## TRACTOR SPECIFICATIONS FOR 108 AND 111 TRACTOR

| Item | 108 Tractor | 111 Tractor |
|---|---|---|
| **Engine** | | |
| Model Number | 191707 | 252707 |
| Manufacturer | Briggs and Stratton | Briggs and Stratton |
| Cylinders | One | One |
| Crankshaft | Vertical | Vertical |
| Stroke/Cycle | Four | Four |

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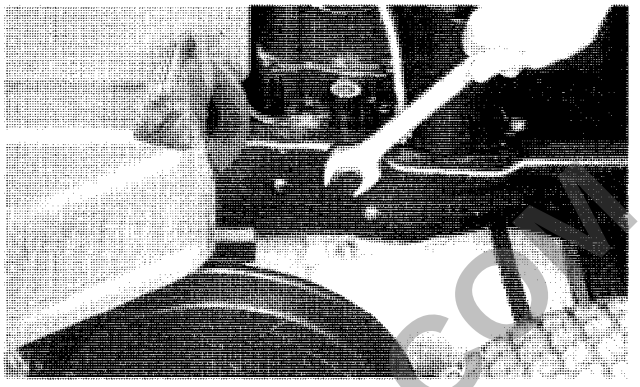
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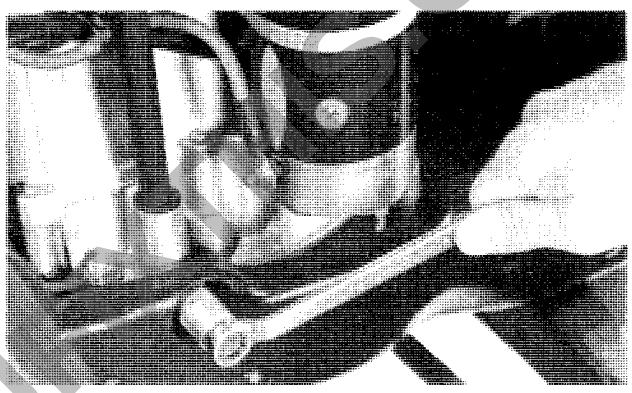
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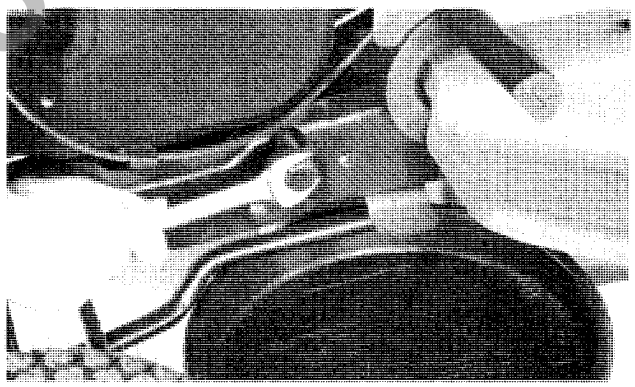
## CHANGE ENGINE OIL

*NOTE: For all 108, 111, and 116 Tractors, change oil every 25 hours. For 112L Tractor, change oil every 50 hours.*

1. Run engine to warm the oil.
2. Park tractor on level surface.
3. Remove drain cap to drain oil.
4. Install drain cap.







*108 and 111 Tractors (upper)*
*112L Tractor (middle)*
*116 Tractor (lower)*

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## MOWER SPECIFICATIONS

| Item | 30-Inch | 38-Inch | 46-Inch |
|---|---|---|---|
| Type | Rotary | Rotary | Rotary |
| Cutting Blades | One | Two | Three |
| Blade Length | 762 mm (30 in.) | 496 mm (19.5 in.) | 407 mm (16 in.) |
| Cutting Width | 762 mm (30-in.) | 965 mm (38 in.) | 1170 mm (46 in.) |
| Cutting Height | 25.4 to 102 mm (1.00 to 4.00 in.) | 25.4 to 102 mm (1.00 to 4.00 in.) | 25.4 to 102 mm (1.00 to 4.00 in.) |

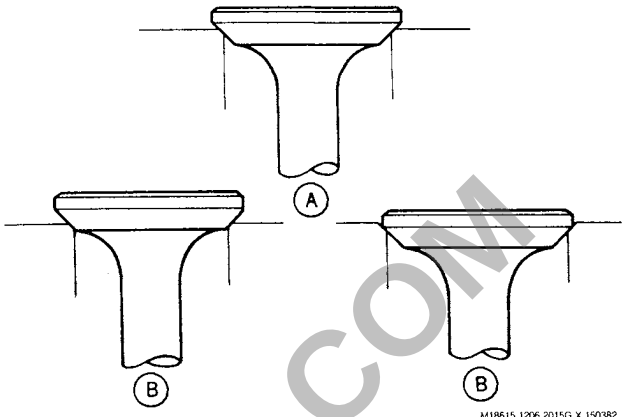
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7. When matching valves to seats, be sure valve seat is centered on the valve face. The position of the valve in the seat is evident after lapping the valve.

**A—Right** **B—Wrong**




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## LAP VALVES

1. Coat face of valve sparingly with a fine lapping compound.

2. Use vacuum cup tool from JDM-53 set, to grip top of valve. Rotate valve in a circular motion to lap valve to seat.

3. Lift valve from seat every 8 to 10 strokes. Continue lapping operation until a uniform ring appears around entire surface of valve face.

4. When lapping is completed, wash all parts in solvent to remove lapping compound. Dry parts thoroughly.

5. Note positon of lap mark on valve face. The lapping mark should appear on or near the center of the valve face.




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## DIAGNOSE MALFUNCTIONS

**Engine Will Not Start**

Fuel tank empty.

Choke and throttle controls broken or improperly adjusted.

Dirt or water in fuel system.

Air cleaner plugged.

Spark plug defective.

Flywheel key sheared.

Faulty coil and condenser.

Breaker points worn, pitted, or out of adjustment.

Armature air gap incorrect.

**Engine Starts Hard**

Fuel line restricted.

Choke and throttle controls improperly adjusted.

Carburetor improperly adjusted.

Dirt or water in fuel system.

Carburetor or intake manifold leaking at gaskets.

Air cleaner restricted.

Spark plug worn or fouled.

Breaker points worn, pitted, or out of adjustment.

Flywheel key sheared.

Armature air gap incorrect.

Low engine compression.

Leaking cylinder head gasket.

**Engine Starts Hard—Continued**

Warped cylinder head.

Worn piston rings.

Worn cylinder bore.

Damaged piston.

Burned or warped valves.

Improper valve clearance.

Broken valve spring.

**Engine Starts But Fails to Keep Running**

Fuel line restricted.

Gas tank vent restricted.

Carburetor improperly adjusted.

Choke and throttle controls improperly adjusted.

Loose ignition system connections.

Faulty condenser.

Excessive engine load.

**Engine Misses Under Load**

Spark plug fouled, pitted or gapped incorrectly.

Carburetor not properly adjusted.

Incorrect spark plug.

Breaker points worn, pitted, or out of adjustment.

Armature air gap incorrect.

Dirt or water in fuel system.

Stale fuel.

Faulty condenser.

