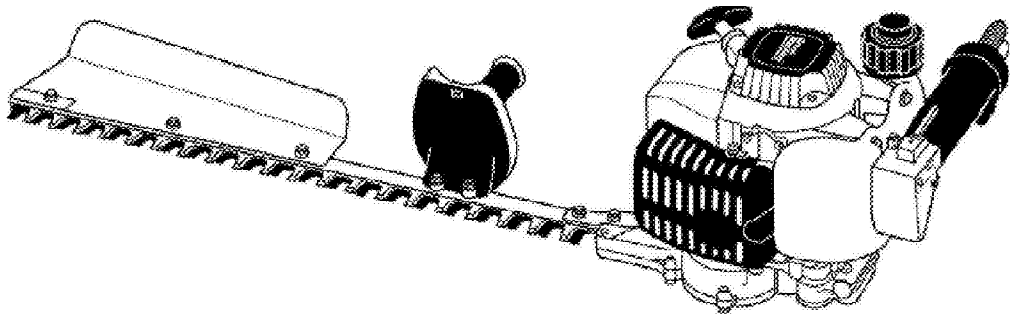
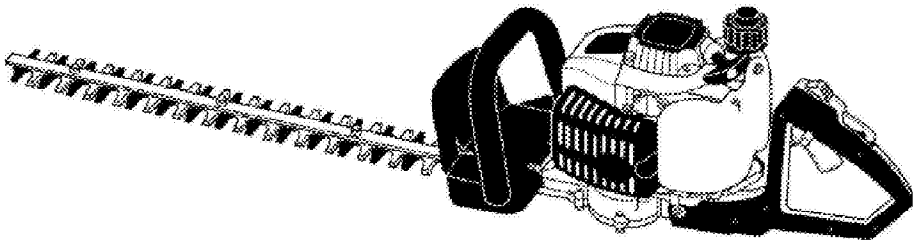
GreenMachine®

Engineered for Survival

Dealer Service Guide





GH24 ..... UT26152
GH30 ..... UT26153

Hedge Trimmers

ST01365

Service Notes:

Before repairs begin, select a clean work surface.

Clean all tools and equipment to be used during assembly.

Clean all parts with solvent, compressed air and shop towels.

Any dirt or other contaminants left in the engine or any other assemblies can significantly reduce engine or component life.

Always refer to this Service Guide for reference to the proper torque specifications for fasteners and other components. Use a torque wrench to tighten all fasteners to these specifications.

Note also: all fasteners that thread into plastic should be rotated counter clockwise until the screw drops in place in the existing threads. Then turn the screw clockwise to tighten. This should always be done when reinstalling fasteners into plastic components. This insures that the original threads are used and new threads are not cut into the plastic, thereby shorting the life of the component.

Contents

SAFETY PRECAUTIONS

GENERAL INSTRUCTIONS

DO NOT ALLOW CHILDREN OR UNTRAINED INDIVIDUALS TO USE THIS UNIT.

Operators must be in good physical condition. Operating equipment can cause fatigue. Perform all work calmly and with caution.

Use this trimmer for cutting bushes and hedges only. Do not use for any other purpose.

Ensure area is secure of other people and animals. Do not allow children to play within 33 feet (10 meters) of work area.

Never start or run the engine inside a closed area; breathing exhaust fumes can kill.

Clear the work area before each use. Remove all objects such as sand, stones, rocks, nails, wire, or other hard objects which can be thrown or obstruct the cutting blades. Be aware of fencing that may be behind hedges.

Do not operate equipment after consuming alcohol, medication, or drugs. Do not operate equipment if feeling ill or fatigued.

PRODUCT USERS ON UNITED STATES FOREST SERVICE LAND, AND IN SOME STATES, MUST COMPLY WITH FIRE PREVENTION REGULATIONS. THIS PRODUCT IS EQUIPPED WITH A SPARK ARRESTOR; HOWEVER, OTHER USER REQUIREMENTS MAY APPLY. CHECK WITH YOUR FEDERAL, STATE, OR LOCAL AUTHORITIES.

PROTECTIVE CLOTHING

Wear full eye and hearing protection when operating equipment.

Always wear protective clothing to reduce the risk of injury.

Wear fitted clothing that does not cause hindrance, work shoes, and gloves. Do not wear loose fitting clothes or jewelry.

Secure long hair.

Wear proper headgear if there is danger of falling objects in work area.

OPERATING SAFETY

Regular maintenance should be performed to ensure safe operation of equipment.

Do not operate in poor lighting.

Keep firm footing and balance. Do not overreach. Do not operate machinery from tree branches or ladders.

Keep all body parts away from cutting blade and hot surfaces.

Do not attempt to cut hedges that are higher than your shoulders. A hedge trimmer held higher than your shoulders is difficult to control.

Do not cut from a ladder, this is extremely dangerous.

Never climb into a tree to limb or prune. Do not stand on ladders, platforms, on a log, or in any position which can cause you to loose your balance or control of the hedge trimmer.

Do not attempt to touch or stop the blades when they are moving.

Never reach over, or near the blade to clear away clippings while the hedge trimmer is running.

Always hold the hedge trimmer with both hands when operating. Use a firm grip on both handles.

To avoid possible electric shock, do not touch high tension cable or spark plug cap while the engine is running.

Always set the trimmer on a flat surface and flip the ON-OFF switch to OFF before attempting to remove any obstruction caught or jammed in the blades.

It has been reported that vibrations from hand-held tools may contribute to a condition called Raynaud s Syndrome in certain individuals. Symptoms may include tingling, numbness, and blanching of the fingers, usually apparent upon exposure to cold. Hereditary factors, exposure to cold and dampness, diet, smoking, and work practices are all thought to contribute to the condition. If you experience any of the symptoms of this condition, immediately discontinue use and see your physician about these symptoms.

ALWAYS STOP ENGINE AND DETACH SPARK PLUG WIRE BEFORE MAKING ANY ADJUSTMENTS OR REPAIRS EXCEPT CARBURETOR ADJUSTMENTS.

FUELING

This product is powered by a 2-cycle engine and requires pre-mixing gasoline and 2-cycle oil. Pre-mix **unleaded** gasoline and 2-cycle engine oil in a clean container approved for gasoline.

NOTE: Higher octane fuel can be used if necessary. Poor engine performance can result.

RECOMMENDED FUEL: THIS ENGINE IS CERTIFIED TO OPERATE ON **UNLEADED** GASOLINE INTENDED FOR AUTOMOTIVE USE.

Mix Green Machine® **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 2.6 oz. per gallon (US).

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

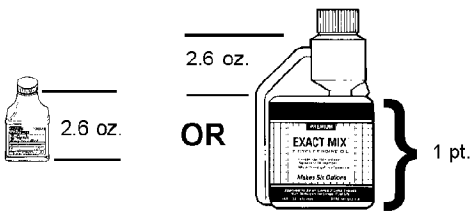
NOTE: Green Machine® Premium Exact Mix fuel mix will stay fresh up to 30 days. DO NOT use fuel mix that is more than 30 days old or engine may not start.

FUEL MIXTURE

GREEN MACHINE® PREMIUM EXACT MIX (50:1)

Green Machine® Premium Exact Mix one pint bottle is the best value and the easiest to use.

Pour about 1/2 the required amount of gasoline into container. Add the required amount of oil to the gasoline. Close and shake the container vigorously. Add the remaining gasoline, and shake again until completely mixed. Serious engine damage can result with inadequately mixed fuel.



Gasoline	Oil
1 gallon (US)	2.6 oz.
1 Liter	20cc

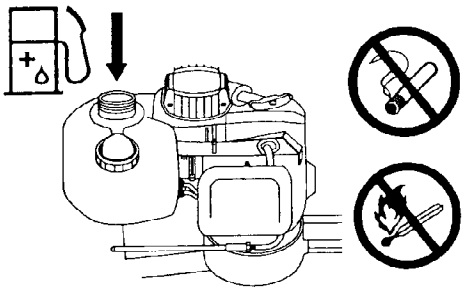
Never attempt to mix fuel in the unit fuel tank.

Do not attempt to fuel the unit near an open flame or in an unventilated area.

