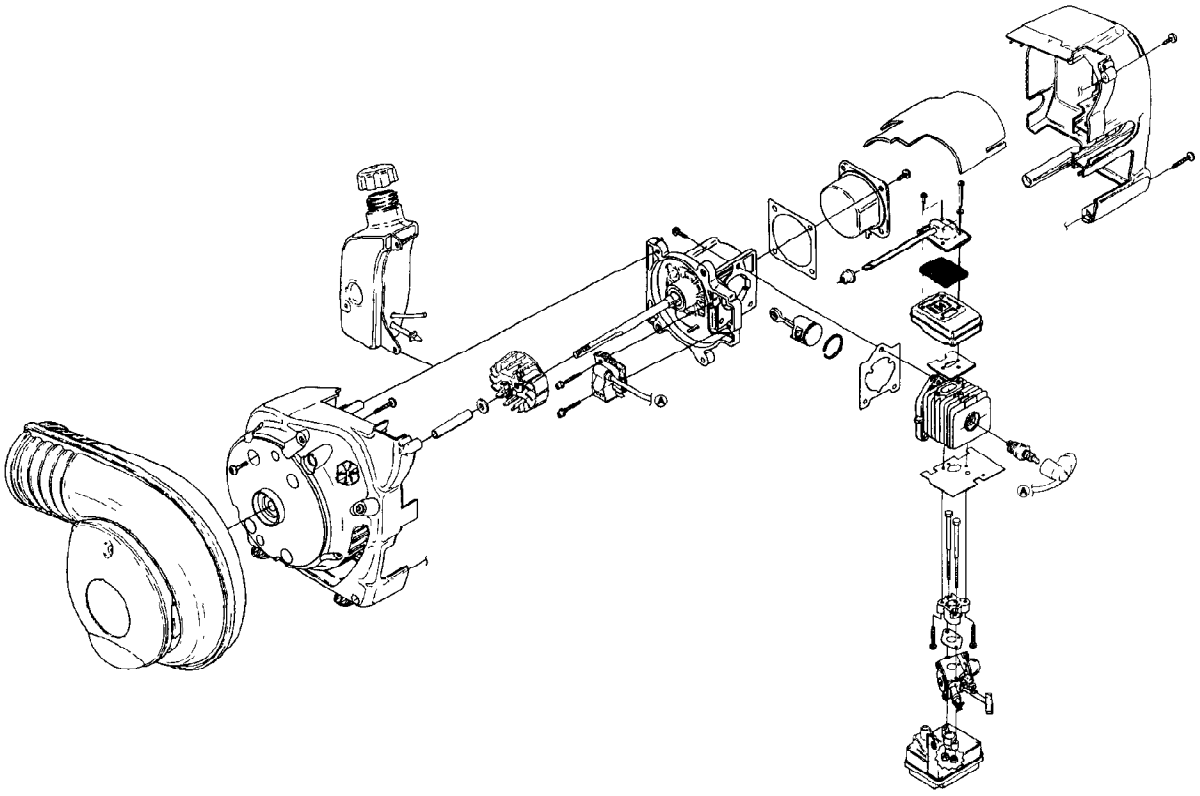
Homelite®

Dealer Service Guide

25mha, 30mha Blowers



JOHN DEERE

Consumer Products

P/N xxxxx

Contents

SAFETY

- **DO NOT ALLOW UNTRAINED INDIVIDUALS TO USE THIS UNIT.**
- Never start or run this blower inside a closed area; breathing exhaust fumes can kill.
- Never operate unit without a spark arrestor screen (located on the muffler).
- Make sure unit is properly assembled and in good operating condition. Do not operate without blower tubes in place.
- **Do not attempt to install or remove attachments, make repairs or remove obstruction from the fan housing while engine is running.**

- Do not operate vacuum without vacuum bag installed; flying debris could cause serious injury. Always close vacuum bag completely before operating.

FOLLOW THESE INSTRUCTIONS TO REDUCE THE RISK OF INJURY:

- Wear full eye and hearing protection while operating this blower.
- Wear heavy long pants, shoes, and gloves.
- Do not wear loose clothing or jewelry.
- Secure long hair above the shoulder.
- Keep all bystanders at least 50 feet (15m) away.
- Do not operate this blower when tired, ill, or under the influence of alcohol, drugs, or medication.
- Do not operate in poor lighting.
- Do not point blower in direction of people.
- Keep a firm footing and balance. Do not overreach.
- Keep all parts of your body away from hot surfaces.
- Wear a face mask in dusty conditions to reduce the risk of injury associated with the inhalation of dust.
- To avoid injury to the operator or unit, do not pick up rocks, broken glass, bottles, or other similar objects when using the vacuum attachment.
- Hold engine higher than the inlet end of the vacuum tube.
- Always point vacuum tube downhill when working on a hillside.
- **ALWAYS STOP ENGINE AND REMOVE SPARK PLUG WIRE BEFORE MAKING ANY ADJUSTMENTS OR REPAIRS EXCEPT CARBURETOR ADJUSTMENTS.**

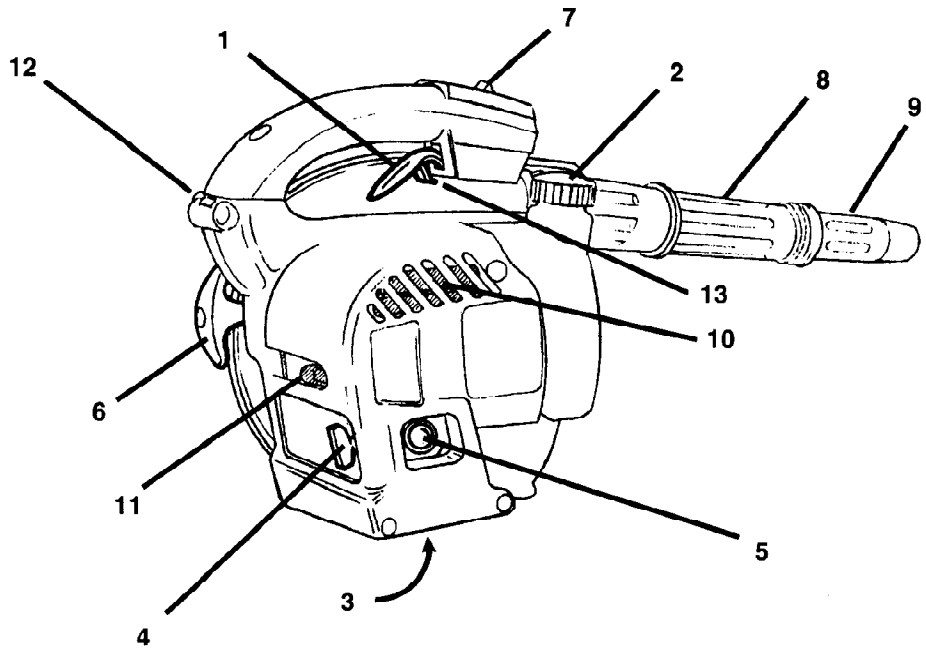
MAINTENANCE & REPAIR

- Use manufacturer's replacement parts. Failure to do so may cause poor performance and possible injury.
- Inspect unit for loose fasteners, fuel leaks, etc. Replace damaged parts.
- Before storing, allow the engine to cool.
- Empty fuel tank and restrain the unit from moving before transporting the blower in a vehicle.

REFUELING (DO NOT SMOKE!)

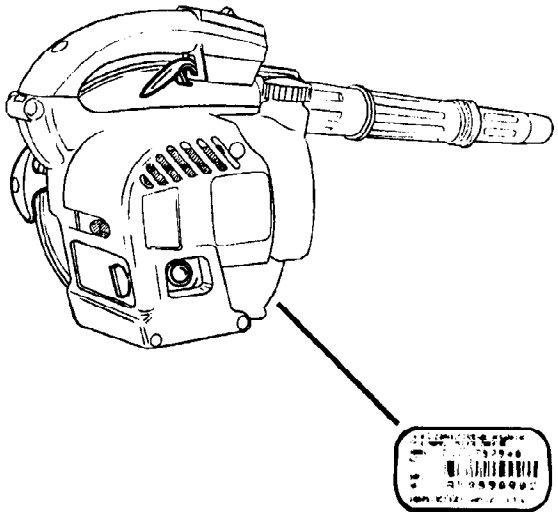
- Mix and store fuel in a container approved for gasoline.
- Mix fuel where there are no sparks or flames.
- Stop engine, and allow to cool before refueling.
- Loosen fuel cap slowly to release pressure and to keep fuel from escaping around the cap.
- Wipe spilled fuel from the unit. Move 10 feet (3m) away from the refueling site before starting the engine.

UNIT FEATURES

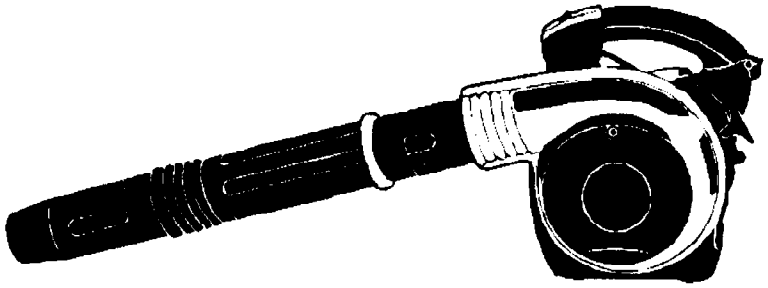


1. Throttle Trigger / Fast Idle
2. Fuel Tank And Cap
3. Air Filter
4. Choke
5. Carburetor And Primer Bulb
6. Starter Rope And Grip
7. Stop Switch
8. Blower Tube
9. Blower Nozzle
10. Muffler / Spark Arrestor
11. Spark Plug
12. Strap Hook
13. Trigger Lock

SERIAL NUMBER IDENTIFICATION



UNIT SPECIFICATONS



Engine

Type	2-cycle, Single Cylinder, Air Cooled	
Engine Displacement	25 cc (1.5 cu.in.)	30 cc (1.9 cu.in.)
Ignition	One Piece Capacitor Discharge	
Ignition Timing	27° BDTC (Non – Adjustable)	
Muffler	Dual Chamber Soft – Tone	
Sound Level	68 dBa @ 50 Feet (25 cc)	70 dBa @ 50 Feet (30 cc)

Fuel System

Carburetor	All Position Diaphragm Type With Primer Bulb
Intake Piston	Piston Port Induction
Air Filter	Foam (Dry)
Engine Shut Off	"Off" Switch On Handle
Throttle Control	Trigger Type Plus Throttle Lock
Fuel Capacity	17 Oz. (503 ml)
Fuel Mix Ratio	Exact Mix™ 50:1 (2.6 oz.to One Gallon)

General

Maximum Velocity	155 mph (249 km / h) – 25 cc	170 mph (274 km / h) – 30 cc
Maximum Volume	360 cfm (612 m^3 / h) – 25 cc	370 cfm, (629 m^3 / h) – 30 cc
Blower Tube Length	26.25" (67 cm) Two Piece Screw Lock	
Vac Capable	Yes (Optional)	
Reduction With Vac	Up To 12:1	
Gutter Kit Capable	Yes (Optional)	
Run Time	50 Minutes	
Weight	10.9 lbs. (4.9 Kg) Blower Only	
Warranty	2 Year Limited	
Assembly	Fully Assembled Except Tubes	

TORQUE SPECIFICATIONS

NOTE:TORQUE SPECIFICATIONS ARE GIVEN IN INCH POUNDS AND NEWTON METERS (N·m)

SIZE & TYPE	QTY	APPLICATION	TORQUE LIMITS (IN. LBS)	TORQUE LIMITS (N·M)
FUEL SYSTEM				
10-24 X 2.188 T-25 TORX TRUSS HEAD	2	MUFFLER TO CYLINDER	50-60	5,6-6,8
8-32 X .375 TORX TRUSS HEAD	2	MUFFLER COVER TO MUFFLER	30-40	3,4-4.5
10-32 X 1.00 T-25 TORX TRUSS HEAD	2	HEAT DAM TO CYLINDER	50-60	5,6-6,8*
10-24 LOCK NUT	2	A/F BOX TO HEAT DAM	30-40	3,4-4,5
#10-14 X .875 T-25 TORX PLASTITE	3	FUEL TANK TO HOUSING	30-40	3,4-4,5
#8-16 X .625 PHILLIPS HEAD PLASTITE	4	AIR FILTER COVER TO A/F BODY	30-40	3,4-4,5
IGNITION SYSTEM				
8-32 X 1.00 TAPTITE T-25 TORX & SLOT	2	MODULE TO C/CASE	30-40	3,4-4,5*
MISCELLANEOUS				
SHROUD				
#10-14 X .875 T-25 TORX TRUSS HEAD PLASTITE	5	SHROUD TO STARTER HSG	30-40	3.4-4.5
VOLUTE, STARTER, HANDLE				
10-24 X .750 MACHINE, TORX TRUSS HEAD	1	DOOR TO VOLUTE	15-20	1.7-2.6
#10-14 X .500 T-25 TORX TRUSS HEAD PLASTITE	2	STARTER PULLEY TO STARTER HSG	30-40	3.4-4.5

**** Use thread locking compound***

TORQUE SPECIFICATIONS

NOTE:TORQUE SPECIFICATIONS ARE GIVEN IN INCH POUNDS AND NEWTON METERS (N·m)

SIZE & TYPE	QTY	APPLICATION	TORQUE LIMITS (IN. LBS)	TORQUE LIMITS (N·M)
MISCELLANEOUS				
#10-14 x .875 T-25 Torx Plastite	5	VOLUTE TO STARTER HSG	55-65	6.2-7.3
3/8-24 HEX NUT	1	FAN TO SHAFT	130-150	14.7-16.9
#10-14 x .500 T-25 Torx Plastite	1	DOOR HINGE TO VOLUTE	30-40	3.4-4.5
10-24 x .750 T-25 TORX TRUSS HEAD	4	C/CASE TO STARTER HSG	55-60	6.2-6.8
#8-16 x .500 T-25 TORX PLASTITE	2	HANDLE COVER TO HANDLE	10-25	1.1-2.8
#10-14 x .875 T-25 TORX PLASTITE	1	HANDLE TO STARTER HSG	30-45	3.4-5.1
ENGINE				
14MM TAPERED SEAT SPARK PLUG	1	TO CYLINDER	120-180	13,6-20,0
12-24 X .750 T-27 TORX TRUSS HEAD	3	C/CASE TO CYLINDER	65-75	7,3-8,5*
10-24 X .500 T-25 TORX TRUSS HEAD	4	C/CASE COVER TO C/CASE	30-40	3,4-4,5*

**** Use thread locking compound***

FUELING SPECIFICATIONS

FUEL AND OIL REQUIREMENTS

This engine is certified to operate on unleaded gasoline intended for automotive use.

This is a 2-cycle engine product and requires premixing gasoline and 2-cycle oil. For normal use, we recommend mixing fuel in a 1 or 2 gallon container approved for gasoline.

Mix HOMELITE® **Premium Exact Mix™** Oil with gasoline according to the instructions on the package. If **Premium Exact Mix™** oil is not available, use a high quality 2-cycle engine oil, mixed at 4 oz. per gallon (US).

DO NOT USE AUTOMOTIVE OIL OR 2-CYCLE OUTBOARD OIL.

NOTE: Premium Exact Mix™ fuel mix will stay fresh up to 30 days.

DO NOT mix quantities larger than usable in a 30 day period.

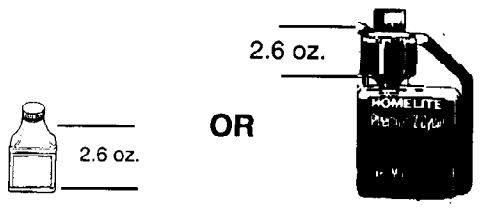
1. Loosen fuel cap slowly. Rest the cap on a clean surface.
2. Carefully pour fuel into the tank. Avoid spillage.
3. Immediately replace fuel cap and hand tighten. Wipe up any fuel spillage.
4. It is normal for smoke to be emitted from a new engine after first use.