***Continued on next page***

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# 108, 111, 111H, 112L AND 116 TRACTORS TECHNICAL MANUAL TM-1206 (MAY-85)

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## ADJUST TRANSMISSION DRIVE BELT

*NOTE: The transmission drive belt on the 111H and 112L Tractors is not adjustable.*

1. Stop engine. DO NOT set parking brake. Put transmission shift lever in gear to hold tractor.

2. Foot clutch must be "UP" in engaged position.

3. Loosen nut (A) on idler.

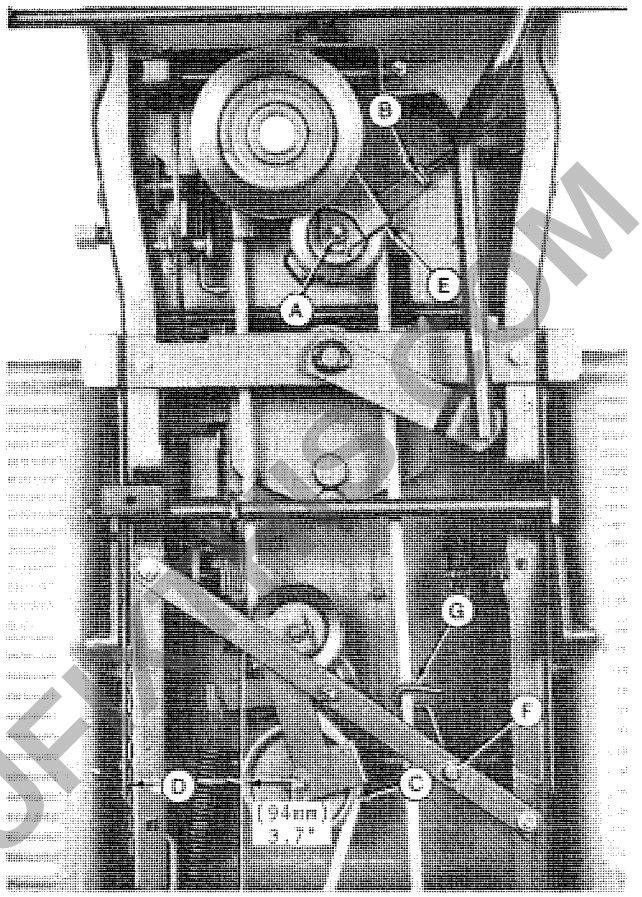
4. Turn adjusting bolt (B) (in or out) until a (94 mm) 3.7-in. dimension is obtained between inner surface of flat idler (C) and inside of frame (D).

5. Adjust belt guide (E) for (4.76 mm) 3/16-in. clearance between guide and belt on the engine side of guide.

6. Tighten nut (A) on idler.

7. Loosen bolt (F) and move guide (G) until belt is centered. Tighten bolt.

**A—Nut**
**B—Adjusting Bolt**
**C—Idler**
**D—Frame**
**E—Belt Guide**
**F—Bolt**
**G—Guide**



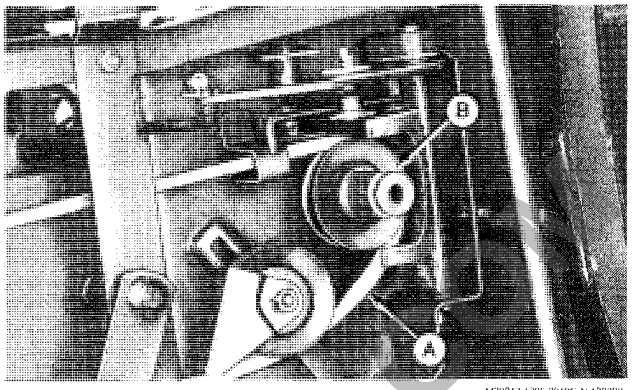

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6. Install drive belt (A) around sheave (B). Push sheave all the way up on shaft.

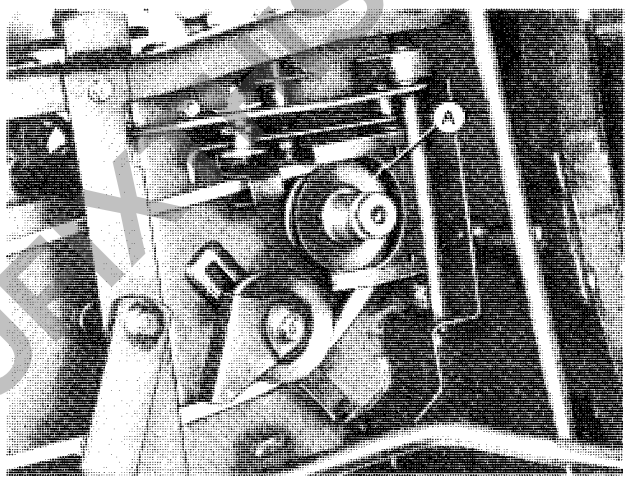



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*NOTE: 108 and 111 Tractors (Serial No. 120,001 and above) and 111 Hydrostatic Tractors are equipped with an electric PTO clutch, on these tractors, refer to Section 50 for instructions on installing clutch.*

7. Move PTO lever forward (engaged position). This moves the clutch fork up and holds the engine drive sheave (A) in place.

8. Remove screwdriver and tighten engine mounting bolts.




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6. Start the drill press. Move the hone up and down in the cylinder approximately 40 cycles-per-minute.

7. Check the diameter of the cylinder regularly during honing. (Stop the drill press before measuring and remove the hone from the cylinder.)

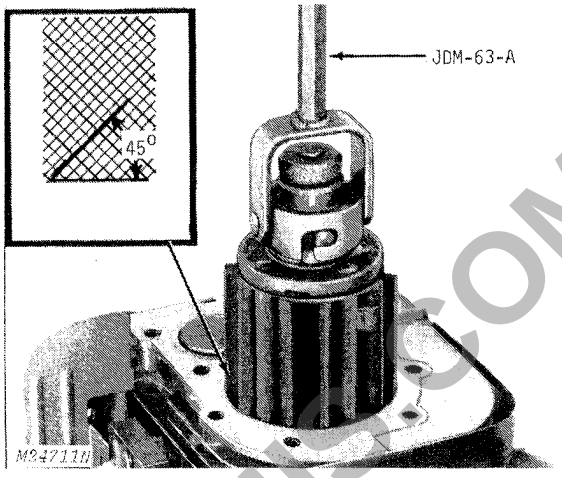
*NOTE: Finish should not be smooth, but have a 45-degree cross-hatch pattern.*

8. Hone the cylinder until it is about (0.0127 mm) 0.0005 in. large to allow for shrinkage when cylinder cools.

**IMPORTANT: DO NOT use solvent or gasoline because these fluids only wash all the oil from the cylinder wall. They do not remove metal particles produced during honing.**

9. Clean the cylinder thoroughly. Use soap, warm water and clean rags. Clean the cylinder wall for a "white glove" inspection. A clean white rag should not show soil from the cylinder wall.

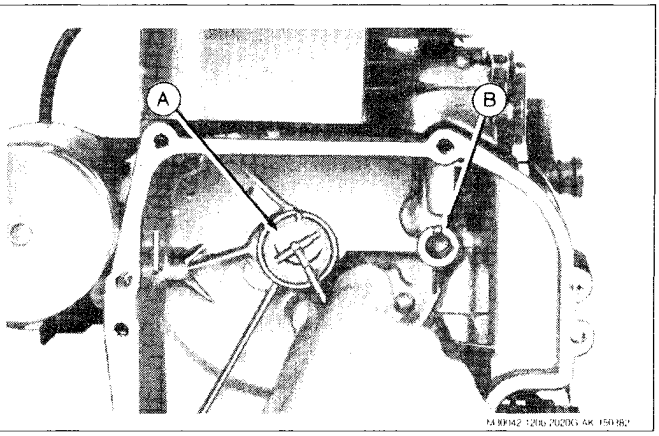
10. Dry the cylinder and coat with engine oil.