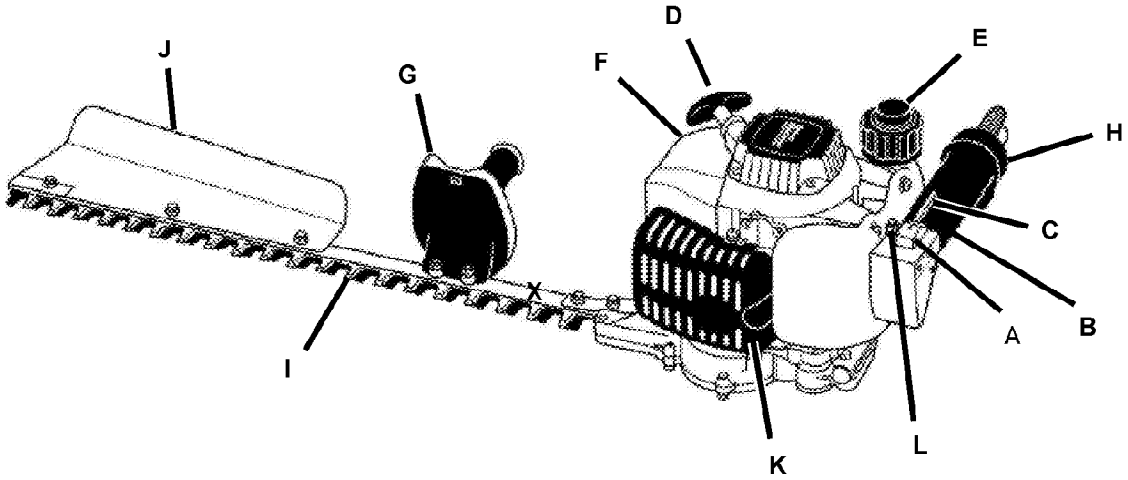
FILLING TANK

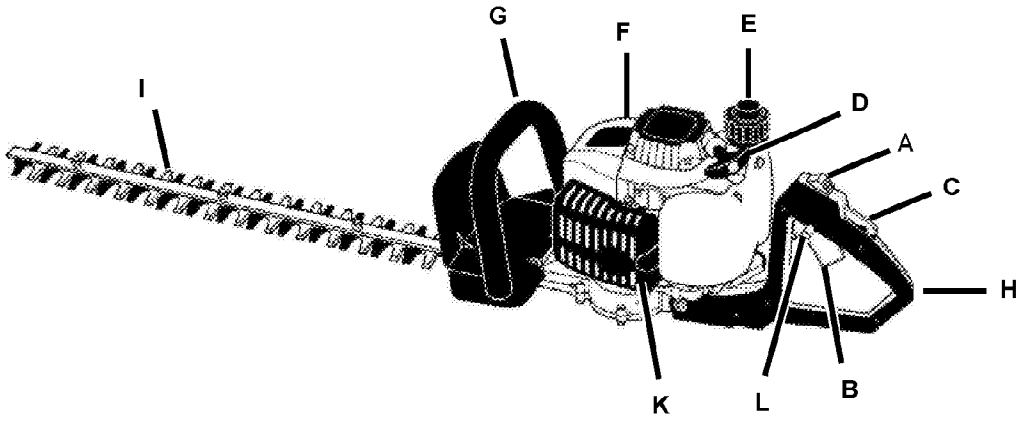
1. Loosen fuel cap slowly.
2. Carefully pour fuel into the tank. Avoid spillage.
3. Immediately replace fuel cap and hand tighten. Wipe up any fuel spillage.

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



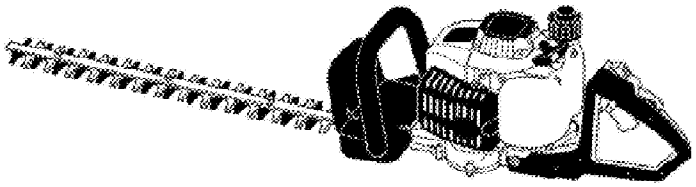
UNIT FEATURES

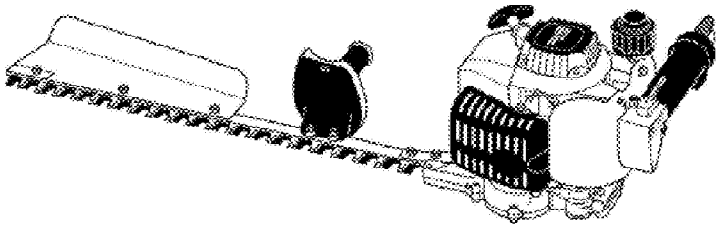




A Stop Switch
B Throttle
C Throttle Lock Out
D Starter Grip
E Fuel Cap
F Carburetor/Choke Lever
G Front Handle
H Rear Handle
I Blade
J Receiver Plate
K Muffler
L Throttle Lock

UNIT SPECIFICATIONS





Engine		
Type	2-cycle, Single Cylinder, Air Cooled	
Engine Displacement	21.7 cc	
Ignition	One Piece Capacitor Discharge	
Muffler	Dual Chamber Soft Tone	
Engine Speeds	2600 RPM Idle, 8300 RPM Maximum	
Fuel System		
Carburetor	Diaphragm Carburetor with Primer Bulb Walbro WYL	
Intake	Piston Port Induction	
Air Filter	Foam (Dry)	
Throttle Control T	rigger Type Plus Throttle Lock	
Fuel Mix Ratio	Exact Mix 50:1 (2.6 oz. to 1 Gallon)	
Fuel Tank Size	21 oz	
Cutting Blade	GH24 24	Double Sided, Dual Reciprocating Blades Blade Speed, 1280 Strokes Per Minute
	GH30 30	Single Sided, Dual Reciprocating Blade Debris Collector Blade Speed, 1680 Strokes Per Minute
General		
Spark Plug	NGK BM7A	
Spark Plug Gap	0.024 to 0.028	
Rotor Air Gap	0.012 to 0.016	
Run Time	.7hr	
Warranty	1 Year Limited Warranty - Commercial 2 Year Limited Warranty - Consumer - Homeowner	

TORQUE SPECIFICATIONS

NOTE: TORQUE SPECIFICATIONS ARE GIVEN IN INCH POUNDS AND NEWTON METERS (Nm.)

SIZE & TYPE	QTY	APPLICATION	TORQUE LIMITS (IN. LBS.)	TORQUE LIMITS (Nm.)	LOCTITE REQUIRED RED 262
M6 X 35MM	2	ANTI VIBE SCREW GH30	31-39	3.5-4.4	
M6	5	BLADE NUT	62-78	7.0-8.8	
M5 X 16MM	3	BLOWER HOUSING	36-44	4.1-5.0	
M5 X 65MM	2	CARBURETOR	18-26	2.0-2.9	
M6 X 25MM	2	CLUTCH ASSEMBLY	65-87	7.3-9.8	
M5 X 20MM	1	CLUTCH HOLDER	36-44	4.1-5.0	
M5 X 16MM	4	CLUTCH HOUSING	36-44	4.1-5.0	
M5 X 25MM	3	CRANKCASE	33-37	3.7-4.2	
M5 X 20MM	2	CYLINDER	62-78	7.0-8.8	
M5 X 14MM	1	CYLINDER COVER	13-17	1.5-1.9	
M6 X 15MM	3	ENGINE TO GEAR CASE	40-48	4.5-5.4	
M6 X 35MM	2	FRONT HANDLE SCREW GH24	13-47	4.4-5.3	
M5 X 20MM	1	FRONT HANDLE SCREW GH30	36-44	4.1-5.0	
M5 X 16MM	3	FUEL TANK	18-26	2.0-2.9	
M5 X 16MM	1	FUEL TANK BRACKET	18-26	2.0-2.9	
M5 X 16MM	7	GEAR CASE COVER	36-44	4.1-5.0	
M5 X 20MM	2	GUIDE PLATE	36-44	4.1-5.0	
M5 x 25MM	2	HEAT DAM	36-44	4.1-5.0	YES
M5 X 20MM	2	IGNITION MODULE	62-78	7.0-8.6	
M5 X 50MM	2	MUFFLER	60-70	6.8-7.9	YES
M5 X 16MM	1	MUFFLER COVER	31-39	3.5-4.4	
M6	1	NIPPLE-GREASE	26-34	2.9-3.8	YES
M4 X 16MM	5	REAR HANDLE SCREW GH24	7-11	.8-1.2	
M4 X 30MM	1	REAR HANDLE SCREW GH24	7-11	.8-1.2	
M4 X 10MM	1	REAR HANDLE SCREW GH24	7-11	.8-1.2	
M6 X 50MM	1	REAR HANDLE SCREW GH24	39-47	4.4-5.3	
M6 X 40MM	1	REAR HANDLE SCREW GH24	39-47	4.4-5.3	
M6 X 35MM	1	REAR HANDLE SCREW GH24	39-47	4.4-5.3	
M5 X 30MM	2	REAR HANDLE SCREW GH30	31-39	3.5-4.4	
M6 X 16MM	1	ROTOR	79-95	8.9-10.7	
14MM	1	SPARK PLUG	122-138	13.8-15.6	
M5 X 30MM	1	STARTER PULLEY(PLASTITE)	18-26	2.0-2.9	
M5 X 14MM	4	STARTER SCREW	13-17	1.5-1.9	
M4 X 10MM	1	THROTTLE CABLE CLAMP GH24	7-11	.8-1.2	

TROUBLESHOOTING

COMPRESSION TESTING

Low compression will cause hard starting, erratic idling, loss of power under load, and hard starting when hot.

