNER'S WARRANTY RESPONSIBILITIES:

As the engine owner, you are responsible for the performance of the required maintenance listed in your Owner's Manual. Textron Golf, Turf & Specialty Products recommends that you retain all receipts covering maintenance on your engine, but Textron Golf, Turf & Specialty Products cannot deny warranty solely for the lack of receipts or for your failure to ensure the performance of all scheduled maintenance.

As the engine owner, you should, however, be aware that Textron Golf, Turf & Specialty Products may deny you warranty coverage if your engine or a part has failed due to abuse, neglect, improper maintenance or unapproved modifications.

LIMITED WARRANTY - FEDERAL (2001)

You are responsible for presenting your engine to the nearest distributor, dealer, or service provider authorized by Textron Golf, Turf & Specialty Products when a problem exists.

If you have any questions regarding your warranty rights and responsibilities, you should contact the Textron Golf, Turf & Specialty Products Warranty Department at 1-800-241-5855 for the information.

THINGS YOU SHOULD KNOW ABOUT THE EMISSION CONTROL SYSTEM WARRANTY

MAINTENANCE AND REPAIRS

You are responsible for the proper use and maintenance of the engine. You should keep all receipts and maintenance records covering the performance of regular maintenance in the event questions arise. These receipts and maintenance records should be transferred to each subsequent owner of the engine. Textron Golf, Turf & Specialty Products reserves the right to deny warranty coverage if the engine has not been properly maintained. Warranty claims will not be denied, however, solely because of the lack of required maintenance or failure to keep maintenance records.

MAINTENANCE, REPLACEMENT OR REPAIR OF EMISSION CONTROL DEVICES AND SYSTEMS MAY BE PERFORMED BY ANY REPAIR ESTABLISHMENT OR INDIVIDUAL; HOWEVER, WARRANTY REPAIRS MUST BE PERFORMED BY A DISTRIBUTOR, DEALER OR SERVICE PROVIDER AUTHORIZED BY TEXTRON GOLF, TURF & SPECIALTY PRODUCTS. THE USE OF PARTS THAT ARE NOT EQUIVALENT IN PERFORMANCE AND DURABILITY TO AUTHORIZED PARTS MAY IMPAIR THE EFFECTIVENESS OF THE EMISSION CONTROL SYSTEM AND MAY HAVE A BEARING ON THE OUTCOME OF A WARRANTY CLAIM.

If other than the parts authorized by Textron Golf, Turf & Specialty Products are used for maintenance replacements or for the repair of components affecting emission control, you should assure yourself that such parts are warranted by their manufacturer to be equivalent to the parts authorized by Textron Golf, Turf & Specialty Products in their performance and durability.

HOW TO MAKE A CLAIM

All repairs qualifying under this limited warranty must be performed by a distributor, dealer or service provider authorized by Textron Golf, Turf & Specialty Products. In the event that any emission-related part is found to be defective during the warranty period, you shall notify Textron Golf, Turf & Specialty Products Warranty Department at 1-800-241-5855 and you will be advised of the appropriate warranty service providers where the warranty repair can be performed.

LIMITED WARRANTY - CALIFORNIA (1995-1999)

CALIFORNIA EMISSION CONTROL WARRANTY STATEMENT YOUR WARRANTY RIGHTS AND OBLIGATIONS

The California Air Resources Board and Fuji Heavy Industries Ltd. (herein "FUJI") are pleased to explain the emission control system warranty on your 1995 and later specialty vehicle engine (herein "engine"). In California, the engine must be designed, built and equipped to meet the State's stringent anti-smog standards. FUJI must warrant the emission control system on your engine for the period of time described below, provided there has been no abuse, neglect or improper maintenance of your engine.

Your emission control system may include parts such as the carburetor and the ignition system. Also included may be hoses, connectors and other emission-related assemblies.

Where a warrantable condition exists, FUJI will repair your engine at no cost to you including diagnosis, parts and labor.

MANUFACTURER'S WARRANTY COVERAGE:

The 1995 and later engines are warranted for two (2) years. If any emission related part on your engine is defective, the part will be repaired or replaced by FUJI.

OWNER'S WARRANTY RESPONSIBILITIES:

As the engine owner, you are responsible for the performance of the required maintenance listed in your Owner's Manual. FUJI recommends that you retain all receipts covering maintenance on your engine, but FUJI cannot deny warranty solely for the lack of receipts or for your failure to ensure the performance of all scheduled maintenance.