## INSPECT CRANKSHAFT AND CAMSHAFT BEARINGS

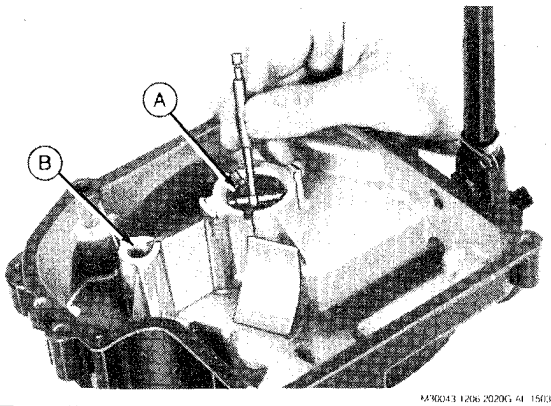
1. Measure the crankshaft bearing (A) and camshaft bearing (B) in the cylinder block with an inside micrometer. Thse bearings are cast with the cylinder block and are not replaceable.

2. Replace the block if maximum inside diameters are exceeded. See specifications in Group 25.




3. Measure the crankshaft bearing (A) and camshaft bearing (B) in the mounting flange with an inside micrometer. These bearings are cast with the crankcase and are not replaceable.

4. Replace crankcase if maximum inside diameters are exceeded. See specifiations in Group 25.



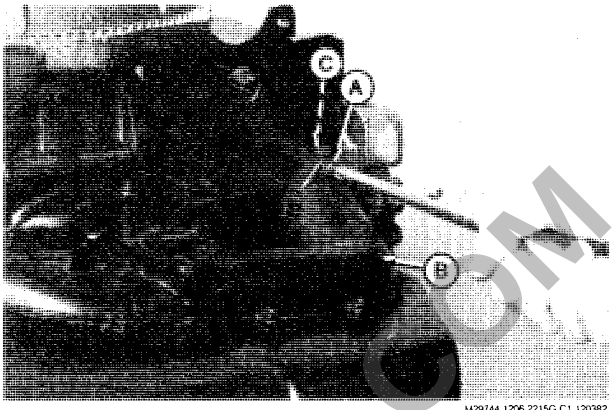



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## REMOVE INTAKE MANIFOLD

1. Disconnect governor linkage.

2. Remove screws (A), intake manifold (B) and gasket (C) from cylinder block.



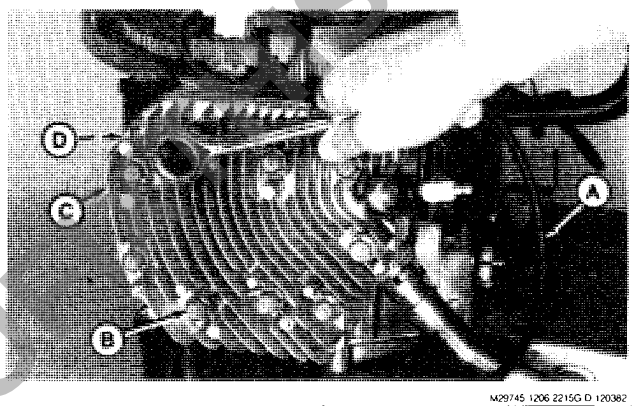

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## REMOVE CYLINDER HEAD

1. Disconnect spark plug wires (A).

2. Remove cylinder head bolts (B), cylinder head (C) and gasket (D).

**A—Spark Plug Wire**
**B—Cylinder Head Bolts**
**C—Cylinder Head**
**D—Gasket**




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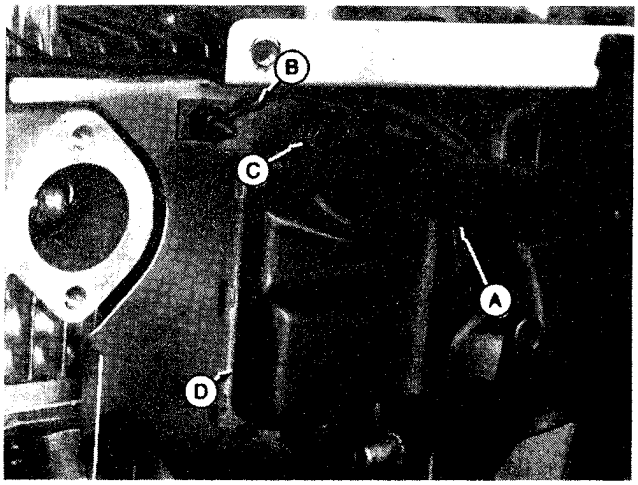
## REMOVE BREATHER

1. Remove breather tube (A).

2. Disconnect armature ground wire (B).

3. Remove screws (C) and breather (D) from engine block.

**A—Breather Tube**
**B—Armature Ground Wire**
**C—Screws**
**D—Breather**




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*NOTE: Finish should not be smooth, but have a 45-degree cross-hatch pattern.*

8. Hone the cylinder until it is about (0.0127 mm) 0.0005 in. large to allow for shrinkage when cylinder cools.

**IMPORTANT: DO NOT use solvent or gasoline because these fluids only wash all the oil from the cylinder wall. They do not remove metal particles produced during honing.**

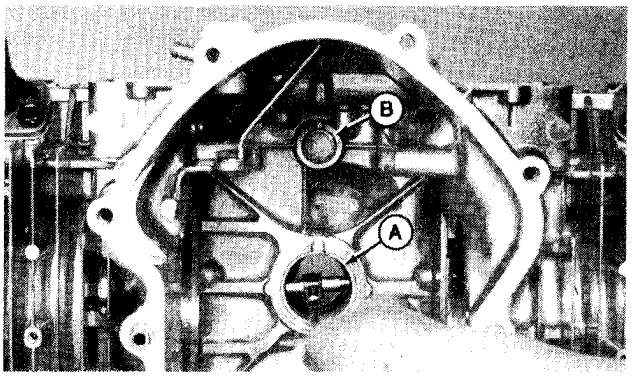
9. Clean the cylinder thoroughly. Use soap, warm water and clean rags. Clean the cylinder wall for a "white glove" inspection. A clean white rag should not show soil from the cylinder wall.

10. Dry the cylinder and coat with engine oil.

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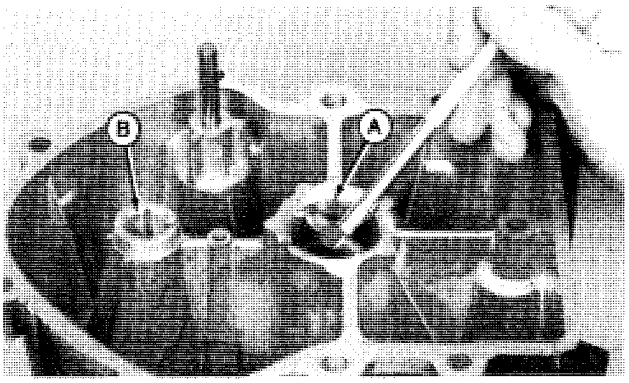
## INSPECT CRANKSHAFT AND CAMSHAFT BEARINGS

1. Measure crankshaft bearing (A) and camshaft bearing (B) in the cylinder block with an inside micrometer. These bearings are cast with the cylinder block and are not replaceable. Replace the block if maximum inside diameters are exceeded. See specifications in Group 25, this Section.




M29793/1206/2220G/AL/130382

2. Measure the crankshaft bearing (A) and camshaft bearing (B) in the crankcase with an inside micrometer. These bearings are cast with the crankcase and are not replaceable. Replace the crankcase if maximum inside diameters are exceeded. See specifications in Group 25, this Section.