   NOTE: Always shut off engine before fueling. Never add fuel to a machine with a running or hot engine. Move at least 10 feet (3m) from refueling site before starting engine. **DO NOT SMOKE!**

FUEL MIXTURE CHART

PREMIUM EXACT MIX™ (50:1)

Gasoline	Oil
1 gallon	2.6 (fl. oz.)
1 Liter	20 (ml)



⚠ WARNING

Experience indicates that alcohol blended fuels (called gasohol or using ethanol or methanol) can attract moisture which leads to separation and formation of acids during storage. Acidic gas can damage the fuel system of an engine while in storage.

ENGINE STORAGE

It is important to prevent gum deposits from forming in essential fuel system parts such as the carburetor, fuel filter, fuel hose or tank during storage.To avoid engine problems, the fuel system should be emptied before storage of 30 days or longer. Follow these instructions:

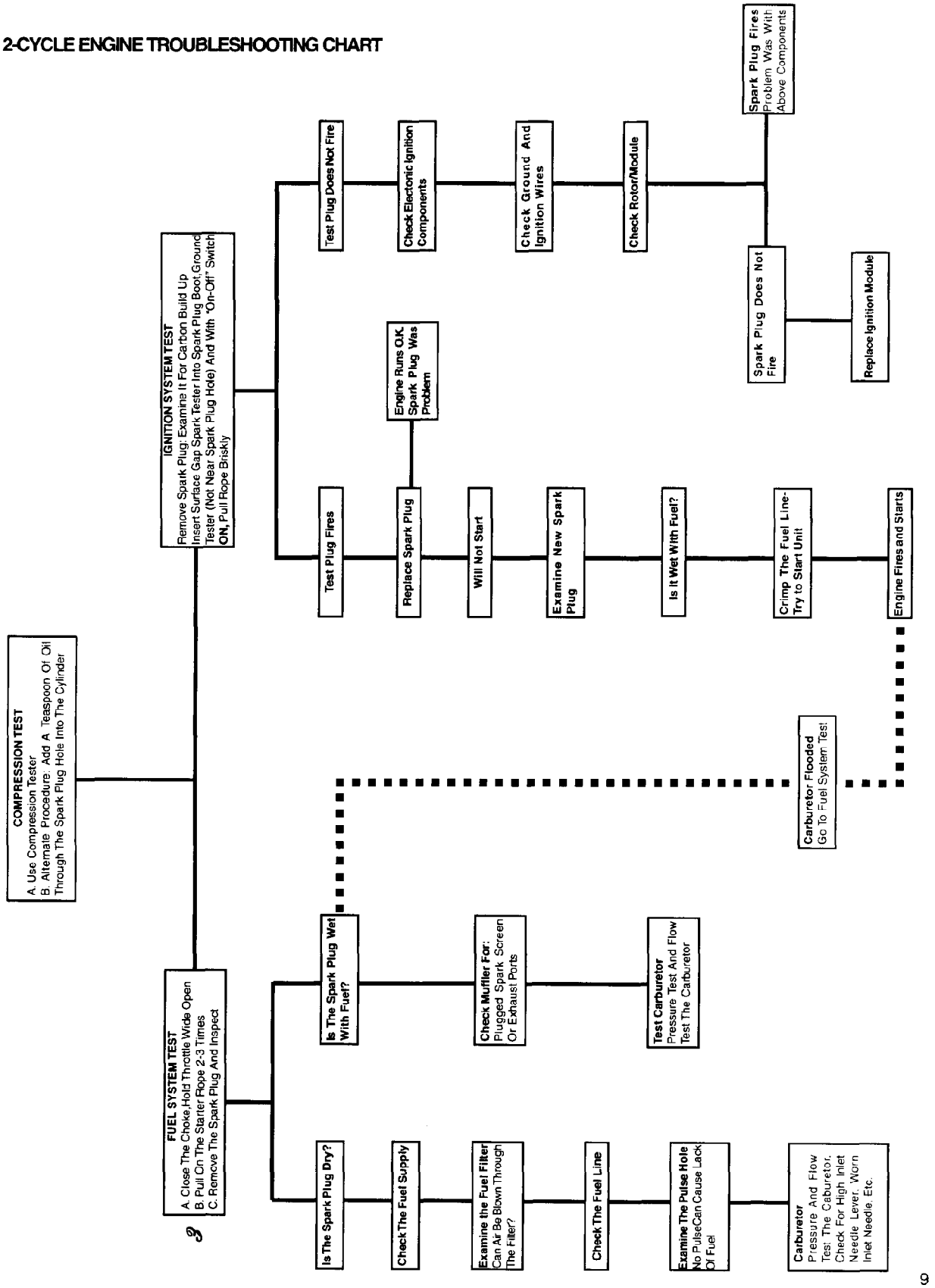
- To remove gasoline, run the engine until the tank is empty and the engine stops.
- If you do not want to remove gasoline, a fuel stabilizer (such as Sta-Bil fuel stabilizer p/n JA54715-6) may be added to any gasoline left in the tank to minimize gum deposits and acids. If the tank is almost empty, mix stabilizer with fresh gasoline/oil mixture in a separate container and add some to the tank.

Always follow instructions on stabilizer container. Run engine at least 10 minutes after stabilizer is added to allow mixture to reach carburetor. Store trimmer in a safe place. See warning above.

FUEL STORAGE

Keep fuel in a clean container approved for fuel storage. Keep all dirt, water or other foreign material out of the container.

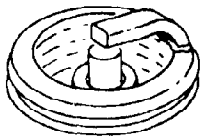
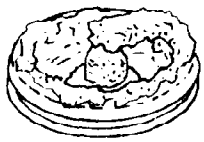
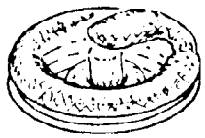
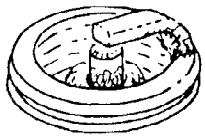
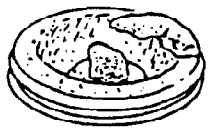
2-CYCLE ENGINE TROUBLESHOOTING CHART



TROUBLESHOOTING

SPARK PLUG TROUBLESHOOTING CHART

Remove spark plug and examine it for the following:

NORMAL	DESCRIPTION	ANALYSIS
	Few combustion deposits on plug. Electrodes not burned or eroded. Insulator tip color, brown to light tan.	Ignition & Carburetion in good condition. Plug is in good condition. Clean & Replace or install new spark plug of same heat range.
OXIDE FOULING 	Electrodes not worn (may be covered with deposits). Insulator nose choked or splattered with ash-like deposits. Deposits are thrown against and adhere to the side electrode. Flying deposits may also wedge be tween the electrodes, shorting out the plug.	Excessive combustion chamber deposits. Clogged exhaust or muffler. Wrong fuel mix or use of non-recommended oils.
GAP BRIDGING 	Sparking gap shorted out by combustion particles fused between electrodes. Originating from combustion chamber or piston crown.	Excessive carbon in cylinder. Use of non-recommended oils and/or fuels. Improper fuel-oil ratio.Clogged exhaust ports.
WET FOULING 	Insulation tip black. Damp oily film over firing end. Carbon layer over entire nose. Electrode not worn.	Idle speed too low. Idle ad justment too rich. Weak ignition output. Air filter badly clogged. Wrong fuel mix (too much oil, wrong type oil). Excessive idling. Plug too cold for type of work. Hi-speed not adjusted properly (too rich).
OVERHEATED 	Electrode burned. Insulator tip color, light grey or chalk white.	Carbon clogged exhaust ports or muffler. Dirty or sawdust clogged cylinder fins. Lean carb. setting, dull chain teeth causing engine overload. Air leak in fuel line, ruptured fuel pump diaphragm. Wrong spark plug heat range (too hot).
WORN OUT 	Corrosive gases produced by combustion attack the electrodes. High voltage spark wears down electrodes. Increases distance the spark must jump.	This condition requires more voltage to fire the plug, often more voltage than the ignition system can produce. Replace with new plug of the same heat range.

TROUBLESHOOTING

SPARK PLUG TROUBLESHOOTING CHART

SHELL INSPECTION	DESCRIPTION	ANALYSIS
	1. Wet with fuel.	Flooded, incorrect carburetor setting (too rich), no spark.
	2. Cracked or broken porcelain.	Insulation breakdown, will cause shorted or grounded condition.
	3. Air gap.	Air gap too wide–intermittant or no spark. Reset gap to .025" (0.6 mm)

Testing Ignition Output

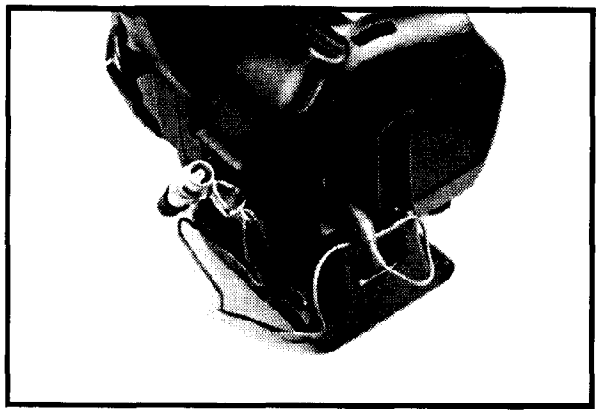


Figure 1

Attach a surface gap spark tester to the end of the spark plug. Attach the spark plug wire to the test plug. Pull the starter rope rapidly. Sparking at the test plug shows that the spark plug is firing under compression.

If there is no spark, remove the spark plug, ground the test plug (may require a ground wire) and pull on the starter grip. if sparking occurs, the spark plug is not firing under compression and must be replaced with a new plug. If there is no sparking, troubleshooting the other ignition components will find the fault.

Ignition Switch Test

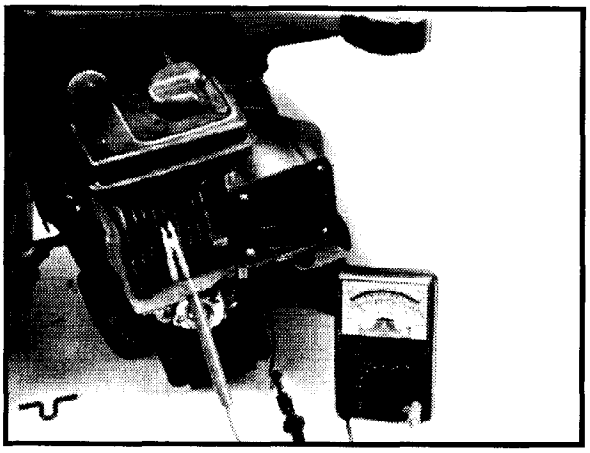


Figure 2A

Remove the shroud. Remove the ground lead from crankcase cover and use the Volt-Ohm-Miliamp (VOM) meter (set on R x 1 or continuity). Connect one lead to the ground wire & connect the other lead to the cylinder (or ground). There should be no continuity.

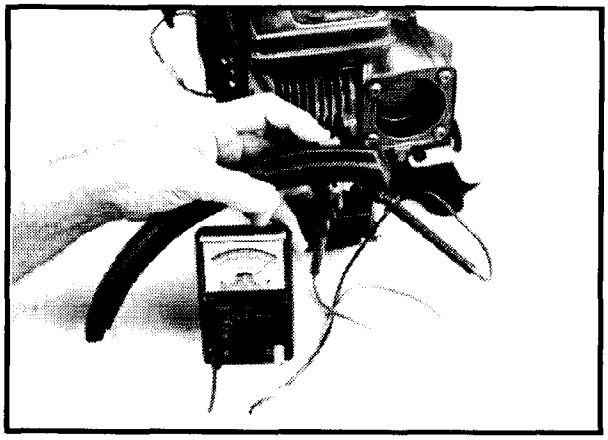


Figure 2B

If there is, remove the two handle cover screws 8-16 x 5/8". Turn the cover over and remove one switch lead from the switch. Use a VOM meter to test the switch. there should be no continuity between the two switch terminals (switch not depressed). If there is continuity replace the switch. If the switch is good (has no continuity) depress the switch and it should have continuity. If the switch is good replace the wire harness.

If there is no continuity, depress the switch. There should be continuity. If not, remove the two 8-16 x 5/8" cover screws, turn the cover over and remove one lead and attach VOM leads to each of the two switch terminals.

Compression Testing

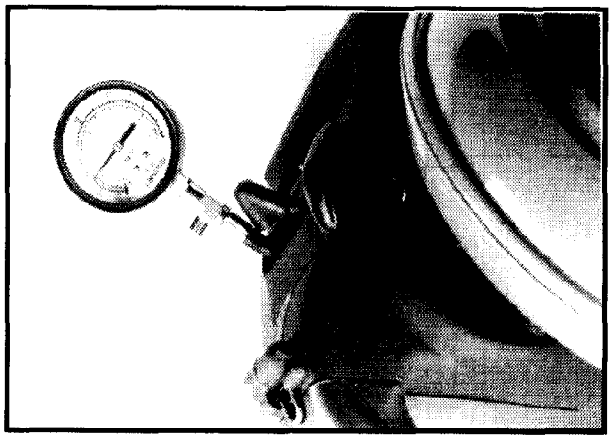


Figure 3

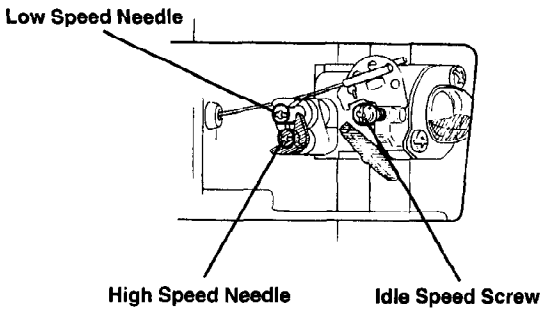
Remove the spark plug. Place the choke lever in the "off " position. With the trigger fully depressed, pull the starter grip several times to purge any fuel left in the crankcase/cylinder. Screw a compression gauge in the cylinder. Pull the starter grip rapidly until the gage needle stops moving upwards. Compression should be:

Cold - 100 psig (6.9 bars)
Hot - 90 psig (6.2 bars)

Adjusting the Carburetor

Fuel system problems can sometimes be remedied by simple carburetor adjustments. Changes in atmospheric pressure, humidity, temperature and altitude can affect the carburetion and performance of gasoline powered engines.

This engine complies with EPA (Environmental Protection Agency) and CARB (California Air Resource Board) regulations which require exhaust emission control. As a result, the carburetor adjustment needle(s) are equipped with plastic cap(s) that prevents counterclockwise rotation from the original factory adjustment.



Adjustments

Use a small straight blade screwdriver to turn the high and low speed needles counterclockwise against the stops on the limiter caps (if the caps have been moved from the factory settings).

Turn the idle speed screw out until it no longer touches the carburetor throttle linkage. Turn the adjustment screw in until it just touches the throttle linkage, then turn it an additional 3 - 4 turns. Turning the idle screw in will raise the idle speed, turning the needle out will lower idle speed.

Start and run the engine, let it warm up for at least five minutes before making any adjustments. The speeds for these blowers are as follows:

Idle Speed:	3800 RPM (Maximum)
Full Load Speed: (With both tubes installed)	7000 RPM

With the unit at idle, use a tachometer to check the idle speed. Adjust the idle speed so it does not exceed the maximum as indicated above.

With the trigger fully depressed, adjust the high speed needle clockwise (if required) to obtain the full load speed as noted above.

If the speeds are too high and the needles cannot be adjusted richer (turned out), the carburetor will have to be replaced or other systems checked.

