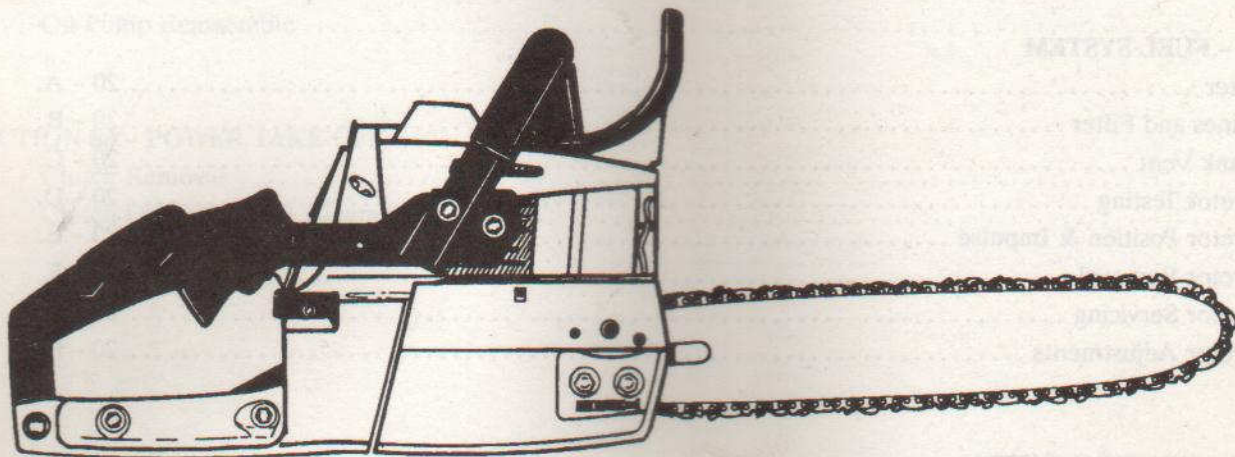


# SERVICE MANUAL

Model: 325



April 1, 1989

Poulan / Weed Eater  
Div. White Consolidated Industries, Inc.  
P. O. Box 9329  
Shreveport, Louisiana 71129



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## 3. ENGINE LACKS POWER

Air Filter dirty	Carburetor Fuel up is muddy
Spark Plug fouled	Carburetor Fuel up on Exhaust Ports
Carburetor out of adjustment	Spark Arrestor Screen clogged
Carburetor dirty	Fuel line restricted
Fuel Pump Pulse System failing	Fuel Filter dirty
Fuel Pump Pulse Channel restricted	Exhaust Air Cap is clogged
Fuel Pump Pulse Screen clogged	Fuel Pump Diaphragm damaged

### NOTE:

Some illustrations may differ from actual models. Although the illustrations may differ, the repair and service information remains the same. Several illustrations have been exaggerated or, changed to better reflect the steps associated with a specific procedures.



# GENERAL SECTION CONTENTS

Troubleshooting .....	10 - A.
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## A. TROUBLESHOOTING CHART

### 1. ENGINE FAILS TO START OR HARD TO START

---

Switch Off or faulty	Air Filter dirty
Fuel Tank empty	Fuel Filter dirty
Spark Plug Wire not connected	Fuel Flow restricted
Spark Plug fouled	Fuel Lines split or damaged
Spark Plug Gap incorrect	Engine flooded
Spark Plug cracked	Carburetor out of adjustment
Ignition Air Gap incorrect	Carburetor Choke Shutter worn or bent
Ignition Module faulty	Engine Compression too low
Ignition Wiring shorted	

### 2. ENGINE WILL NOT IDLE PROPERLY

---

Air Filter dirty	Inlet Needle binding
Fuel Tank Vent clogged	Throttle Valve cocked
Fuel Mixture improper	Circuit Plate Welch Plug damaged
Fuel Flow restricted	Metering Diaphragm damaged
Fuel Line split, loose or damaged	Fuel Pump Diaphragm damaged
Carburetor Mounting Screws loose	Dirt or trash in Carburetor Fuel Passage
Carburetor dirty	Carburetor Throttle Shaft too tight
Crankshaft Seals leaking	Carburetor Throttle Spring damaged
Engine Compression low	Throttle Stop Lever bent
Carburetor out of adjustment	Throttle Linkage binding
Metering Lever or Inlet Needle binding	Carburetor Nozzle Check Valve damaged
Carburetor Inlet Screen dirty	Contamination at Carburetor Welch Plug
Clutch Faulty or Damaged	

### 3. ENGINE LACKS POWER

---

Air Filter dirty	Carbon Build up in muffler
Spark Plug fouled	Carbon build up on Exhaust Ports
Carburetor out of adjustment	Spark Arrestor Screen clogged
Carburetor dirty	Fuel Flow restricted
Fuel Pump Pulse System leaking	Fuel Filter dirty
Fuel Pump Pulse Channel restricted	Ignition Air Gap incorrect
Fuel Pump Cover Screws loose	Fuel Pump Diaphragm damaged
Metering Diaphragm improperly assembled	Metering Diaphragm damaged
Metering Diaphragm rivet loose	Ignition on Module faulty
Metering Diaphragm cover screws loose	Carburetor Inlet Needle dirty
Carburetor Circuit Plate screws loose	Metering Lever binding
Carburetor Circuit Plate Welch Plug damaged	Fuel Tank Vent clogged



#### 4. ENGINE FLOODS

---

Metering Lever set too high  
Inlet Needle & Seat dirty  
Inlet Needle binding

Inlet Needle & Seat worn  
Improper starting procedure  
Choke not functioning properly

#### 5. IDLE IS "RICH"

---

Carburetor out of adjustment  
Metering Lever is worn  
Metering Lever set too high  
Metering Lever binding  
Inlet Needle & Seat dirty

Inlet Needle binding  
Inlet Needle & Seat worn  
Carburetor Circuit Plate screws loose  
Carburetor Circuit Plate Welch Plug damaged  
Contamination at Carburetor Welch Plug

#### 6. IDLES WITH CARBURETOR NEEDLE "CLOSED"

---

Metering Lever set too high  
Metering Lever or Inlet Needle binding  
Inlet Needle & Seat dirty  
Inlet Needle & Seat worn or damaged

Carburetor Circuit Plate Welch Plug damaged  
Carburetor Nozzle Check Valve damaged  
Carburetor Adjustment Needle damaged

#### 7. IDLE IS ERRATIC

---

Dirt or trash in Carburetor Fuel Passage  
Fuel Lines split, loose or damaged  
Metering Diaphragm Button loose  
Carburetor Circuit Plate Welch Plug damaged  
Contamination at Carburetor Welch Plug  
Carburetor Circuit Plate Welch Plug leaking  
Carburetor mounting bolts loose

Carburetor Throttle Shaft worn  
Carburetor Throttle Valve screw loose  
Carburetor Throttle Valve worn  
Metering Lever or Inlet Needle binding  
Inlet Needle & Seat dirty  
Metering Diaphragm damaged

#### 8. CARBURETOR NEEDLE REQUIRES FREQUENT ADJUSTMENTS

---

Dirt or trash in Carburetor Fuel Passage  
Metering Lever set too high  
Metering Lever or inlet needle binding

Metering Diaphragm damaged  
Metering Diaphragm Gasket damaged



## 9. LOADS UP WHILE RUNNING

---

Metering Lever set too high  
Metering Lever or Inlet Needle binding  
Metering Lever Spring damaged  
Metering Lever Spring improperly installed

Inlet Needle & Seat dirty  
Inlet Needle & Seat worn or damaged  
Carburetor Circuit Plate Welch Plug damaged

## 10. FUEL DRIPPING FROM CARBURETOR

---

Fuel Line Split, loose or damaged  
Fuel Pump cover screws loose  
Metering Lever set too high  
Metering Diaphragm leaking  
Inlet Needle binding

Defective Diaphragm gasket  
Loose Metering Diaphragm cover screws  
Inlet Needle & Seat dirty  
Inlet Needle & Seat worn or damaged

## 11. ENGINE SMOKES EXCESSIVELY

---

Carburetor out of adjustment  
Air Filter dirty  
Crankcase Leak

Improper fuel mixture  
Welch Plug loose or damaged

## 12. ENGINE VIBRATES EXCESSIVELY

---

Flywheel loose or damaged  
Isolators worn  
Clutch Worn or Damaged

Chain Dull or Damaged

## 13. OILER FAILS TO LUBRICATE BAR AND CHAIN

---

Oil Level in Tank Low  
Oiler out of adjustment  
Oil Line split, loose, or damaged  
Oil discharge hole restricted  
Improper Bar & Chain Lubrication

Oil Hole in Guide Bar blocked  
Oil Filter Dirty  
Oiler Worm Gear worn  
Oil Tank Vent restricted

## 14. CHAIN MOVES AT IDLE SPEED

---

Carburetor out of adjustment  
Clutch faulty or damaged

See "Engine will not idle properly"



## 15. CHAIN DOES NOT MOVE WITH ACCELERATION

---

Chain tension too tight  
Carburetor out of adjustment  
Rails of Guide Bar damaged

Clutch faulty or damaged  
Chain not installed on Sprocket

## 16. CHAIN CLATTERS OR CUTS ROUGH

---

Chain tension incorrect  
Cutters faulty or damaged  
Chain worn or dull  
Chain improperly sharpened

Chain depth gauges too high  
Sprocket worn or damaged  
Clutch faulty or damaged

## 17. CHAIN STOPS DURING THE CUT

---

Chain cutter tops not filed flat  
Guide Bar rails bent or uneven  
Guide Bar damaged

Clutch faulty or damaged  
Excess pressure applied during cut

## 18. CHAIN CUTS AT AN ANGLE

---

Chain cutters damaged  
Chain dull, or worn

Guide bar bent, or worn



## B. SPECIFICATION TABLE

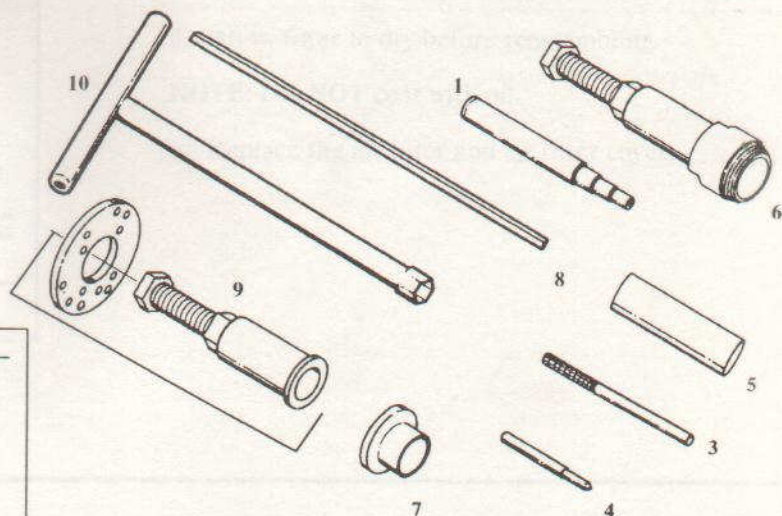
SPECIFICATION TABLE	
MODEL:	325
ENGINE DISPLACEMENT:	3.2 Cu. In.
GUIDE BAR:	Control Tip (Replaceable Sprocket Nose)
CHAIN TYPE:	Guard Link (.58 Gauge)
CHAIN SIZE:	.325 Pitch - 66 Drive links
SPARK PLUG TYPE:	Champion - CJ7Y
SPARK PLUG GAP:	.025"
IGNITION TYPE:	Solid State System
IGNITION AIR GAP:	.009" - .012"
FUEL MIX RATIO:	40:1 (Poulan PRO® brand Oil)
OIL PUMP TYPE:	Automatic
OIL PUMP OUTPUT:	Minimum 4 c.c. Maximum 9 c.c.
MUFFLER TYPE:	Spark Arresting / Temperature Limiting

## C. SPECIAL SERVICE TOOLS

Illustration may vary from actual tool.

DESCRIPTION	PART NO.
1. Piston Pin Tool	505-381705
2. Main Bearing Tool	505-381709
3. Expansion Washer Tool	505-381735
4. Carburetor Valve Seat Tool	505-381329
5. Oiler Worm Gear Puller	502-540102
6. Seal Puller	505-381809
7. Seal Tool	505-381739
8. Flywheel Pin	505-240602
9. Crankcase Puller Tool	502-516101*
10. 8 mm Wrench	505-381308

\* Note: Crankcase Puller Tool 505-381811 can be used in place of 503-516101



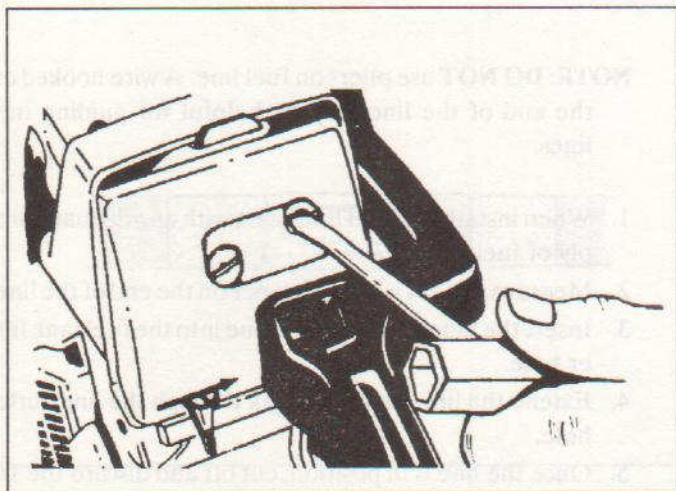


## FUEL SYSTEM CONTENTS

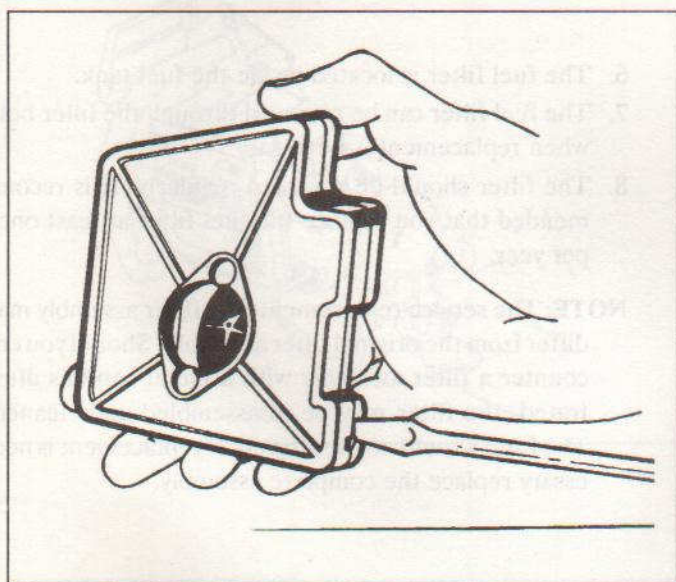
Air Filter .....	20 - A.
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## A. AIR FILTER



1. Clean off the air filter cover and the area around the cover.
2. Loosen the two screws on the filter cover and remove the filter cover and filter.



3. Separate the filter assembly using a screwdriver.
4. Wash the filter in soap and water.

**CAUTION:** DO NOT use gasoline, or other flammable liquid to clean the filter to avoid creating a fire hazard.

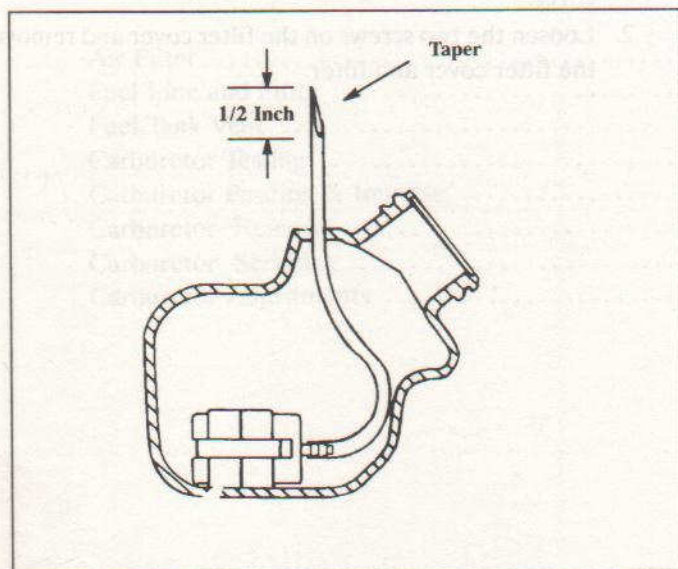
5. Allow filter to dry before reassembling.