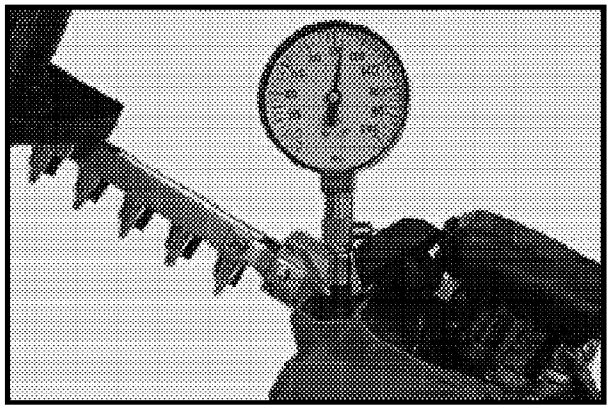


FIGURE 1

Use a ¾ deep-set socket or combination wrench to remove the spark plug. Place the choke lever in the OFF position. Hold the throttle open (with trigger depressed fully) and pull the starter grip rapidly several times to purge any excess fuel in the crankcase and cylinder. Thread a compression gauge (Green Machine P/N 94194) into the spark plug hole. Pull the starter grip rapidly until the gauge reaches its peak (stops moving).

Engine compression should be:

Hot 100-PSIG Minimum.

Cold 110-PSIG Minimum.

Readings below 100 PSIG indicate an engine problem. Compression testing should not be used as the sole criteria for rebuilding an engine. Performance and visual inspection are necessary.

IGNITION SYSTEM TESTING

To test ignition output, remove the spark plug terminal from the spark plug. Use a ¾ deep-set socket or combination wrench to remove the spark plug.

Inspect spark plug electrodes for wear and deposits. The spark plug gap should be 0.024 0.028 . Reinstall the spark plug.

WARNING

The following ignition test may cause the unit to start. Always make this test in a safe place, free of any obstructions.

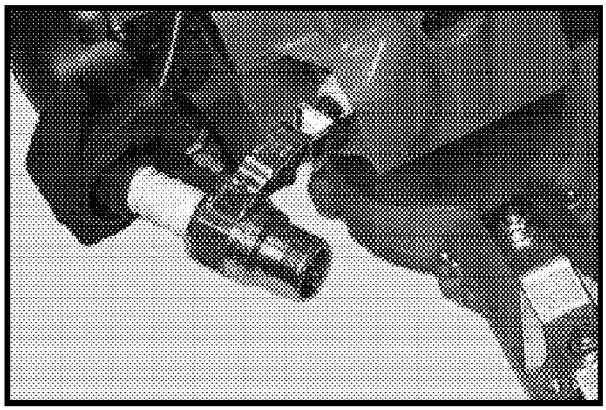


FIGURE 2

Insert the spark tester (Green Machine P/N JA313164) between the spark plug terminal and the tip of the spark plug. Move the ignition switch to the ON or I position. Pull the starter grip rapidly. A spark should jump the 3/16 to 1/4 gap between the tester electrodes. If a spark occurs, the ignition module and spark plug are performing properly.

If, however, no spark occurs in the previous test, connect the spark tester to the base of the spark plug. This may require an extra grounding lead in order to make the connection. Pull the starter grip again, rapidly.

If a spark now jumps the gap, this indicates spark plug failure under compression. Replace the spark plug and test again. If no sparking occurs at either location, the failure is with the other ignition components. This is the only reliable way to compression test the spark plug and test the potential voltage available in the solid state ignition. If no spark is present, proceed with further testing.

IGNITION SYSTEM

IGNITION SWITCH TEST

Disconnect the switch wire going to the ignition switch at the connection junction. Place the ignition switch in the ON or I position.

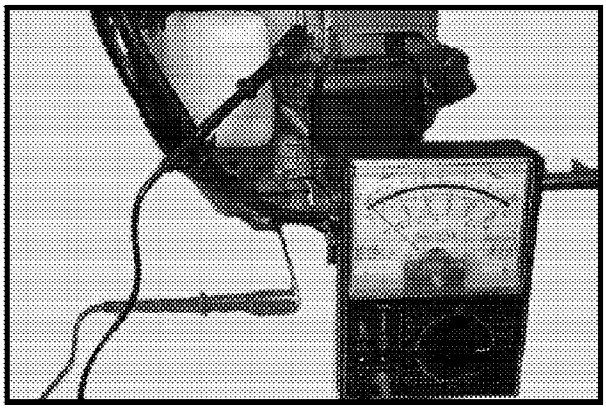


FIGURE 3

Attach a volt-ohm-meter positive probe to the male connector (switch lead wire) and the negative probe to ground. Turn the meter dial to the lowest ohm s scale, R X 1 or equivalent. There should be no continuity.

Place the ignition switch to the OFF or O position. There should be continuity. Replace the switch if any other readings are obtained.

ROTOR/MODULE INSPECTION.

In order to access the module you must remove the muffler and cylinder covers. Remove the muffler cover by removing the lower phillips head screw, push in on the upper tab and lift off. Use a ¾ deep-set socket or combination wrench to remove the spark plug. Remove the cylinder cover screw and lift off the cover.

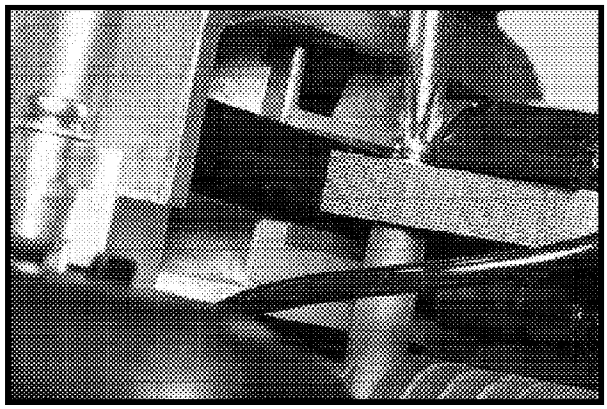


FIGURE 4

The rotor/module air gap must be correct if the ignition system is to work properly. If the air gap is too wide, the voltage output will be too low causing no output under compression or loss of spark after a short period of time or repeated changing of the spark plug. If the air gap is set too close, the rotor and module will suffer mechanical damage. The ignition module air gap should be set to 0.012 to 0.016 . The appropriate shim is P/N PS24306.

Rotate the rotor magnets 90° away from the module.

Loosen the 2 module retaining screws. Place the shim between the rotor and module. Rotate the rotor so the magnets on the rotor are aligned with the module core legs.

With the shim still located between the core legs and rotor magnets, tighten both module mounting screws with a phillips bit or screwdriver. Use a torque wrench to tighten the 2 screws to 65-80in. lbs. (7.0-8.8Nm).

Rotate the rotor to remove the air gap shim.

To access the rotor, remove the top 2 fuel tank mounting screws, 3 blower housing screws and remove the blower housing.

To remove the rotor, rotate the piston to bottom dead center and insert a length of rope into the spark plug hole to act as a piston stop. Remove the bolt holding the rotor onto the crankshaft.

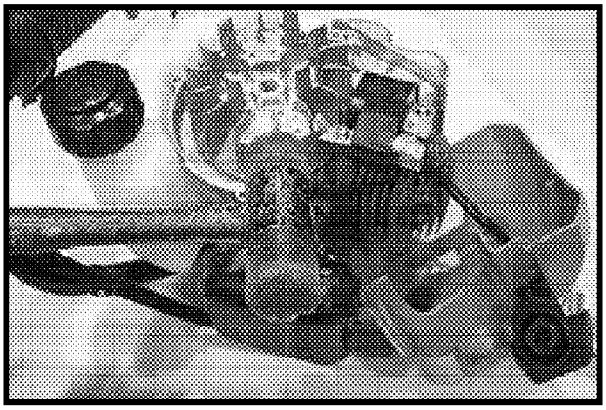


FIGURE 5

Tap on the counterweight side of the rotor with a plastic or rawhide mallet to free it from the crankshaft.

The rotor contains magnets, which under normal operating conditions should not require any maintenance except for occasional cleaning.

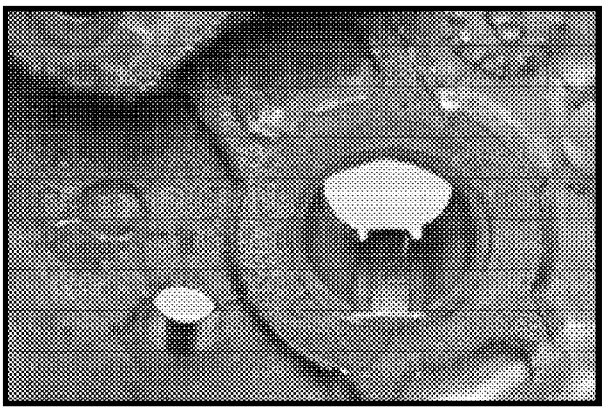


FIGURE 6

The rotor may affect the operation of the ignition system if the key has been sheared, the rotor/module air gap is too wide or if permanent magnetism has been reduced or removed (by striking the rotor magnets with a mallet). A sheared rotor key will allow the spark plug to fire (even under compression) but the unit will not start. If this condition exists, remove the rotor and check the cast-in key and keyway area of the rotor and crankshaft.