Static Test – Fuel Pump

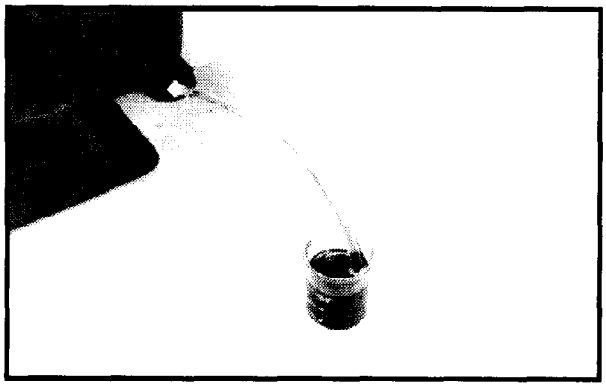


Figure 4

Separate the inlet fuel lines at the inlet fitting. Connect a length of clear plastic tubing to the inlet fitting (and fuel line attached to the carburetor). Add colored liquid (colored water, coffee, soda, etc.) to an open container. Place the end of the clear plastic tubing into the colored liquid.

Close the choke on the carburetor. With the throttle wide open, pull the starter grip briskly. Look for the colored liquid to begin to travel up the clear tubing toward the carburetor.

When the colored liquid is drawn (at least half way) up the clear tubing, stop pulling the starter grip. We now know the crankcase is delivering the needed pulse/vacuum to the carburetor and that the fuel pump side of the carburetor is working.

If the colored liquid is not drawn up the clear tubing, a problem may exist in the carburetor fuel pump, fuel inlet screen, inlet needle and seat, or pulse passageways. Inspect and/or pressure test the carburetor and/or carburetor components to find the fault.

Static Tests – Carburetor

Although access can be gained to the carburetor, fuel inlet elbow and fuel overflow lines without removing the shroud and other components, we are showing these components removed in order to provide better viewing.

Remove the Shroud

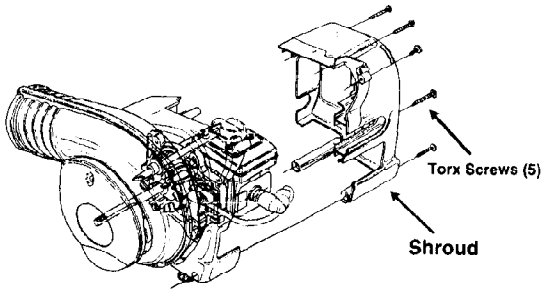


Figure 5

Remove the shroud and five #10-14 x 7/8" Torx head screws with a T-25 Torx bit or screwdriver.

Remove the Carburetor

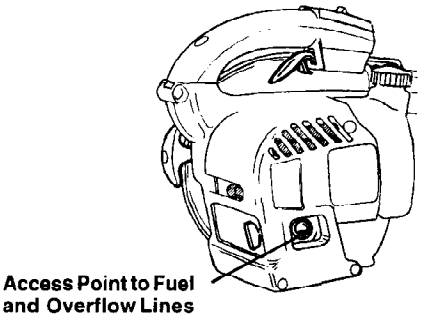


Figure 6

Use a small flat blade screwdriver to push the fuel and overflow lines off the carburetor fittings.

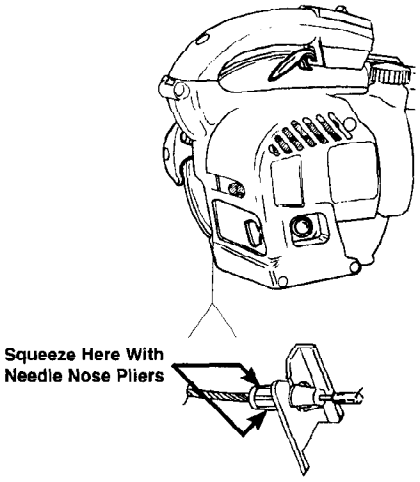


Figure 7

Use a pair of needle nose pliers to unhook the "Z" fitting from the carburetor. Then squeeze the cable housing with needle nose pliers to free it from the air cleaner body.

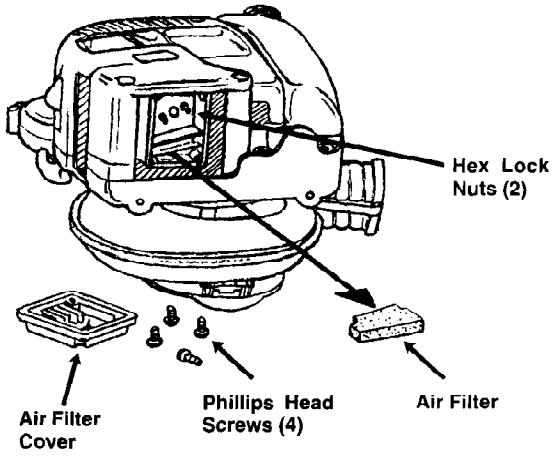


Figure 8

Remove the air filter cover by using a #1 phillips head screwdriver to remove the four #8-16 x 1/2" screws.

Pull the air filter element out of the air filter body. Use a 3/8" socket to remove two 10-24 locknuts.

Slide the carburetor and carburetor gasket off the two carburetor mounting studs.

Pressure Testing the Carburetor

Pressure testing the carburetor prior to disassembly will test gasket integrity, fuel inlet screen, inlet needle valve, welch plugs, and high and low speed circuits.

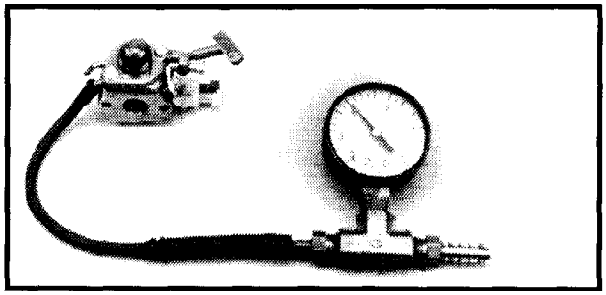


Figure 9

Install a pressure tester on the carburetor fuel inlet fitting. Pressurize the carburetor to 5-6 PSIG (0,34-0-41 bars). The fuel pump side of the carburetor should hold pressure. If not, replace the carburetor.

Testing For A Stuck Inlet Needle

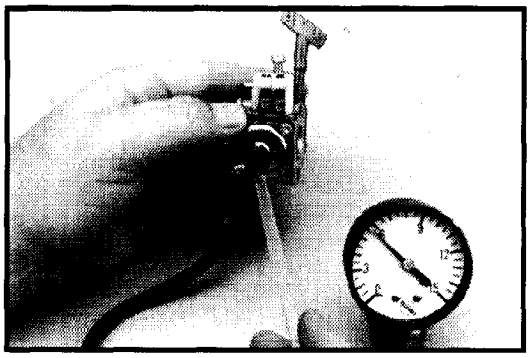


Figure 10

With the carburetor still pressurized, place a piece of rubber tubing or a drinking straw over the atmospheric vent hole on the metering diaphragm cover. Blow into the straw or tubing to depress the metering diaphragm. The pressure gauge should show an immediate loss of pressure (gauge needle drops to zero).The immediate loss of pressure indicates a properly working inlet needle, lever and lever spring.

If there is no pressure loss the inlet needle is stuck or the inlet lever is badly misadjusted, causing fuel starvation to the engine. Carburetor replacement is recommended.

SERVICE NOTE

If you want to test the carburetor on the unit, depressing the primer bulb will actuate the metering diaphragm.

Testing Pop–Off And Reseat Of The Inlet Needle

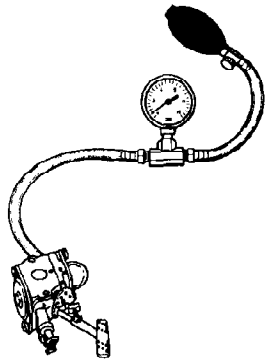


Figure 11

The pop–off pressure, or the pressure required to unseat the inlet needle is not critical, as pop–off pressure may vary as much as 10 psig (0.7 bars) between two of the same model carburetor. What is important is that the inlet needle will unseat and the reseat (hold pressure) at a minimum of 8–10 psig (0.6–0.7 bars). To test the ability of the carburetor inlet needle to seat do the following:

1. Turn the limiter caps wide open (counterclockwise) against the stops.
2. Pressurize the carburetor to 15 psig (1.0 bars).
3. If the inlet needle does not pop off, use air pressure (straw, rubber tubing or depress the primer bulb) to deflect the metering diaphragm and inlet lever.
4. The gauge needle should drop in pressure as the inlet needle is opened and then released, then slowly lose pressure until the inlet needle seats at between 8 -10 psig (0.6-0.7 bars). This tests that fuel pump pressure (5 - 7 psig/ 0.3 - 0.5 bars) will not override the inlet needle and flood the engine. Replace the carburetor if the pop - off pressure is too low.
5. If the pressure drops below 8 - 10 psig (0.6 - 0.7 bars) and reseats at a lower pressure or if it does not seat, replace the carburetor.

Disassembly And Inspection

Fuel Tank And Components

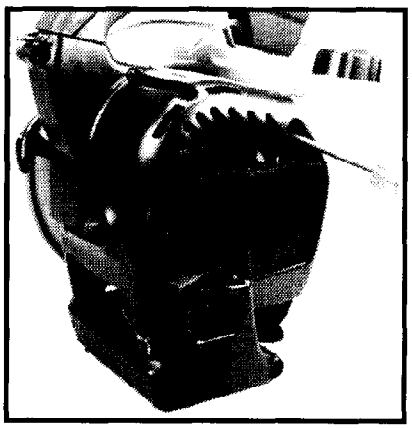


Figure 12

Use T-25 Torx bit to remove the five 10-14 x 7/8" screws securing the shroud to the starter housing. Remove the strap hanger as it is loose.

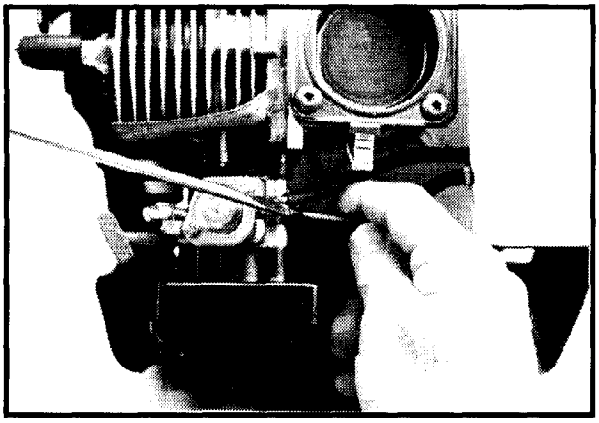


Figure 13

Push the over flow and fuel pickup lines off the carburetor with a flat blade screwdriver.

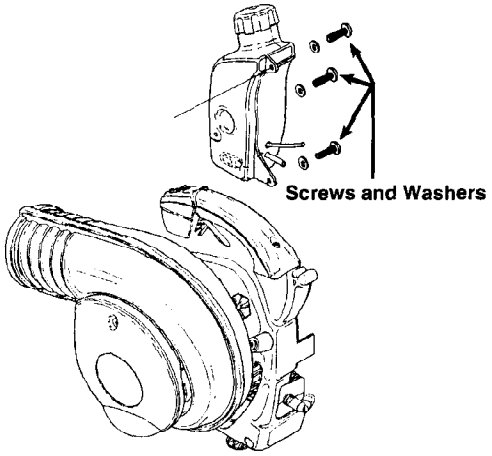


Figure 14

Use T-25 Torx to remove the three #10-14 x 7/8") Torx plastite screws and flat washers from the fuel tank. Lift the fuel tank off the blower.

SERVICE NOTE

The fuel cap uses a non replaceable filter and check valve. Replace the cap if the blower is starving for fuel.

Inspect the fuel line, overflow line and fuel pick up line for signs of abrasion or pin hole leaks. Use a pressure tester and vacuum gauge if the diagnosis (lean running, will only start on choke) warrants their use.

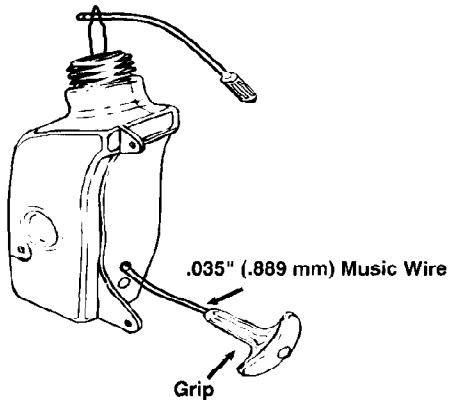


Figure 15

To replace the fuel pickup line or overflow line, pull out and discard the old line.

Slide the loop of the fuel line installation tool (made with #15 gauge, /.035" music wire and a grip) through the tank and out the fuel filler hole.

Insert the new line into the installation tool loop (as shown above). Squeeze the loop against the line to hold the line in place.

Pull the line and installation tool back through the tank until contact with the tank wall is made.

Give a sharp pull on the tool – this will pull the line part way through the tank.

Remove the tool and continue pulling the line until the outside tank line length is met.

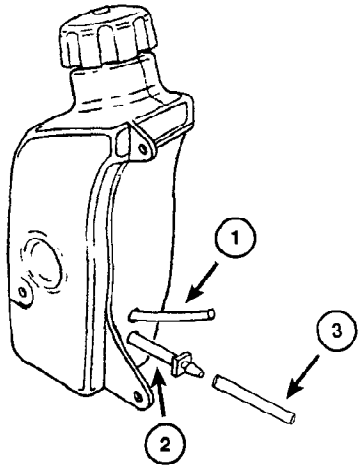


Figure 16

Line Length:	Total	Outside Tank
①	4.5"	3.5"
②	2.5"	1.0"
③	3.0"	3.0"

FUEL SYSTEM

Air Filtration and Carburetor

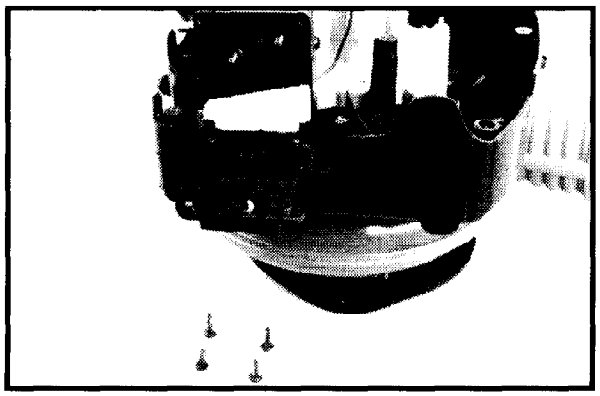


Figure 17

Remove the air filter cover by using a #1phillips head screwdriver to remove the four #8-16 x 1/2" screws.

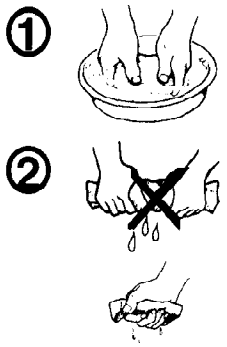


Figure 18

1) Clean the filter in a soap and water solution.

2) Do not *wring* the filter dry, but squeeze the excess water and soap out of the foam. Let the filter dry completely before installing it back on the unit.

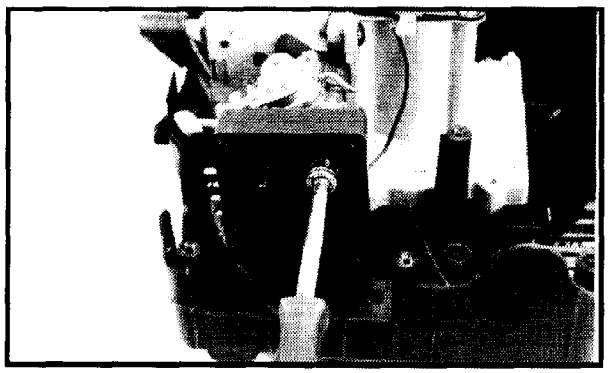


Figure 19

Use 3/8" socket to remove two 10-24 locknuts. Slide the air filter body off the studs. A pair of needle nose pliers may be used to disconnect the cable housing from the air filter body at this time.