**NOTE:** DO NOT coat with oil.

6. Replace the air filter and air filter cover.

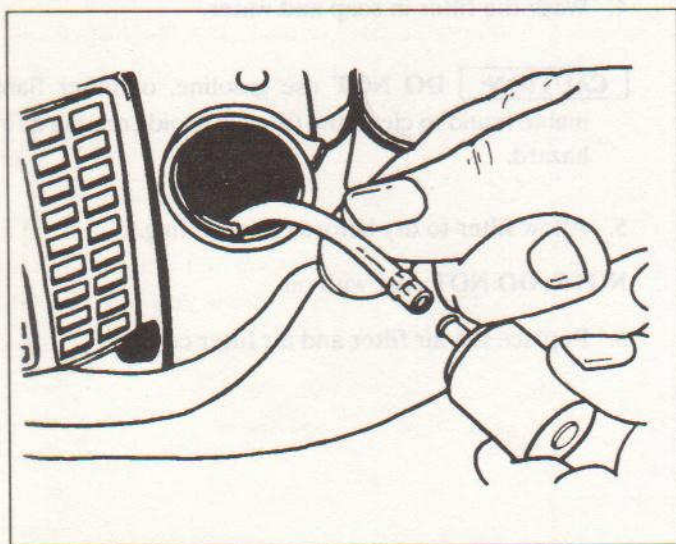


## B. FUEL LINE AND FUEL FILTER



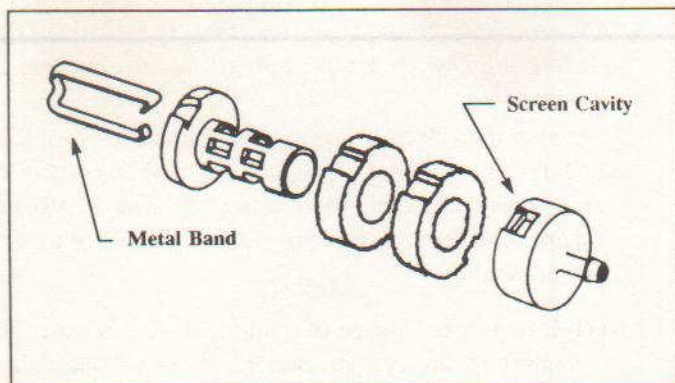
**NOTE:** DO NOT use pliers on fuel line. A wire hooked on the end of the line may be helpful for guiding fuel lines.

1. When installing a fuel line, start with an adequate supply of fuel line.
2. Measure and cut a  $1/2$  inch taper on the end of the line.
3. Insert the tapered end of the line into the fuel tank filler hole.
4. Extend the line out of the tank through the line outlet hole.
5. Once the line is in position, cut off and discard the  $1/2$  inch taper.



6. The fuel filter is located inside the fuel tank.
7. The fuel filter can be removed through the filler hole when replacement is necessary.
8. The filter should be replaced regularly. It is recommended that you replace the fuel filter at least once per year.

**NOTE:** The service replacement fuel filter assembly may differ from the original filter assembly. Should you encounter a filter assembly with a metal band as illustrated, the filter may be disassembled and cleaned. The filter should not be altered. If replacement is necessary replace the complete assembly.



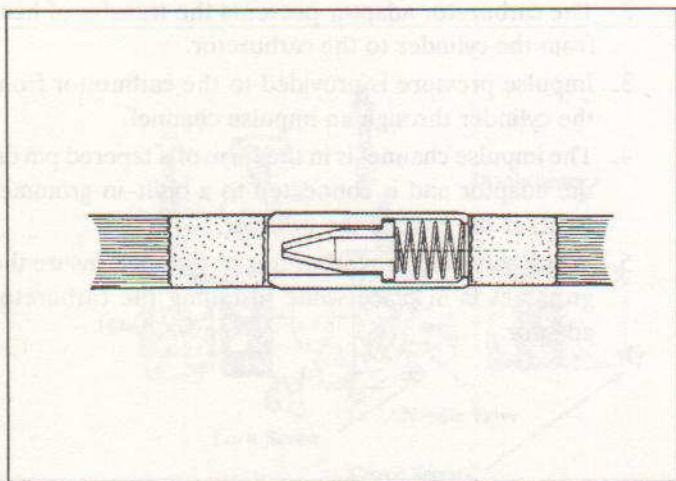
9. Some filters include a screen that is accessible by removing the metal band on the filter assembly. The screen is located on the top section of the assembly. (Not included in all units)

**NOTE:** DO NOT remove the screen. Should it be necessary to clean the screen, blow air across the top of the upper section. DO NOT blow air down into the screen cavity.

10. Should replacement be necessary, DO NOT substitute. Replace the complete assembly.



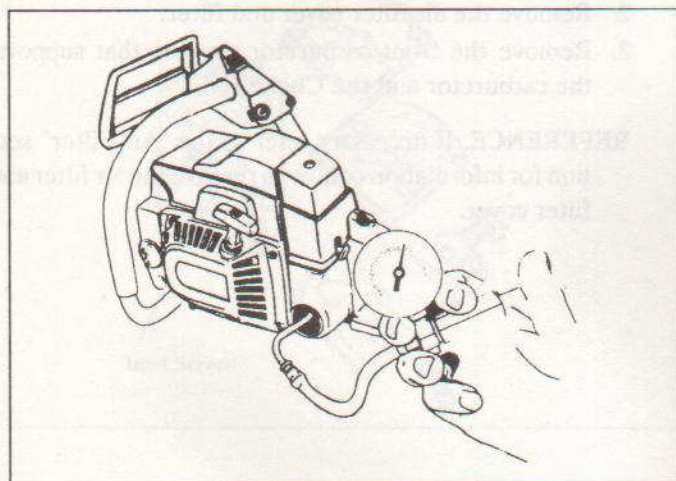
## C. FUEL TANK VENT



**NOTE:** The check valve is serviced as a complete assembly. Do not attempt to repair and reuse a damaged check valve.

1. The fuel tank is vented by means of a check valve.
2. The check valve is located near the fuel expansion tank.
3. A drainage line is located on the underside of the crankcase. When servicing the saw, inspect the drainage line and clean if necessary.

## D. CARBURETOR TESTING



1. Pop off pressure and fuel lines can be tested without unit disassembly, or with the carburetor removed from the saw.
2. Install the pressure tester in place of fuel filter located inside the fuel tank.
3. Hand pump pressure into the system.
4. Pop off pressure should be 17 to 35 psi (pounds per Square inch) with a wet carburetor.

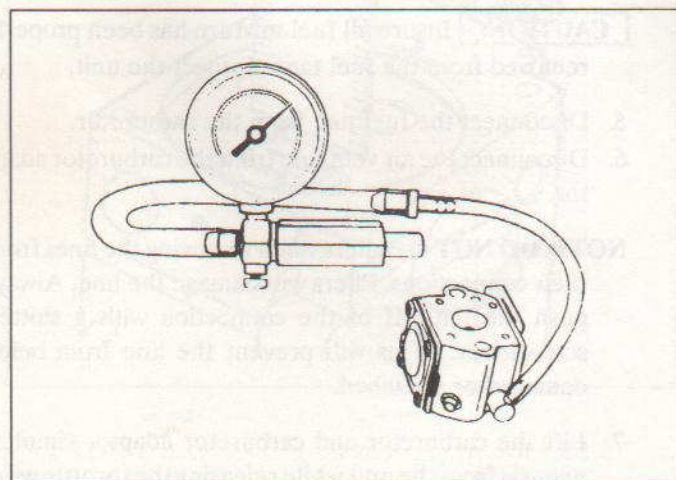
**NOTE:** A wet carburetor requires the carburetor to be internally moist with the proper fuel mixture. A new carburetor dry off the shelf may not pop off at the same psi as a wet carburetor.

5. A split, loose, or damaged fuel line will not allow the pressure to build up in the system.

**NOTE:** Pop off pressure on most carburetors is 17 to 26 psi. If pop off pressure is extremely high check for a clogged inlet screen in the carburetor.

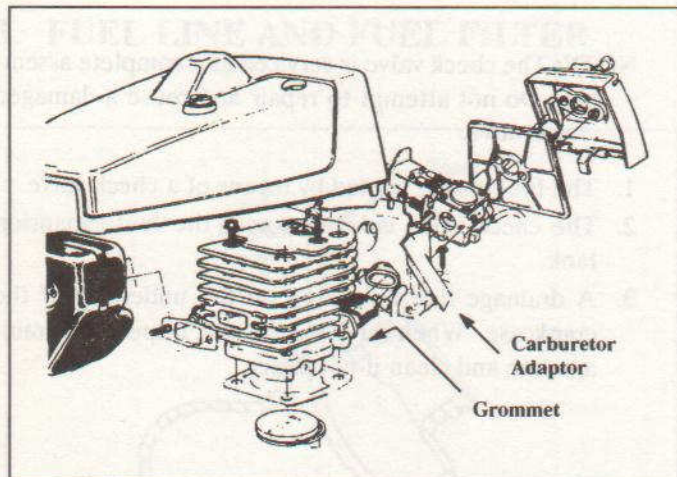
6. Lower than "Normal" pop off pressure indicates: The Metering Lever is set too high, or a weak metering lever spring.
7. Higher than "Normal" pop off pressure indicates: The Metering Lever is set to low, a improper metering lever spring, contamination in the fuel system, a faulty diaphragm, bent or binding metering lever, or a worn inlet needle.

**NOTE:** Improper storage of a unit with fuel mixture remaining in the system, may result in a higher than "Normal" pop off pressure.



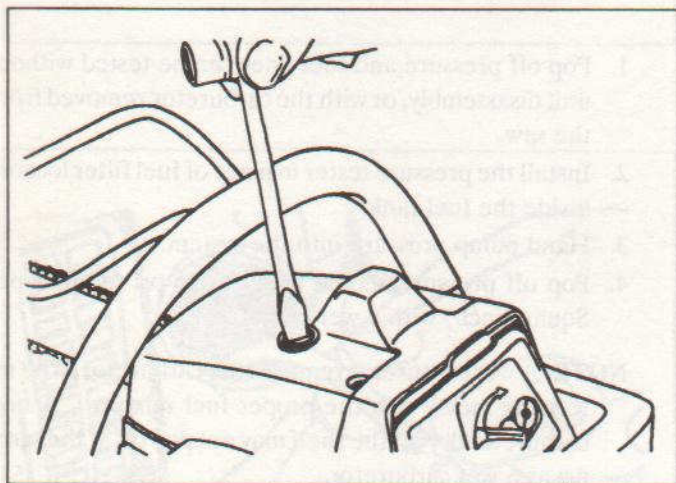


## E. CARBURETOR POSITION &amp; IMPULSE



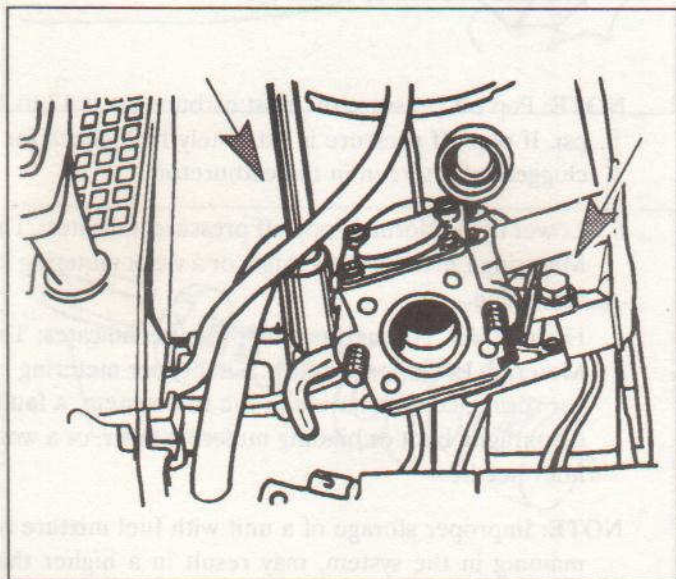
1. The carburetor is attached to a carburetor adaptor.
2. The carburetor adapter prevents the transfer of heat from the cylinder to the carburetor.
3. Impulse pressure is provided to the carburetor from the cylinder through an impulse channel.
4. The impulse channel is in the form of a tapered pin on the adaptor and is connected to a built-in grommet (seal) at the base of the cylinder.
5. When servicing the carburetor or cylinder, insure the grommet is in place while installing the carburetor adaptor.

## F. REMOVING THE CARBURETOR



1. Remove the cylinder cover.
2. Remove the air filter cover and filter.
3. Remove the front carburetor support that supports the carburetor and the Choke rod..

**REFERENCE:** If necessary refer to the "Air Filter" section for information of how to remove the air filter and filter cover.



4. Remove the two screws retaining the carburetor adaptor to the crankcase.

**CAUTION:** Insure all fuel mixture has been properly removed from the fuel tank. Inspect the unit.

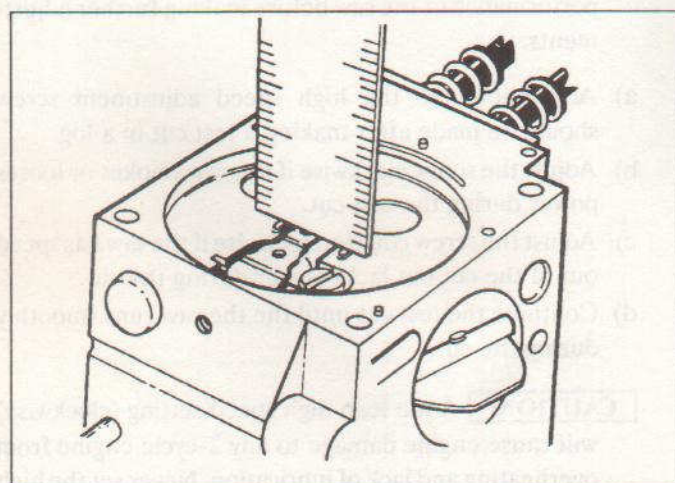
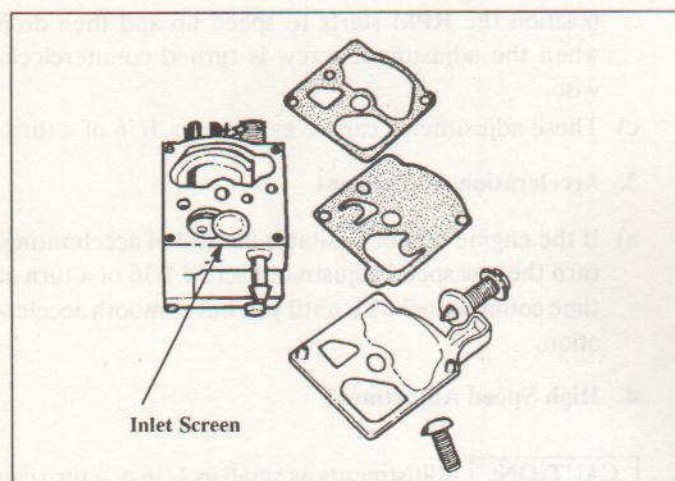
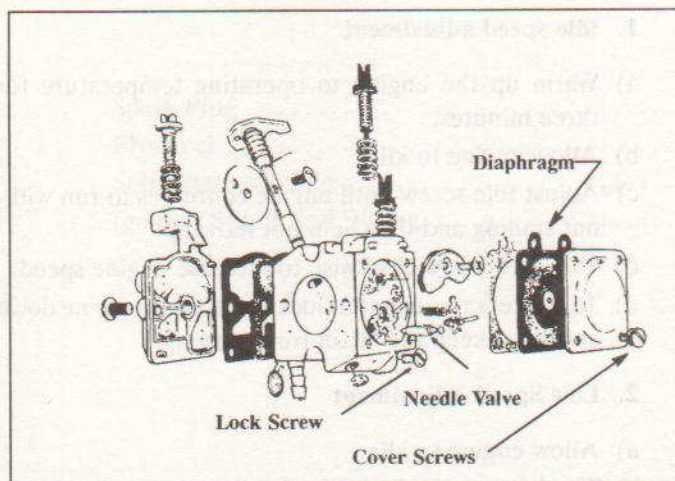
5. Disconnect the fuel line from the carburetor.
6. Disconnect the air vent line from the carburetor adaptor.