As the engine owner, you should, however, be aware that FUJI may deny you warranty coverage if your engine or a part has failed due to abuse, neglect, improper maintenance or unapproved modifications.

You are responsible for presenting your engine to a dealer, distributor or warranty station authorized by E-Z-GO DIVISION OF TEXTRON, INC. Augusta, Georgia, (herein "E-Z-GO") to which FUJI supplies the engine as soon as a problem exists. The warranty repairs should be completed in a reasonable amount of time, not to exceed 30 days.

If you have any questions regarding your warranty rights and responsibilities, you should contact the E-Z-GO Warranty Department at 1-800-241-5855.

LIMITED WARRANTY on Emission Control Systems - California Only -

FUJI, Tokyo, Japan, warrants to the owner of the 1995 and later engine that the engine (1) has been designed, built and equipped so as to conform at the time of manufacture with the applicable regulations of the California Air Resources Board, and (2) is free from defects in materials and workmanship which could cause it to fail to conform with those regulations as may be applicable in the terms and conditions stated below.

A. WARRANTY COMMENCEMENT DATE

The warranty period begins on the date the engine is delivered to a first retail purchaser.

B. LENGTH OF COVERAGE

FUJI warrants to a first retail purchaser and each subsequent purchaser that the engine is free from defects in materials and workmanship which could cause the failure of a warranted emission-related part for a period of two (2) years after the date of delivery to the first retail purchaser.

C. WHAT IS COVERED:

1. REPAIR OR REPLACEMENT PARTS

Repairs and replacement of any warranted part will be performed at no charge to you by an authorized dealer, distributor or a warranty station. You may contact the E-Z-GO Warranty Department at 1-800-241-5855 to get the nearest appropriate location where your warranty repairs are performed.

2. WARRANTY PERIOD

This warranty continues for a period of two (2) years and shall apply only to the repair, replacement or adjustment of the component parts which are not scheduled for replacement as required maintenance. Further, component parts which are scheduled only for regular inspection to the effect of "repair or replace as necessary" shall be warranted for the warranty period. Any warranted



LIMITED WARRANTY - CALIFORNIA (1995-1999)

part which is scheduled for replacement as required maintenance shall be warranted for the period of time up to the first scheduled replacement point for that part.

3. DIAGNOSIS

You shall not be charged for diagnostic labor which leads to the determination that a warranted part is defective, if the diagnostic work is performed at an authorized dealer, distributor or warranty station.

4. CONSEQUENTIAL DAMAGES

If a warranted part failed causing damages to other engine components, consult a warranty station.

D. WHAT IS NOT COVERED

1. This limited warranty does not cover any part which malfunctions, fails or is damaged due to failure to follow the maintenance and operating instructions set forth in the 1995 and later Owner's Manual including:

- (1) improper or inadequate scheduled engine inspection and maintenance
- (2) improper or inadequate maintenance of any warranted parts
- (3) improper installation, adjustment or repair of the engine or of any warranted part unless performed by an authorized dealer
- (4) failure to follow recommendations on fuel use contained in the 1995 and later Owner's Manual
- (5) repairs performed outside of the authorized warranty service facilities
- (6) use of parts which are not authorized by FUJI.

2. Add-on or modified parts

This warranty does not cover any part which malfunctions, fails or is damaged due to alterations by changing, adding to or removing parts from the engine.

3. Expenses incurred by processing warranty claims

FUJI, any authorized dealer, distributors and warranty station shall not be liable for any loss of use of the engine, for any alternative usage, for any damage to goods, loss of time or inconvenience.

E. HOW TO FILE A CLAIM

All repairs qualifying under this Limited Warranty must be performed by a dealer who sold you the engine or distributors or warranty stations authorized by E-Z-GO. In the event that any emission-related part is found to be defective during the warranty period, you should notify E-Z-GO Warranty Department at 1-800-241-5855 and you will be given the appropriate warranty service facilities where the warranty repair is performed.

F. WHERE TO GET WARRANTY SERVICE

It is recommended that warranty service be performed by the authorized dealer who sold you the engine, although warranty service will be performed by any authorized dealers, distributors and warranty stations anywhere in the United States. When warranty repair is needed, the engine must be brought to an authorized dealer, distributorship or warranty station's place of business during normal business hours. In all cases, a reasonable time, not to exceed 30 days, must be allowed for the warranty repair to be completed after the engine is received by the authorized dealer, distributor or service station.