Next, remove the cable "Z" fitting from the carburetor. (Zama cable "Z" fitting goes into second hole from the top (11 o'clock position).

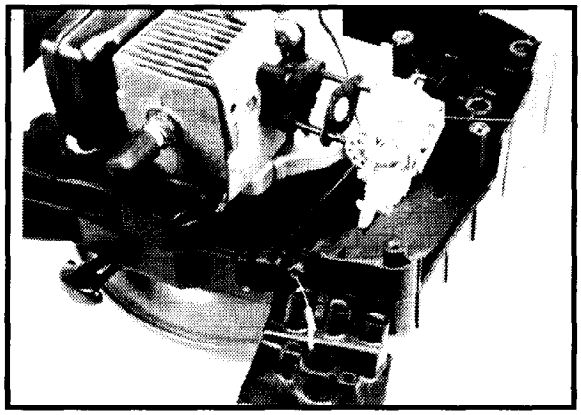


Figure 20

Pull the carburetor and carburetor gasket off the two 10-24 x 2 3/4" mounting studs.

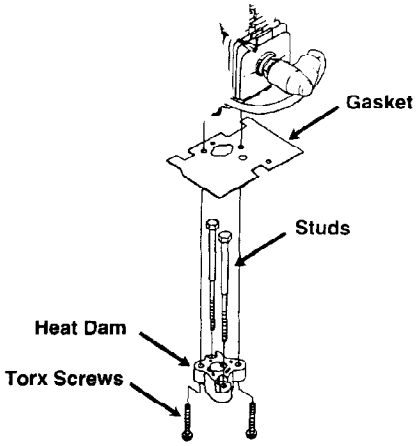


Figure 21

Use a T-25 Torx bit to remove the two 10-32 x 1" carburetor spacer screws. Lift the carburetor spacer, gasket,and studs off the cylinder.

SERVICE NOTE

Replace both carburetor spacer gasket and carburetor gasket on reassembly.

Remove the Muffler

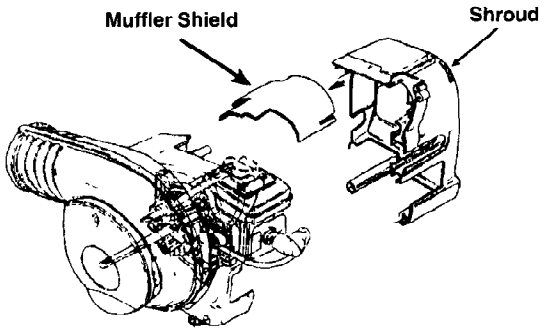


Figure 22

Remove the shroud and four Torx head screws with a T-25 Torx bit or screwdriver. Pull the heat shield off the muffler.

SERVICE NOTE

The muffler shield must be installed with the cutouts in the shield going towards the starter housing.

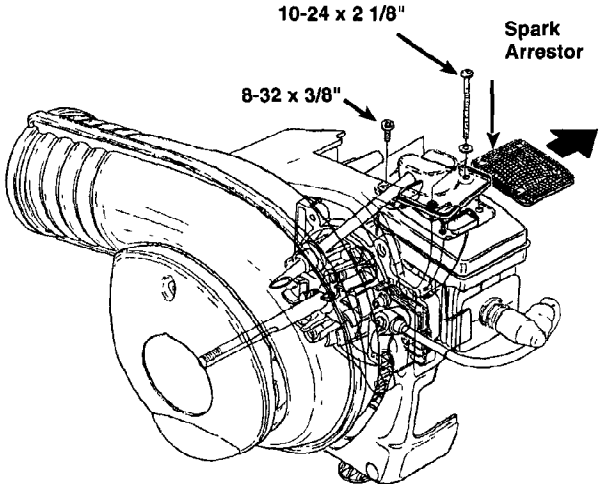


Figure 23

Use a T-25 Torx bit to remove the two 10-24 x 2 1/8 screws and #10 flat washers.retaining the muffler to the cylinder. Then, use a T-20 Torx bit to remove the two (8-32 x 3/8") screws and the muffler cap. The spark arrestor screen can be replaced or serviced at this time. The muffler consists of the following parts: Muffler cap, muffler gasket, spark arrestor, and muffler body.

SERVICE NOTE

Inspect the spark arrestor screen for carbon build up. A carbon filled screen will cause hard starting, low power, and no high speed operation. Replace the screen if it is full of carbon

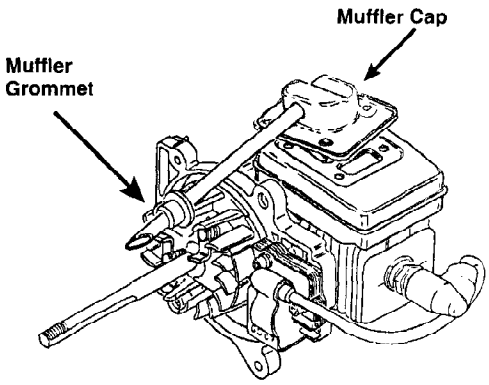


Figure 24

To remove the muffler: partially lift the muffler cap off the muffler body and slide the muffler discharge tube and muffler cap out of the muffler grommet in the volute assembly

Lift the muffler gasket off the cylinder. On assembly, the center hole in the gasket must align with the hole in the cylinder

SERVICE NOTE

The spark screen assembly must be placed on the muffler body with the gasket side of the spark screen facing down. Replace the spark screen if the gasket is damaged or old. A leaking gasket may cause heat damage to the surrounding housings or vapor lock

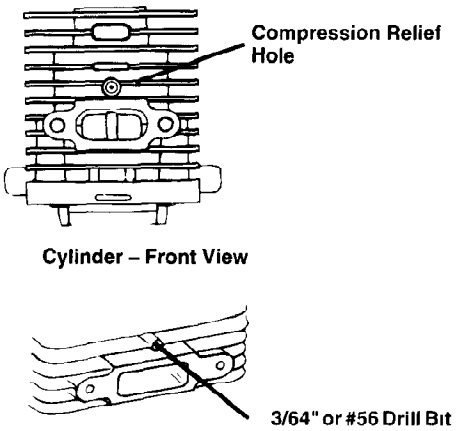
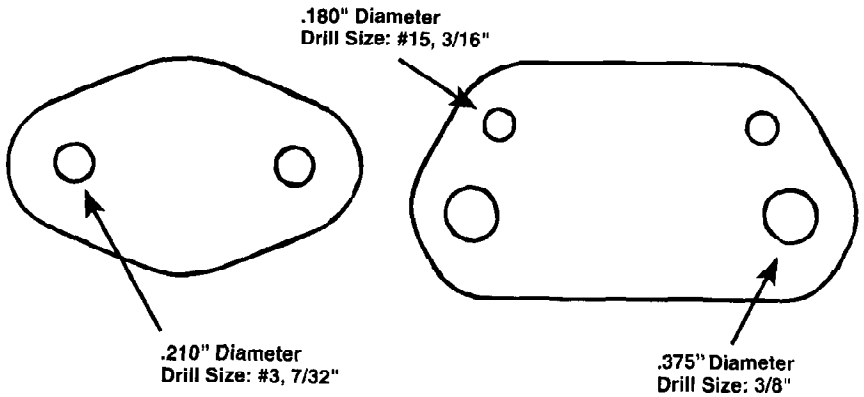


Figure 25

The compression relief hole should be cleaned periodically with a 3/64"or #56 twist drill. Move the piston to bottom dead center position. Insert the twist drill and turn **by hand** to clean. Use compressed air to blow the carbon particles out of the cylinder.

Crankcase/Cylinder Pressure and Vacuum Testing



Sealing Plate Templates

Figure 26

Pressure and vacuum testing of the crankcase/cylinder is an important procedure that is often overlooked All air going into the engine must pass through the carburetor. Air bypassing the carburetor because of leaking seals, gaskets or porous castings will cause hard starting, erratic idling, poor acceleration and deceleration. Pressure and vacuum testing the crankcase and cylinder is the best way to determine where a leak is occurring.

Pressure Testing

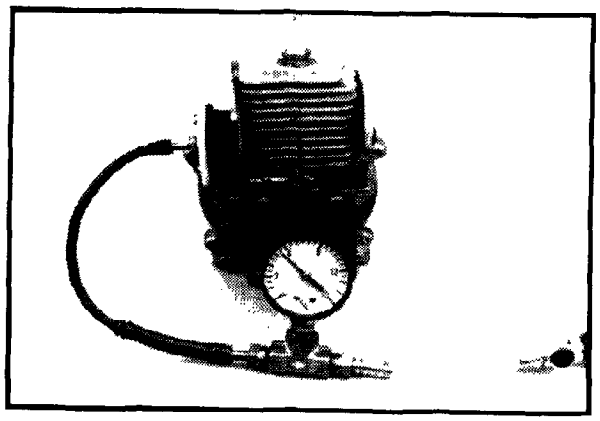


Figure 27

To pressure test the crankcase,close off both intake and exhaust ports with sealing plates and rubber gaskets as shown above. *Note*: The intake sealing plate has been drilled and tapped A barbed fitting (purchase locally) is in the intake plate. Use a pressure tester to introduce 5-6 PSIG (0,34-0.41 bars) of pressure into the crankcase and cylinder. The crankcase should hold pressure. A drop in pressure indicates an air leak. To find out where the air leak is, spray or paint a soap and water solution on suspected areas (gaskets, seals, castings, etc.).

Vacuum Testing

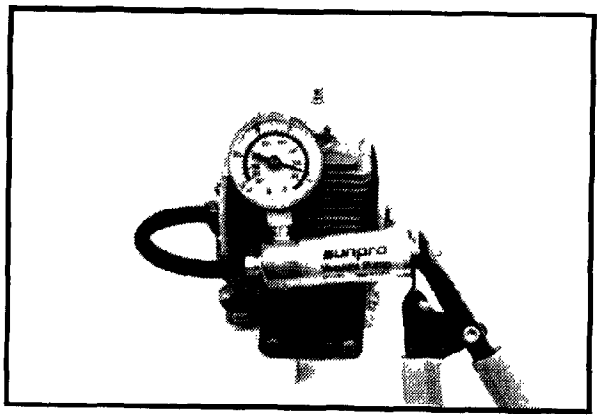


Figure 28

Vacuum testing of the crankcase and cylinder is an important part of troubleshooting as the crankshaft seals must seal tight against both vacuum and pressure

With the intake and exhaust sealing plates in place, install a vacuum tester and actuate the vacuum tester until the gauge needle reaches 5-6 inches of mercury (5"-6" Hg or 12,7 - 15,2 cm Hg) This is generally the point of maximum negative pressure reached during wide open throttle operation

when the engine is running at wide open throttle Vacuum loss should not exceed 4 inches of mercury (4" Hg or 10 cm Hg) in one minute. If a leakdown occurs, replace the crankshaft seals and retest.

Vacuum testing of the garlock type crankshaft seal is more reliable than pressure testing as these seals are designed primarily to keep air from leaking into the crankcase.

CAUTION

Do not submerge the engine in water or paint it with liquid during vacuum testing.

Testing The Stop Switch and Wiring Harness

Remove the Shroud

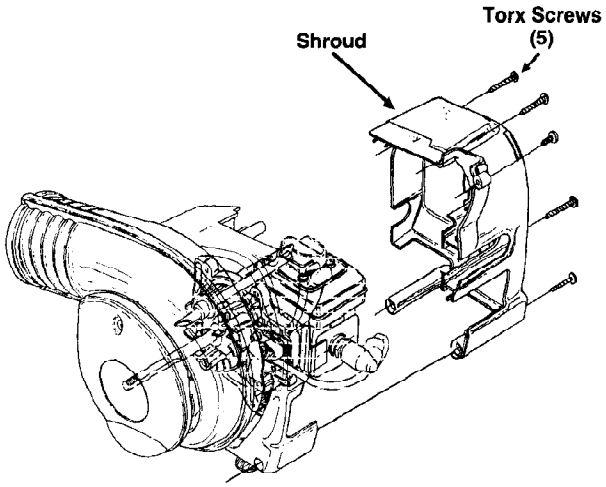


Figure 29

Remove the shroud and Five (10-14 x 7/8") torx head screws with a T-25 Torx bit or screwdriver.

Test Wiring Harness

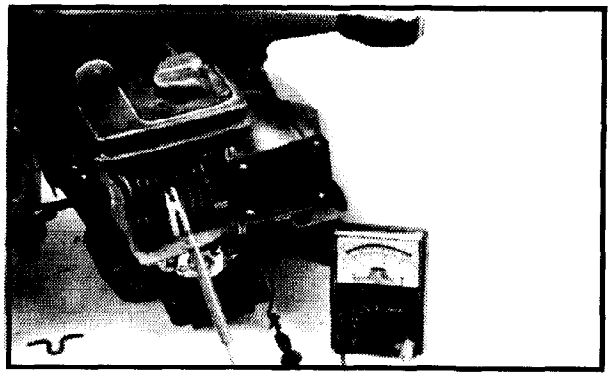


Figure 30

1) Remove the ground lead from the crankcase cover and use a Volt-Ohm-Milliamp (VOM) meter (set on R x 1 or continuity). Connect one lead to the ground wire and connect the other lead to the cylinder (or ground).
2) There should be no continuity. If there is, remove the two 8-16 x 5/8" handle cover screws. Turn the cover over and remove one switch lead from the switch. Use a VOM meter to test the switch. There should be no continuity between the two switch terminals (switch not depressed). If there is continuity replace the switch. If the switch is good (has no continuity) depress the switch and it should have continuity. If the switch is good replace the wire harness.

Test The Stop Switch

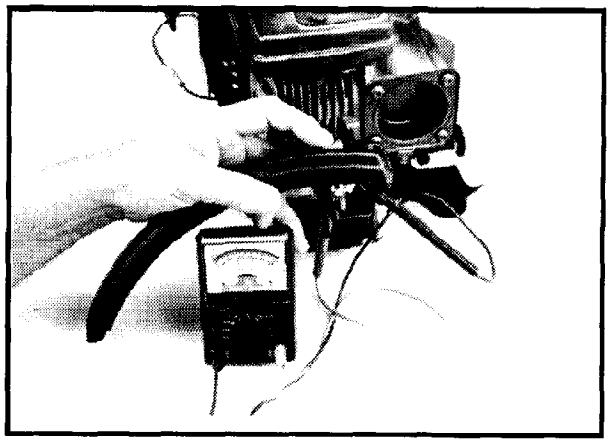


Figure 31

3) Depress the switch. There should be continuity. If not, remove the two 8-16 x 5/8" cover screws, turn the cover over and remove one lead and attach the VOM leads to each of the two switch terminals.

Depress the switch. If continuity now exists replace the wiring harness. If there is no continuity, replace the switch.

Rotor and Module Inspection

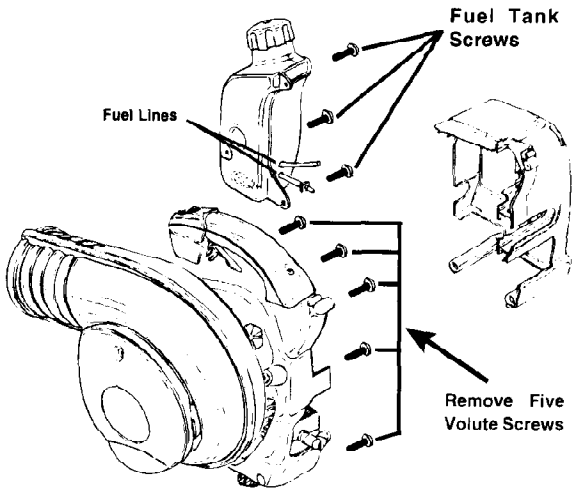


Figure 32

With the engine shroud removed, use a T-25 Torx bit to remove the five 10-14 x 7/8" screws to separate the volute assembly from the fan / starter housing.