Low magnetic field strength in the rotor magnets will reduce output and may cause loss of fire under compression.

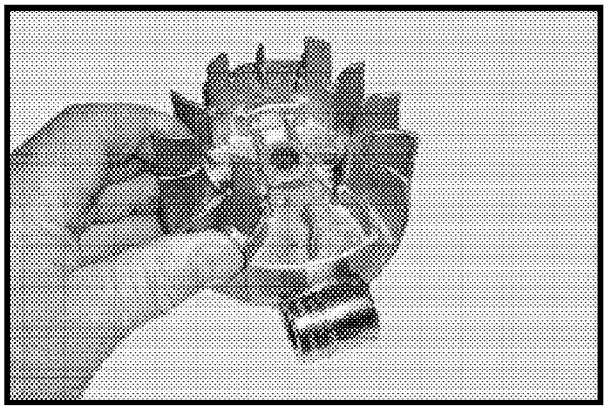


FIGURE 7

Test the rotor magnets by placing a large socket on the rotor magnets. Shake the rotor. The magnets should hold onto the socket unless the field is weak.

Missing fins or damage to the rotor is not acceptable. Always replace the rotor if the rotor fins are missing or if there is visible damage to the rotor.

Caution

Operating an engine with a damaged rotor could result in a rotor explosion and possible injury.

If the module has been found to be defective, remove the spade connector from the grounding tab. Using a Phillips bit or screwdriver remove the 2 screws and lift the module off of the mounting bosses.

DISASSEMBLEY AND INSPECTION.

If testing has indicated the fuel system is causing the problem, perform the following tests to narrow the area of inspection.

These units are designed to run in virtually any position. For that reason the fuel tank venting system is designed so that, no matter how the unit is positioned, no fuel can escape and spill on the operator or ground. The venting system will allow air to enter in, in order to compensate for a vacuum, but will not allow fuel or pressure to escape. The fuel systems are designed with this pressure accounted for. It is perfectly normal for pressure to build within the fuel tank when the unit is operated. If, however, this vent is plugged and will not allow air to enter the tank, a vacuum could form in the tank. The engine would starve for fuel and stop running after a short time. A good indication of this would be that the unit could be restarted after the fuel cap was opened slightly to relieve the vacuum. Replace the cap if the hedge trimmer is starving for fuel as previously described, or, if the cap leaks and will not hold fuel and pressure within the tank.

Remove the fuel cap and drain all the fuel from the fuel tank. Check the fuel lines and fuel filter.

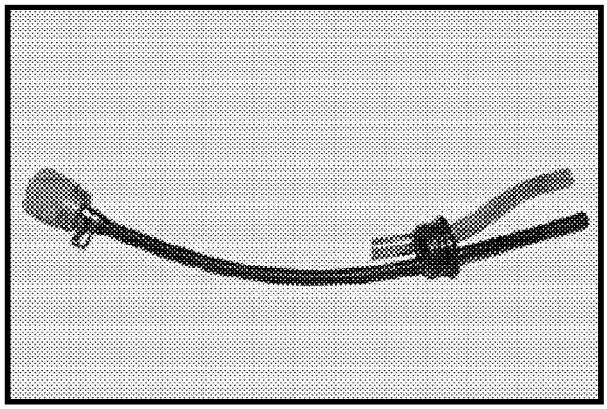


FIGURE 8

Remove the grommet and fuel tube assembly from the fuel tank to gain access to the flexible fuel pickup line and fuel filter. Inspect the fuel filter for buildup of dirt and debris. If the filter is discolored or appears yellow; or if dirt streaks are visible, replace the filter. A fuel filter that is loaded with dirt will cause hard starting and loss of power. Examine the fuel line for kinks, tears or pinhole leaks. The line should be flexible and should spring back to its original shape if compressed. Replace the line or fuel tube assembly if it is hard or stiff to the touch. A hard or stiff fuel line cannot flex to follow the fuel in the tank when the hedge trimmer is run in varying operating positions. Inspect the fuel line, overflow line and fuel pick up line for signs of abrasion or pinhole leaks. Possible holes or fuel line leaks may be present if the unit indicates lean running, or, will only start on choke even after the engine is warm. You may use a pressure tester, Green Machine P/N 94197 to pressure test the fuel lines or tubes and determine the source of the leaks. The fuel tube assemblies and grommets are easily reinstalled in the fuel tank by threading the tubing though the grommet and pushing the grommet back into the hole in the tank wall.

PRIMER BULB

In order to test the integrity of the primer bulb; first disconnect the high-tension lead from the spark plug.

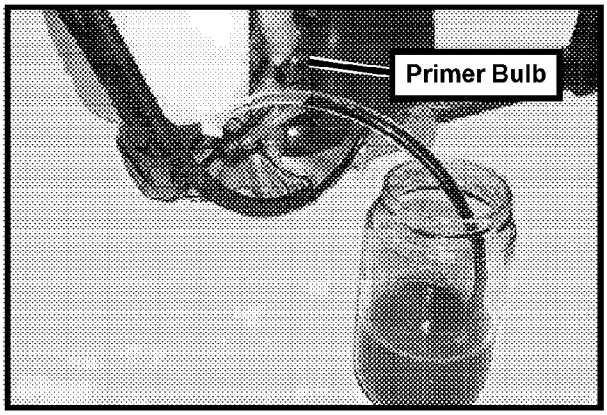


FIGURE 9

Remove the fuel filter. Push a straight fitting onto the fuel pickup line and connect a length of clear plastic tubing to the straight fitting. Add some colored liquid (colored water, coffee, etc.) to a small open container. Place the other end of the clear plastic line in the liquid. Push the primer bulb a few times. Look for the colored liquid to travel up the clear tubing toward the carburetor. If the colored liquid moves up the tubing, **STOP** pushing the primer bulb before the liquid reaches the carburetor. This indicates that the primer bulb is pumping to the carburetor and the primer side of the carburetor is working. If the colored liquid does not move up the tubing the problem may be in the line, primer bulb, or the primer bulb base plate check valve.

CRANKCASE PULSE INTEGRITY

While the clear line is still in the colored liquid close the choke on the carburetor.

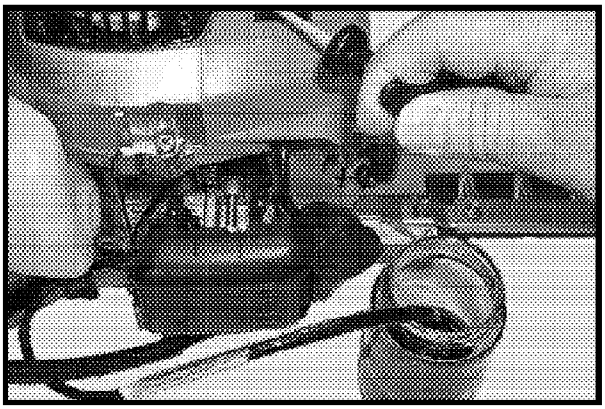


FIGURE 10

Pull the starter grip briskly. Look for the colored liquid to begin to travel up the clear tubing toward the carburetor. If the colored liquid moves up the clear tubing, **STOP** pulling the starter grip before the liquid reaches the carburetor. This indicates that 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 does not move up the clear tubing the problem may be in the carburetor fuel pump, the inlet screen, inlet needle and seat area, pulse hole, etc. and will require further testing to determine the cause of the problem.

PRESSURE TESTING THE CARBURETOR

Pressure testing the carburetor will test the fuel inlet line, pump cover and gasket integrity, fuel pump inlet and outlet check valves and the fuel inlet screen.

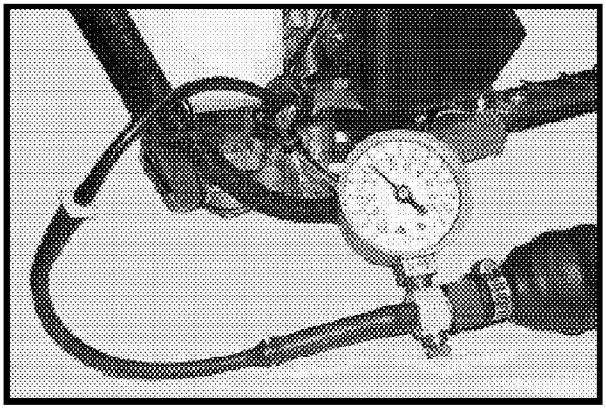


FIGURE 11

Connect the pressure tester (P/N 94197) to the straight fitting in previous tests. Pressurize the carburetor to 5 to 6 psi. The fuel pump side of the carburetor should hold pressure.

If not, push the fuel inlet line off the carburetor inlet fitting and attach the pressure tester line to the carburetor fitting. Once again pressurize the carburetor. If it now holds pressure, the fuel line has a pinhole or tear and must be replaced.

Pressurize the carburetor again. If it does not hold pressure, tighten the cover and primer base retaining screws. Once again pressurize the carburetor and **REPLACE** if it does not hold pressure.

DO NOT ATTEMPT TO REBUILD THE CARBURETOR.