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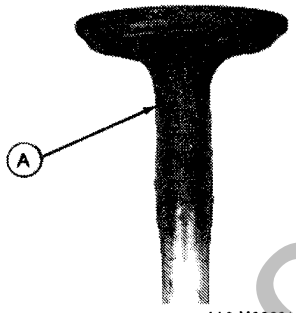


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Using old or stale gasoline is a common cause for sticky valves (A).

This gummy deposit can be seen on the valve. When this condition exists, the carburetor may also contain gum deposits and will require a complete cleaning.

Always use fresh gasoline and drain fuel tank, lines, and carburetor before storing tractor.



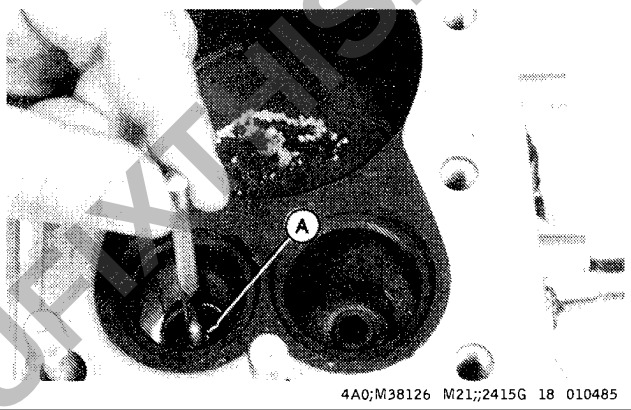

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## CHECK VALVE GUIDES

1. Clean inside of valve guides with valve guide cleaner.

2. Measure inside diameter of valve guides (A).

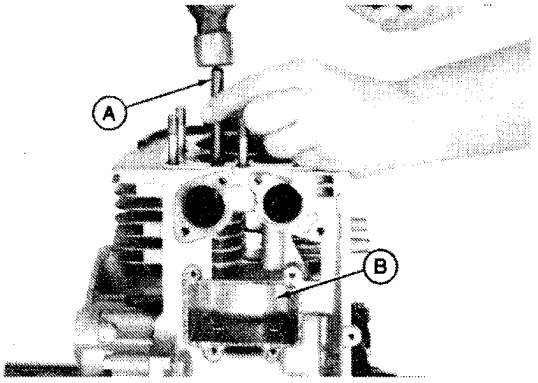
3. Replace valve guide if inside diameter is more than 8.062 mm (0.3176 in.).




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## REPLACE VALVE GUIDE BUSHING

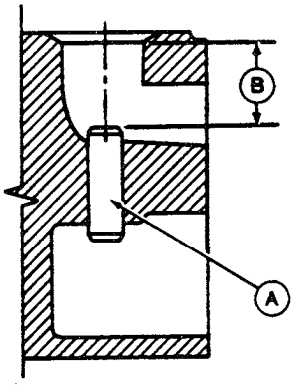
1. Use JDE-118 Valve Guide driver (A) to drive guide into breather chamber (B). Use locking pliers to crush guide. After crushing, drive remaining portion of guide into breather chamber and remove.




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2. Use JDE-118 Valve Guide to install new valve guide (A).

Drive guide into cylinder body until distance from valve seat counterbore to top of guide (B) is 30 mm (1.178 in.)




| | | |
|---|---|---|
| B | IN | 30MM |
| | EX | 30MM |

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## INSTALL BLOWER HOUSING

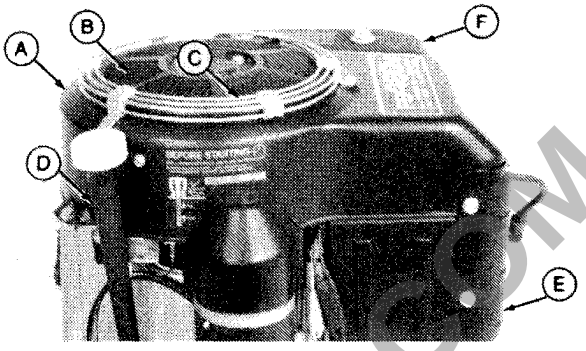
1. Install blower housing (A) and tighten screws.

2. Install screen (B), protector (C) and dipstick (D). Tighten screws.

3. Install cylinder head cover (E) and tighten screws.

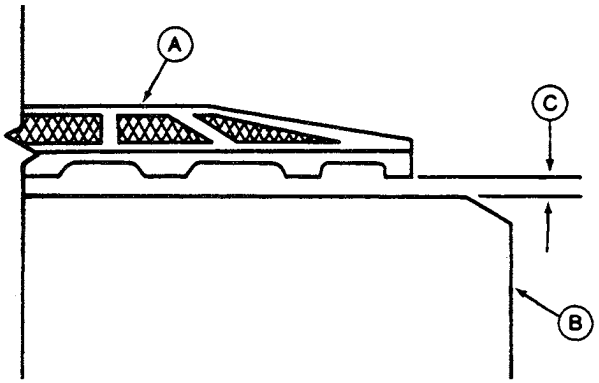
4. Install air cleaner assembly (F).

**A—Blower Housing**
**B—Screen**
**C—Protector**
**D—Dipstick**
**E—Cylinder Head Cover**
**F—Air Cleaner Assembly**




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*NOTE: The gap (C) between the blades under the screen (A) and the blower housing (B) should be not less than 1 mm (0.0394 in.). use washers to adjust gap.*



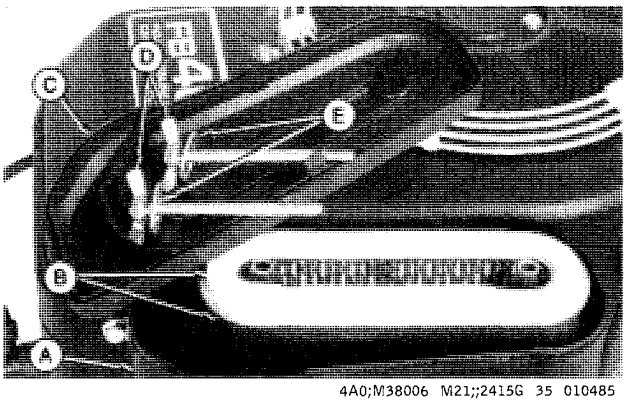

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## INSTALL AIR CLEANER

1. Install O-ring, air cleaner body (A), and filter elements (B).

2. Install cover (C) and fasten with screws (D) and washers (E).

**A—Air Cleaner Body**
**B—Filter Elements**
**C—Cover**
**D—Screws**
**E—Washers**




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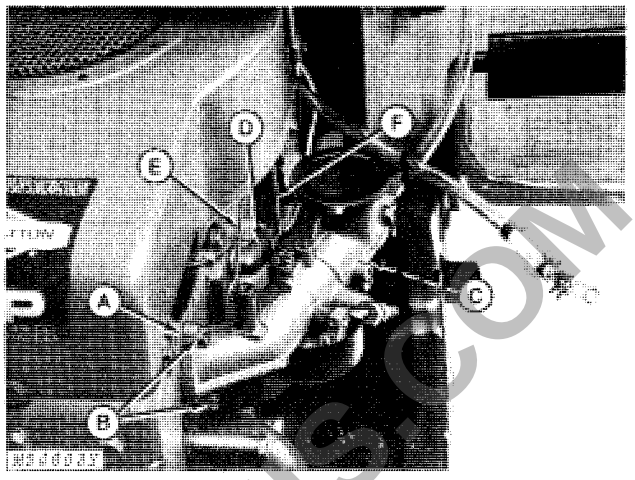
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5. Remove screws (B and C) carburetor and gasket (A) from engine.