Remove The Fan Assembly

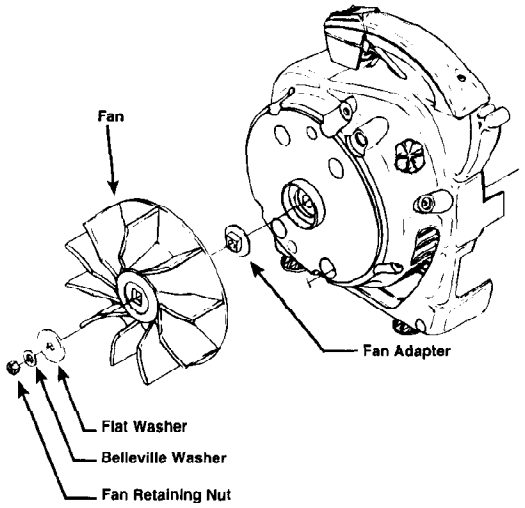


Figure 33

Insert a looped length of starter rope into the cylinder (piston at Bottom Dead Center position) to act as a piston stop. Use a 9/16" (14 mm) socket to remove the fan retaining nut, belleville washer and flat washer. The fan, and fan adapter can now be removed from the crankshaft. After these parts are removed slide the spacer off the crankshaft shaft so it will not be lost.

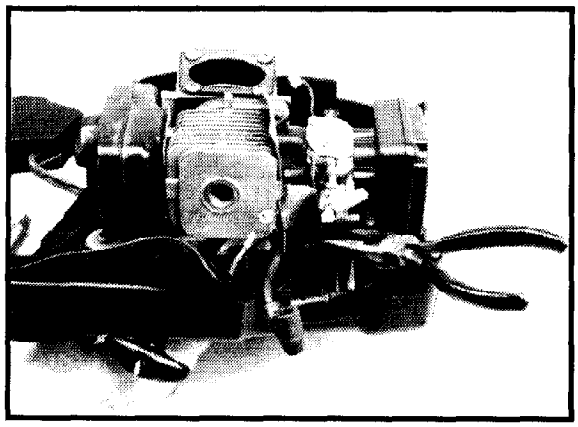


Figure 34

Disconnect the ground wire at the crankcase cover, and the ignition module male and female leads at the module. Use a pair of needle nose pliers to unhook the "Z" fitting from the carburetor. Then squeeze the cable housing with the needle nose pliers to free it from the air cleaner body.

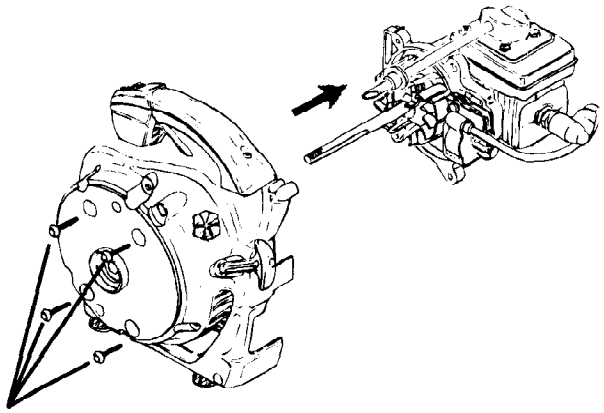


Figure 35

Use a T-25 Torx bit to remove the four 10-24 x 3/4" engine mounting screws. Once this is done pull the engine from the starter housing. Remove the flat washer from the crankshaft.

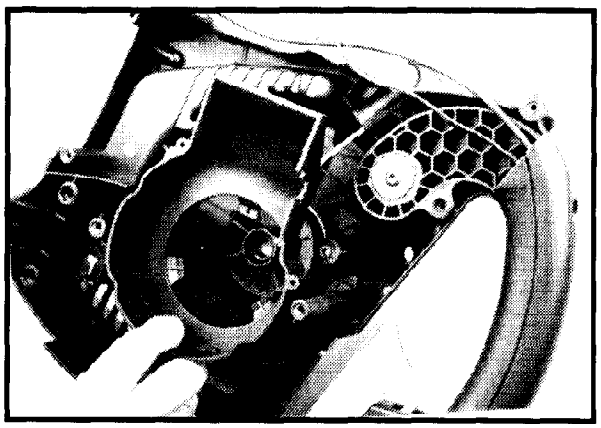


Figure 36

The scroll fits into the starter housing as a slip fit on the two posts (molded in the housing). The scroll may come out with either the starter housing or the engine assembly.

Ignition Module And Rotor Disassembly / Assembly

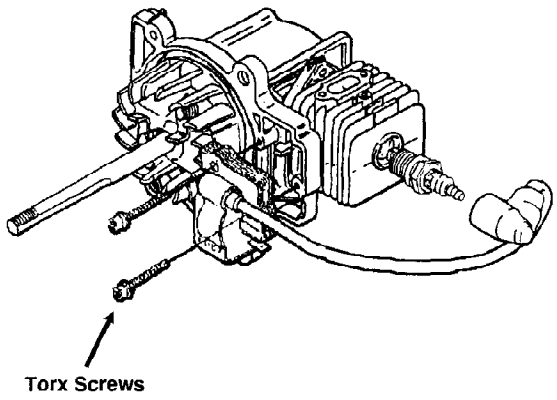


Figure 37

The module can be removed by using a T-25 Torx bit to loosen the two 8-32 x 1" mounting screws. Lift the module off the crankcase. The kill switch lead on the module may be removed at this time.

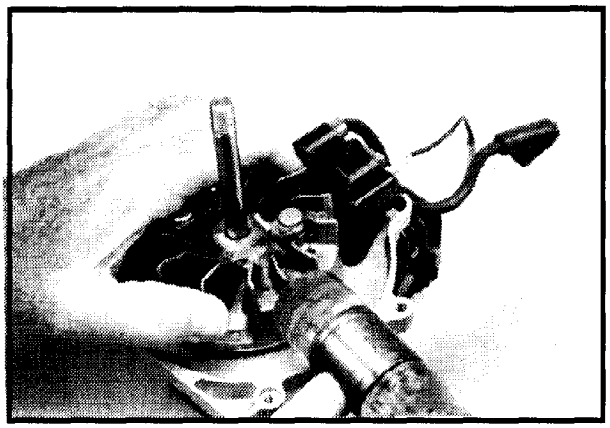


Figure 38

To install the module: Mount the module and insert the two 8-32 x 1" screws. Place a pink shim (.015" / 0.4mm) between the rotor and module. Rotate the rotor until the magnets are parallel with the module core legs. The module will draw tight against the rotor. Tighten the module mounting screws to 30 - 40 in. lbs. (3.4 - 4.5 Nm). Remove the shim.

Rotor Removal

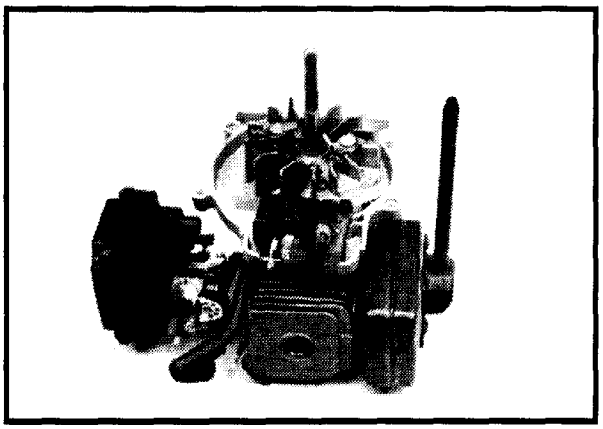


Figure 39

Remove the rotor by holding the rotor with one hand and striking the **non**-magnetized side of the rotor with a plastic, deadweight or rawhide mallet.

MISCELLANEOUS

Handle Disassembly

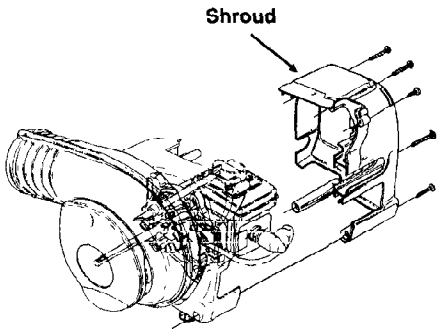


Figure 40

Remove the shroud and five #10-14 x 7/8" Torx head screws with a T-25 Torx bit or screwdriver. Pull the heat shield off the muffler.

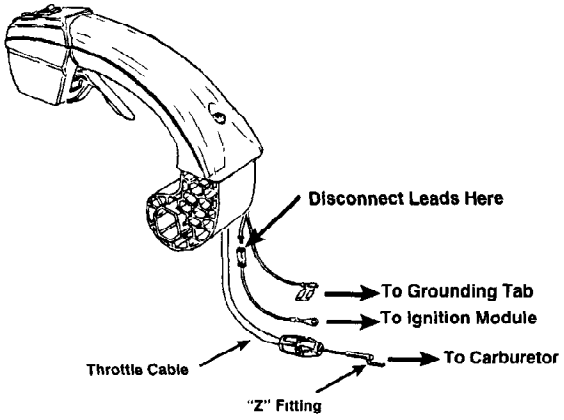


Figure 41

Disconnect the ground wire at the crankcase cover (grounding tab), and the two ignition leads at the module. The two leads can be pulled apart for ease of disassembly and assembly. Use a pair of needle nose pliers to unhook the "Z" fitting from the carburetor.

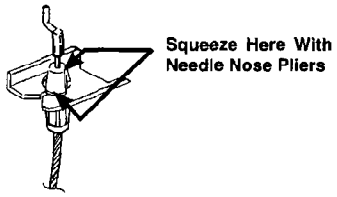


Figure 42

Then squeeze the cable housing with needle nose pliers to free it from the air cleaner body.

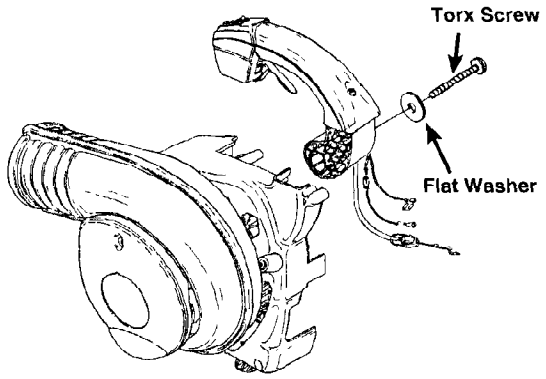


Figure 43

Use a T-25 Torx bit to remove the 10-14 x 3/4" Torx screw and flat washer retaining the handle. Remove the handle

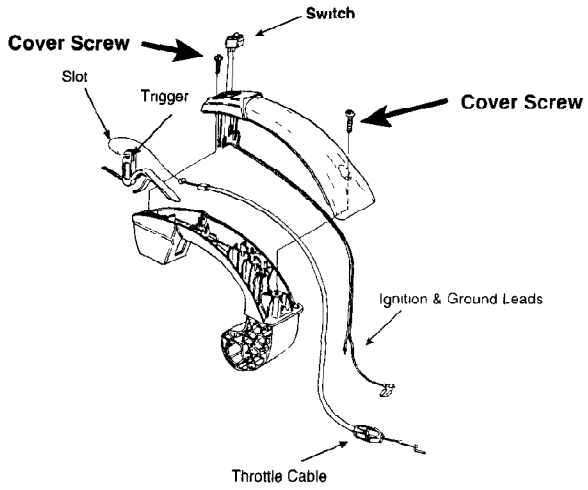


Figure 44

Use a T-25 Torx bit to remove the two 8-16 x 5/8" screws from the cover

Once the cover is removed, the electrical leads (harness) and throttle cable are exposed. These two components are nested in the honeycombed part of the handle Pull the harness and throttle cable out of the handle and pull up on the throttle cable so the trigger (and throttle cable end) will come out of the handle. Rotate the end of the throttle cable until the cable is aligned with the slot in the trigger The cable can now be disconnected from the trigger.

MISCELLANEOUS

Volute and Fan Disassembly

Remove the Shroud

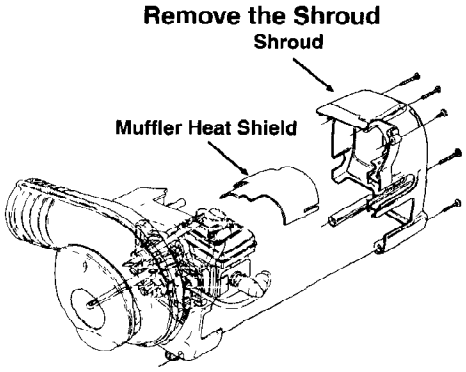


Figure 45

Remove The Fuel Tank And Volute

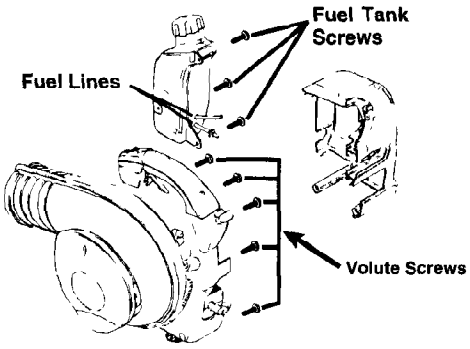


Figure 46

With the engine shroud removed, use a T-25 Torx bit to remove the five 10-14 x 7/8"screws to separate the volute assembly from the fan /starter housing.

Remove The Fan

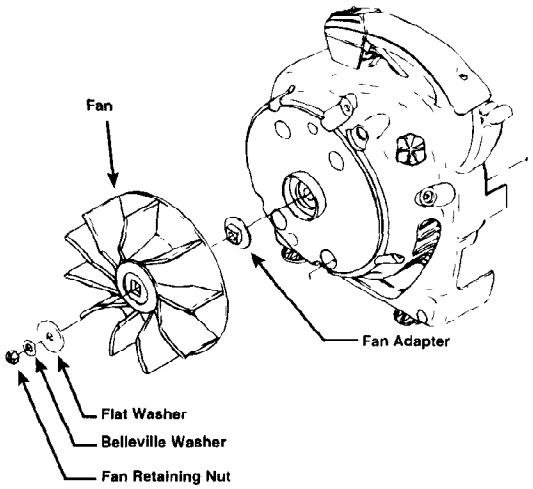


Figure 47

Insert a length of starter rope into the spark plug hole (piston at Bottom Dead Center position) to act as a piston stop Use a 9/16" (14 mm) socket to remove the fan retaining nut, flat washer and belleville washer. The fan, and fan adapter can now be removed from the crankshaft. After these parts are removed grab the spacer (not shown above) and slide it off the shaft so it will not be lost.

Starter Repair

Disconnect Wiring Harness

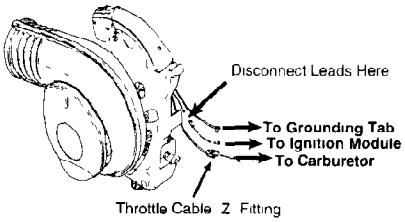


Figure 48

Remove the shroud, fuel tank, volute and fan assemblies (see above).

Disconnect the ground wire at the crankcase cover (grounding tab), and the two ignition module leads at the module The two ignition leads can be pulled apart for ease of disassembly and assembly. Use a pair of needle nose pliers to unhook the "Z" fitting from the carburetor.

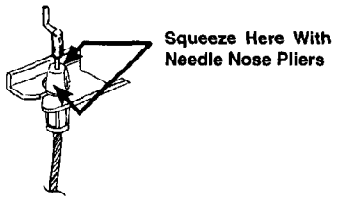


Figure 49

Then squeeze the cable housing with needle nose pliers to free it from the air cleaner body.