G. MAINTENANCE, REPLACEMENT AND REPAIR OF EMISSION-RELATED PARTS

Only warranted engine replacement parts approved by FUJI should be used in the performance of any warranty maintenance or repairs on emission-related parts. If other than authorized parts are used for maintenance, replacement or repair of components affecting emission control, you should assure yourself that such parts are warranted by their manufacturer to be equivalent to authorized parts in performance and durability. FUJI, however, assumes no liability under this warranty with respect to parts other than authorized parts. The use of non-authorized replacement parts does not invalidate the warranty on other components unless the non-authorized parts cause damage to warranted parts.

H. PARTS COVERED UNDER THE CALIFORNIA EMISSIONS WARRANTY

- (1) Fuel Metering System
 - (i) Carburetor and internal parts
 - (ii) Choke System
 - (iii) Fuel filter (annual maintenance item)
- (2) Air Induction System
 - (i) Air filter element (semi-annual maintenance item)
- (3) Ignition System
 - (i) Spark plug (annual maintenance item)
 - (ii) Ignition Coil
 - (iii) Ignitor Complete
 - (iv) Pulser Coil

LIMITED WARRANTY - CALIFORNIA (1995-1999)

- (4) Exhaust Manifold
- (5) Miscellaneous Items Used in Above Systems
 - (i) Fuel hoses, clamps and sealing gaskets

I. MAINTENANCE STATEMENTS

It is your responsibility to have all scheduled inspection and maintenance services performed at the times recommended in the 1995 and later Owner's Manual and to retain proof that inspection and maintenance services are performed at the times when recommended. FUJI will not deny a warranty claim solely because you have no record of maintenance; however, FUJI may deny a warranty claim if your failure to perform required maintenance resulted in the failure of warranted part. The proof which you maintain should be given to each subsequent owner of the engine. You are responsible for performing the scheduled maintenance described below based on the procedures specified in the 1995 and later Owner's Manual. The scheduled maintenance below is based on the normal engine operating schedule.

PROCEDURE	INTERVAL
a) Check for sealing of fuel cap and proper operation of fuel gauge (at each fueling). Check that fuel cap vent is free of dirt.	WEEKLY
b) Check engine for unusual noise, vibration acceleration.	MONTH (20 HOURS)
c) Check engine electrical system for coil/spark plug wire for cracks/loose connections.	3 MONTH (50 HOURS)
d) Check fuel system for leaks at tank cap, lines, filters, pump, carburetor. Check lines for cracks/deterioration.	3 MONTH (50 HOURS)
e) Check air cleaner filter element.	SEMIANNUAL (125 HOURS)
f) Replace engine oil, DO NOT OVERFILL. SAE 10W-30/10W-40 SF,SG,CC oil.	SEMIANNUAL (125-150 HOURS)
g) Clean oil filter in solvent (at oil change). Replace O-rings if required.	SEMIANNUAL (125-150 HOURS)
h) Replace air cleaner filter element if required.	ANNUAL (250-300 HOURS)
i) Check fuel filter for dirt build up. (Replace as required)	ANNUAL (250-300 HOURS)
j) Check the spark plugs for gap 0.030. (Replace if required)	ANNUAL (250-300 HOURS)
k) Check timing belt tension, signs of wear/damage. Replace only if worn or damaged.	ANNUAL (250-300 HOURS)

LIMITED WARRANTY - CALIFORNIA (2000)

CALIFORNIA EMISSION CONTROL WARRANTY STATEMENT YOUR WARRANTY RIGHTS AND OBLIGATIONS

The California Air Resources Board and Fuji Heavy Industries Ltd. (herein "FUJI") are pleased to explain the emission control system warranty on your 2000 and later small off-road engine (herein "engine"). In California, the engine must be designed, built and equipped to meet the State's stringent anti-smog standards. FUJI must warrant the emission control system on your engine for the period of time described below, provided there has been no abuse, neglect or improper maintenance of your engine.

Your emission control system may include parts such as the carburetor and the ignition system. Also included may be hoses, connectors and other emission-related assemblies.

Where a warrantable condition exists, FUJI will repair your engine at no cost to you including diagnosis, parts and labor.

MANUFACTURER'S WARRANTY COVERAGE:

The 2000 and later engines are warranted for two (2) years. If any emission related part on your engine is defective, the part will be repaired or replaced by FUJI.

OWNER'S WARRANTY RESPONSIBILITIES:

As the engine owner, you are responsible for the performance of the required maintenance listed in your Owner's Manual. FUJI recommends that you retain all receipts covering maintenance on your engine, but FUJI cannot deny warranty solely for the lack of receipts or for your failure to ensure the performance of all scheduled maintenance.