AIR & FUEL SYSTEM

AIR FILTER INSPECTION

Remove the air filter cover by pushing the tab inward on the right side while pulling on the cover.

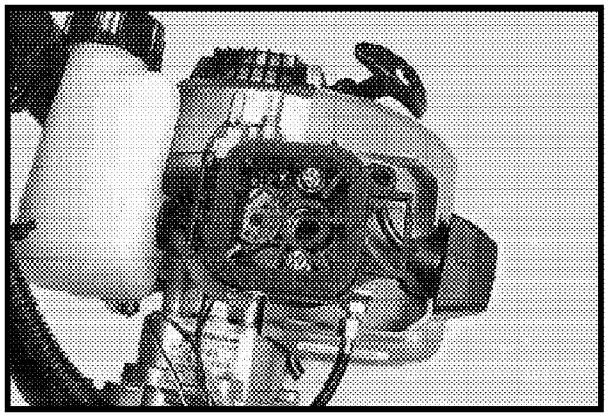


FIGURE 12

The air filter housing is fitted with a reusable foam element. If a buildup of dust can be seen on the filter, it must be cleaned or replaced. Remove as much loose dust from around the filter as possible. Remove the foam air filter. Tap the filter firmly against a flat surface to loosen and remove the dust. After several cleanings the filter may be washed in warm soapy water. Rinse and dry before use.

CARBURETOR REMOVAL

The carburetor may be removed by first disengaging the throttle cable. Use a flat blade screwdriver to push the fuel and return lines off of the carburetor fittings.

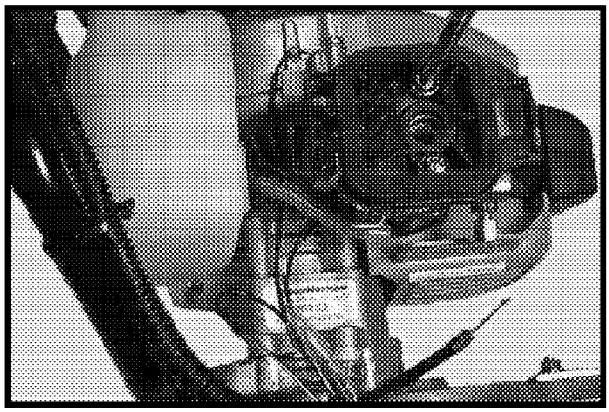


FIGURE 13

Remove the 2 Phillips head screws and lift off the air filter base plate, cable bracket, carburetor and gaskets.

HEAT DAM TESTING

To test for pulse through the heat dam, place 1 or 2 drops of oil in the carburetor heat dam pulse hole.

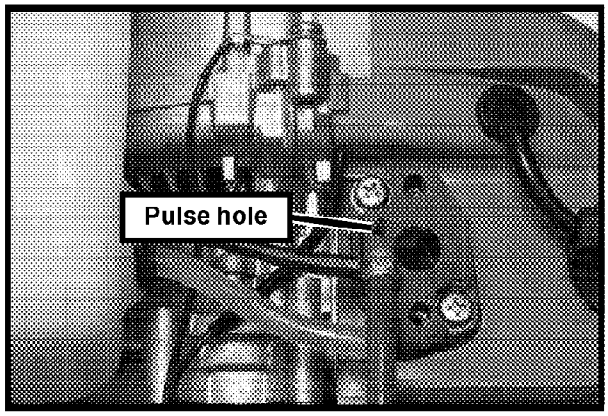


FIGURE 14

Pull rapidly on the starter grip. The oil should be pushed out of the pulse hole, indicating that the passageway is clear. If there is no pulse, remove the 2 phillips head heat dam retaining screws and washers, heat dam and gasket.

Examine the heat dam pulse passageway to find the problem.

EXHAUST SYSTEM

The cylinder fins and housings should be checked periodically and cleaned to help prevent the engine from overheating.

The unit should never be operated without the muffler in place. If local regulations require the use of a Spark Arrestor Screen check its condition frequently and clean or replace it, if it is clogged or deteriorated. A clogged spark arrestor screen will cause hard or no starting, loss of power, and lack of high-speed operation.

Use a 5/32 or 4MM hex key to remove the 2 socket head screws securing the muffler.

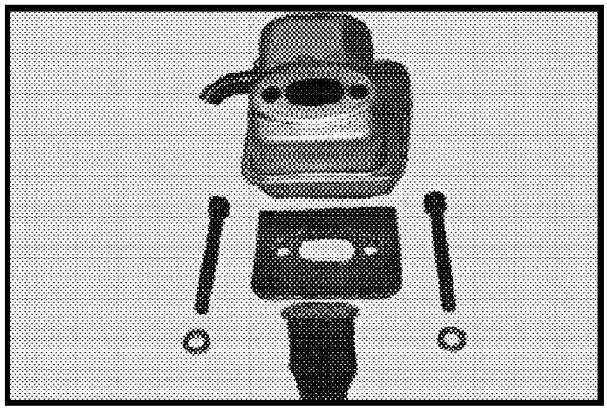


FIGURE 15

The muffler is supplied as a one-piece assembly. The only service parts available are the muffler, spark arrestor, gaskets and fasteners. The spark arrestor screen can be cleaned or replaced.

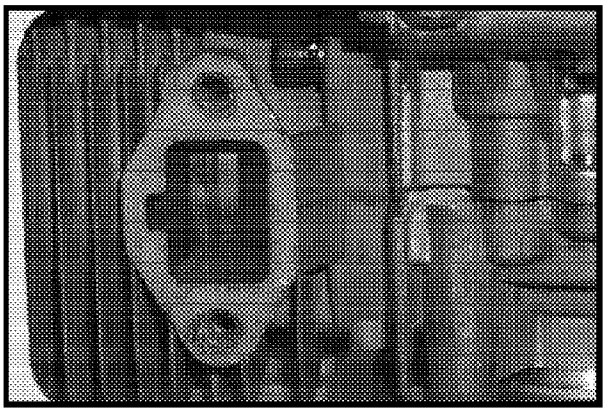


FIGURE 16

Examine the cylinder exhaust port, piston, and piston ring for carbon build up.

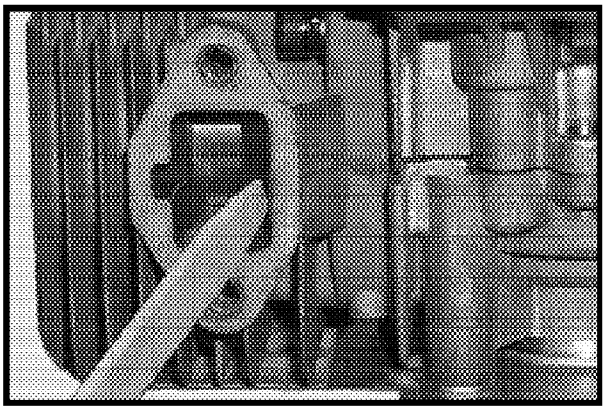


FIGURE 17

If the exhaust port is clogged, rotate the piston until it fully covers the exhaust port, and then carefully remove the carbon with a plastic or wooden scraper. Do not scratch the piston or damage the edges of the exhaust port. Use compressed air to blow the carbon particles out of the cylinder.

CRANKCASE/CYLINDER PRESSURE AND VACUUM TESTING

Pressure and vacuum testing the crankcase and 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 or gaskets will cause hard starting, erratic idling, poor acceleration and overheating. Pressure and vacuum testing is the best way to determine where a leak is occurring.

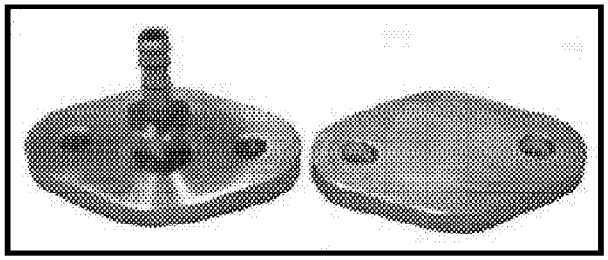


FIGURE 18

Begin pressure testing the crankcase by closing off both the intake and exhaust ports with sealing plates and rubber gaskets. Note that the intake sealing plate has been drilled and tapped. A barbed fitting has been installed in the intake plate. Use the templates to make these sealing plates. They are typically cut from aluminum or Plexiglas, using a band saw or jigsaw. They can be drilled with an electric drill or drill press.