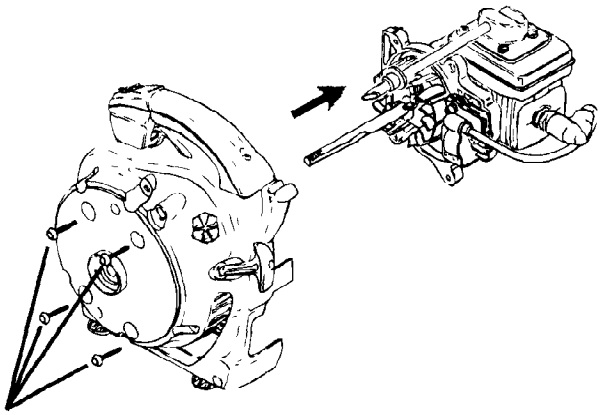


Figure 50

Use a T-25 Torx bit to remove the four 10-24 x 3/4" engine mounting screws. Once this is done pull the engine from the starter housing.

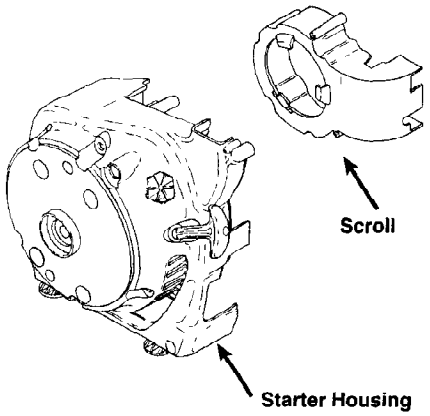


Figure 51

The scroll is a loose fit in the starter housing and may stay with the starter housing or come out with the powerhead. The scroll fits into the starter housing as a slip fit on the two posts (molded in the housing) The scroll provides proper air flow for cooling the engine

CAUTION ⚠

The rewind spring is under tension Wear eye protection at all times when servicing the starter.

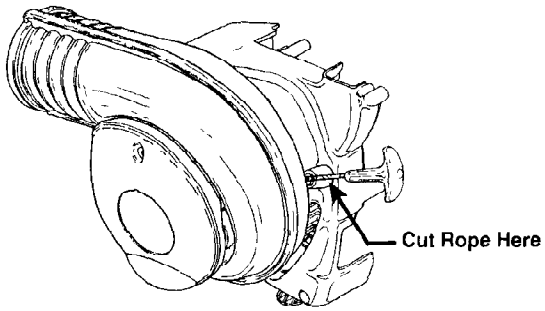


Figure 52

If the rope is to be replaced, cut the rope just below the grip This will relieve spring tension.

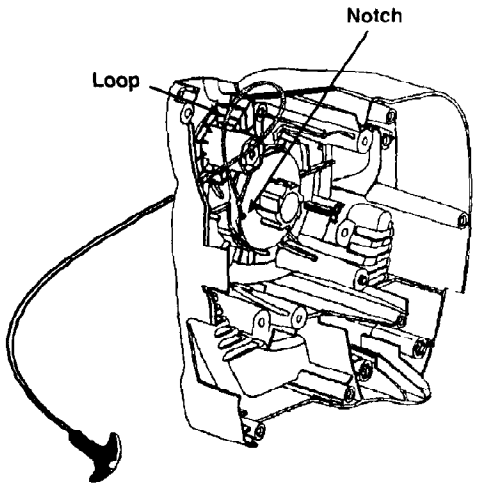


Figure 53

If the rope is not to be replaced, pull approximately 10" (25 cm) of rope out of the starter housing until the notch in the pulley flange is aligned with the rope exit hole Place your thumb on the pulley flange to keep the pulley from turning

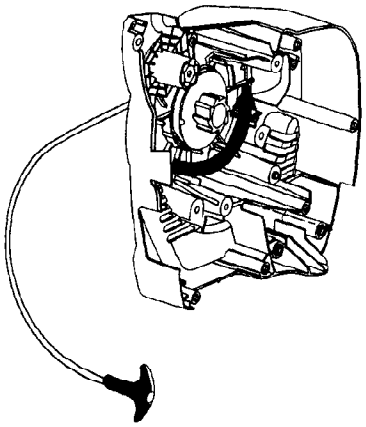


Figure 54

Apply pressure on the rope in the notch while **SLOWLY** unwinding the pulley until spring tension is relieved.

WARNING ⚠

Eye protection should be worn when removing the pulley from the starter housing. The spring coils remain under tension within the container and can fly out with great force if disturbed.

SERVICE NOTE

If the spring jumps out of the container, it can be rewound within the container in a clockwise direction (spring coils facing up)

Slowly lift the pulley off the starter post. Use needle nose pliers to grasp the inner spring hook. Carefully lift the rewind spring and container from the starter housing.

Replace the rope if frayed or too short (rope length is 42" or 107 cm). Replace the spring and container if the spring is bent or broken. If the inner spring hook will not engage the pulley, carefully reshape the spring hook by bending it with needle nose pliers until it once again engages the pulley.

Starter Assembly

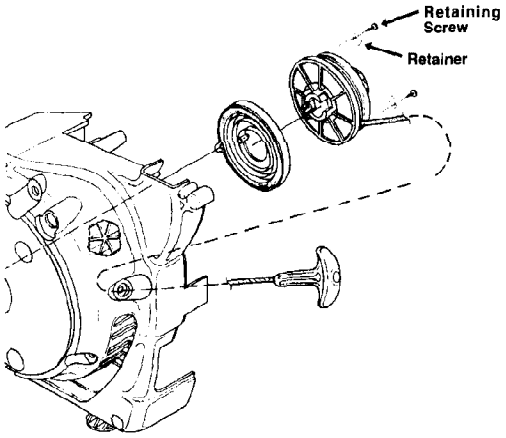


Figure 55

Remove the two #10-14 x 1/2" screws and retainers holding the pulley in place.

Gently, rotate the pulley back and forth to free it from the spring hook. If resistance is felt when lifting the pulley off the spring, carefully lift up the pulley just far enough to expose the spring hook. Then use a flat blade screwdriver to push the spring hook off the pulley.

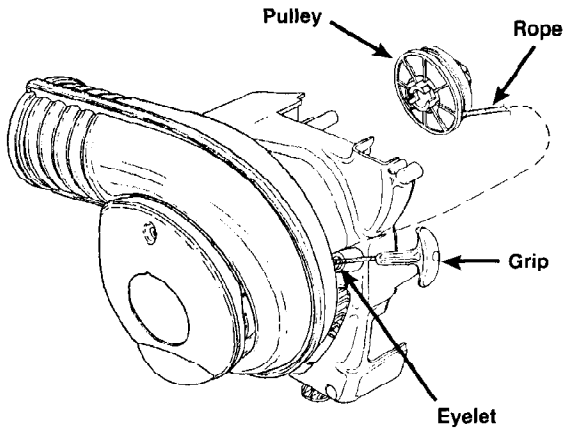


Figure 56

Wind all but 10" (25 cm) of rope on the pulley in a clockwise direction (ratchet side up) before placing the pulley in the starter housing. If the rope has been cut or replaced, pass the rope through the eyelet in the starter housing and slide the grip to the end of the rope.

MISCELLANEOUS

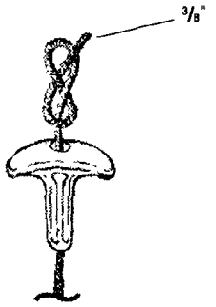


Figure 57

Once the rope is through the grip, tie a figure eight knot (as shown above) leaving approximately three eights of an inch above the knot after it has been set (pulled tight). Curl the pigtail (length of rope above the knot) around the knot and pull the knot into the grip

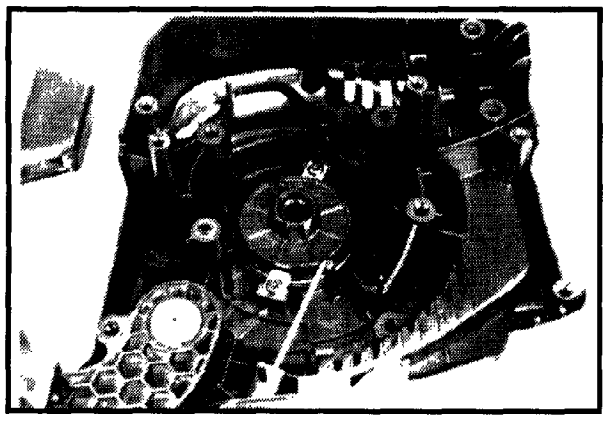


Figure 58

Lightly grease the starter housing pulley post with multi-purpose grease prior to assembly.

Place the pulley in the housing and press down on the pulley while turning (in both directions) to engage the recoil spring hook.

Adding Prewinds

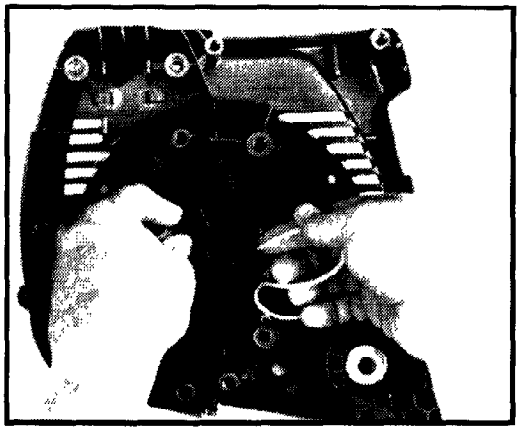


Figure 59

Reinstall the flat retainers and Torx screws For proper recoil operation, two prewinds on the rewind spring are required. Pull 10" (25 cm) of slack rope back into the housing to form a loop. Put the loop in the pulley notch (see above) and wind the pulley in a clockwise direction two complete revolutions Use your thumb to hold the pulley and use the grip to pull the loop back out of the starter housing. When the grip is released all the rope should rewind back into the starter housing.

Testing Rewind Spring Tension

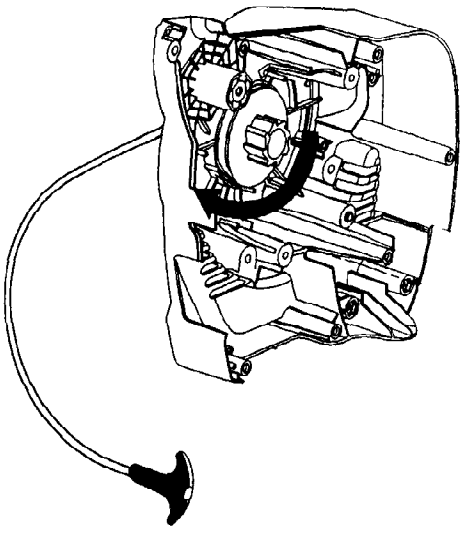


Figure 60

With the starter fully assembled, pull the rope completely out of the housing. Grasp the pulley and turn it clockwise

If the pulley will not rotate, the spring is bottoming out Release one prewind and re-check.

If the spring does not bottom out and you can turn the pulley more than one and one half turns, add one turn clockwise

Disassembly And Inspection

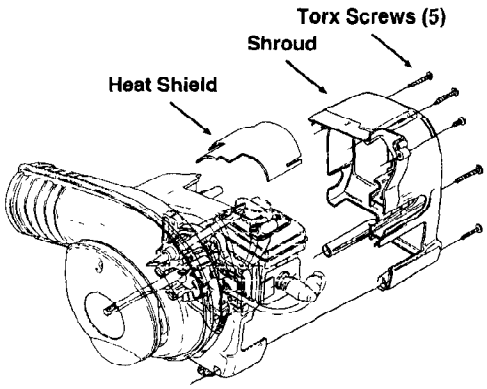


Figure 61

Use T-25 Torx bit to remove the five 10-14 x 7/8" screws securing the shroud to the starter housing. Pull the heat shield off the muffler.

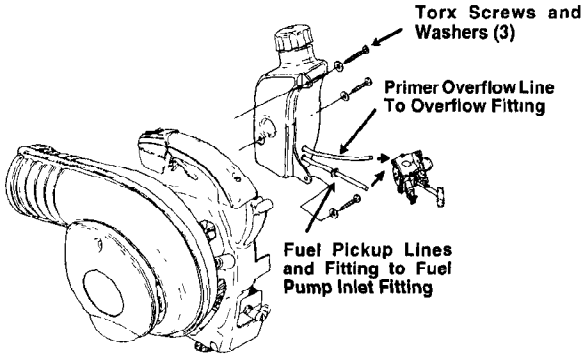


Figure 62

Push over flow and fuel pickup lines off the carburetor with a flat blade screwdriver.

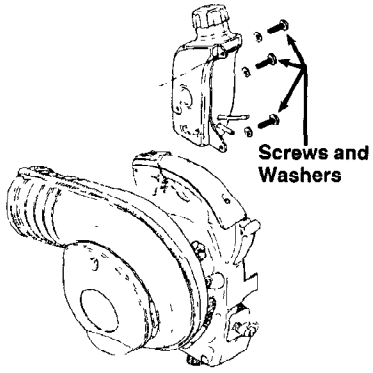


Figure 63

Use T-25 torx bit to remove the Three #10-14 x 7/8" torx plastite screws and flat washers from the fuel tank Lift the fuel tank off the blower.

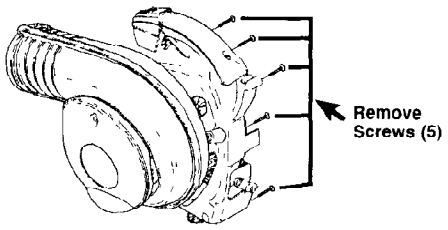


Figure 64

Use a T-25 Torx bit to remove five #10-14 x 1 1/8" screws holding the volute assembly to the fan / starter housing

Remove The Fan Assembly

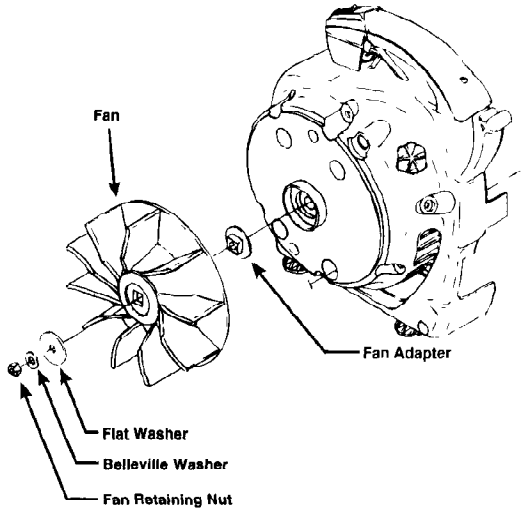


Figure 65

Insert a length of starter rope into the cylinder (piston at Bottom Dead Center position) to act as a piston stop Use a 9/16" (14 mm) socket to remove the fan retaining nut, flat washer and Belleville washer. The fan, and fan adapter can now be removed from the crankshaft. After these parts are removed grab the spacer and slide it off the shaft so it will not be lost

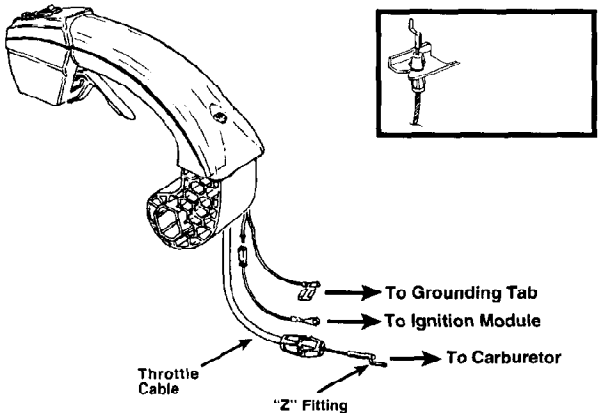


Figure 66

Disconnect the ground wire at the crankcase cover, and the ignition module male and female leads at the module. Use a pair of needle nose pliers to unhook the "Z" fitting from the carburetor. Then squeeze the cable housing with the needle nose pliers to free it from the air cleaner body (see inset above).