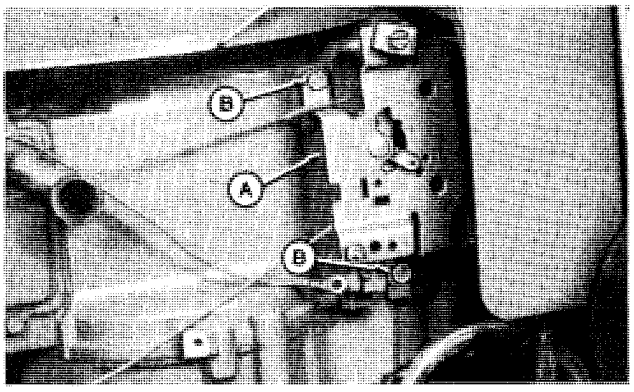
6. Disconnect throttle linkage (E) choke linkage (F) and breather hose (D) from carburetor.

**A—Gasket**
**B—Mounting Screws**
**C—Bracket Screw**
**D—Breather Hose**
**E—Throttle Linkage**
**F—Choke Linkage**




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7. Remove throttle plate screws (B) from throttle plate (A). Do not lose spacer.



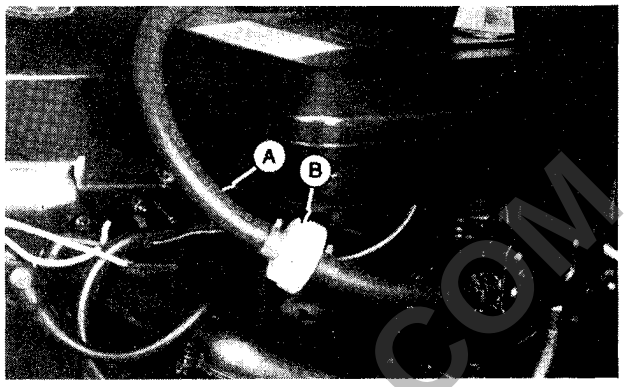

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## TEST FUEL PUMP




**CAUTION: Gasoline is dangerous. Avoid fires due to smoking or careless maintenance practices.**

1. Disconnect fuel line (A) from filter (B). Place end of fuel line in clean container.

2. Crank engine for 15 seconds. Pump output should be at least (0.5 L) 1 pt.

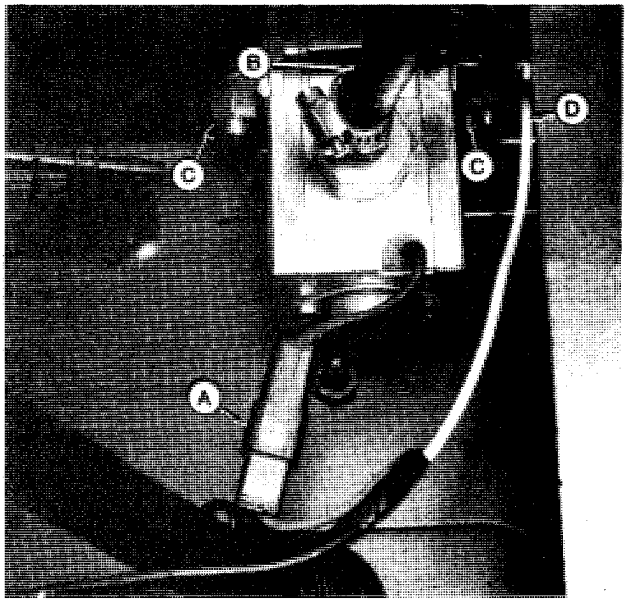
3. If output is low, check fuel line, strainer or tank for restrictions before replacing pump.

4. If there is no output, check electrical lead and connections before replacing pump.

5. Connect fuel line (A) to filter (B).

M29611 1206 3215G B 170382

## REMOVE FUEL PUMP




1. Remove battery and battery base. See Section 42, Group 10.

2. Close fuel shut-off valve.

**CAUTION: Gasoline is dangerous. Avoid fires due to smoking or careless maintenance procedures.**

3. Disconnect lead (A), fuel hose (B), and fuel hose on underside of pump.

4. Remove two screws and nuts (C), white lead (D), and pump.

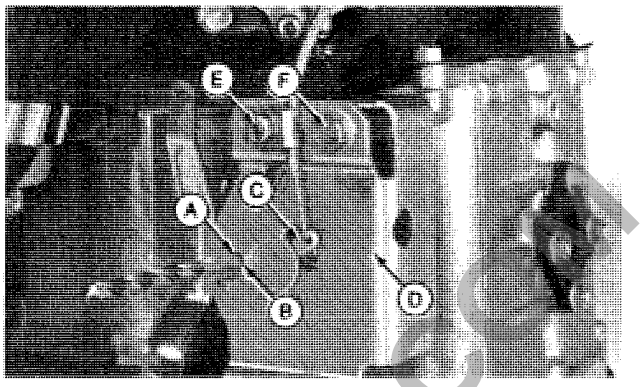
**A—Lead**
**B—Fuel Hose**
**C—Nuts**
**D—White Lead**

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## ADJUST FAST IDLE SPEED




**CAUTION: Avoid burns from engine exhaust when you adjust fast idle speed.**

1. Move throttle lever on dash to FAST position.

2. Align hole (A) with hole (B) by installing a 15/64 in. drill bit. Tighten clamp bolt (E).

3. Loosen control plate bolts (F).

4. Put a vibration tachometer on the engine. Move control plate (D) left or right until the fast idle speed is 3350 rpm.

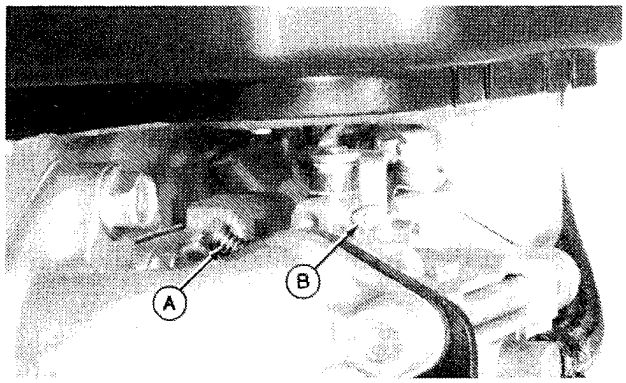
5. Tighten control plate bolts (F).