**NOTE: DO NOT** use pliers when removing the lines from their connections. Pliers will damage the line. Always push the line off of the connection with a slotted screwdriver. This will prevent the line from being damaged or stretched.

7. Lift the carburetor and carburetor adaptor simultaneously from the unit while releasing the throttle wire.



## G. CARBURETOR SERVICING



1. Access the main diaphragm by removing the four cover screws and cover.
2. Remove the gasket and diaphragm carefully to avoid damage.
3. Inspect diaphragm for damage and replace if necessary.
4. The needle valve can be removed for servicing by removing the lock screw that retains the lever spindle.
5. Lift the spindle and needle valve from the carburetor, once the lock screw has been loosened.
6. Inspect the needle valve, and the valve seat for possible wear.

7. Remove the pump diaphragm cover.
8. Remove and replace the carburetor inlet screen.
9. Insure all channels are clean and free before re-assembly.

**NOTE:** DO NOT use steel wire or similar material to clean carburetor channels.

10. Replace gasket with new gasket.

11. During re-assembly make sure the part of the metering lever that makes contact with the diaphragm is level with the surface of the material in the carburetor.
12. If adjustment is necessary to the metering lever, be careful not to damage the needle valve.

**NOTE:** ALWAYS use new gaskets during re-assembly.

**REFERENCE:** Refer to the section "Carburetor Testing" to insure the carburetor is functioning correctly after re-assembly.

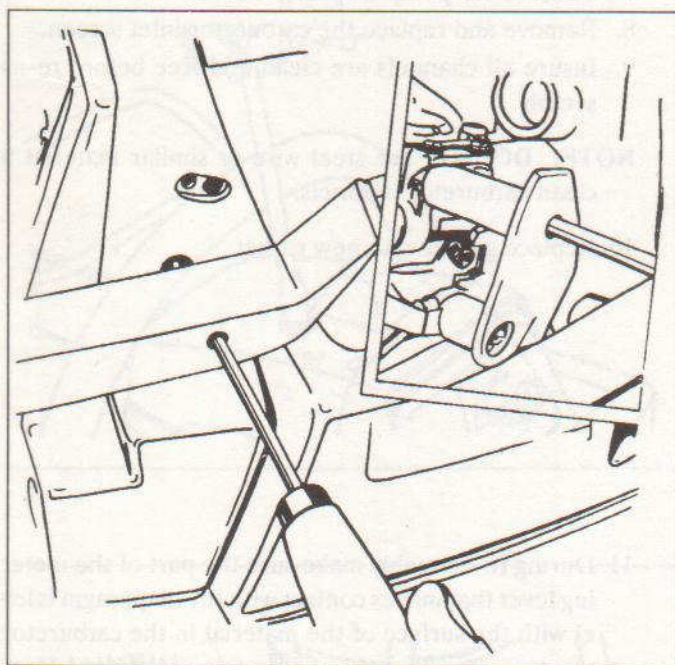


## H. CARBURETOR ADJUSTMENTS

**NOTE:** Normal carburetor adjustments explained in the operator's manual are not covered under warranty.

### ⚠ WARNING

The chain will be moving during most of this procedure. Wear your protective gear and observe all safety precautions within the operator's manual.



### 1. Idle speed adjustment

- Warm up the engine to operating temperature for three minutes.
- Allow engine to idle.
- Adjust Idle screw until engine continues to run without stalling and the chain not moving.
- Turn idle screw clockwise to increase engine speed.
- Turn idle screw counterclockwise to slow engine down and/or to keep the chain from turning.

### 2. Low Speed Adjustment

- Allow engine to idle.
- The low speed adjustment is located at the midpoint position from the position the RPM starts to drop when the adjustment screw is turned clockwise and the position the RPM starts to speed up and then drop when the adjustment screw is turned counterclockwise.
- These adjustments can be as fine as a 1/16 of a turn.

### 3. Acceleration Adjustment

- If the engine dies or hesitates instead of accelerating, turn the low speed adjustment screw 1/16 of a turn at a time counterclockwise until you have smooth acceleration.

### 4. High Speed Adjustment

**CAUTION:** Adjustments as small as 1/16 of a turn can affect engine performance. It is important to turn the screw only 1/16 of a turn per adjustment and test the performance of the saw before making further adjustments.

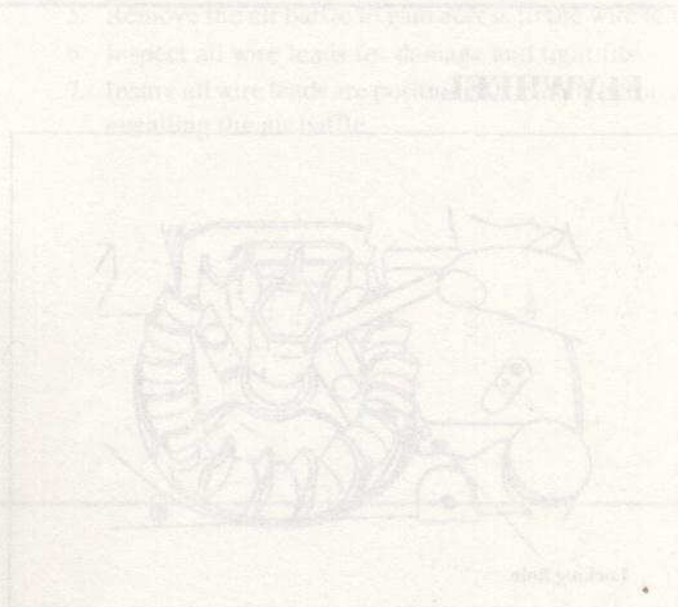
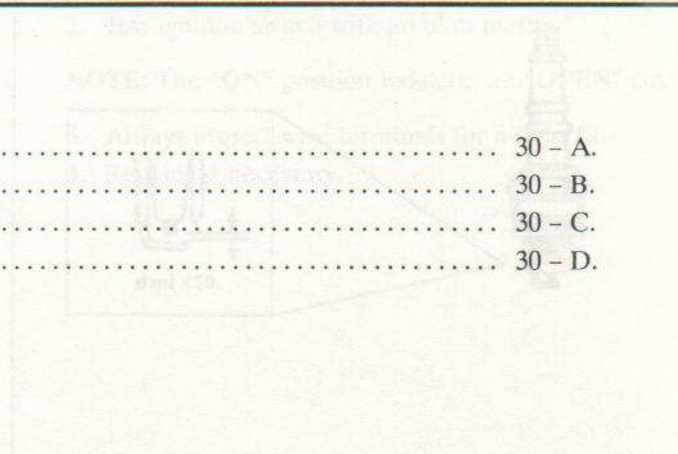
- Adjustments to the high speed adjustment screw should be made after making a test cut in a log.
- Adjust the screw clockwise if the saw smokes or loses power during the test cut.
- Adjust the screw counterclockwise if the saw has speed out of the cut but lacks power during the cut.
- Continue the test cut until the saw runs smoothly during the cut.

**CAUTION:** A too lean high speed setting (clockwise) will cause engine damage to any 2-cycle engine from overheating and lack of lubrication. Never set the high speed adjustment screw so far clockwise that you have high speed but lack of power while cutting.



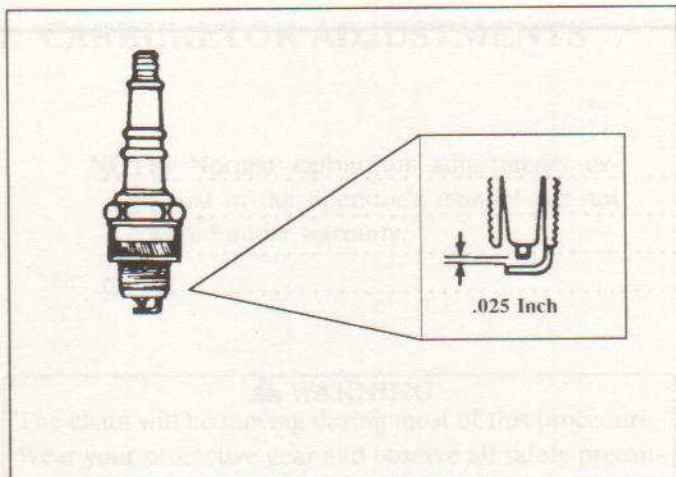
# IGNITION SYSTEM CONTENTS

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Flywheel .....	30 - B.
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## A. SPARK PLUG

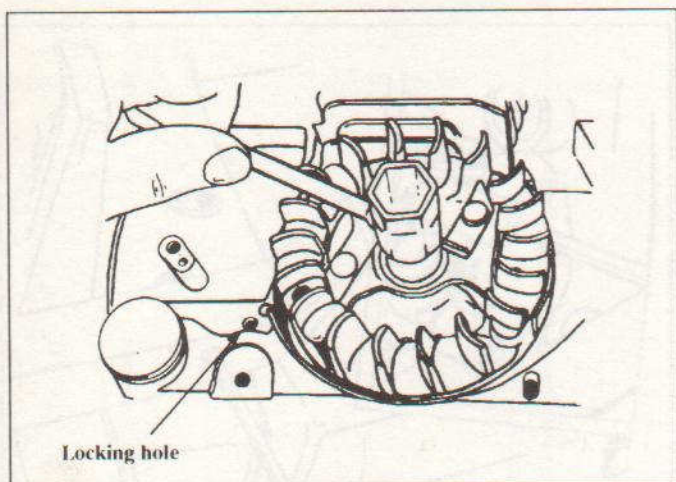


1. Inspect the spark plug.
2. Clean and set the spark plug gap to .025 inch.
3. A "Normal" plug should show few combustion deposits. The insulator tip color will be dry not moist.

**NOTE:** Should you excessively choke the unit prior to plug removal, the insulator will not be dry.

4. A light gray or chalk white insulator with a burned electrode indicates "overheating".
5. A "wet fouled" plug is indicated by a damp oily film with a carbon layer over the entire nose of the spark plug.
6. Peppered ash like deposits on the insulator indicates an "oxide fouled" plug.

## B. FLYWHEEL

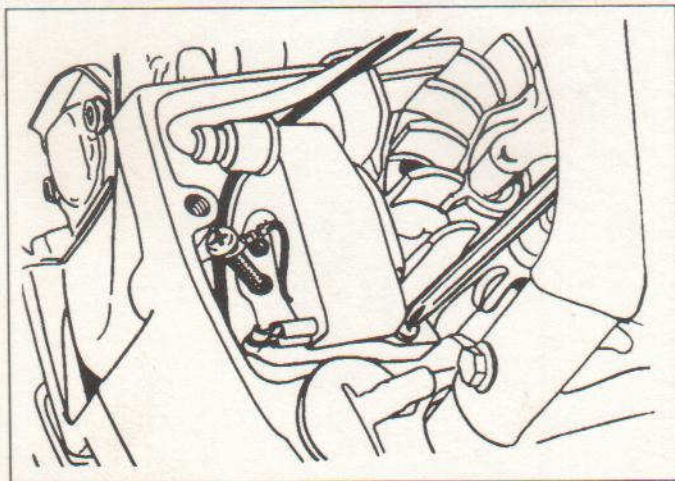


1. Lock the flywheel from rotating by inserting the Flywheel Pin Tool into the locking hole in the crankcase.
2. Remove the flywheel nut.
3. Lift the flywheel Plate from the flywheel.
4. Remove the flywheel from the crankshaft.
5. The flywheel is held into position with a tapered fit and a woodruff key.

**NOTE:** It may be necessary to utilize a flywheel puller for removal. **DO NOT** Hit the end of the Crankshaft or Flywheel with a metal object to loosen the flywheel.

**NOTE:** The flywheel has two keyways. – Always reinstall the flywheel aligning the keyway marked "5" with the crankshaft keyway.

## C. SOLID STATE MODULE

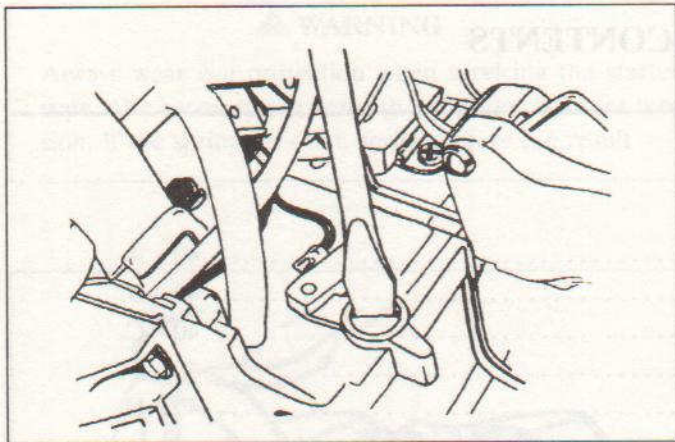


1. Set the air gap between the flywheel and the module using a brass or plastic shimstock.
2. The air gap should be set between .009" to .012" .
3. Loosen the module mounting screws.
4. Place the shimstock between the laminations on the module and the flywheel magnets.
5. **DO NOT** force. Allow the flywheel magnets to draw the module against the shimstock.
6. Tighten the mounting screws and recheck the air gap.

**NOTE:** It is important to recheck the air gap after tightening the mountings screws. This will insure the process of tightening the screws did not twist the module out of position.