Remove the Engine

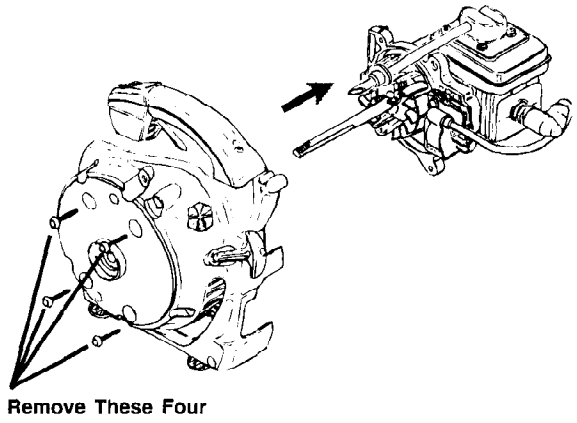


Figure 67

Use a T-25 Torx bit to remove the four 10-24 x 3/4" engine mounting screws. Once this is done pull the engine from the starter housing.

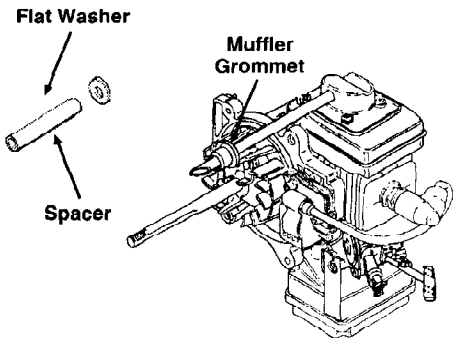


Figure 68

Slip the spacer and flat washer off the crankshaft. If the muffler grommet has come out of the volute with the muffler pipe, pull it off the muffler and push it back into the housing.

Remove the Muffler

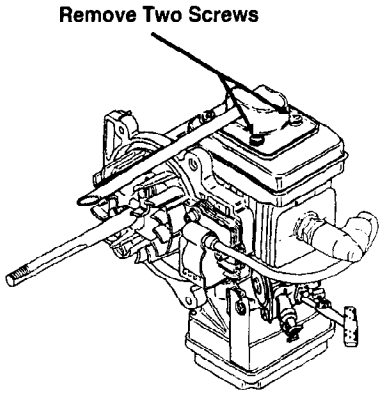


Figure 69

Use a T-25 Torx bit or screwdriver to remove the two 2 10-24 x 2 1/8" truss head screws holding the muffler to the cylinder.

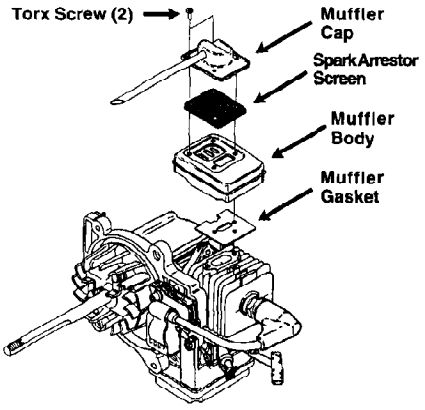


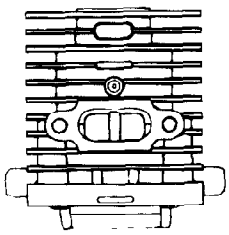
Figure 70

Use a T-25 Torx bit remove the two Torx screws holding the muffler cap, spark arrestor screen, muffler body and muffler gasket to the cylinder.

SERVICE NOTE

Because the spark arrestor screen is mated to a gasket the assembly should be replaced when carbon buildup covers 25% or more of the screen's surface area or if the gasket is damaged.

Remove the muffler gasket and replace it as required. On assembly, the hole in the gasket must line up with the hole in the cylinder.



Front View

Figure 71

The compression relief hole should be cleaned periodically with a 3/64"or #56 twist drill. Move the piston to bottom dead center position Insert the twist drill and turn **by hand** to clean. Use compressed air to blow the carbon particles out of the cylinder

Remove Carburetor And Air Filter

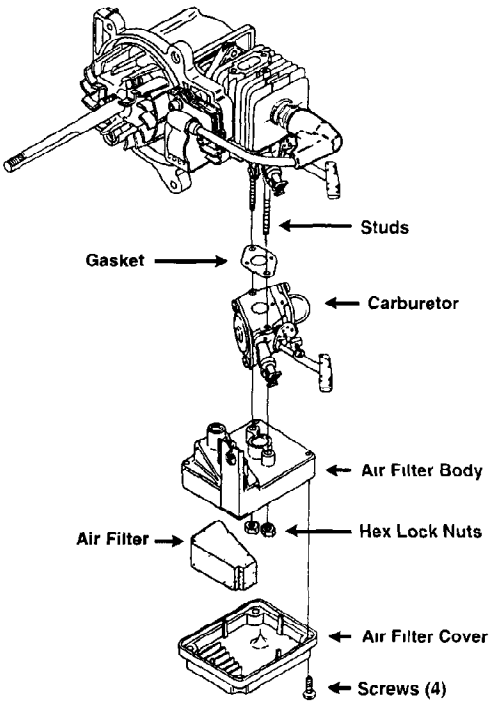


Figure 72

Use a #2 phillips head screwdriver to remove the four (8 - 16 x 1/2") air filter screws and air filter cover Remove the air filter and look for dirt build up. The blower will run rich if the filter is loaded with dirt . This foam element is easily cleaned with a liquid soap and water solution

Use a 3/8" socket to remove the two 10 - 24 hex lock nuts, then slide the air filter body and carburetor off the two 10 - 24 x 2 1/8" carburetor mounting studs

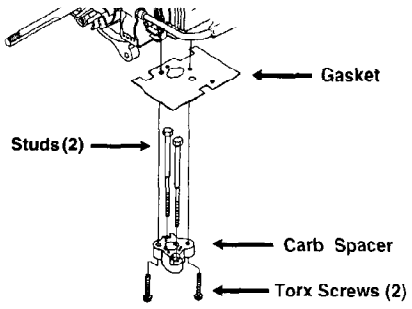


Figure 73

Use a T-25 torx bit or screwdriver to remove the two (10-32 x 1") torx screws securing the heat dam (carburetor spacer), studs and heat dam gasket to the cylinder Pull the heat dam off the

cylinder and remove the studs.The studs fit into pockets in the back side of the heat dam and should drop into the pockets when assembling the studs to the heat dam

Ignition Module, Rotor, Spark Plug Disassembly

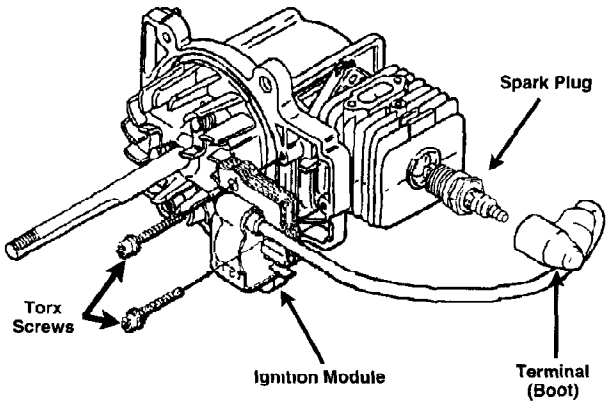


Figure 73

The module can be removed by using a T-25 Torx bit to loosen the two 8-32 x 1" mounting screws. Lift the module off the crankcase The kill switch lead on the module may be removed at this time. Use a 5/8" deep set socket to remove the spark plug.

Rotor Removal

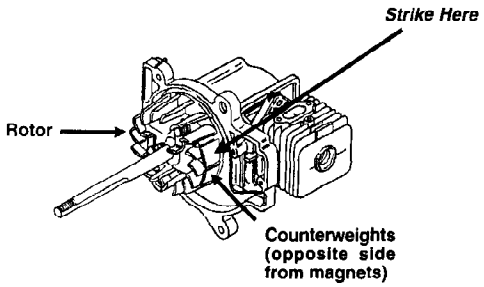


Figure 74

Remove the rotor by holding the rotor with one hand and striking the **non**-magnetized side of the rotor with a plastic, deadweight or rawhide mallet

Crankcase Cover Removal

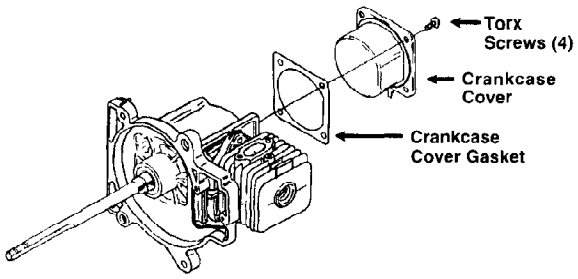


Figure 75

Use a T-25 torx bit or wrench to remove the four (10-24 x 1/2") torx screws securing the crankcase cover to the crankcase Lift off the crankcase cover and gasket.

SERVICE NOTE

Always replace the crankcase gasket on reassembly

Remove Cylinder, Piston and Rod Assembly

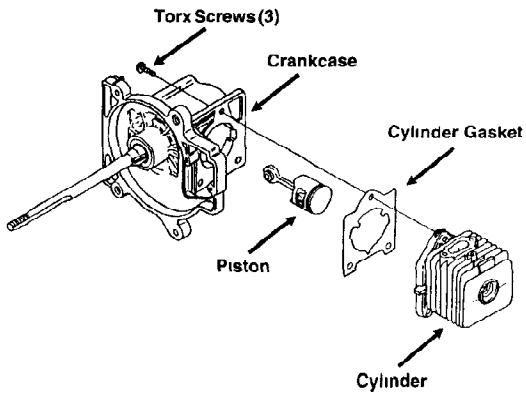


Figure 76

Use a T-27 torx bit and socket to remove the three 10-24 x 3/4" torx screws holding the cylinder to the crankcase

Lift the cylinder off the crankcase. It may be necessary to use a rocking (back and forth) motion to free the cylinder from the crankcase slowly, lift the cylinder just far enough to expose the connecting rod Do not pull the cylinder off the piston at this time. Instead, grasp the connecting rod and push it off the crankshaft crankpin and pull the cylinder and piston/rod assembly off the crankcase.

The piston and rod assembly can now be safely pulled out of the cylinder.

Remove Piston Ring From Piston

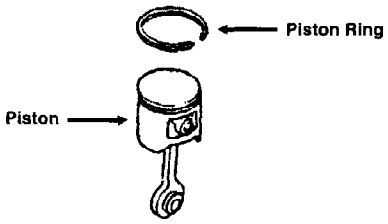


Figure 77

Place your thumbs at the back of the rings opposite the piston ring opening. Use your two index fingers to pry the two ends of the piston ring *just* far enough to clear the piston.

SERVICE NOTE

If the piston ring is to be reused, mark the piston ring so that it can be replaced back in the piston in the same position as when first removed.

The piston and rod assembly is supplied as an assembly only. Replace the entire assembly if problems exist wih the rod, rod bearings, piston or connecting rod.

Assembly

Piston Ring to Piston

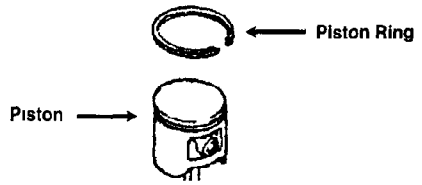


Figure 78

Lubricate the piston ring with SAE 30 motor oil prior to assembly

Place the piston ring on top of the piston. Gently pry apart the open end of the piston just far enough to start the closed end of the piston ring over the piston. Push the back side of the piston ring until it seats in the piston ring groove.

Slide the open end of the piston ring until it too slips into place Care must be taken during this manoeuver not to scrap the side of the piston with the edge of the piston ring.

Assembly Piston / Rod To Cylinder

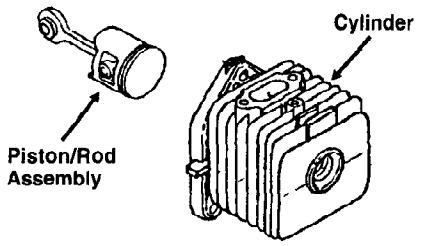


Figure 79

Lightly oil the piston outside diameter with SAE 30 motor oil. Put multi - purpose grease or use light oil to the connecting rod caged bearing. Apply oil to a rag and swab the inside diameter of the cylinder to clean and lubricate the cylinder bore

Collapse the piston ring with your fingers and push the piston *slowly* into the cylinder. It may be necessary to rock the piston back and forth to get it started into the cylinder bore.

Assemble Cylinder To Crankcase

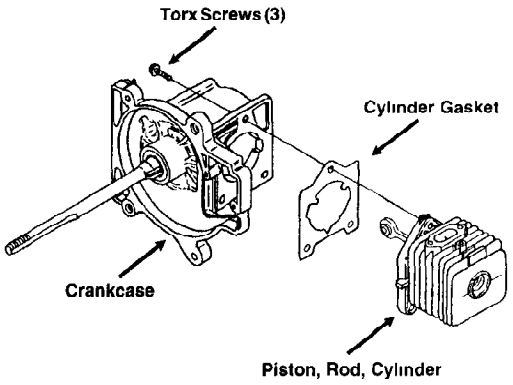


Figure 80

Make sure the crankcase is clean and free of debris and old oil. Place a new cylinder gasket on the crankcase with the cut-outs in the gasket matching the transfer and pulse ports.

Pull the rod and piston assembly out of the cylinder so the skirt of the piston is flush with the bottom of the cylinder Rotate the crankshaft until the crankpin is in the top dead center position

Insert the rod, piston and cylinder assembly into the crankcase and engage the crankpin with the connecting rod and bearing

Once this is done, push the cylinder down on the piston and rod until it mates with the crankcase.

If the cylinder retaining torx screws are to be reused, apply thread locking compound to the first few threads of each screw Thread the three 10-24 x 3/4" torx screws from the bottom of the crankcase to the cylinder by hand, then torque the screws to 65 - 70 in. lbs (7.3 - 7.9 Nm).

Crankcase Cover To Crankcase

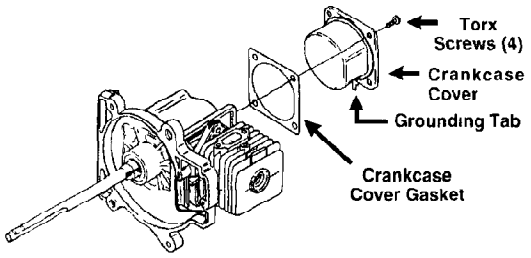


Figure 81

Place the crankcase cover gasket on the crankcase and insert the crankcase cover with the grounding tab facing down (as shown above).

Assemble the four 10-24 x 1/2" torx screws and torque the screws to 30 - 40 in lbs (3.4 - 4.5 Nm).

Ignition Module, Rotor And Spark Plug Assembly

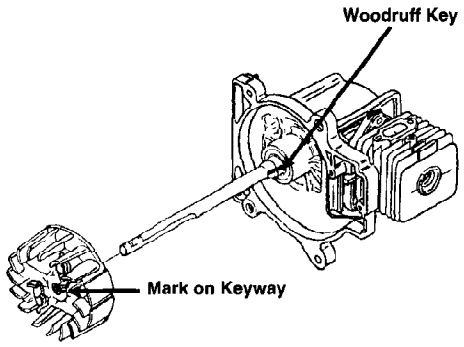


Figure 82

The rotor has a "blind" keyway. A mark on the face of the rotor must be lined up with the woodruff key when installing the rotor on the crankshaft.