6. Adjust choke (See Adjust Choke in this group.)

**A—Hole**
**B—Hole**
**C—Throttle Control Lever**
**D—Control Plate**
**E—Clamp Bolt**
**F—Bolt**

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## ADJUST IDLE SPEED




**CAUTION: Engine surfaces are hot. Do not use fingers to adjust idle mixture screw. Use a screwdriver.**

1. Turn idle mixture screw (A) in until it just seats, then back it out 1 1/8 turns.

2. Start and warm the engine. Move throttle lever to SLOW position on dash.

3. Put a vibration tachometer on the engine. Adjust idle speed screw (B) until the idle speed is 1350 to 1450 rpm.

4. Adjust idle mixture screw (A) until engine idles at maximum speed.

5. Turn idle mixture screw (A) back out 1/4 turn.

6. Adjust idle speed screw (B) until idle speed is 1400 rpm.

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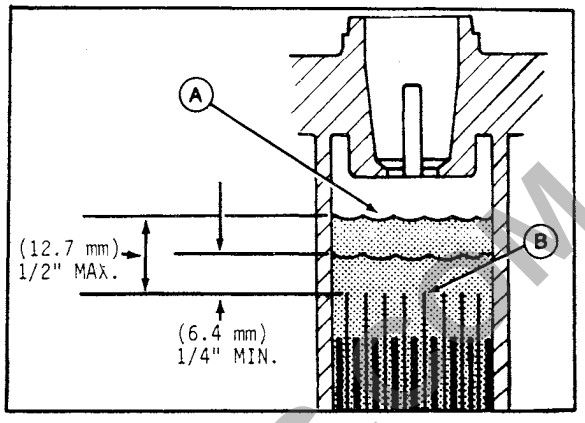


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**CAUTION: While charging battery, hydrogen and oxygen gases are emitted which are very explosive. Therefore, keep open flames and sparks away from battery and provide adequate ventilation.**

3. Charge battery at 15 amps for 10 minutes or 7 amps for 30 minutes. DO NOT exceed recommended charging rate.

4. After charging, add electrolyte (A) until it is (6.35 to 12.70 mm) 1/4 to 1/2 inch above the plates (B).



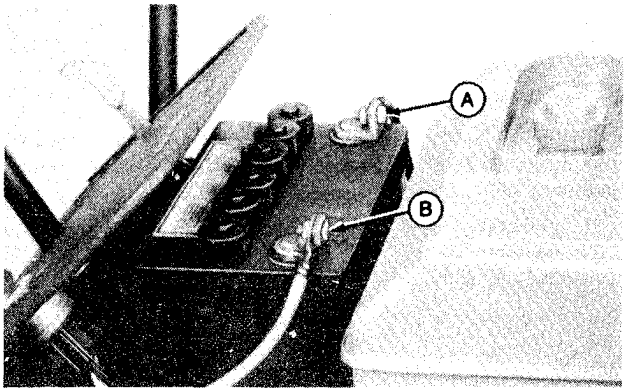

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## INSTALL BATTERY

1. Place battery in tractor.

2. Connect positive (+) cable (B) first and then negative (−) cable (A).

3. Install hold-down and secure with washers and wing nuts.



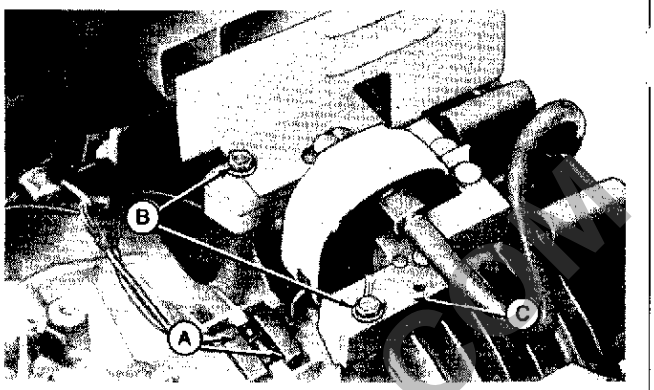

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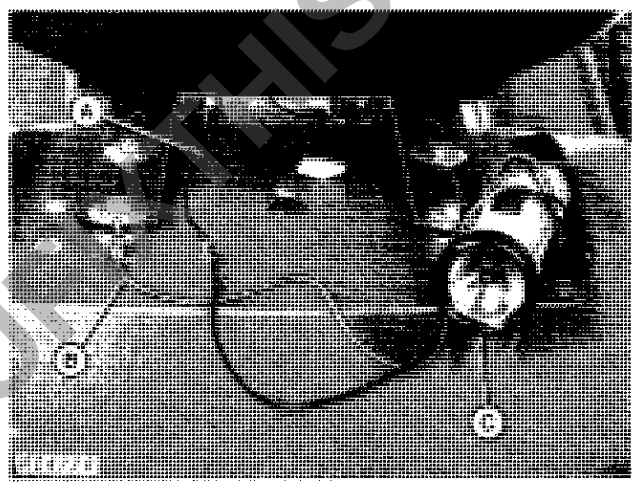
## INSTALL ARMATURE WITH COIL




M30163 1206 4015G AL 120382

1. Install armature (C) with cap screws (B).
2. Move armature away from flywheel. Set coil air gap.
3. Tighten cap screws (B).
4. Place wires in recess of cylinder block. Install clips (A) to hold wires in place.
5. Install condenser.

## TEST SEAT SAFETY SWITCH

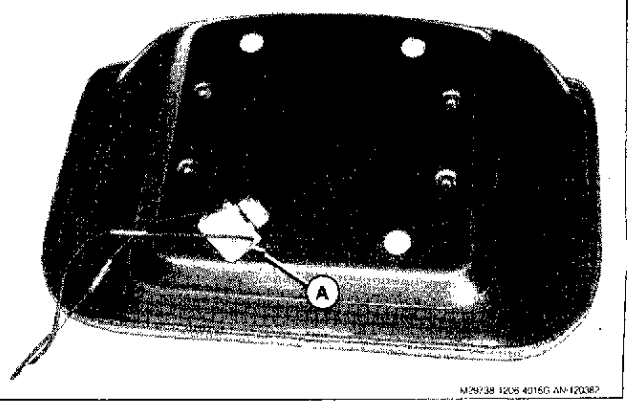



**IMPORTANT: The purpose of the seat safety switch is to kill the ignition when engine is running, PTO is engaged and operator leaves seat. This is a safety feature to prevent any accidental contact with mower blades. The engine will continue to run if PTO is disengaged and operator leaves seat.**

1. Disconnect seat switch lead (A) from wiring harness.
2. Install a test light (C) between switch lead wire (A) and ground (B). Light should light.
3. Light should go out when center of seat is depressed.
4. If light does not light or goes out when seat is depressed, replace switch.

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## REPLACE SEAT SAFETY SWITCH




M29738 1206 4015G AM 120382

1. Disconnect seat switch lead from wiring harness.
2. Disconnect ground wire from seat spring. Remove seat.
3. Invert seat and remove safety switch (A).
4. Install new safety switch (A).
5. Install seat and wiring.

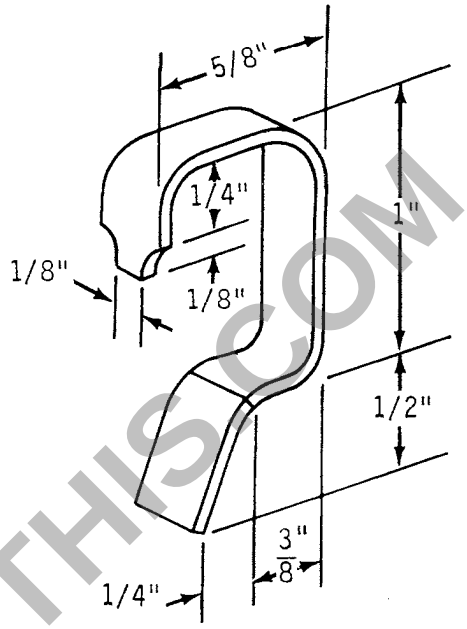
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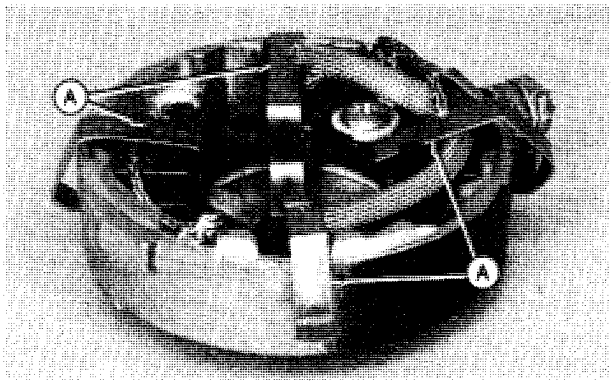
## ASSEMBLE STARTER

1. Use a scrap rewind starter spring to make four brush holders. Bend spring carefully to prevent breaking the brittle material.