As the engine owner, you should, however, be aware that FUJI may deny you warranty coverage if your engine or a part has failed due to abuse, neglect, improper maintenance or unapproved modifications. You are responsible for presenting your engine to a dealer, distributor or warranty station authorized by E-Z-GO DIVISION OF TEXTRON, INC. Augusta, Georgia, (herein "E-Z-GO") to which FUJI supplies the engine as soon as a problem exists. The warranty repairs should be completed in a reasonable amount of time, not to exceed 30 days.

If you have any questions regarding your warranty rights and responsibilities, you should contact the E-Z-GO Warranty Department at 1-800-241-5855.

LIMITED WARRANTY on Emission Control Systems - California Only -

FUJI, Tokyo, Japan, warrants to the owner of the 2000 and later engine that the engine (1) has been designed, built and equipped so as to conform at the time of manufacture with the applicable regulations of the California Air Resources Board, and (2) is free from defects in materials and workmanship which could cause it to fail to conform with those regulations as may be applicable in the terms and conditions stated below.

J. WARRANTY COMMENCEMENT DATE

The warranty period begins on the date the engine is delivered to a first retail purchaser.

K. LENGTH OF COVERAGE

FUJI warrants to a first retail purchaser and each subsequent purchaser that the engine is free from defects in materials and workmanship which could cause the failure of a warranted emission-related part for a period of two (2) years after the date of delivery to the first retail purchaser.

L. WHAT IS COVERED:

1. REPAIR OR REPLACEMENT PARTS

Repairs and replacement of any warranted part will be performed at no charge to you by an authorized dealer, distributor or a warranty station. You may contact the E-Z-GO Warranty Department at 1-800-241-5855 to get the nearest appropriate location where your warranty repairs are performed.

2. WARRANTY PERIOD

This warranty continues for a period of two (2) years and shall apply only to the repair, replacement or adjustment of the component parts which are not scheduled for replacement as required maintenance. Further, component parts which are scheduled only for regular inspection to the effect of "repair or replace as necessary" shall be warranted for the warranty period. Any warranted

LIMITED WARRANTY - CALIFORNIA (2000)

part which is scheduled for replacement as required maintenance shall be warranted for the period of time up to the first scheduled replacement point for that part.

3. DIAGNOSIS

You shall not be charged for diagnostic labor which leads to the determination that a warranted part is defective, if the diagnostic work is performed at an authorized dealer, distributor or warranty station.

4. CONSEQUENTIAL DAMAGES

If a warranted part failed causing damages to other engine components, consult a warranty station.

M. WHAT IS NOT COVERED

1. This limited warranty does not cover any part which malfunctions, fails or is damaged due to failure to follow the maintenance and operating instructions set forth in the 2000 and later Owner's Manual including:

- (1) improper or inadequate scheduled engine inspection and maintenance
- (2) improper or inadequate maintenance of any warranted parts
- (3) improper installation, adjustment or repair of the engine or of any warranted part unless performed by an authorized dealer
- (4) failure to follow recommendations on fuel use contained in the 2000 and later Owner's Manual
- (5) repairs performed outside of the authorized warranty service facilities
- (6) use of parts which are not authorized by FUJI.

2. Add-on or modified parts

This warranty does not cover any part which malfunctions, fails or is damaged due to alterations by changing, adding to or removing parts from the engine.

3. Expenses incurred by processing warranty claims

FUJI, any authorized dealer, distributors and warranty station shall not be liable for any loss of use of the engine, for any alternative usage, for any damage to goods, loss of time or inconvenience.

N. HOW TO FILE A CLAIM

All repairs qualifying under this Limited Warranty must be performed by a dealer who sold you the engine or distributors or warranty stations authorized by E-Z-GO. In the event that any emission-related part is found to be defective during the warranty period, you should notify E-Z-GO Warranty Department at 1-800-241-5855 and you will be given the appropriate warranty service facilities where the warranty repair is performed.

O. WHERE TO GET WARRANTY SERVICE

It is recommended that warranty service be performed by the authorized dealer who sold you the engine, although warranty service will be performed by any authorized dealers, distributors and warranty stations anywhere in the United States. When warranty repair is needed, the engine must be brought to an authorized dealer, distributorship or warranty station's place of business during normal business hours. In all cases, a reasonable time, not to exceed 30 days, must be allowed for the warranty repair to be completed after the engine is received by the authorized dealer, distributor or service station.