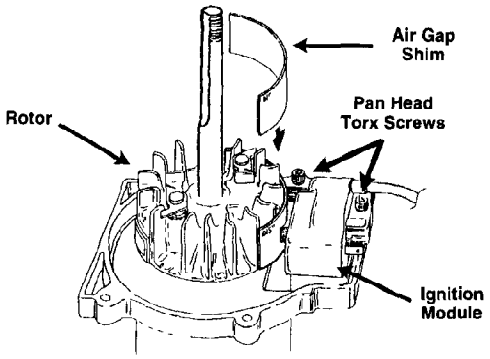


Figure 83

To install the module: Mount the module and insert the two 8-32 x 1" pan head torx screws. Place a pink shim (.015" / 0.4mm) between the rotor and module. Rotate the rotor until the magnets are parallel with the module core legs. The module will draw tight against the rotor. Tighten the module mounting screws to 30 - 40 in. lbs (3.4 - 4.5 Nm) Remove the shim.

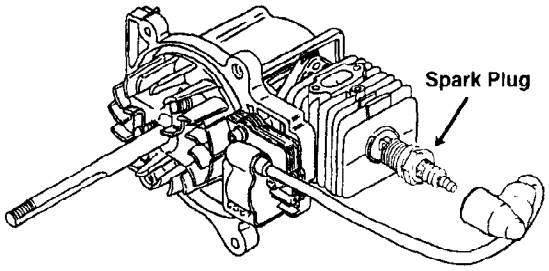


Figure 84

Thread the spark plug into the cylinder and torque the plug to 120 - 180 in. lbs (13.6 - 20.3 Nm)

Install The Ignition Lead

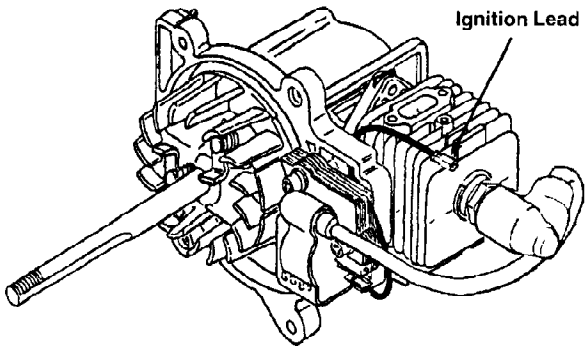


Figure 85

If the ignition lead has been removed from the ignition module, the lead must now be routed as shown above. Push the spade terminal on the grounding tab then route the lead under the high tension lead, behind the module core and through the opening in the crankcase.

Heat Dam, Studs to Crankcase

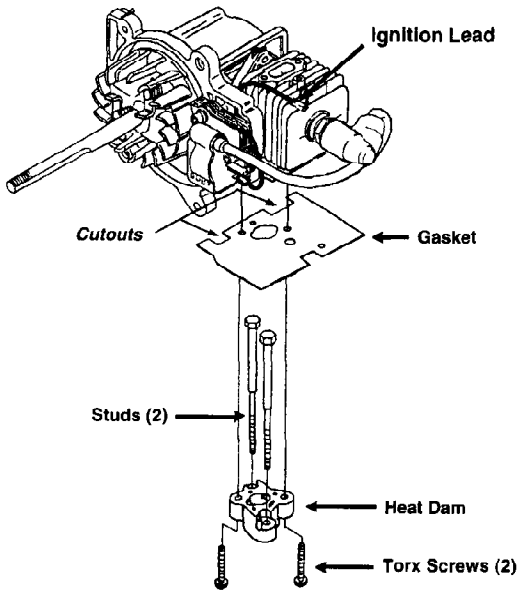


Figure 86

Place the carburetor gasket on the crankcase. Be sure to place the gasket on the crankcase with the two cutouts side of the gasket facing down and the screw and pulse holes in the gasket line up with the holes in the crankcase.

SERVICE NOTE

When assembling the gasket to the cylinder be sure to route the igniton lead under the gasket.

Insert the two 10-24 x 2 7/8" special square head screws into the heat dam (carburetor spacer). Make sure the heads on the screws are flush with the surface of the heat dam

Set the heat dam on the cylinder. Apply thread locking compound on the first few threads of each screw and insert the two (10-32 x 1") pan head torx screws into the heat dam and cylinder. Tighten the screws until snug. Torque the two screws to 50 - 60 in. lbs (5.6 - 6.8 Nm).

Slide the carburetor gasket on the studs and push it on until the gasket is flat on the heat dam. Make sure the pulse hole in the gasket is lined up with the pulse hole in the cylinder.

Assemble Carburetor And Air Filter

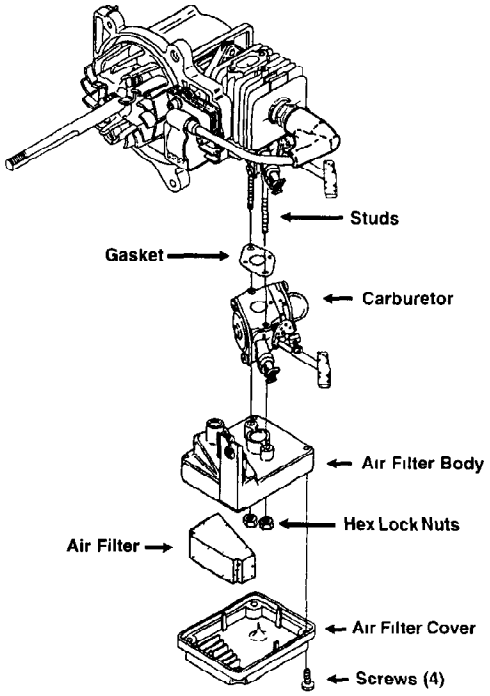


Figure 87

Place the intake side of the carburetor (opposite the choke) towards the heat dam and mount the carburetor on the two studs. Move it in place against the gasket, then assemble the air filter body and two 10-24 hex lock nuts Just prior to tightening the two lock nuts, square the air filter body Torque the two lock nuts to 30 - 40 in. lbs (3.4 - 4.5 Nm)

Insert the air filter element into the cavity in the air filter body, place the air filter cover on the air filter body and insert the four #10-14 x 1/2" phillips head screws into the air filter cover and body. torque the four screws to 30 - 40 in lbs (3 4 - 4 5 Nm).

Muffler Assembly to Cylinder

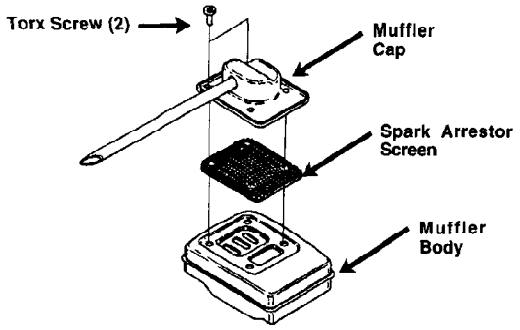


Figure 88

Put the spark screen and gasket assembly on the muffler followed by the muffler cap and two 8-32 x 3/8" torx screws Tighten the two secrews hand tight.

SERVICE NOTE

The gasketed side of the spark screen must go towards the muffler

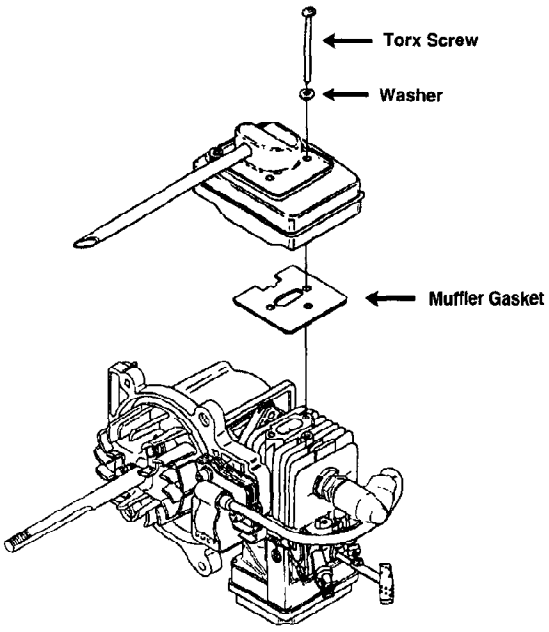


Figure 89

Place the muffler gasket on the cylinder with the round hole in the gasket lined up with the compression relief hole in the cylinder.

Assemble the muffler, two (10-24 x 2 1/8") torx screws and flat washers to the muffler. Torque the two screws to 50 - 60 in. lbs (5.6 - 6.8 Nm).

Assemble Handle To Starter

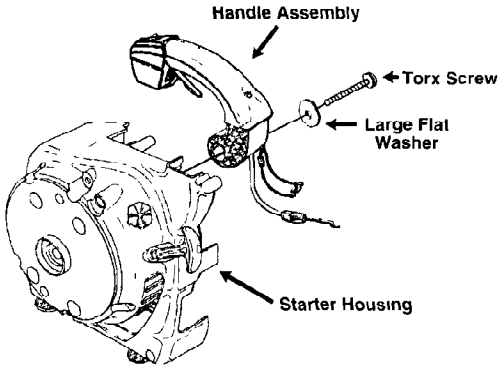


Figure 90

Slide the handle assembly into the slot in the starter housing Place the large #10 flat washer on the #10-14 x 7/8" torx screw and thread the screw into the housing Torque the screw to 30 - 45 in. lbs (3.4 - 5.1 Nm).

Assemble Engine To Housing

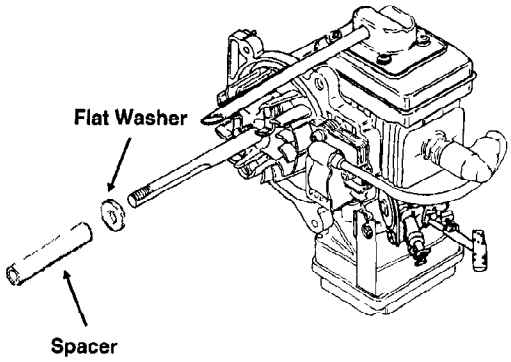


Figure 91

SERVICE NOTE

Be careful to route the electrical wiring and throttle cable in front of the handle assembly before insertion into the housing.

Slide the large inside diameter washer on the crankshaft and then slip the spacer on the shaft. *Note* The spacer that was taken off the unit is the one that must go back on it Other products use similar spacers but they differ in length

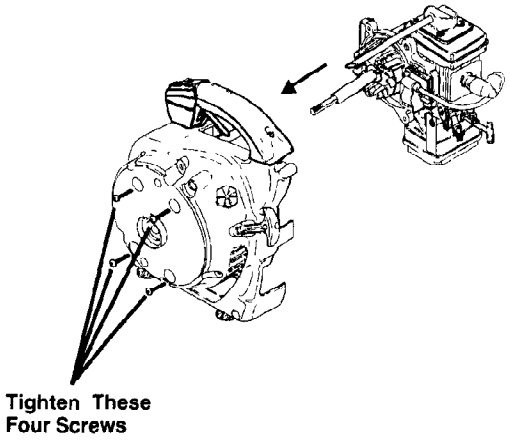


Figure 92

Line up the powerhead and insert the crankshaft and muffler discharge pipe through the holes in the starter. Adjust the powerhead and starter so the screw holes match up. Insert the four 10-24 x 3/4" torx screws and torque the screws to 55 - 60 in. lbs (6.2 - 6.8 Nm).

Assemble Fan To Crankshaft

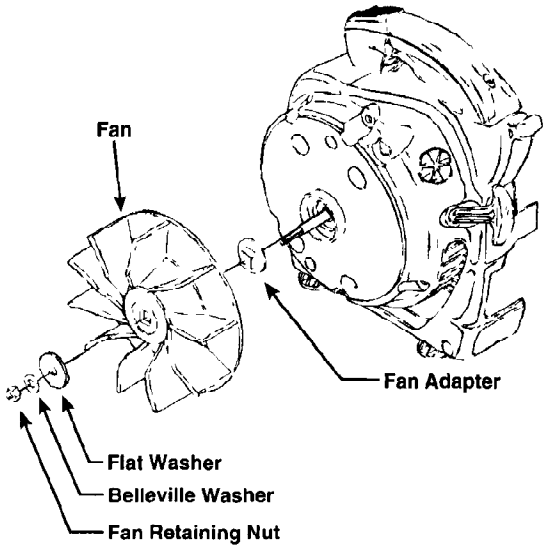


Figure 93

Insert a loop of starter rope into the cylinder (piston at Bottom Dead Center position) to act as a piston stop. Press the fan adapter into the back of the fan and slide the fan on the crankshaft. Place the Large 3/8" flat washer, belleville washer on the crankshaft and thread the 3/8"-24 fan retaining nut on the crankshaft. torque the fan retaining nut to 130 - 150 in. lbs (14.7 - 16.9 Nm).

Assemble Volute to Starter Housing

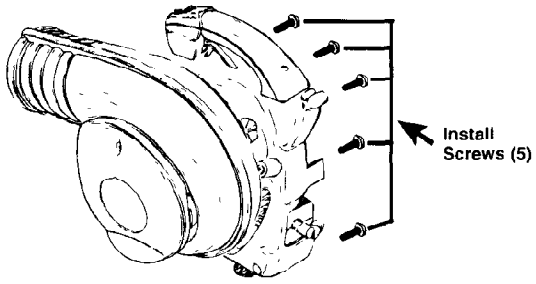


Figure 94

Align the volute and muffler grommet with the muffler discharge pipe. Push the volute on the starter housing until it presses against the starter housing Insert the five #10-14 x 7/8" torx head screws through the housing and into the volute. Torque the screws to 35 - 45 in lbs (4.0 - 5.0 Nm).

Assemble Fuel Tank to Starter Housing

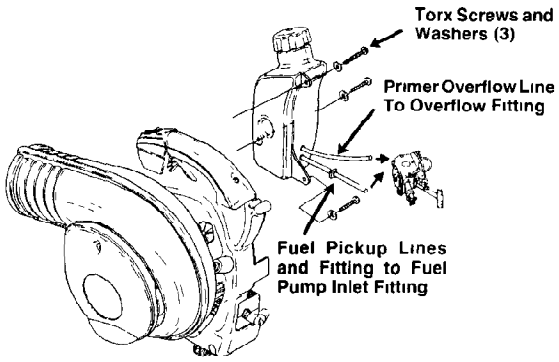


Figure 95

Push the single, one piece overflow line coming out the fuel tank on the primer overflow fitting. Slide the two piece line and fitting (fuel pickup line) on the fuel pump inlet fitting.

Position the fuel tank on the starter housing and start the three torx screws and washers into the bosses on the starter housing Torque the three screws to 30 - 40 in. lbs (3 0 - 4 0 Nm)

Assemble Shield and Shroud

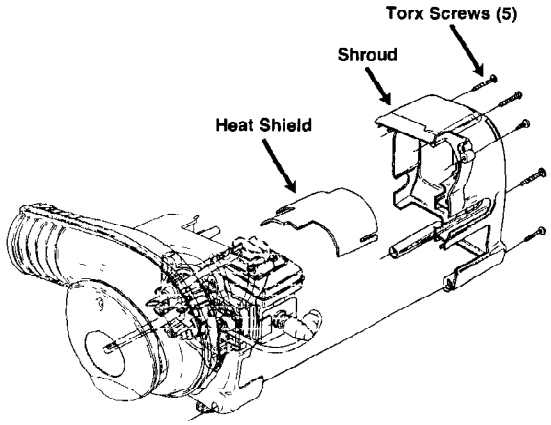


Figure 96

Slide the heat shield (with the cutouts towards the engine) over the muffler and into the starter housing. Mount the shroud over the engine and against the starter housing. Make sure the shroud at the top goes over the starter housing and not under it. A mismatch can occur if you are not careful.

NOTES

WORLDWIDE COMMERCIAL & CONSUMER EQUIPMENT DIVISION
Consumer Products, P.O. Box 7047 Charlotte, N.C. 28241-7047