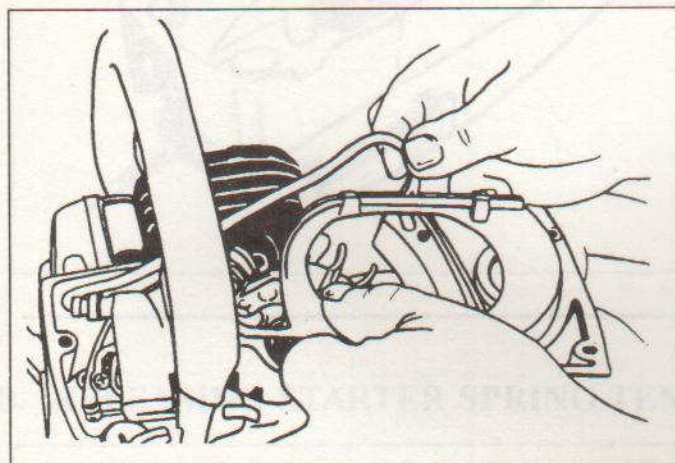
## D. IGNITION SWITCH AND WIRING



1. Inspect the ignition switch for worn contact points.
2. Test ignition switch with an ohm meter.

**NOTE:** The "ON" position indicates an "OPEN" circuit.

3. Always inspect wire terminals for a tight fit.
4. Replace if necessary.

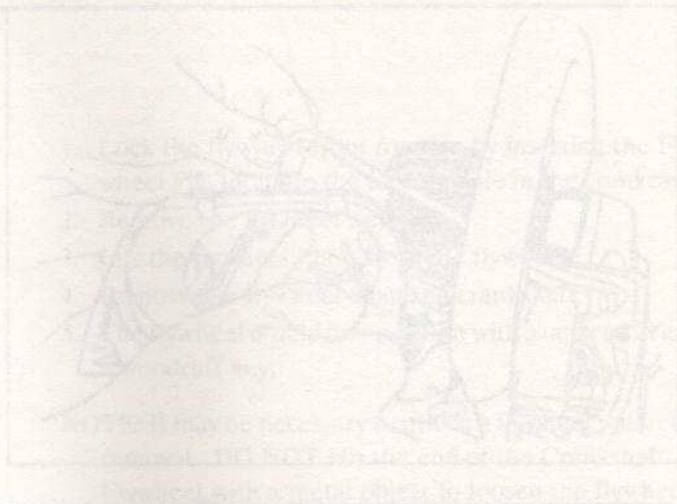
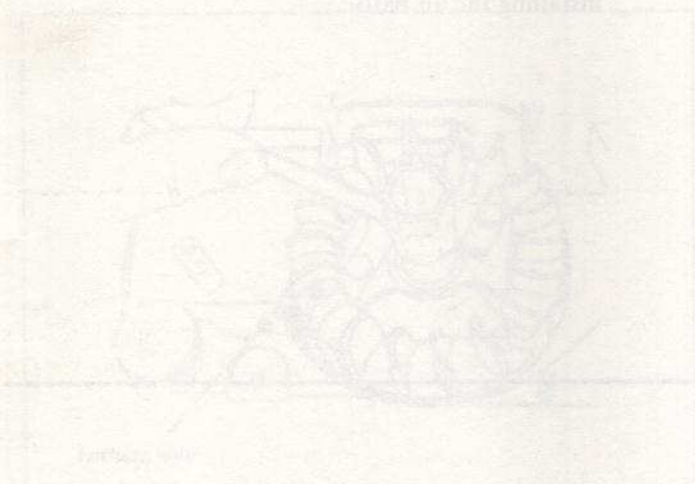


5. Remove the air baffle to gain access to the wire leads.
6. Inspect all wire leads for damage and tight fits.
7. Insure all wire leads are positioned correctly before re-installing the air baffle.



# STARTER SYSTEM CONTENTS

Accessing the Starter Pulley .....	40 - A.
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Starter Rope Replacement .....	40 - C.
Starter Pulley Replacement .....	40 - C.
Starter Spring Replacement .....	40 - D.



## C. SOLID STATE MODULE



1. Remove the cap screw and washer from the top of the module.
2. Lift the module out of the engine block.
3. Inspect the module for damage.
4. Replace the module with a new one if necessary.
5. Tighten the cap screw and washer to the specified torque.

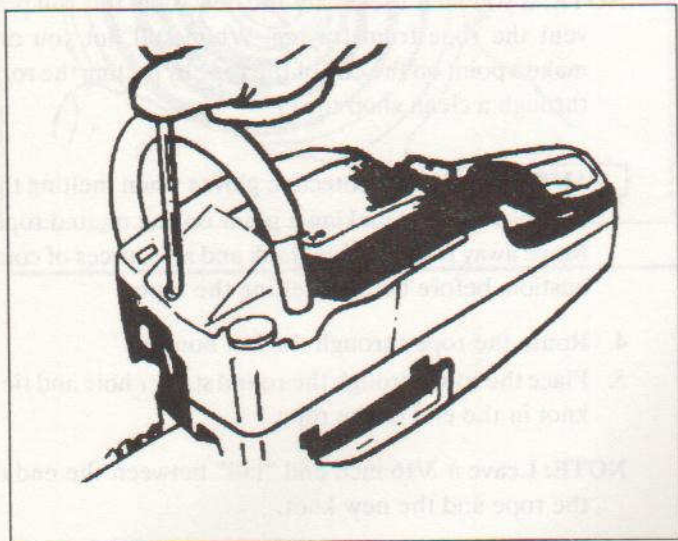
NOTE: The module is a sensitive component. Handle it with care and avoid contact with the module's internal components. The module is not to be used if it is damaged or if it does not meet the specifications.



## A. ACCESS TO STARTER PULLEY

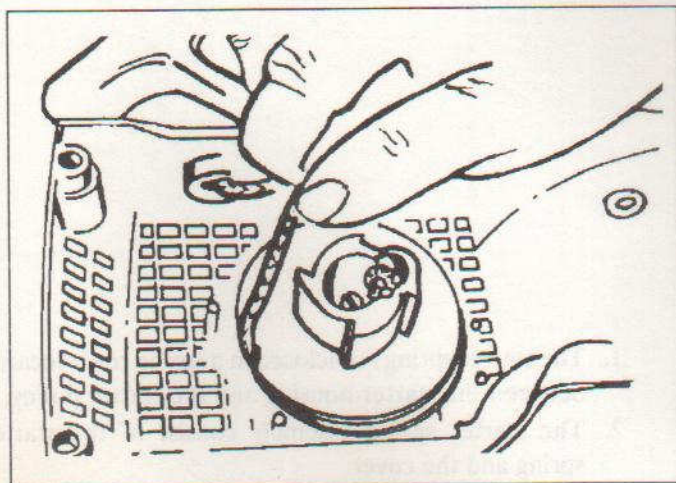
**⚠ WARNING**

Always wear eye protection when servicing the starter rope. The recoil spring beneath the pulley is under tension. If the spring flies out, serious injury can result.



1. Drain the fuel tank.
2. Remove the three fan housing screws.
3. Separate the fan housing from the engine.

## B. RELEASING STARTER SPRING TENSION

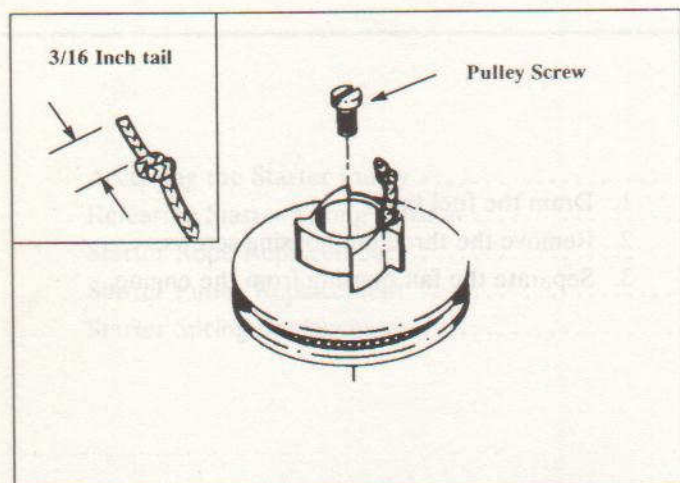


**NOTE:** If the starter rope requires replacement, yet is not broken, it is necessary to release the spring tension from the starter spring.

1. Pull 10 inches of rope from the starter pulley.
2. Catch the rope in the notch found on the outer edge of the starter pulley.
3. Turn the starter pulley counterclockwise until the spring tension is released from the pulley.



## C. STARTER ROPE OR PULLEY REPLACEMENT



1. Remove the pulley screw in the center of the pulley.
2. Lift the pulley carefully while gently twisting it counterclockwise.
3. Remove any old rope remaining on the pulley.

**NOTE:** If you melt the end of the new rope, this will prevent the rope from fraying. While still hot you can make a point on the end of the rope by pulling the rope through a clean shop towel.

**CAUTION:** Wear protective gloves when melting the Starter rope and making a point on the melted rope. Move away from the fuel tank and all sources of combustion, before before melting the rope.

4. Route the rope through the fan housing.
5. Place the rope through the round starter hole and tie a knot in the end of the rope.

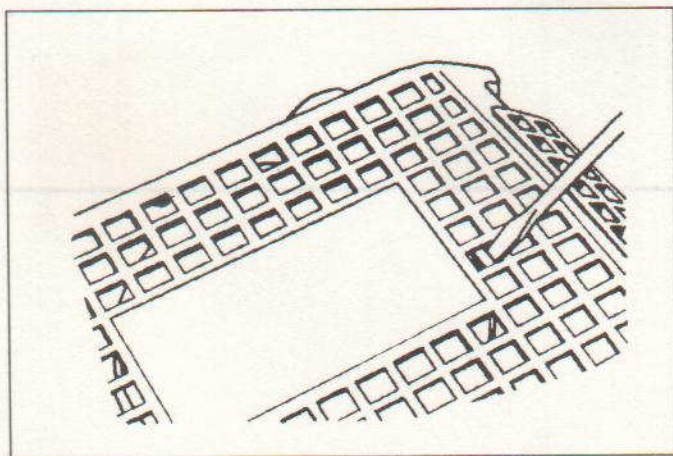
**NOTE:** Leave a 3/16 inch end "tail" between the end of the rope and the new knot.

6. Pull the rope tightly until the knot is seated inside the starter pulley.

## D. STARTER SPRING REPLACEMENT

**⚠ WARNING**

Always wear eye protection and gloves when servicing the starter spring. The recoil spring, located beneath the pulley, and the replacement spring are under tension. If the spring flies out, serious injury can result.



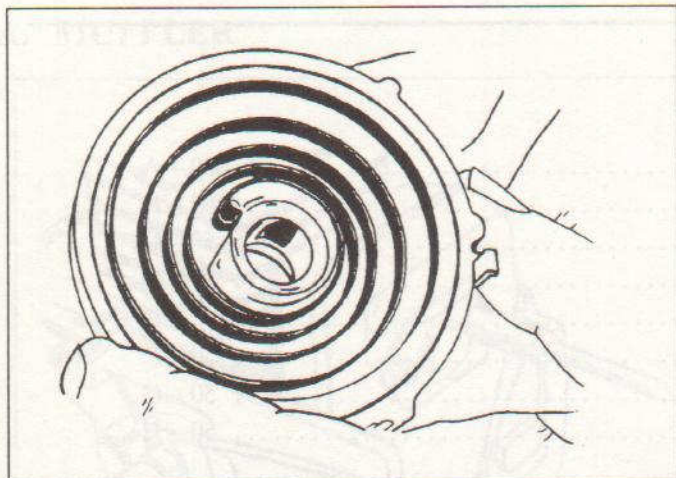
1. The starter spring is enclosed in a spring cover located between the starter housing and the starter pulley.
2. The starter spring assembly consist of the starter spring and the cover.
3. Remove the starter pulley

**REFERENCE:** If necessary refer the the section "Starter rope and pulley replacement" for information on removing the starter pulley.

**NOTE:** The spring assembly is held in place with two locking tabs on the outward side of the fan housing.

4. Remove the spring assembly by pressing the two locking tabs with a slotted screwdriver.

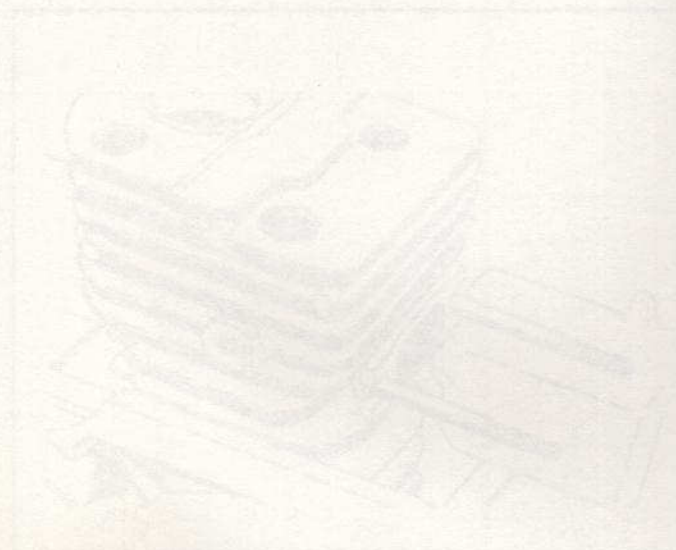




**NOTE:** The starter spring and cover are not sold separate from the assembly. When servicing the starter spring, or cover, order the starter assembly.

5. Clean the starter spring and other starter parts regularly.

## B. EXHAUST PORTS



1. Remove the Spark Plug
2. Remove the piston and rod (to check the oil level) by pulling the starter rope.
3. Use a wire den. scraper to clean the carbon from the Exhaust Ports.
4. Run the engine with clean oil for 10-15 minutes.
5. Reinstall the piston and rod, and the Spark Plug.



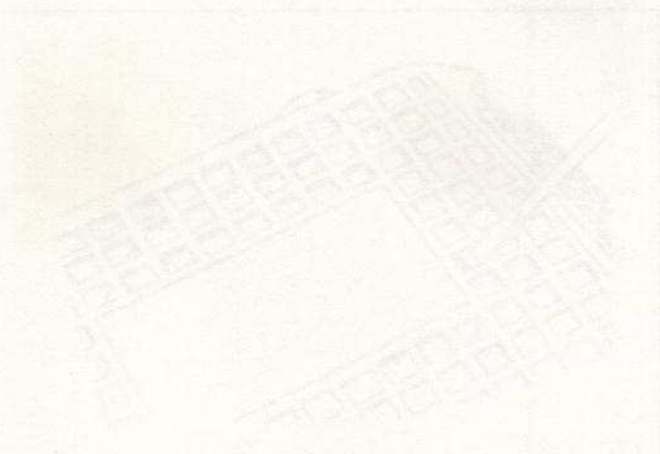
## ENGINE SECTION CONTENTS

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Main Bearing Bearing & Seals .....	50 - H.

## D. STARTER SPRING REPLACEMENT

## A WARNING

Always wear eye protection and gloves when working on the starter spring. The recoil spring, located behind the pulley, can be replaced without the need for tools. If the spring does not return to its original position, it may cause injury.



1. The starter spring is located in the spring compartment between the pulley housing and the starter pulley.
2. The starter spring extends around the pulley and the gear.
3. Remove the starter pulley.

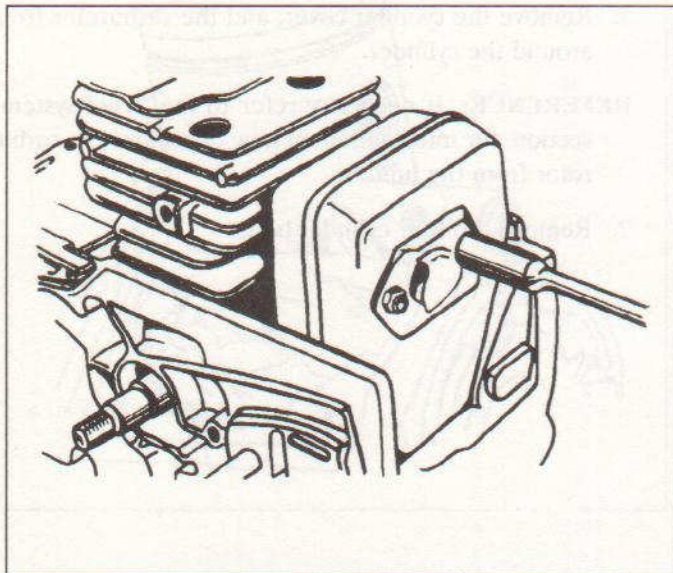
**NOTE:** If necessary, refer to the section on the pulley and pulley ring removal. The pulley ring is located behind the starter pulley.

**NOTE:** The spring should be replaced with a new one. Do not use the old one.

4. Remove the spring and install the new one. The new spring should be installed with the pulley ring.



## A. MUFFLER



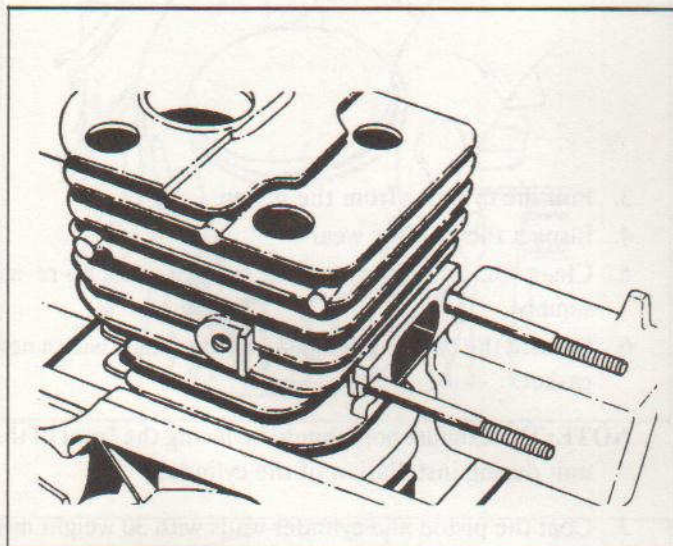
1. Remove the two muffler cover screws
2. Remove the lower muffler bracket screw.
3. Inspect the muffler parts and clean or replace as necessary.