P. MAINTENANCE, REPLACEMENT AND REPAIR OF EMISSION-RELATED PARTS

Only warranted engine replacement parts approved by FUJI should be used in the performance of any warranty maintenance or repairs on emission-related parts. If other than authorized parts are used for maintenance, replacement or repair of components affecting emission control, you should assure yourself that such parts are warranted by their manufacturer to be equivalent to authorized parts in performance and durability. FUJI, however, assumes no liability under this warranty with respect to parts other than authorized parts. The use of non-authorized replacement parts does not invalidate the warranty on other components unless the non-authorized parts cause damage to warranted parts.

Q. PARTS COVERED UNDER THE CALIFORNIA EMISSIONS WARRANTY

- (1) Fuel Metering System
 - (i) Carburetor and internal parts
 - (ii) Choke System
 - (iii) Fuel filter (annual maintenance item)
- (2) Air Induction System
 - (i) Air filter element (semi-annual maintenance item)
- (3) Ignition System
 - (i) Spark plug (annual maintenance item)
 - (ii) Ignition Coil
 - (iii) Ignitor Complete
 - (iv) Pulser Coil



LIMITED WARRANTY - CALIFORNIA (2000)

- (4) Exhaust Manifold
- (5) Miscellaneous Items Used in Above Systems
 - (i) Fuel hoses, clamps and sealing gaskets

R. MAINTENANCE STATEMENTS

It is your responsibility to have all scheduled inspection and maintenance services performed at the times recommended in the 2000 and later Owner's Manual and to retain proof that inspection and maintenance services are performed at the times when recommended. FUJI will not deny a warranty claim solely because you have no record of maintenance; however, FUJI may deny a warranty claim if your failure to perform required maintenance resulted in the failure of warranted part. The proof which you maintain should be given to each subsequent owner of the engine. You are responsible for performing the scheduled maintenance described in the Periodic Service Schedule of this manual. The scheduled maintenance is based on the normal engine operating schedule.

LIMITED WARRANTY - CALIFORNIA (2001)

CALIFORNIA EMISSION CONTROL WARRANTY STATEMENT YOUR WARRANTY RIGHTS AND OBLIGATIONS

The California Air Resources Board and Fuji Heavy Industries Ltd. (herein "FUJI") are pleased to explain the emission control system warranty on your 2001 and later small off-road engine (herein "engine"). In California, the engine must be designed, built and equipped to meet the State's stringent anti-smog standards. FUJI must warrant the emission control system on your engine for the period of time described below, provided there has been no abuse, neglect or improper maintenance of your engine.

Your emission control system may include parts such as the carburetor and the ignition system. Also included may be hoses, connectors and other emission-related assemblies.

Where a warrantable condition exists, FUJI will repair your engine at no cost to you including diagnosis, parts and labor.

MANUFACTURER'S WARRANTY COVERAGE:

The 2001 and later engines are warranted for two (2) years. If any emission related part on your engine is defective, the part will be repaired or replaced by FUJI.

OWNER'S WARRANTY RESPONSIBILITIES:

As the engine owner, you are responsible for the performance of the required maintenance listed in your Owner's Manual. FUJI recommends that you retain all receipts covering maintenance on your engine, but FUJI cannot deny warranty solely for the lack of receipts or for your failure to ensure the performance of all scheduled maintenance.

As the engine owner, you should, however, be aware that FUJI may deny you warranty coverage if your engine or a part has failed due to abuse, neglect, improper maintenance or unapproved modifications.

You are responsible for presenting your engine to a dealer, distributor or service provider authorized by Textron Golf, Turf & Specialty Products Augusta, Georgia, (herein "Textron Golf, Turf & Specialty Products") to which FUJI supplies the engine as soon as a problem exists. The warranty repairs should be completed in a reasonable amount of time, not to exceed 30 days.

If you have any questions regarding your warranty rights and responsibilities, you should contact the Textron Golf, Turf & Specialty Products Warranty Department at 1-800-241-5855.

LIMITED WARRANTY on Emission Control Systems - California Only -

FUJI, Tokyo, Japan, warrants to the owner of the 2001 and later engine that the engine (1) has been designed, built and equipped so as to conform at the time of manufacture with the applicable regulations of the California Air Resources Board, and (2) is free from defects in materials and workmanship which could cause it to fail to conform with those regulations as may be applicable in the terms and conditions stated below.

A. WARRANTY COMMENCEMENT DATE

The warranty period begins on the date the engine is delivered to a first retail purchaser.