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2. Install brush holders (A) over brushes.



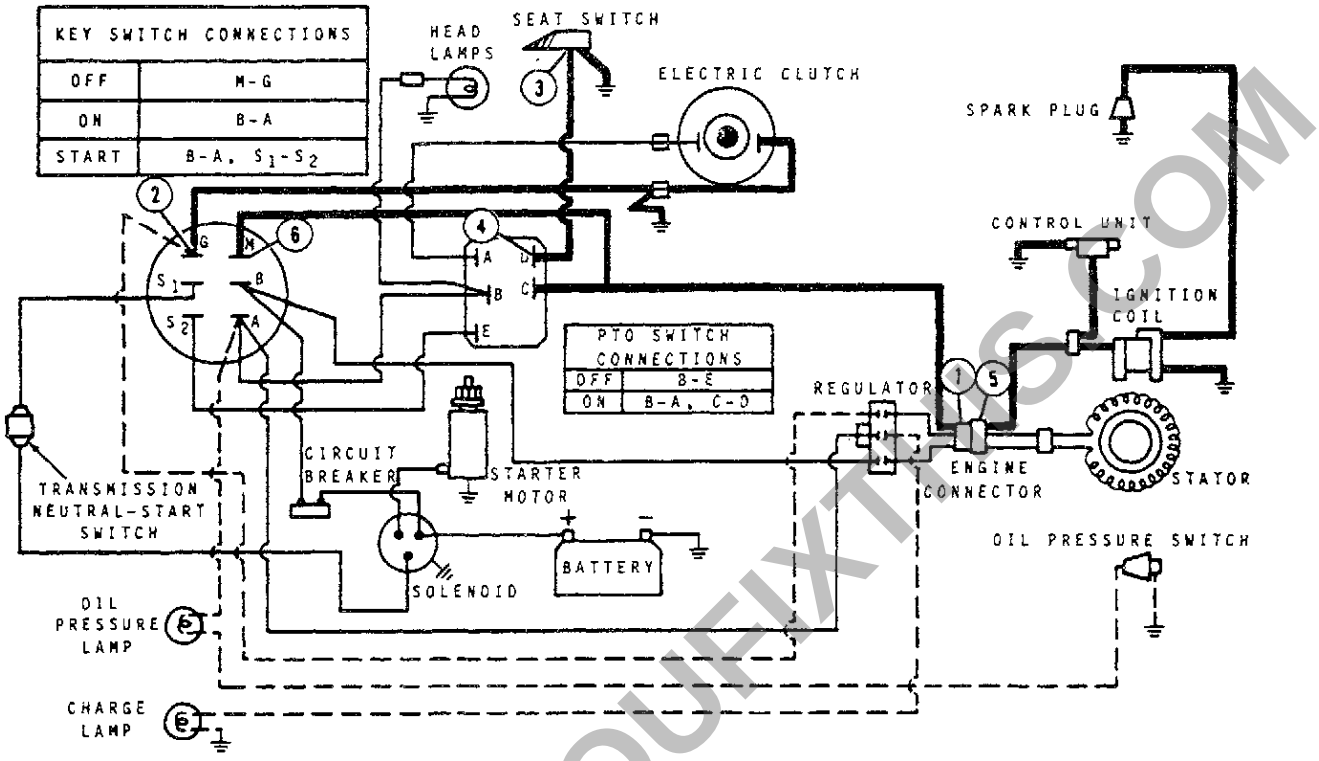

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## TEST 2—IGNITION GROUND CIRCUIT




**Step A**
1. Disconnect white lead at point 1.
2. Connect a test light to white lead and ground.
3. Turn key switch to OFF position. Tester should light.
4. Turn key switch to RUN position. Tester light should go out.

5. Turn key switch to RUN position and put PTO switch in ON position. Light should go on.
6. Push down on center of seat cushion. Light should go out.
7. If tests are good, go to Step E. If any test is incorrect, go to Step B.

**Step B**
1. Disconnect wiring coupler from key switch.
2. Connect test light to points 2 and 6.
3. Turn key switch to OFF position. Light should go on.
4. Turn key switch to RUN position. Light should go out.
5. If tests are good, go to Step C. If any test is incorrect, replace key switch.

**Step C**
1. Connect wiring coupler to key switch.
2. Disconnect wiring from seat switch.
3. Connect test light to points 1 and 3.
4. Put PTO switch in ON position. Light should go on. Put PTO switch in OFF position. Light should go out.
5. If tests are good, go to Step D. If any test is incorrect, replace PTO switch.

**Step D**
1. Connect test light to point 4 and ground.
2. Push down on center of seat cushion. Light should go off. Release seat pressure. Light should go on.
3. If tests are good, go to Step E. If any test is incorrect, replace seat switch.
4. Connect wiring coupler to seat switch.

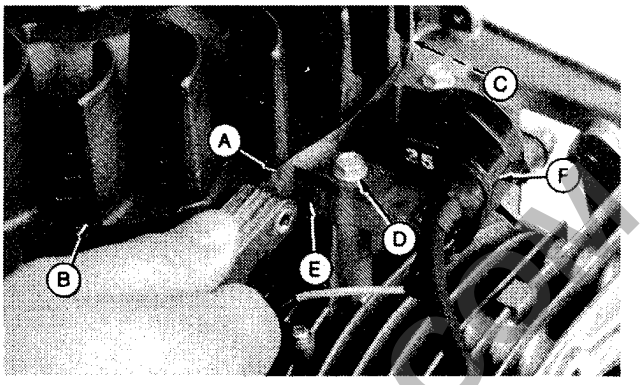
**Step E**
1. Disconnect spark plug wire from plug.
2. Connect test light to point 5 and ground.
3. Turn key switch to START position and check test light as engine crankshaft turns.
4. If test light flickers while crankshaft turns, the engine ground wire is good. Go to Test 3.
5. If test light does not flicker, the engine ground wire is defective.

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## INSTALL ARMATURE WITH COIL




1. Install flywheel (B). (See Section 24 Group 20.)

2. Install armature (F). Hand tighten screws (D).

3. Put a 0.3 mm (0.012 in.) feeler gauge (A) against the flywheel (B). Keep gauge away from magnet (C).

4. Push the armature (F) against the gauge and tighten screws (D).

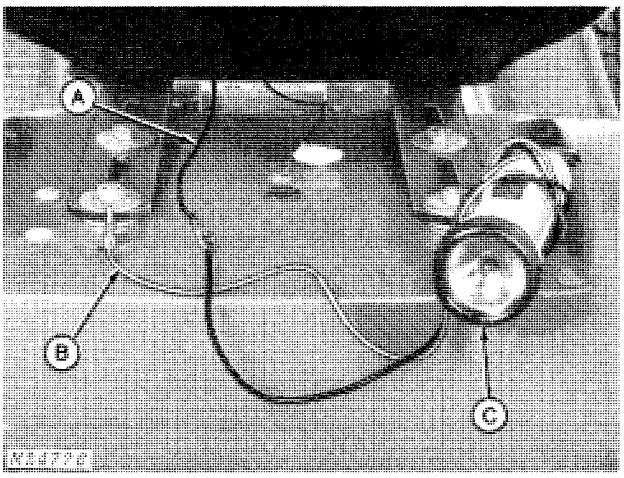
5. Turn flywheel to remove gauge.