**NOTE:** While the muffler is is apart, clean the exhaust ports on the cylinder.

**REFERENCE:** Refer to the section "Exhaust Ports" for information on cleaning the exhaust ports on the cylinder.

4. Replace the gasket with a new gasket before re-assembly.

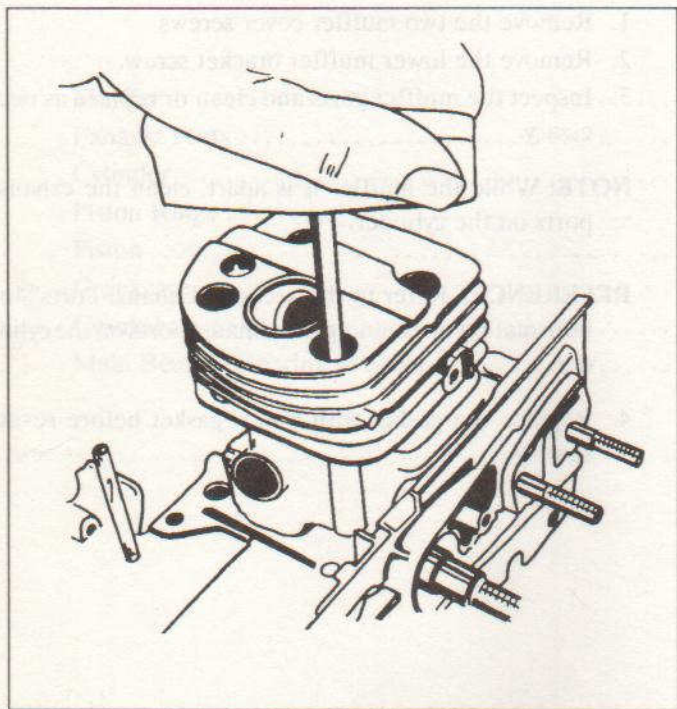
## B. EXHAUST PORTS



1. Disconnect the Spark Plug.
2. Position the piston upward to block the exhaust port by pulling the starter rope.
3. Use a wooden scraper to clean all carbon from the Exhaust Ports.
4. Turn the engine with exhaust ports facing down and shake out all loose carbon.
5. If compressed air is available, blow all loose carbon from the area.



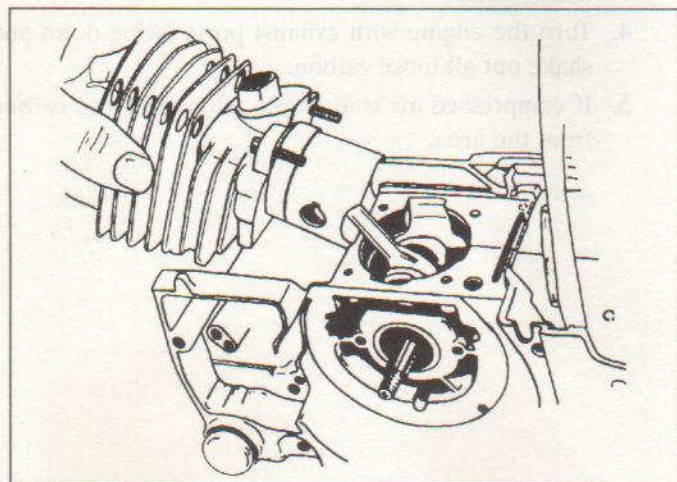
## C. CYLINDER



1. Remove the cylinder cover, and the carburetor from around the cylinder.

**REFERENCE:** If necessary refer to the "Fuel system" section for information on how to remove the carburetor from the unit.

2. Remove the four cylinder bolts.



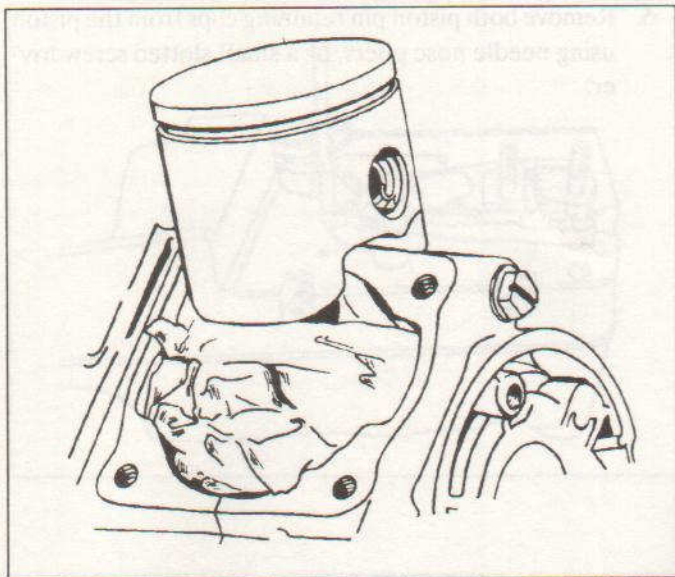
3. Pull the cylinder from the piston.
4. Inspect the unit for wear.
5. Clean the cylinder mounting surface, prior to re-assembly.
6. Discard the old cylinder gasket and replace with a new gasket.

**NOTE:** The exhaust port should be facing the front of the unit during installation of the cylinder.

7. Coat the piston and cylinder walls with 30 weight motor oil before re-installing the cylinder onto the piston.
8. Support the piston and utilize a ring compressor when placing the cylinder onto the piston.



## D. PISTON RINGS

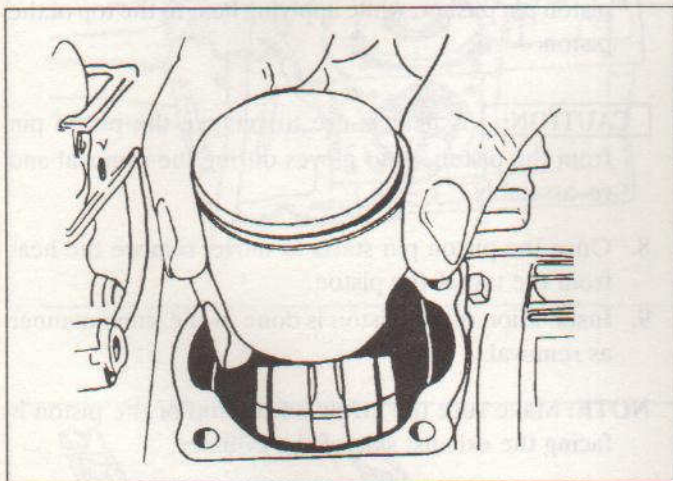


1. Place a shop towel in the crankcase opening to prevent dirt or other material from entering into the crankcase.
2. When installing a piston ring make certain the piston ring gap aligns with the ring peg on the piston.

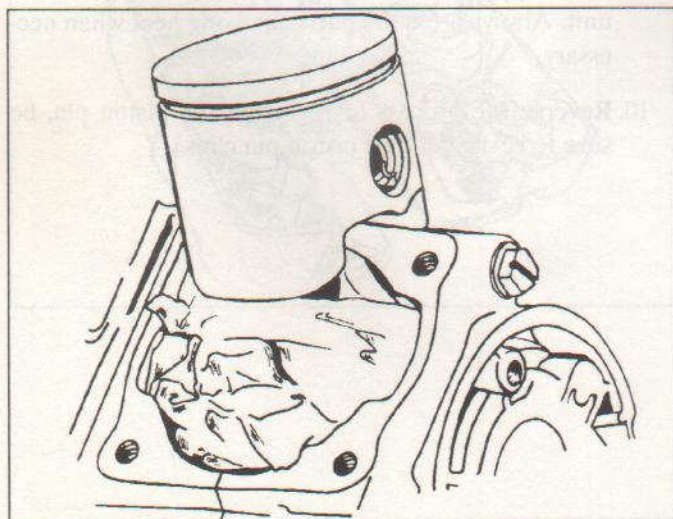
**NOTE:** The ring peg is not centered in the ring groove of the piston.

3. The piston ring wear can be measured by sliding the ring into the cylinder bore. The end gap measurement should be no more than (.8 mm).
4. Inspect the ring and replace if the piston ring edges are worn round and are not square.
5. Before re-assembly inspect the piston ring groove and scrape off all combustion residues with a wooden scraper.

## E. PISTON

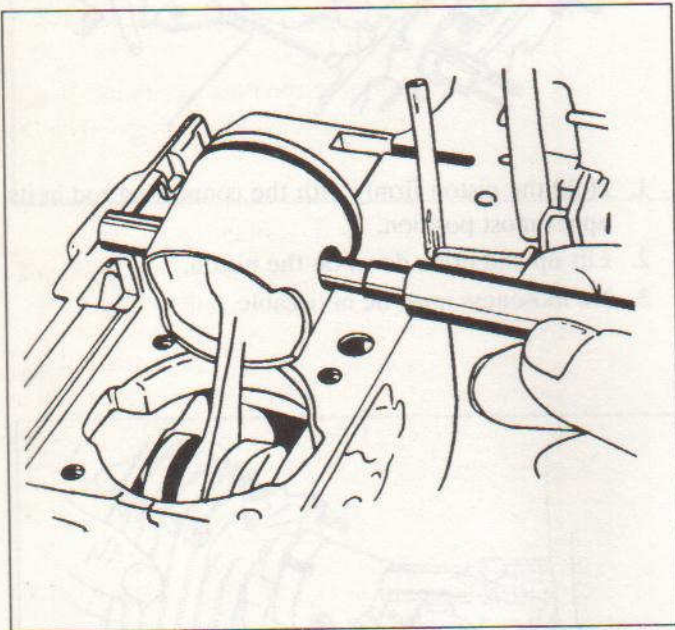
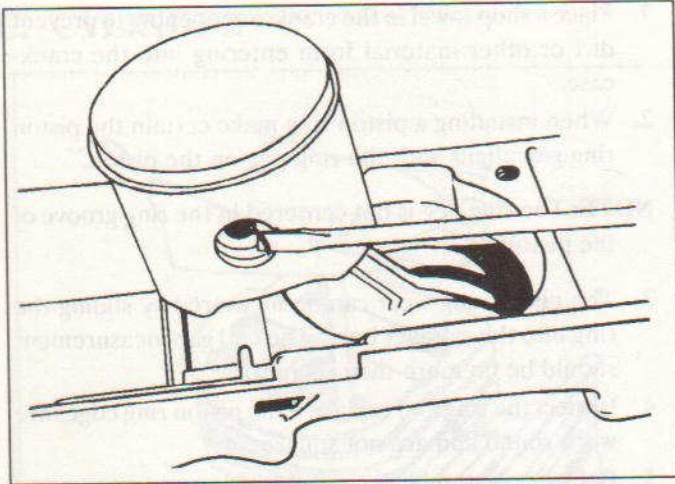


1. Hold the piston firmly with the connecting rod in its upper most position.
2. Lift up and press down on the piston.
3. No looseness must be noticeable.



4. Place a shop towel in the crankcase to prevent dirt or other material from entering into the crankcase.





5. Remove both piston pin retaining clips from the piston using needle nose pliers, or a small slotted screwdriver.

6. Hold the connecting rod and piston firmly.
7. Press the piston pin out of the piston using the piston pin pusher tool

**NOTE:** If necessary you can apply steady pressure to the piston pin pusher, while applying heat to the top of the piston.

**CAUTION:** If heat is use to remove the piston pin from the piston, wear gloves during the removal and re-assembly.

8. Once the piston pin starts to move, remove the heat from the top of the piston.
9. Installation of the piston is done in the same manner as removal.

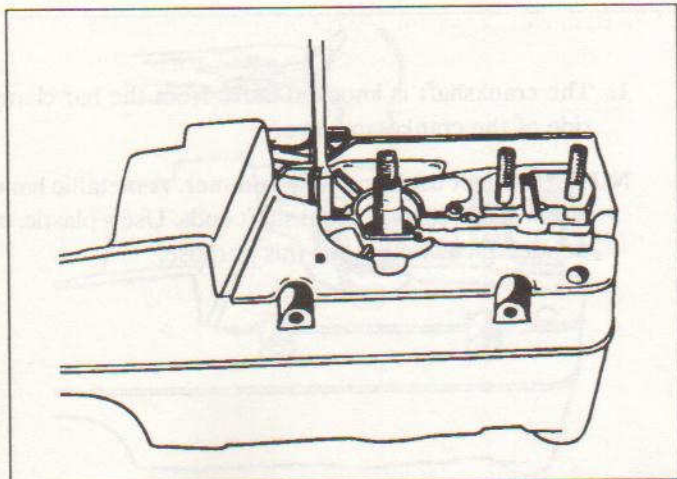
**NOTE:** Make sure the arrow on the top of the piston is facing the exhaust side of the cylinder.

**CAUTION:** **DO not** tap on the piston or piston pusher tool. Tapping will cause unnecessary damage to the unit. Always press the parts, applying heat when necessary.

10. Reverse the process to re-install the piston pin, be sure to re-install new piston pin clips.



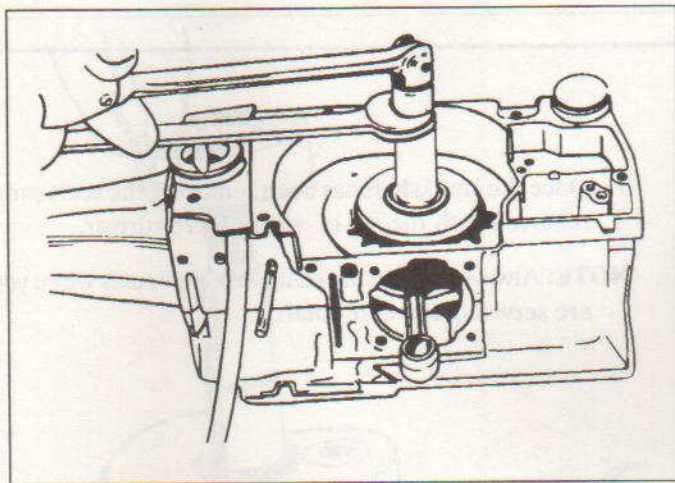
## F. CRANKCASE



1. Remove the 10 crankcase bolts.

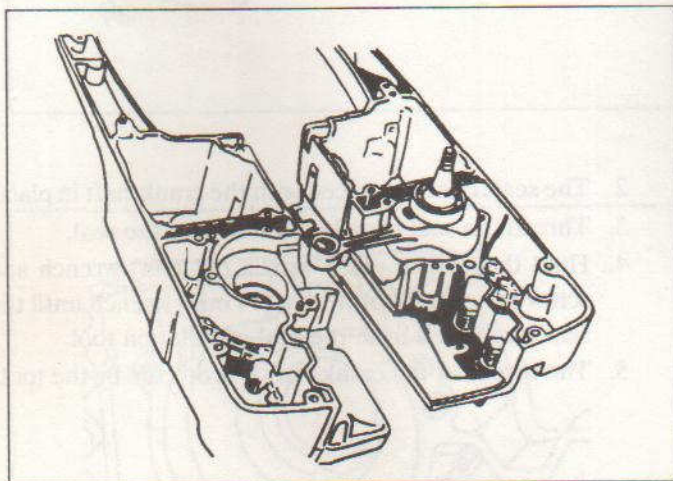
**NOTE:** The oil pump gear must be removed from the crankshaft before the crankcase halves can be separated.