B. LENGTH OF COVERAGE

FUJI warrants to a first retail purchaser and each subsequent purchaser that the engine is free from defects in materials and workmanship which could cause the failure of a warranted emission-related part for a period of two (2) years after the date of delivery to the first retail purchaser.

C. WHAT IS COVERED:

1. REPAIR OR REPLACEMENT PARTS

Repairs and replacement of any warranted part will be performed at no charge to you by an authorized dealer, distributor or a service provider. You may contact the Textron Golf, Turf & Specialty Products Warranty Department at 1-800-241-5855 to get the nearest appropriate location where your warranty repairs are performed.

2. WARRANTY PERIOD

This warranty continues for a period of two (2) years and shall apply only to the repair, replacement or adjustment of the component parts which are not scheduled for replacement as required maintenance. Further, component parts which are scheduled only for regular inspection to the effect of "repair or replace as necessary" shall be warranted for the warranty period. Any warranted

LIMITED WARRANTY - CALIFORNIA (2001)

part which is scheduled for replacement as required maintenance shall be warranted for the period of time up to the first scheduled replacement point for that part.

3. DIAGNOSIS

You shall not be charged for diagnostic labor which leads to the determination that a warranted part is defective, if the diagnostic work is performed at an authorized dealer, distributor or service provider.

4. CONSEQUENTIAL DAMAGES

If a warranted part failed causing damages to other engine components, consult a service provider.

D. WHAT IS NOT COVERED

1. This limited warranty does not cover any part which malfunctions, fails or is damaged due to failure to follow the maintenance and operating instructions set forth in the 2001 and later Owner's Manual including:

- (1) improper or inadequate scheduled engine inspection and maintenance
- (2) improper or inadequate maintenance of any warranted parts
- (3) improper installation, adjustment or repair of the engine or of any warranted part unless performed by an authorized dealer
- (4) failure to follow recommendations on fuel use contained in the 2001 and later Owner's Manual
- (5) repairs performed outside of the authorized warranty service facilities
- (6) use of parts which are not authorized by FUJI.

2. Add-on or modified parts

This warranty does not cover any part which malfunctions, fails or is damaged due to alterations by changing, adding to or removing parts from the engine.

3. Expenses incurred by processing warranty claims

FUJI, any authorized dealer, distributors and service providers shall not be liable for any loss of use of the engine, for any alternative usage, for any damage to goods, loss of time or inconvenience.

E. HOW TO FILE A CLAIM

All repairs qualifying under this Limited Warranty must be performed by a dealer who sold you the engine or distributors or service providers authorized by Textron Golf, Turf & Specialty Products. In the event that any emission-related part is found to be defective during the warranty period, you should notify Textron Golf, Turf & Specialty Products Warranty Department at 1-800-241-5855 and you will be given the appropriate warranty service facilities where the warranty repair is performed.

F. WHERE TO GET WARRANTY SERVICE

It is recommended that warranty service be performed by the authorized dealer who sold you the engine, although warranty service will be performed by any authorized dealers, distributors and service providers anywhere in the United States. When warranty repair is needed, the engine must be brought to an authorized dealer, distributorship or service provider's place of business during normal business hours. In all cases, a reasonable time, not to exceed 30 days, must be allowed for the warranty repair to be completed after the engine is received by the authorized dealer, distributor or service station.

G. MAINTENANCE, REPLACEMENT AND REPAIR OF EMISSION-RELATED PARTS

Only warranted engine replacement parts approved by FUJI should be used in the performance of any warranty maintenance or repairs on emission-related parts. If other than authorized parts are used for maintenance, replacement or repair of components affecting emission control, you should assure yourself that such parts are warranted by their manufacturer to be equivalent to authorized parts in performance and durability. FUJI, however, assumes no liability under this warranty with respect to parts other than authorized parts. The use of non-authorized replacement parts does not invalidate the warranty on other components unless the non-authorized parts cause damage to warranted parts.