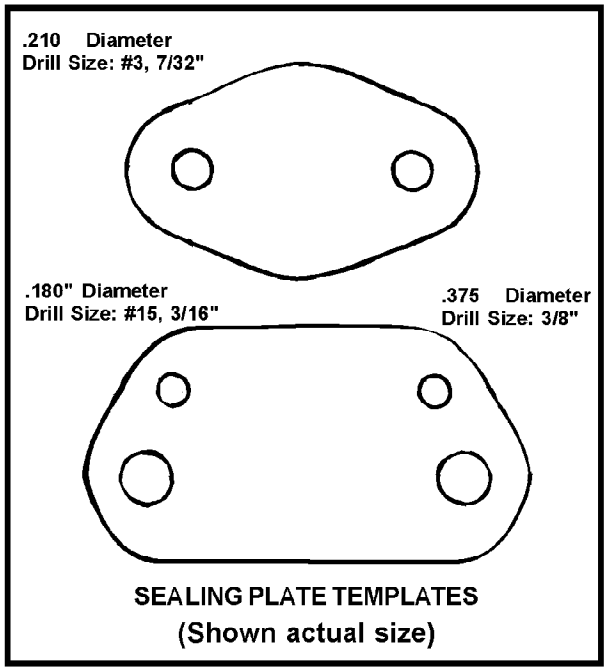


FIGURE 19

Use a Pressure Tester (P/N 94197) to introduce 5 to 6 lbs. of pressure into the crankcase and cylinder.

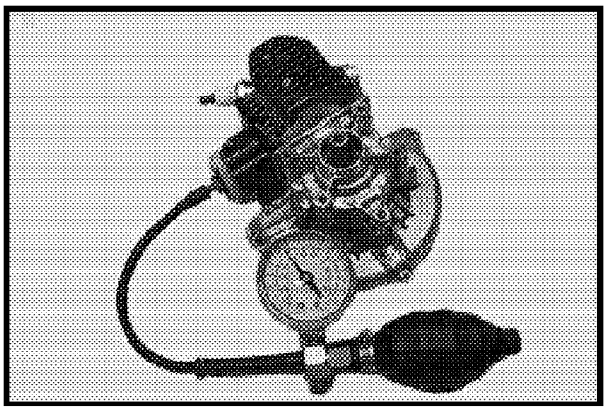


FIGURE 20

The crankcase should hold pressure or leak at a rate not to exceed 1 lb./min.

A drop in pressure above specified levels indicates an air leak.

To find out where an air leak is occurring, paint or spray a soap and water solution on the suspected areas (gaskets, seals, etc.) and watch for bubbles.

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.

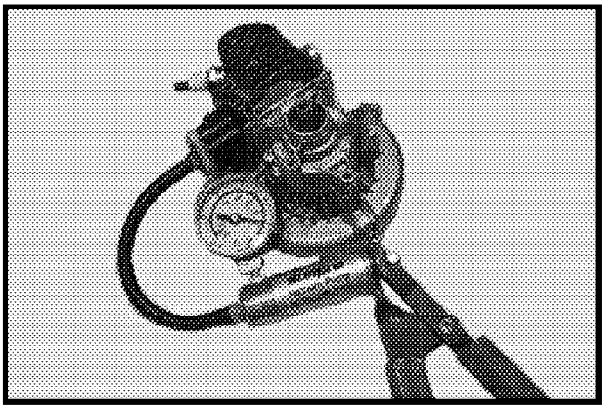


FIGURE 21

With the intake and exhaust sealing plates in place, install a vacuum tester (P/N A-08279) and actuate the vacuum tester until the gauge needle reaches 5 to 6 inches of mercury.

This is generally the point of maximum negative pressure reached during wide open throttle operation.

Vacuum loss should not exceed 4 of mercury in 1 minute. If leak down occurs, replace the crankshaft seals.

Vacuum testing of the crankshaft seals 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.

STARTER

DISASSEMBLY AND REPAIR

Use a phillips screwdriver to remove the 4 screws holding the starter assembly to the blower housing.

CAUTION

Eye protection should always be used when repairing or adjusting the starter mechanism.

Be careful not to dislodge or pull up the spring coils or the spring will fly out. If it does fly out, it can inflict injuries.

DO NOT let partially assembled starters lie about where they can be handled by the unwary.

If the rope is to be replaced, use your thumb to apply pressure to the pulley and cut the rope just below the grip. Slowly relieve the tension on the spring.

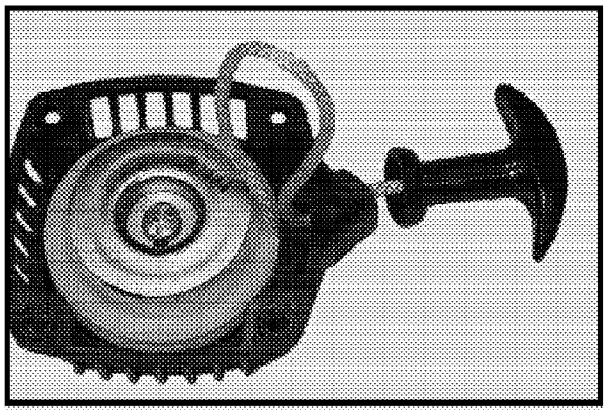


FIGURE 22

If the rope is **NOT** going to be replaced lay the starter housing down flat. Pull approximately 10 of rope out of the starter housing. Align the notch in the pulley flange with the rope exit hole. Place your thumb on the pulley to keep it from turning. Pull the slack rope back through the starter housing to form a loop. Place the loop of rope closest to the pulley into the notch. Apply pressure on the rope in the notch while **SLOWLY** unwinding the pulley clockwise until the spring tension is relieved.

Remove the Plastite screw securing the pulley to the pulley post.

Lift the washer and dog assembly away from the pulley.

Jiggle the pulley free (from the spring housing) and lift it off the pulley post.

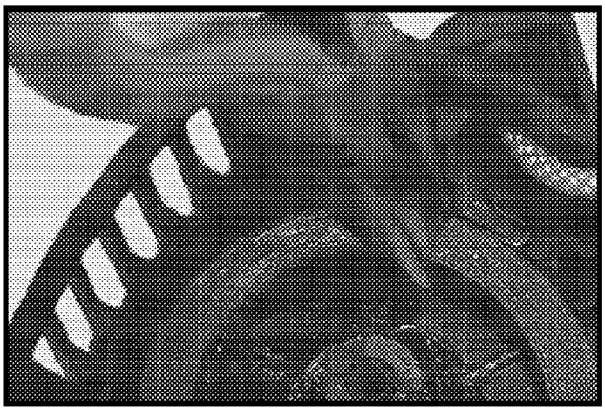


FIGURE 23

If the rewind spring is to be replaced, use needle nose pliers to grasp the spring. Carefully lift the rewind spring from the starter housing.

Rewind the new spring in a counter-clockwise direction.

Lightly grease the starter housing pulley post with multipurpose grease prior to assembly.

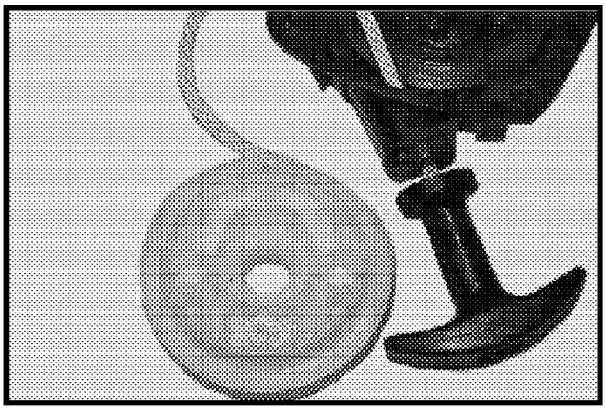


FIGURE 24

If the rope is to be replaced, thread the new rope through the pulley and knot the end of the rope. Pull the knot tight into the pulley.

STARTER

Put the free end of rope through the eyelet in the housing and through the starter grip.

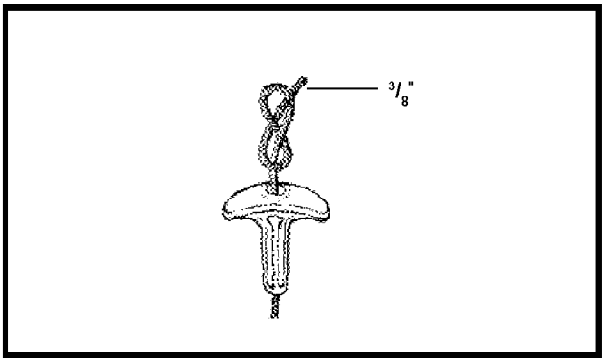


FIGURE 25

Once the rope is through the grip, tie a figure 8 knot (as shown) leaving approximately 3/8 above the knot after the knot has been set or pulled tight. Curl the pigtail, or length of rope above the knot, around the knot. Pull the knot into the grip.

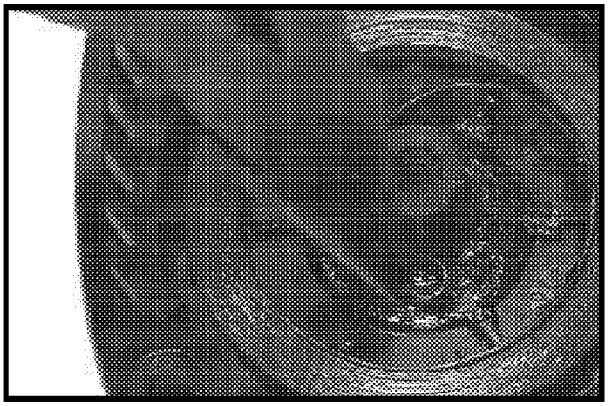


FIGURE 26

Place the pulley in the housing and press down on the pulley while turning the pulley back and forth to engage the spring hook. If the inner spring hook will not engage the pulley, carefully reshape the spring hook by bending it with needle nose pliers until it engages the pulley.