**REFERENCE:** Refer to the "Oiler System" section for information on oil pump gear removal.



2. Thread the puller cylinder portion of the crankcase puller onto the crankshaft shaft.
3. Place the puller disk onto the puller cylinder.
4. Insure the puller disk aligns with the roll pin(s) on the crankcase.
5. Attach the puller disk to the crankcase with the puller hardware provided with the puller assembly.
6. Tighten the puller cylinder screw against the crankshaft shaft, forcing the crankcase halves apart.

**NOTE:** A large "C" clamp style Crankcase removal tool can be utilized in place of the Crankcase removal tool illustrated. Refer to the Tool Chart in section 10 for the Part Number of all Service Tools.

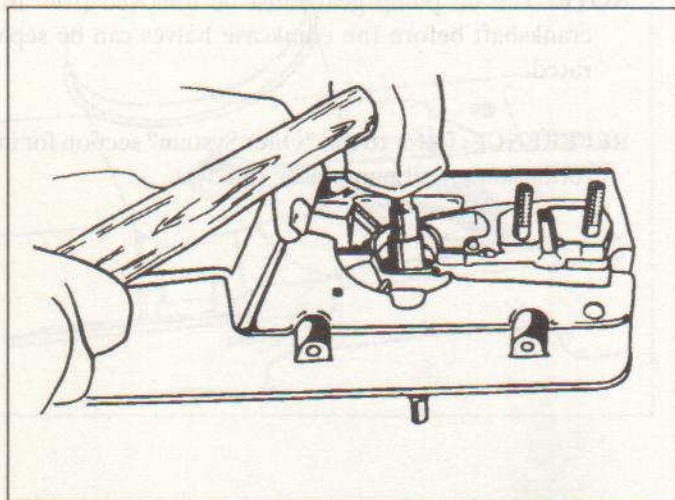


7. Clean the mounting surface of the crankcase before re-assembly.

**NOTE:** The bar mounting bolts are pressed into the crankcase. If replacement of a bar mounting bolt is necessary, you do not need to split the crankcase. Installation of the bar mounting bolt can be obtained by removing the muffler from the unit.



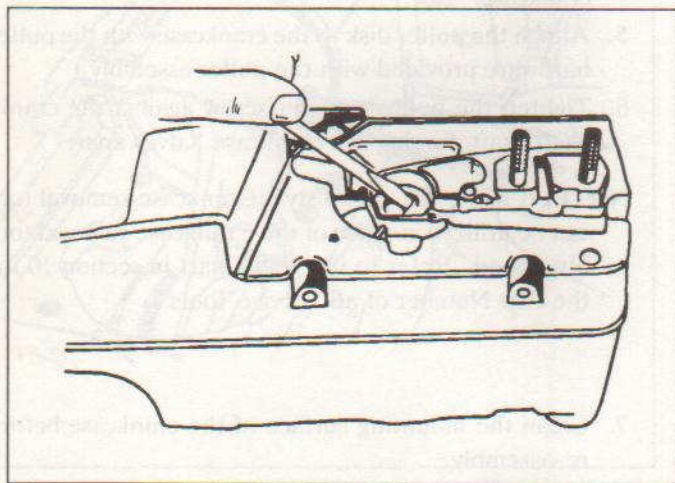
## G. CRANKSHAFT



1. The crankshaft is knocked loose from the bar clamp side of the crankcase half.

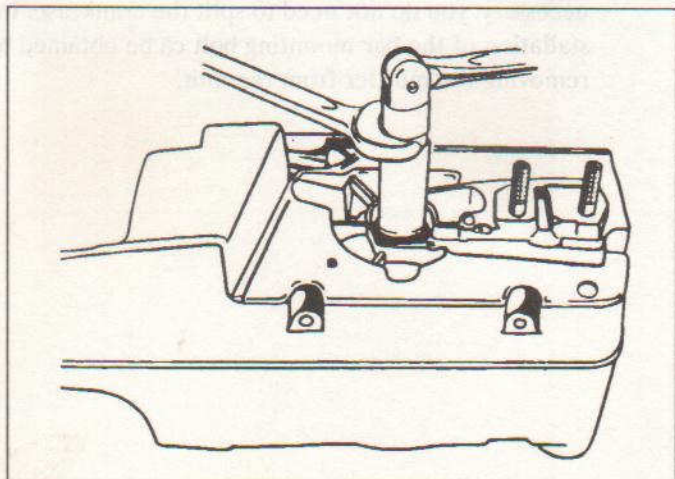
**NOTE:** DO Not use a metallic hammer. A metallic hammer will damage the crankshaft ends. Use a plastic, or wooden faced mallet for this purpose.

## H. MAIN SEALS AND BEARING



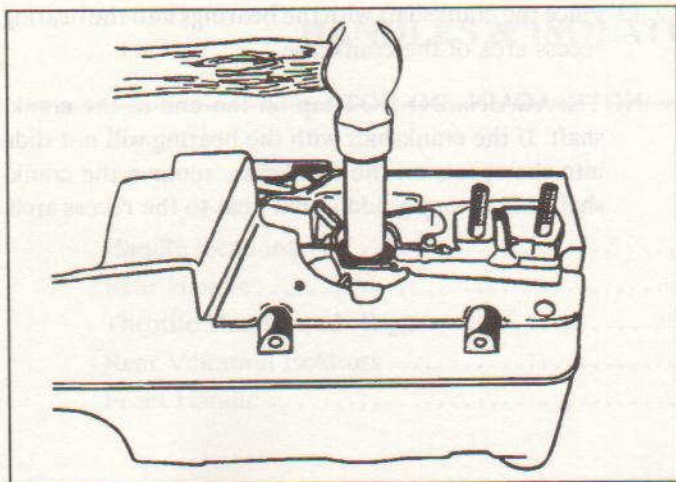
1. Once the crankshaft has been removed, the seals can be removed with the aid of slotted screwdriver.

**NOTE:** Always replace the seals with new seals when you are servicing the crankshaft.

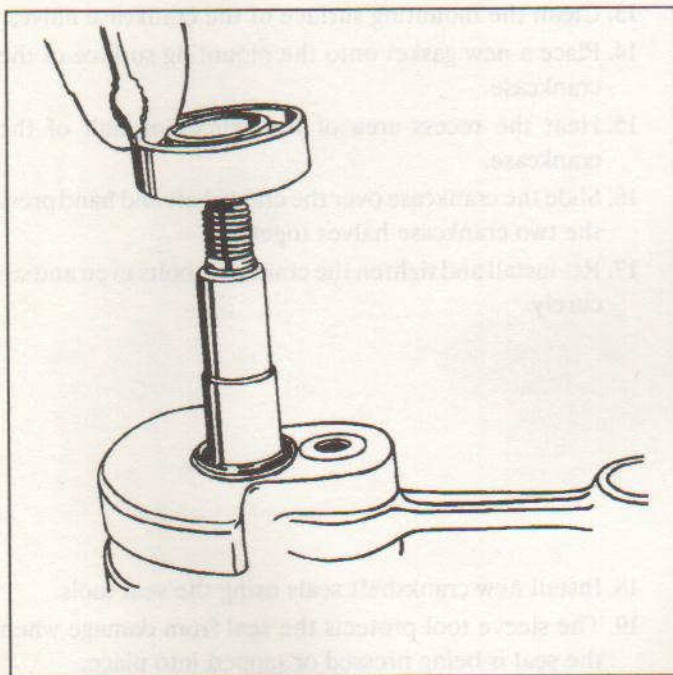


2. The seals can be serviced with the crankshaft in place.
3. Thread the seal installation tool into the seal.
4. Hold the tool in place with a (17 mm) wrench and screw the center bolt with a (14 mm) wrench until the seal is released from the seal installation tool.
5. The thread of the crankshaft is protected by the tool.





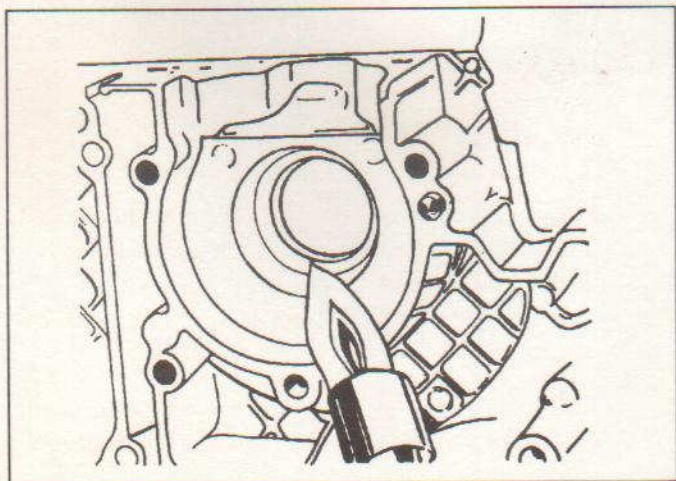
6. The main bearing can be removed with the main bearing service tool.
7. Place the main bearing service tool over the bearing facing the outside of the crankcase.
8. Tap the bearing toward the inside of the crankcase halve.



9. When replacing bearings on the crankshaft heat the two bearings in oil and slide them onto the crankshaft.

**CAUTION:** Be sure to wear protective gloves when using heat to remove, or re-install parts on the unit.

**NOTE:** DO NOT tap on the bearings. If necessary you can cool the crankshaft in the refrigerator before installing the bearings. Do not tap on, or apply heat direct to the bearings.

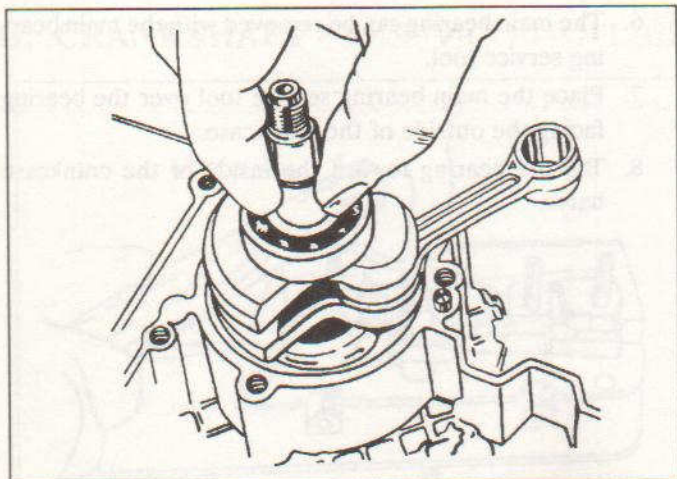


10. Using a heat source place heat to the bearing recess in the flywheel side of the crankcase halve.

**NOTE:** DO NOT tap on the bearing, or the crankcase.

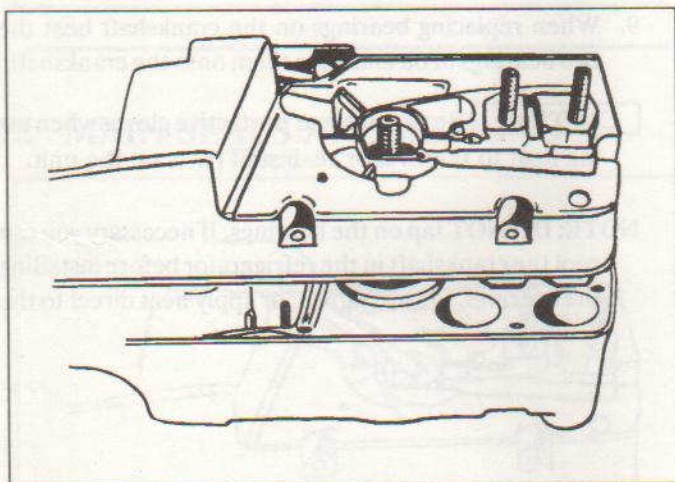
11. Make sure to evenly distribute the heat to the recess area.



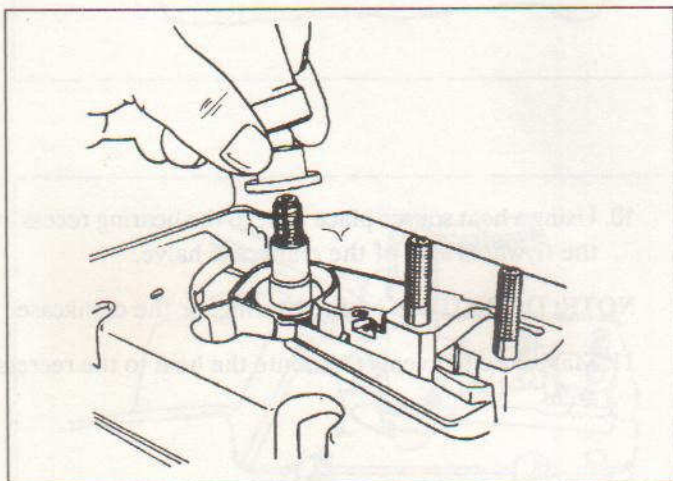


12. Place the crankshaft with the bearings into the bearing recess area of the crankcase.

**NOTE: AGAIN...DO NOT** tap on the end of the crankshaft. If the crankshaft with the bearing will not slide into the recess on the crankcase, remove the crankshaft and re-apply additional heat to the recess area.



13. Clean the mounting surface of the crankcase halves.  
 14. Place a new gasket onto the mounting surface of the crankcase.  
 15. Heat the recess area of the remaining half of the crankcase.  
 16. Slide the crankcase over the crankshaft and hand press the two crankcase halves together.  
 17. Re-install and tighten the crankcase bolts even and securely.

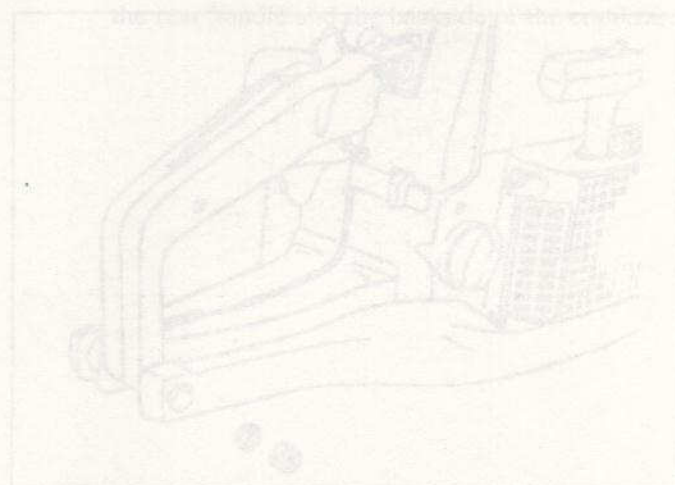
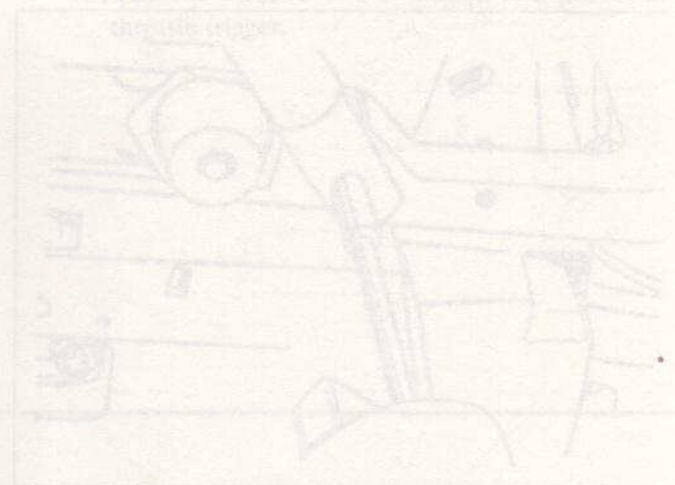


18. Install new crankshaft seals using the seal tools.  
 19. The sleeve tool protects the seal from damage when the seal is being pressed or tapped into place.