H. PARTS COVERED UNDER THE CALIFORNIA EMISSIONS WARRANTY

- (1) Fuel Metering System
 - (i) Carburetor and internal parts (and/or pressure regulator or fuel injection system)
 - (ii) Air/fuel ration feedback and control system, if applicable
 - (iii) Cold start enrichment system, if applicable
 - (iv) Regulator assembly (gaseous fuel, if applicable)
- (2) Air Induction System
 - (i) Intake manifold, if applicable
 - (ii) Air filter
- (3) Ignition System
 - (i) Spark plugs
 - (ii) Magneto or electronic ignition system

LIMITED WARRANTY - CALIFORNIA (2001)

- (iii) Spark advance/retard system, if applicable
- (4) Exhaust Manifold, if applicable
- (5) Miscellaneous Items Used in Above Systems
 - (i) Electronic controls, if applicable
 - (ii) Hoses, belts, connectors, and assemblies
 - (iii) Filter lock assembly (gaseous fuel, if applicable)

I. MAINTENANCE STATEMENTS

It is your responsibility to have all scheduled inspection and maintenance services performed at the times recommended in the 2001 and later Owner's Manual and to retain proof that inspection and maintenance services are performed at the times when recommended. FUJI will not deny a warranty claim solely because you have no record of maintenance; however, FUJI may deny a warranty claim if your failure to perform required maintenance resulted in the failure of warranted part. The proof which you maintain should be given to each subsequent owner of the engine. You are responsible for performing the scheduled maintenance described in the Periodic Service Schedule of this manual. The scheduled maintenance is based on the normal engine operating schedule.

LIMITED WARRANTY - CALIFORNIA (2004)

CALIFORNIA EMISSION CONTROL WARRANTY STATEMENT YOUR WARRANTY RIGHTS AND OBLIGATIONS

The California Air Resources Board and Fuji Heavy Industries Ltd. (herein "FUJI") are pleased to explain the emission control system warranty on your 2004 and later small off-road engine (herein "engine"). In California, new engine must be designed, built and equipped to meet the State's stringent anti-smog standards. FUJI must warrant the emission control system on your engine for the period of time described below, provided there has been no abuse, neglect or improper maintenance of your engine.

Your emission control system may include parts such as the carburetor and the ignition system. Also included may be hoses, connectors and other emission-related assemblies.

Where a warrantable condition exists, FUJI will repair your engine at no cost to you including diagnosis, parts and labor.

MANUFACTURER'S WARRANTY COVERAGE:

The 2004 and later engines are warranted for two (2) years. If any emission related part on your engine is defective, the part will be repaired or replaced by FUJI.

OWNER'S WARRANTY RESPONSIBILITIES:

As the engine owner, you are responsible for the performance of the required maintenance listed in your Owner's Manual. FUJI recommends that you retain all receipts covering maintenance on your engine, but FUJI cannot deny warranty solely for the lack of receipts or for your failure to ensure the performance of all scheduled maintenance.

As the engine owner, you should, however, be aware that FUJI may deny you warranty coverage if your engine or a part has failed due to abuse, neglect, improper maintenance or unapproved modifications. You are responsible for presenting your engine to a dealer, distributor or service provider authorized by E-Z-GO Division of Textron Augusta, Georgia, (herein "E-Z-GO") to which FUJI supplies the engine as soon as a problem exists. The warranty repairs should be completed in a reasonable amount of time, not to exceed 30 days.

If you have any questions regarding your warranty rights and responsibilities, you should contact the E-Z-GO Warranty Department at 1-800-241-5855.

LIMITED WARRANTY on Emission Control Systems - California Only -

FUJI, Tokyo, Japan, warrants to the owner of the 2004 and later engine that the engine (1) has been designed, built and equipped so as to conform at the time of manufacture with the applicable regulations of the California Air Resources Board, and (2) is free from defects in materials and workmanship which could cause it to fail to conform with those regulations as may be applicable in the terms and conditions stated below.

J. WARRANTY COMMENCEMENT DATE

The warranty period begins on the date the engine is delivered to a first retail purchaser.

K. LENGTH OF COVERAGE

FUJI warrants to a first retail purchaser and each subsequent purchaser that the engine is free from defects in materials and workmanship which could cause the failure of a warranted emission-related part for a period of two (2) years after the date of delivery to the first retail purchaser.

L. WHAT IS COVERED:

1. REPAIR OR REPLACEMENT PARTS

Repairs and replacement of any warranted part will be performed at no charge to you by an authorized dealer, distributor or a service provider. You may contact the E-Z-GO Warranty Department at 1-800-241-5855 to get the nearest appropriate location where your warranty repairs are performed.

2. WARRANTY PERIOD

This warranty continues for a period of two (2) years and shall apply only to the repair, replacement or adjustment of the component parts which are not scheduled for replacement as required maintenance. Further, component parts which are scheduled only for regular inspection to the effect of "repair or replace as necessary" shall be warranted for the warranty period. Any warranted

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part which is scheduled for replacement as required maintenance shall be warranted for the period of time up to the first scheduled replacement point for that part.