Replace the dog assembly, cupped washer and screw.

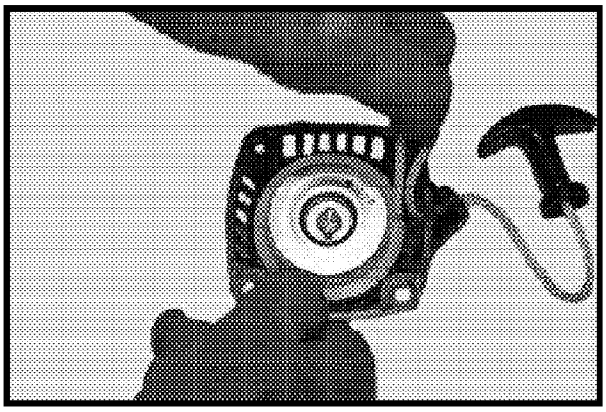


FIGURE 27

For proper recoil operation, 2 to 3 pre-winds on the recoil spring are required. Pull 10 of slack rope back into the housing to form a loop. Put the loop in the pulley notch and wind the pulley in a counter-clockwise direction 3 to 4 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 pulley is released, all of the rope should rewind back into the starter housing.

Proper spring coil tension must now be tested.

With the starter fully assembled, pull the starter rope as far as possible out of the housing. Hold the pulley from turning and recoiling with your thumb while switching your other hand from the starter grip to the rope; as close to the rope eyelet as possible. Continue to hold the rope fully extended, grasp the pulley and turn it counterclockwise. If the pulley will not rotate, the spring is bottoming out.

Release 1 pre-wind or revolution of the pulley and repeat this check.

If the spring does not bottom out and you can turn the pulley more than 1 turn, the spring is not tight enough.

Add 1 revolution of the pulley counterclockwise, then, repeat the check.

This check of the recoil spring tension will assure that the repairs that you make to the starter will be lasting ones. It will maximize the life of the rope, spring and other components.

ENGINE DISASSEMBLY

Separate the handle and gear case assembly from the engine.

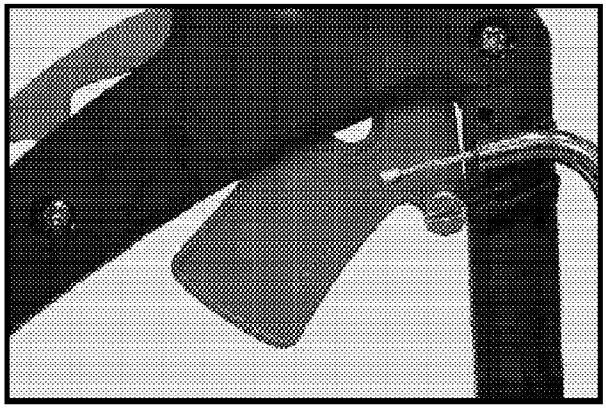


FIGURE 28

On the **GH24** disconnect the ignition switch lead wire at the connecting junction under the fuel tank. Use a Phillips head screwdriver to remove the screw and cable holder attached to the rear handle. Remove the throttle cable from the throttle lever. Remove the bolt and ground wire from the under side of the handle. Remove the remaining 2 bolts retaining the gear case to the engine.

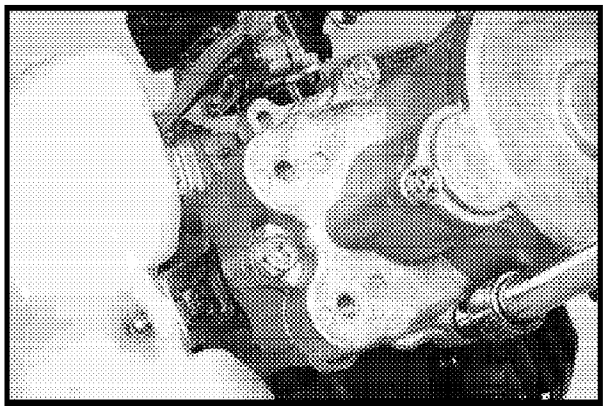


FIGURE 29

On the **GH30** disconnect the ignition switch lead wire at the connecting junction. Remove the Phillips head screw and the ground wire from the blower housing. Remove the throttle wire from the carburetor lever and pull the wire and jacket out of the adjusting assembly. Remove the 3 bolts that hold the engine to the gear case.

Remove the 3 fuel tank retaining screws and lift the tank away from the engine.

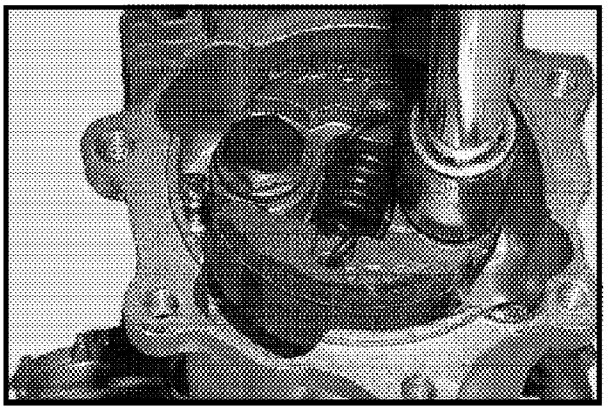


FIGURE 30

To remove the clutch, first rotate the piston to bottom dead center and insert a length of rope into the spark plug hole to act as a piston stop. Remove the 2 bolts holding the clutch to the clutch holder.

Service note: Make sure the LO is facing out when you re-assemble the clutch to the clutch holder.

Loosen the clutch holder retaining bolt counterclockwise 1/2 turn.

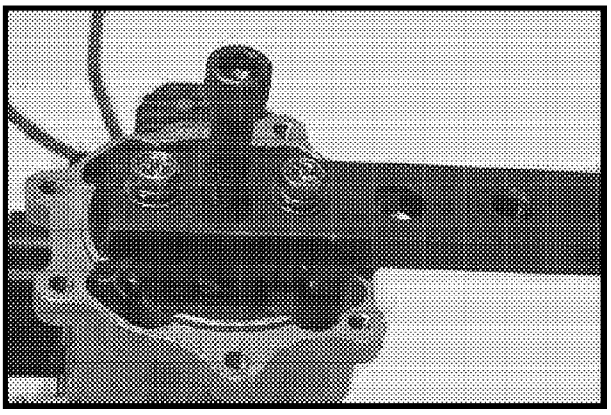


FIGURE 31

Use a puller (Green Machine P/N A98059) and the appropriate length 6MM screws, to free the clutch holder from the crankshaft taper. Remove the bolt and the clutch holder.

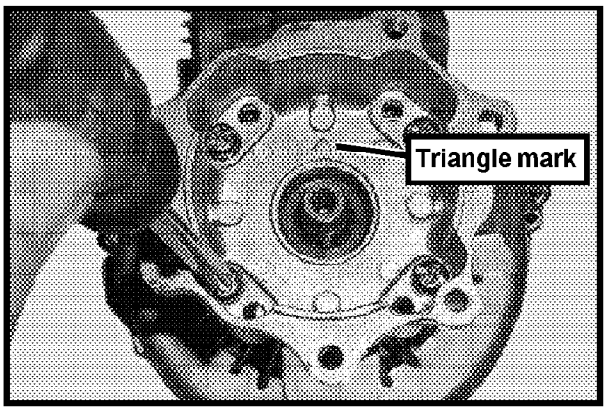


FIGURE 32

Note the location of the clutch housing and then remove the 4 phillips head screws retaining the housing.

Use a 5/32 or 4MM hex key wrench to remove the cylinder screws.

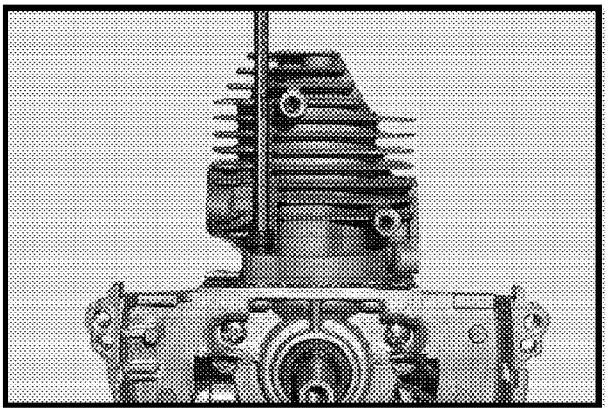


FIGURE 33

Carefully lift the cylinder off the crankcase. It may be necessary to use a back and forth rocking motion to free the cylinder from the crankcase and gasket. Then, pull the cylinder off the piston assembly and free of the crankcase.