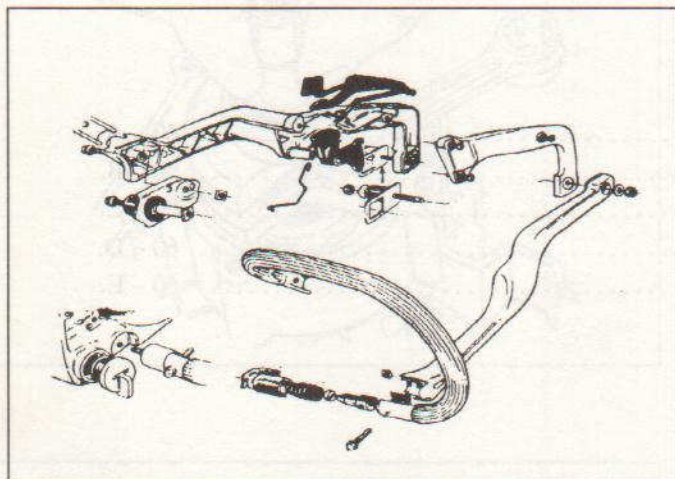
## HANDLES &amp; ISOLATORS SECTION CONTENTS

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Front Handle .....	60 - E.



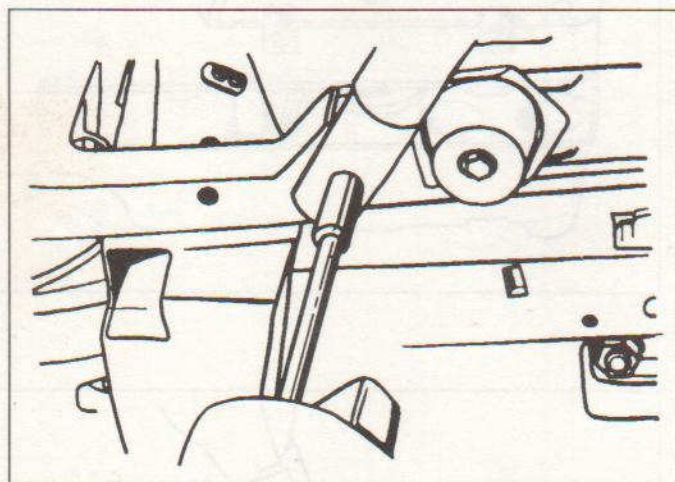


## A. HANDLES



1. The handles are mounted to the engine in three locations.

## B. REAR HANDLE AND ISOLATOR

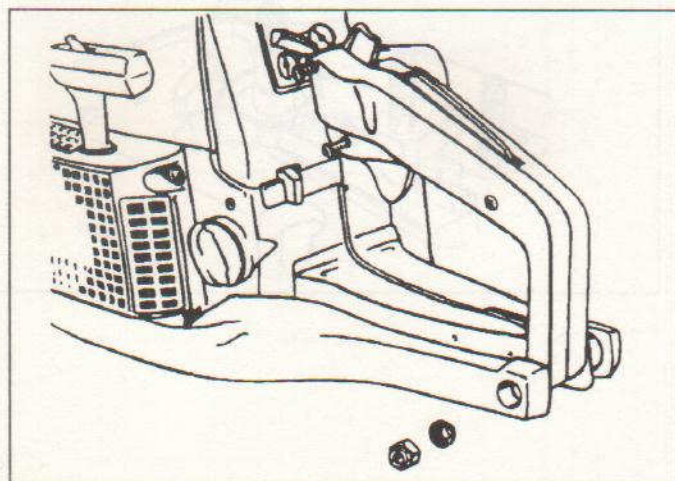


1. Remove the screw mounting the rear

**NOTE:** This screw is located on the bar clamp side of the unit.

2. The vibration isolator located beside the handlebar screw can be replaced without any further disassembly.

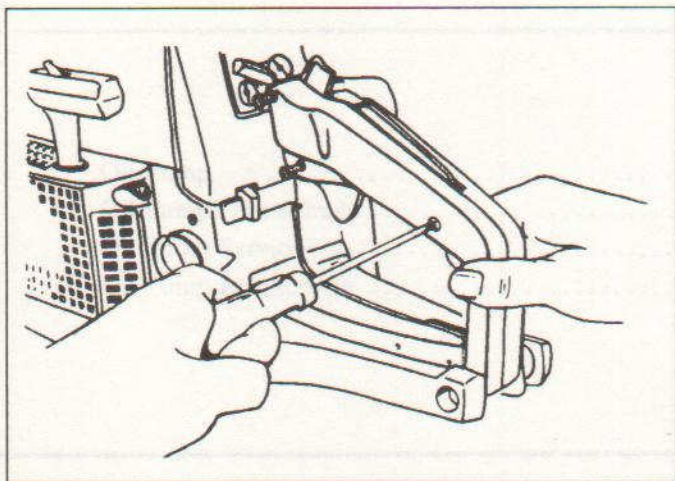
**NOTE:** When one isolator requires replacement, it is recommended that all isolators be replaced at the same time.



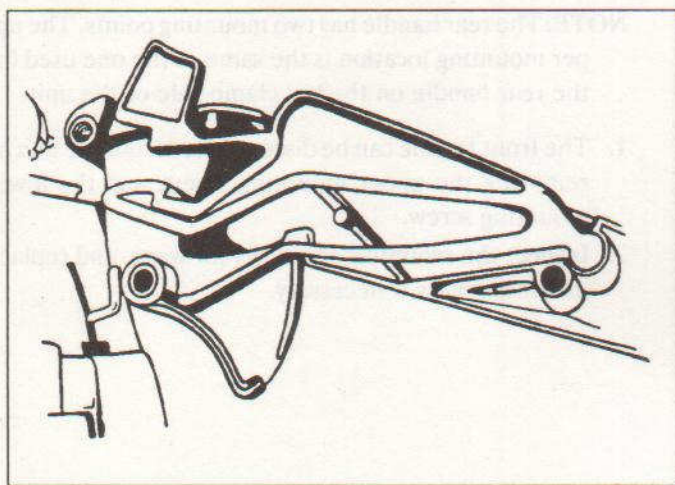
3. The rear handle is secured to the rear isolator and handle with a washer and nut.



## C. THROTTLE HANDLE AND TRIGGER



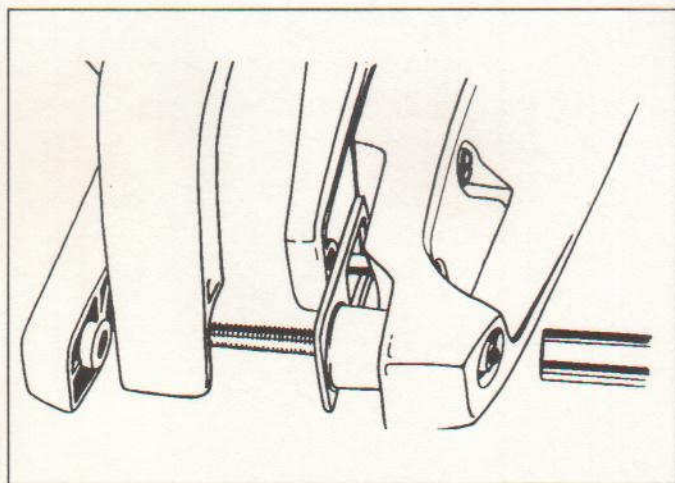
1. Remove the rear handle mounting washer and screw as show above.
2. Remove the three rear handle cover screws.
3. The cover can be removed without affecting the moving parts of the throttle assembly.
4. Lift the cover from the rear handle.



5. The components of the throttle section must be installed as illustrated.

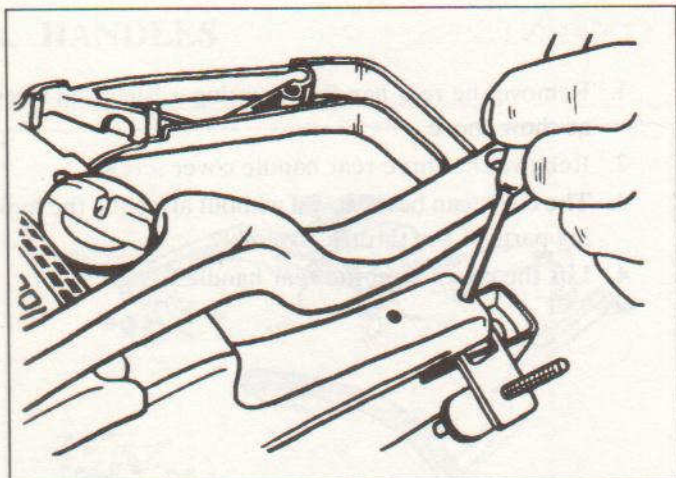
**NOTE:** The throttle wire is located in a pocket in the throttle trigger.

## D. REAR VIBRATION ISOLATOR



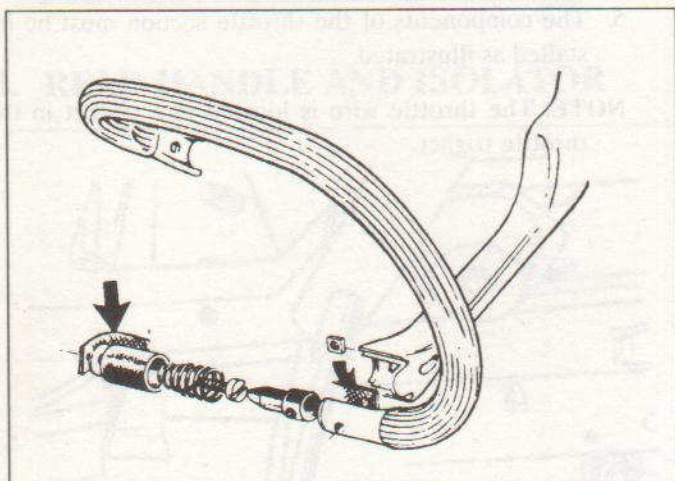
1. Remove the nut retaining the isolator located between the rear handle and the backside of the crankcase.





2. Press or punch out the roll pin holding the isolator plate to the crankcase assembly.

## E. FRONT HANDLE



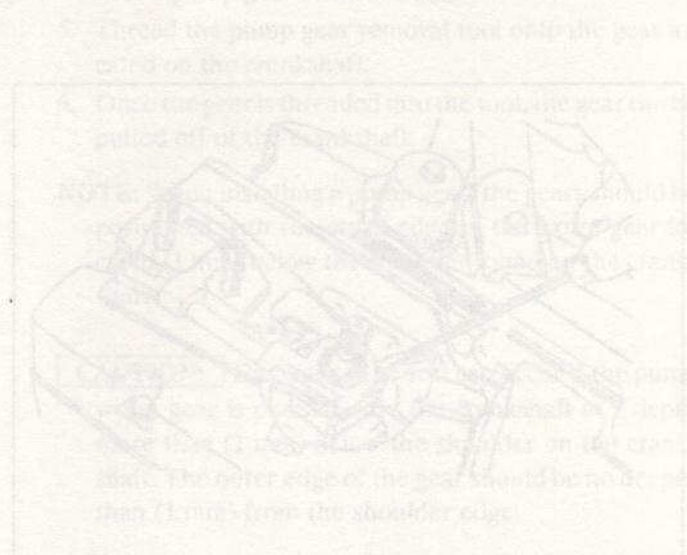
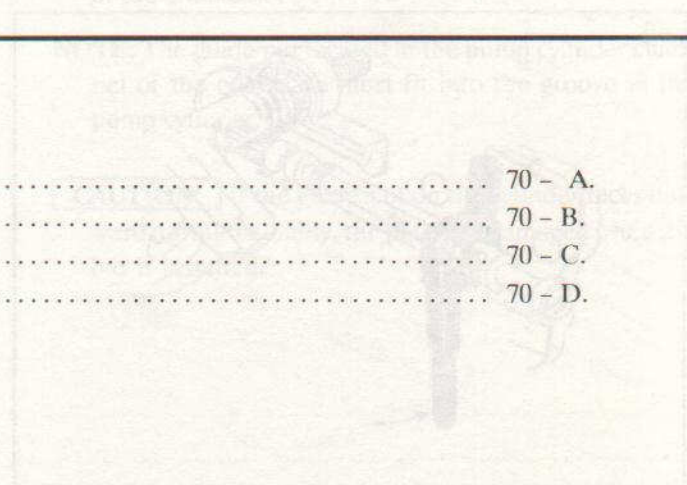
**NOTE:** The rear handle has two mounting points. The upper mounting location is the same as the one used for the rear handle on the bar clamp side of the unit.

1. The front handle can be disconnected from the unit by removing the upper mounting screw, and the lower mounting screw.
2. Inspect the mounting locations for wear, and replace mounting parts if necessary.

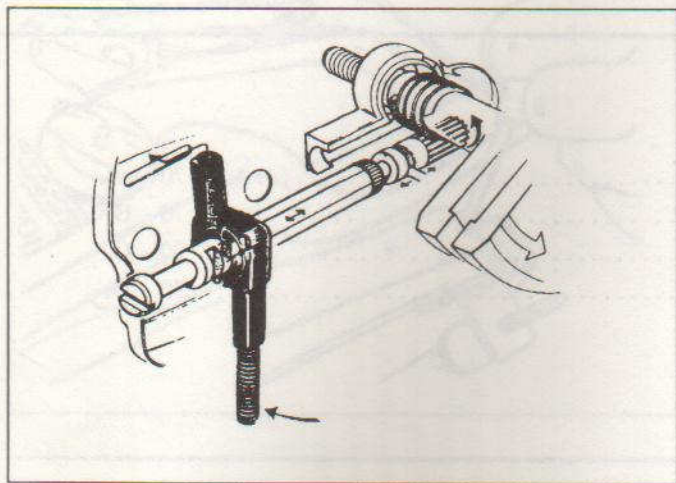


## OILER SYSTEM CONTENTS

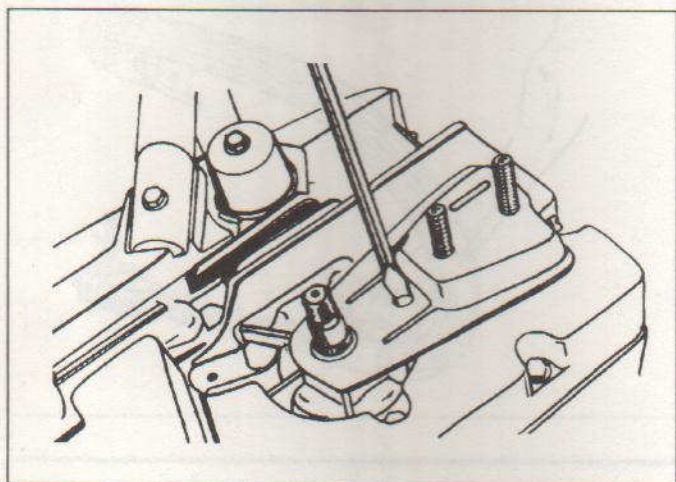
Oil Pump .....	70 - A.
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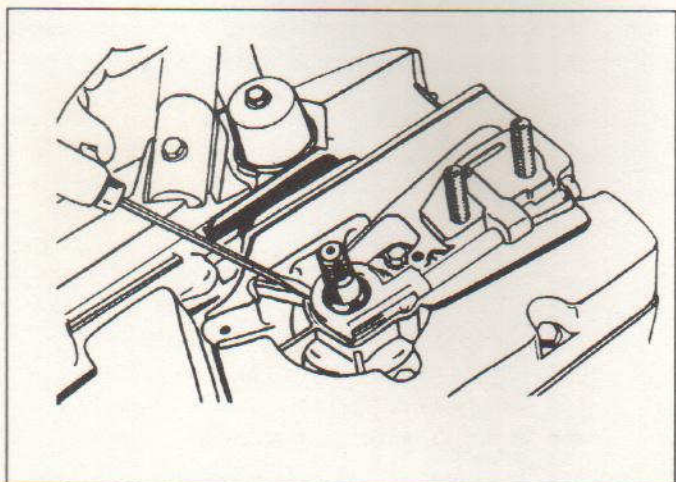


**A. OIL PUMP**

1. The oil pump is an automatic pump with an adjustable output setting.
2. The pump is driven by a worm gear located on the crankshaft.