3. DIAGNOSIS

You shall not be charged for diagnostic labor which leads to the determination that a warranted part is defective, if the diagnostic work is performed at an authorized dealer, distributor or service provider.

4. CONSEQUENTIAL DAMAGES

If a warranted part failed causing damages to other engine components, consult a service provider.

M. WHAT IS NOT COVERED

1. This limited warranty does not cover any part which malfunctions, fails or is damaged due to failure to follow the maintenance and operating instructions set forth in the 2004 and later Owner's Manual including:

- (1) improper scheduled engine inspection and maintenance
- (2) improper maintenance of any warranted parts
- (3) improper installation, adjustment or repair of the engine or of any warranted part unless performed by an authorized dealer
- (4) failure to follow recommendations on fuel use contained in the 2004 and later Owner's Manual
- (5) repairs performed outside of the authorized warranty service facilities
- (6) use of parts which are not authorized by FUJI

2. Add-on or modified parts

This warranty does not cover any part which malfunctions, fails or is damaged due to alterations by changing, adding to or removing parts from the engine.

3. Expenses incurred by processing warranty claims

FUJI, any authorized dealer, distributors and service providers shall not be liable for any loss of use of the engine, for any alternative usage, for any damage to goods, loss of time or inconvenience.

N. HOW TO FILE A CLAIM

All repairs qualifying under this Limited Warranty must be performed by a dealer who sold you the engine or distributors or service providers authorized by E-Z-GO. In the event that any emission-related part is found to be defective during the warranty period, you should notify E-Z-GO Warranty Department at 1-800-241-5855 and you will be given the appropriate warranty service facilities where the warranty repair is performed.

O. WHERE TO GET WARRANTY SERVICE

It is recommended that warranty service be performed by the authorized dealer who sold you the engine, although warranty service will be performed by any authorized dealers, distributors and service providers anywhere in the United States. When warranty repair is needed, the engine must be brought to an authorized dealer, distributorship or service provider's place of business during normal business hours. In all cases, a reasonable time, not to exceed 30 days, must be allowed for the warranty repair to be completed after the engine is received by the authorized dealer, distributor or service station.

P. MAINTENANCE, REPLACEMENT AND REPAIR OF EMISSION-RELATED PARTS

Only warranted engine replacement parts approved by FUJI should be used in the performance of any warranty maintenance or repairs on emission-related parts. If other than authorized parts are used for maintenance, replacement or repair of components affecting emission control, you should assure yourself that such parts are warranted by their manufacturer to be equivalent to authorized parts in performance and durability. FUJI, however, assumes no liability under this warranty with respect to parts other than authorized parts. The use of non-authorized replacement parts does not invalidate the warranty on other components unless the non-authorized parts cause damage to warranted parts.

Q. PARTS COVERED UNDER THE CALIFORNIA EMISSIONS WARRANTY

- (1) Fuel Metering System
 - (i) Carburetor and internal parts (and/or pressure regulator or fuel injection system)
 - (ii) Air/fuel ratio feedback and control system, if applicable
 - (iii) Cold start enrichment system, if applicable
 - (iv) Regulator assy (gaseous fuel, if applicable)
- (2) Air Induction System
 - (i) Intake manifold, if applicable
 - (ii) Air filter
- (3) Ignition System
 - (i) Spark plugs

LIMITED WARRANTY - CALIFORNIA (2004)

- (ii) Magneto or electronic ignition system.
- (iii) Spark advance/retard system, if applicable
- (4) Exhaust manifold, if applicable
- (5) Miscellaneous Items Used in Above Systems
 - (i) Electronic controls, if applicable
 - (ii) Hoses, belts, connectors, and assemblies
 - (iii) Filter lock assy (gaseous fuel, if applicable)

R. MAINTENANCE STATEMENTS

It is your responsibility to have all scheduled inspection and maintenance services performed at the times recommended in the 2004 and later Owner's Manual and to retain proof that inspection and maintenance services are performed at the times when recommended. FUJI will not deny a warranty claim solely because you have no record of maintenance; however, FUJI may deny a warranty claim if your failure to perform required maintenance resulted in the failure of warranted part. The proof which you maintain should be given to each subsequent owner of the engine. You are responsible for performing the scheduled maintenance described in the Periodic Service Schedule of this manual. The scheduled maintenance is based on the normal engine operating schedule.



A Textron Company

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