**A—Feeler Gauge**
**B—Flywheel**
**C—Magnet**
**D—Screws**
**E—Armature Legs**
**F—Armature**

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## TEST SEAT SAFETY SWITCH

**IMPORTANT: The purpose of the seat safety switch is to kill the ignition when engine is running, PTO is engaged and operator leaves seat. This is a safety feature to prevent any accidental contact with mower blades. The engine will continue to run if PTO is disengaged and operator leaves seat.**




1. Disconnect seat switch lead (A) from wiring harness.

2. Install a test light (C) between switch lead wire (A) and ground (B). Light should light.

3. Light should go out when center of seat is depressed.

4. If light does not light or goes out when seat is depressed, replace switch.

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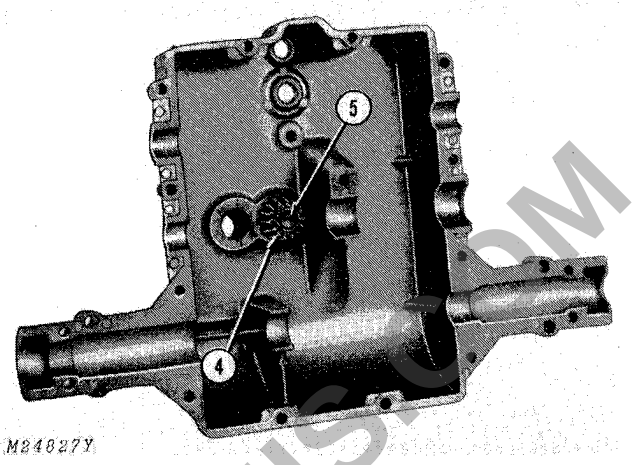


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4. Slip input shaft and gear out of case.

5. Remove snap ring, gear, washer and seal from input shaft.

6. Remove old grease from case by washing it in solvent.



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## REMOVE INTERNAL COMPONENTS

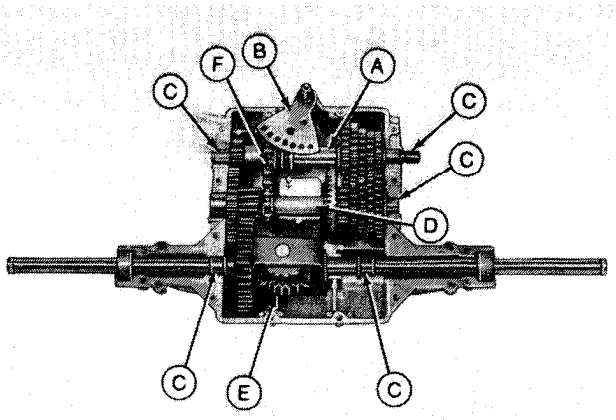
*NOTE: Observe how parts are assembled before removing them from case.*

1. Remove shifter fan (B) from case.

2. Remove transmission gear and shaft assemblies as a unit by lifting them out of case.

3. Lift differential assembly (E) out of case.

4. Remove old grease from case and then wash off case and parts with solvent.



M24828Y

**A—Shifter and Brake Shaft**
**B—Shifter Fan**
**C—Flanged Bushings**
**D—Countershaft**
**E—Differential Assembly**
**F—Drive Chain**

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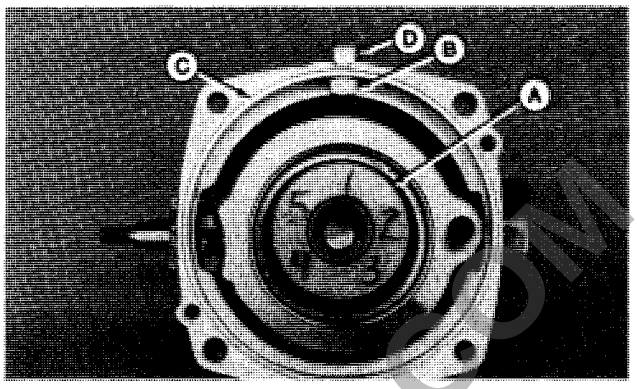


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3. Install pump rotor assembly (A).

4. Install dump valve guide (B), O-ring (C) and nut (D).

**A—Pump Rotor**
**C—O-Ring**
**D—Dump Valve Guide**
**D—Nut**

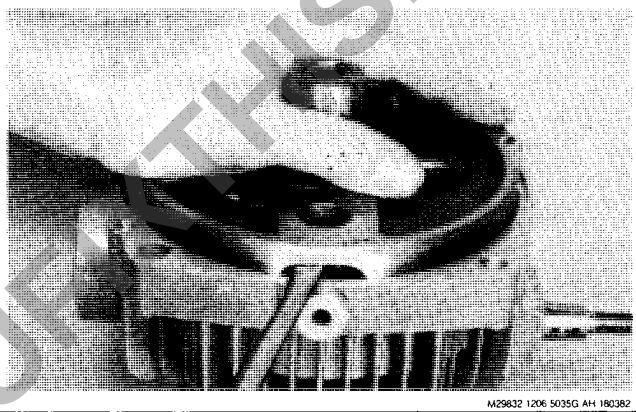


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**IMPORTANT: Do not force pivot pin assembly into pump rotor.**

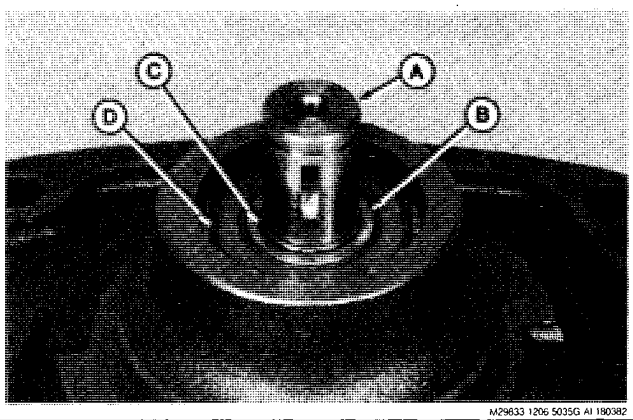
5. Place dump valve springs and bracket in pivot pin assembly. Install assembly in cover. Thread dump valve shaft into place.

6. Install sealing ring.


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7. Install output shaft (A), bearing (B), snap ring (C) and retainer (D).

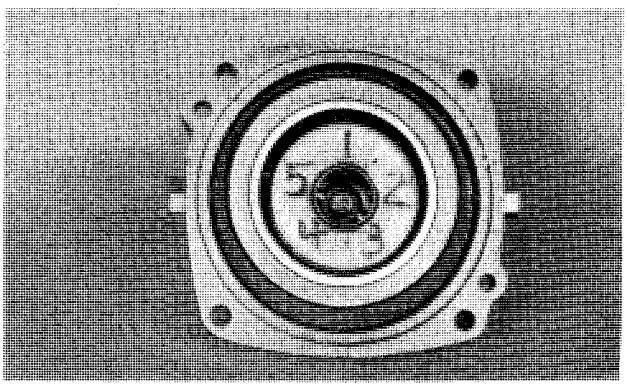
**A—Output Shaft**
**B—Bearing**
**C—Snap Ring**
**D—Retainer**



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8. Install ball pistons with springs into their respective motor bores. Install rotor assembly in body.

9. Make sure rotor assembly engaged with output shaft.


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