**B. OIL PUMP DISASSEMBLY**

1. Remove the chain, bar, and clutch from the unit.
2. The inner chain guide plate acts as a cover to the oil pump area.
3. Remove the cover screw and lift the cover from the unit.

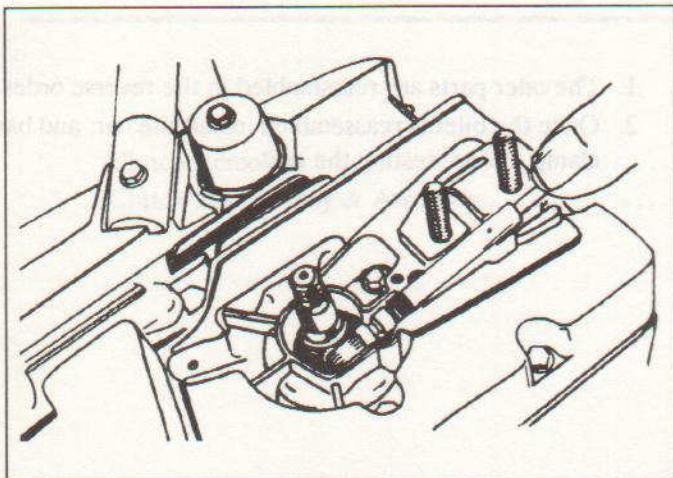


4. Lift the cover from the worm gear located on the crankshaft.

**NOTE:** The cover is pressed on by hand, and can be removed with a screwdriver.



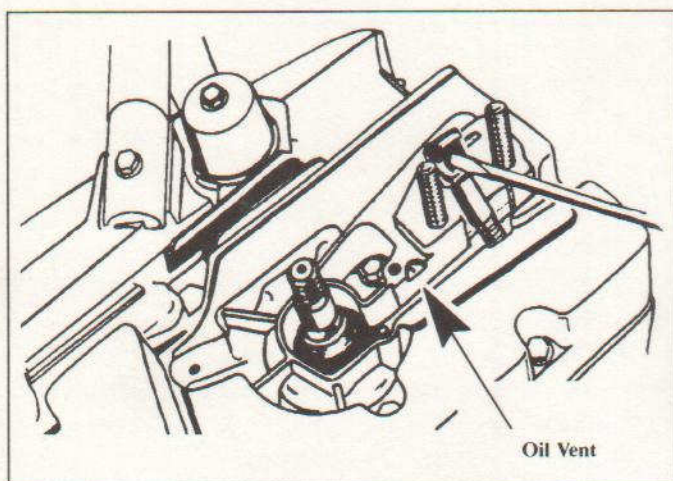
## C. OIL PUMP SERVICE



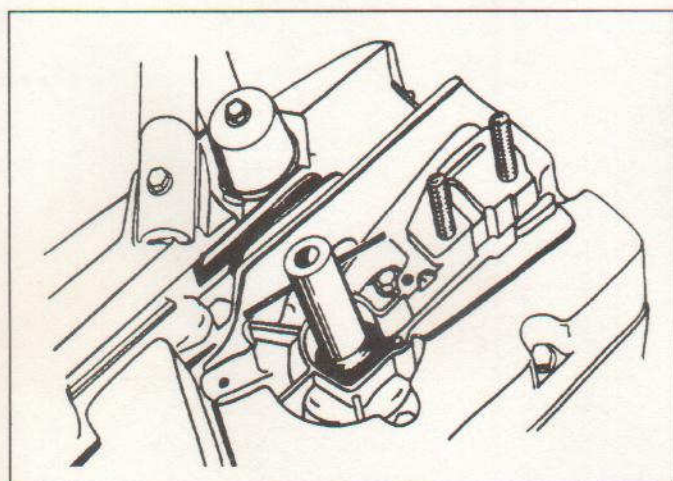
1. The oil pump components fit loosely into the channel in the crankcase.

**NOTE:** The guide pin located in the pump cylinder channel of the crankcase must fit into the groove in the pump cylinder.

**CAUTION:** If the guide slot on the cylinder faces outward during assembly, the parts are damaged when the bar is installed.



2. The oil pickup line and filter can be removed with a screwdriver.
3. Inspect the air vent to the oil tank located between the crankshaft and the bar mounting bolt. Clean if necessary.



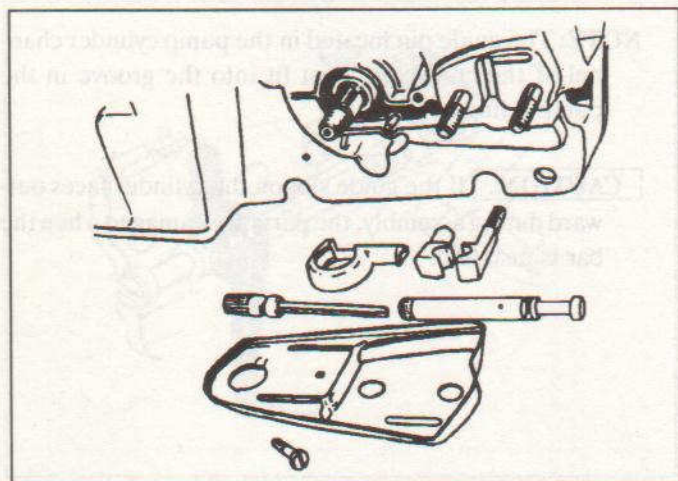
4. The pump gear can be removed from the crankshaft with a pump gear removal tool.
5. Thread the pump gear removal tool onto the gear located on the crankshaft.
6. Once the gear is threaded into the tool, the gear can be pulled off of the crankshaft.

**NOTE:** When installing a pump gear, the gears should be positioned with the outer edge of the worm gear located (1 mm) below the shoulder found on the crankshaft.

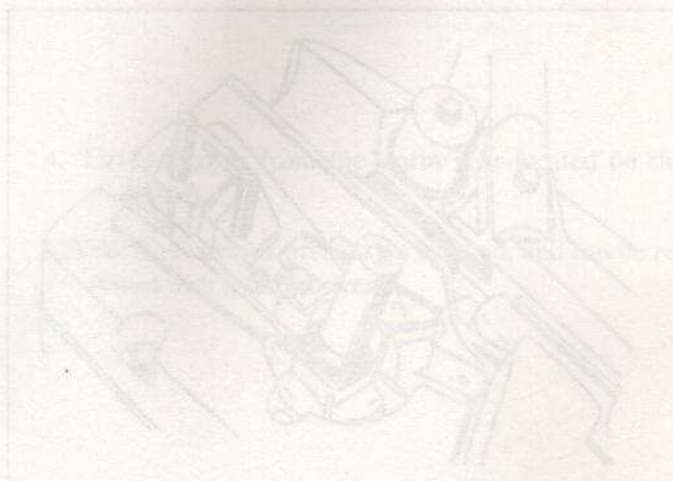
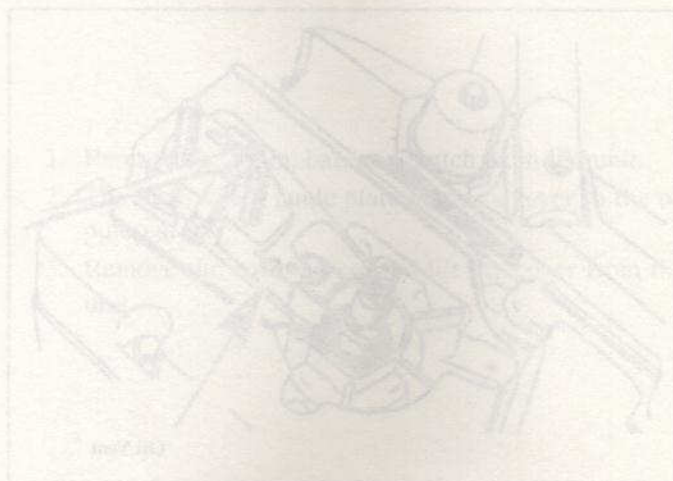
**CAUTION:** Damage to the seal can occur if the pump worm gear is pressed onto the crankshaft at a depth more than (1 mm) below the shoulder on the crankshaft. The outer edge of the gear should be no deeper than (1 mm) from the shoulder edge.



# D. OILER REASSEMBLING



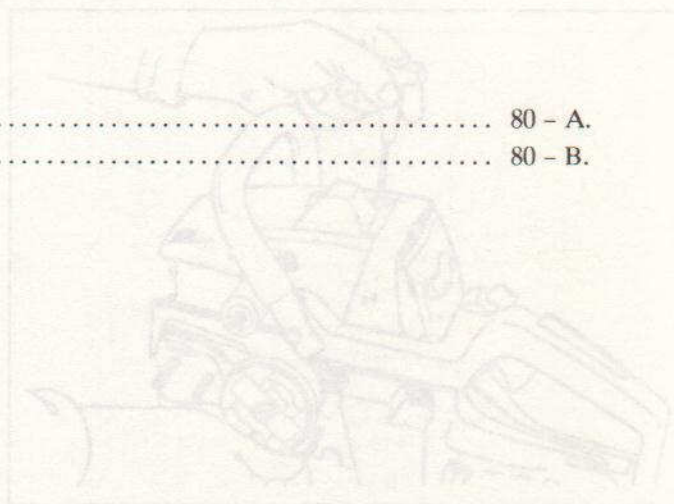
1. The oiler parts are reassembled in the reverse order.
2. Once the oiler is reassembled install the bar, and bar clamp, before testing the unit.



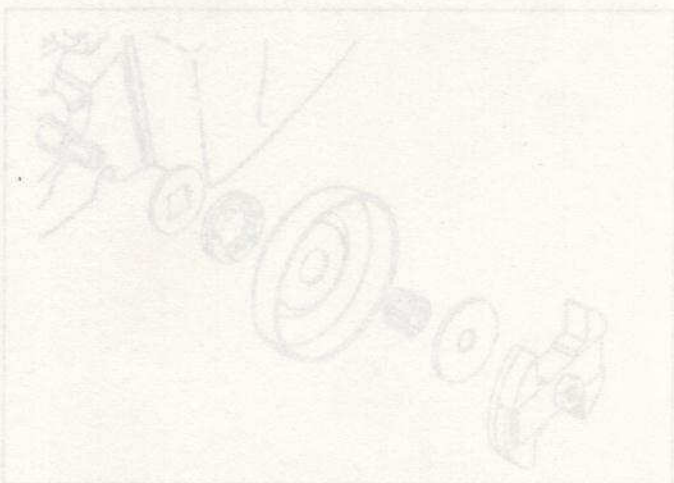
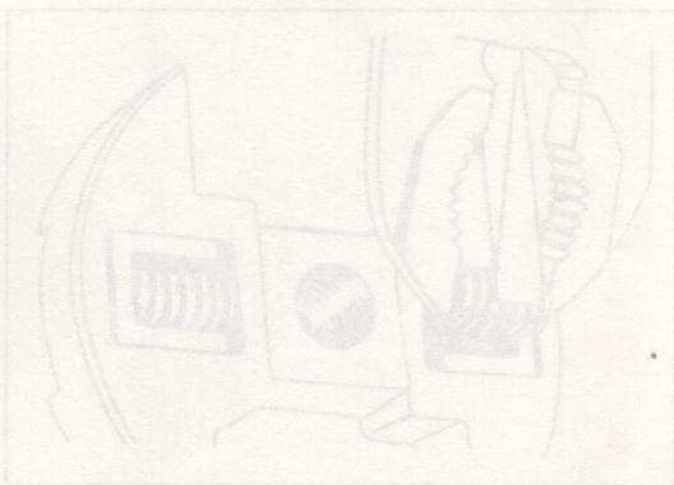


# POWER TAKE OFF CONTENTS

Clutch Removal .....	80 - A.
Clutch Disassembly & Assembly .....	80 - B.



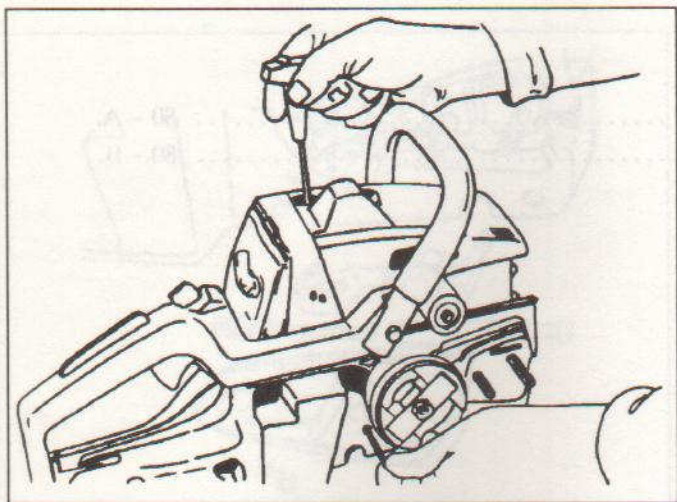
## B. CLUTCH DISASSEMBLY & ASSEMBLY





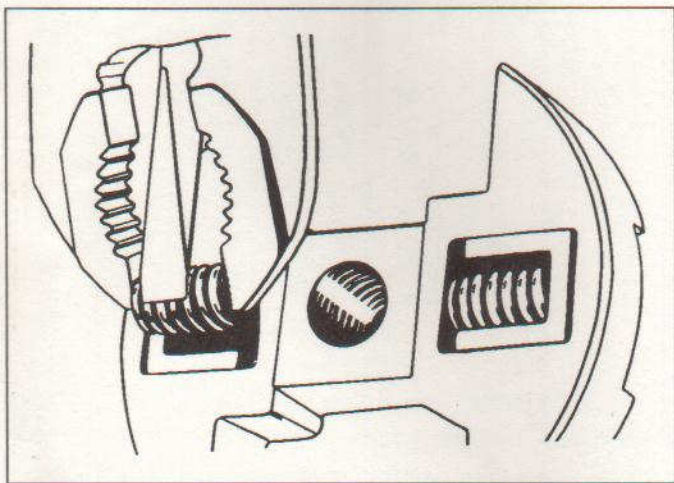
## Section 80

### A. CLUTCH REMOVAL

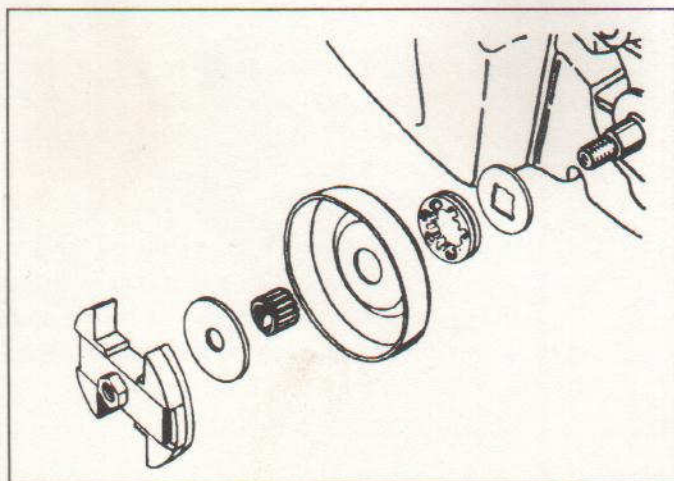


1. Lock the Crankshaft by inserting the Lock pin service tool .
2. The tool should be inserted in the hole located at the 7 o'clock position below the Clutch.
3. Rotate the flywheel slowly until the pin slides in and locks.
4. The clutch is threaded onto the crankshaft and must be unscrewed in a clockwise position.

### B. CLUTCH DISASSEMBLY & ASSEMBLY



1. No special tools are needed to disassemble the clutch shoes.
2. The clutch shoes can be pushed off the clutch hub using your thumbs.
3. Reassemble clutch using a screwdriver and pliers as shown in the illustration. Compress the spring with the pliers and press the spring from the pliers into the clutch hub using a screwdriver.



4. When replacing the clutch assembly, be sure to assemble the parts in the order as illustrated.