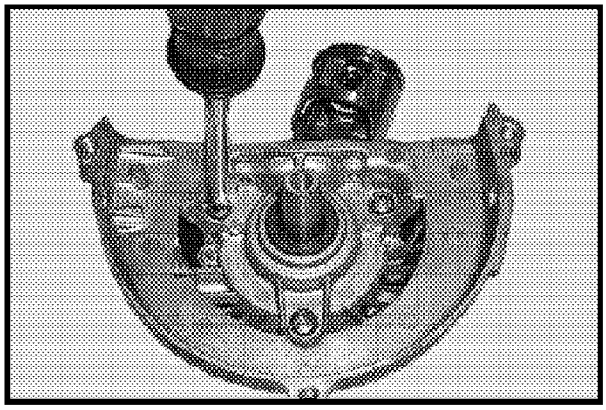


FIGURE 34

Remove the Phillips head screws securing the crankcase halves. Split the crankcase by holding the small side of the crankcase while tapping on the end of the crankshaft with a plastic mallet. A puller may also be used to separate the crankcase halves.

With a plastic mallet tap on the end of the crankshaft to drive it out of the main bearing in the large crankcase half. An arbor press may also be used to remove the crankshaft from the crankcase half.

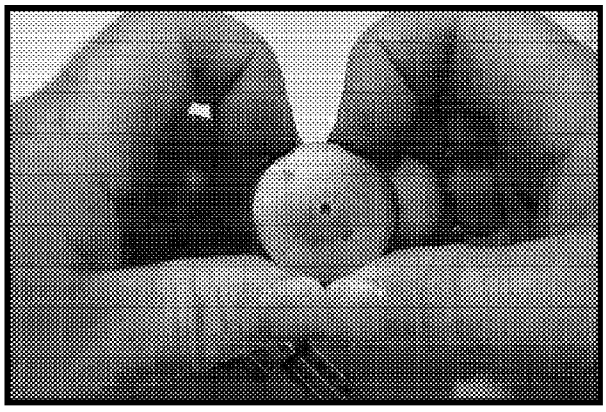


FIGURE 35

Remove the piston ring from the piston. Place your thumbs at the back of the piston ring, opposite the piston ring opening, or, end gap. Use your fingers to pry the 2 ends of the piston ring just far enough to clear the piston.

Examine the ring for thin spots or other signs of wear.

Check the piston ring groove for carbon build up. Carefully remove any carbon build up from the piston and piston ring groove. Take care not to scratch the piston during this cleaning process.

Use needle nose pliers to carefully remove the retaining ring that secures the wrist pin. Push the wrist pin out of the piston and connecting rod. Lift the piston from the end of the connecting rod and remove the wrist pin bearing.

INSPECTION OF THE INTERNAL ENGINE COMPONENTS

Examine the wrist pin for signs of wear, scoring or overheating. Place the bearing in the connecting rod and the wrist pin through the bearing. Rotate the wrist pin in the bearing. Take note if roughness or binding is felt while rotating the wrist pin.

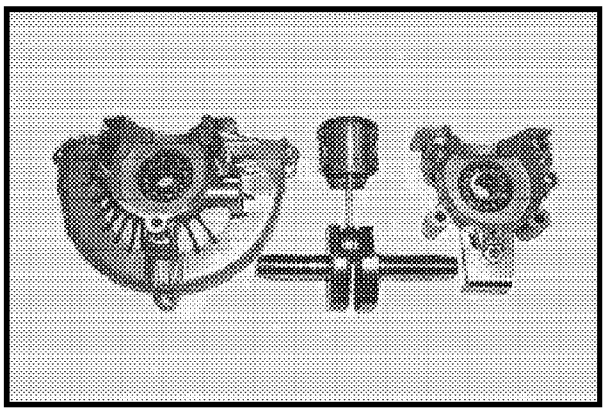


FIGURE 36

Rotate the main bearings to check for roughness or binding. Examine the crankshaft seals for nicks, cuts and abrasion. Replace the bearings if roughness or binding is felt while rotating the bearing. The main bearings and crankcase seals may be removed and installed by using an arbor press.

Inspect the piston, cylinder, connecting rod and crankshaft for signs of overheating such as bluing, discoloration, scoring or lack of lubrication.

Inspect the crankcase halves for stress cracks and the machined surfaces for flaws.

ENGINE ASSEMBLY

Before assembly begins remove all the old gasket material from the mating surfaces, clean the components and blow them off with compressed air.

De-glaze the piston with crocus cloth if varnish build up is present.

When installing the piston ring on the piston, align the ring end gap with the locating pin. Place the piston ring on top of the piston. Gently pry apart the open end of the piston ring just far enough to start the closed end of the piston ring over the piston. Push the closed portion of the piston ring until it seats in the piston ring groove. Slide the open ends of the piston ring until they slip into place. Care must be taken so as not to scratch the piston with the edge of the piston ring.

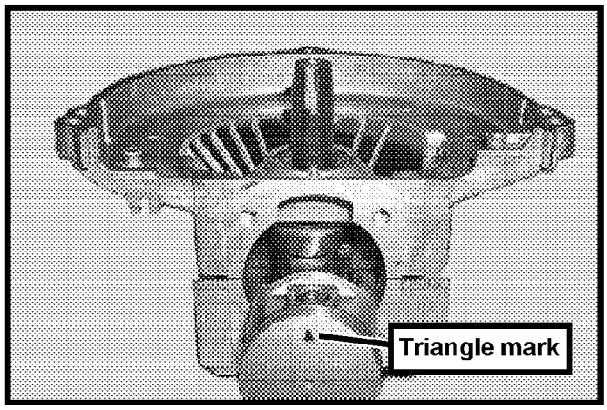


FIGURE 37

When installing a new piston, align the triangle mark on top of the piston so that it faces toward the end of the crankshaft with the key slot.

If a new piston assembly or piston ring is replaced the cylinder must also be de-glazed if it is to be re-used. A 50/50 mixture of kerosene and engine oil along with a silicon carbide, Christmas tree or ball type hone may be used to de-glaze the cylinder. Clean cylinder thoroughly after honing.

Lubricate the main and connecting rod bearings with 2-cycle engine oil. Install the key slotted end of the crankshaft assembly into the large crankcase half.

Use a new crankcase gasket and put the crankcase halves together. Use a torque wrench to tighten the screws to 33-37 in. lbs. (3.7-4.2 Nm).

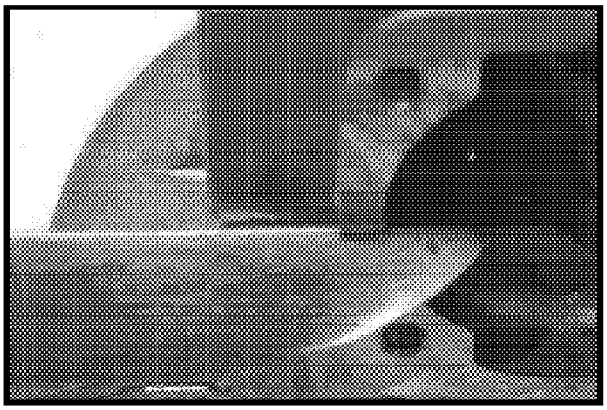


FIGURE 38

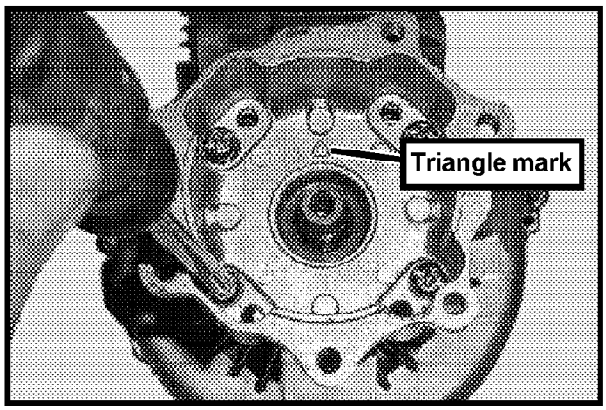


FIGURE 39

Trim off the excess crankcase gasket sticking out from the cylinder-mounting surface with a knife.

Place a new cylinder gasket on the crankcase.

Use an oiled cloth to clean and lubricate the cylinder walls, even if the cylinder is new. Be sure to face the module-mounting bosses toward the key slotted end of the crankshaft.

Lubricate the piston and piston rings with Green Machine 2-cycle engine oil.

Use your fingers to collapse the piston ring as you apply downward pressure on the cylinder. This will allow the cylinder to slide down over the piston.

Rotate the crankshaft to ensure that the piston moves freely in the cylinder bore. Apply thread-locking compound to the first few threads of each of the cylinder retaining screws.

Install and use a torque wrench to tighten the 2 cylinder screws to 62-78 in. lbs. (7.0-8.8 Nm).

Note the orientation of the clutch housing (triangle mark towards cylinder). Install and use a torque wrench to tighten the 4 phillips head screws to 36-44 in. lbs. (4.1-5.0 Nm).

Rotate the piston to bottom dead center and insert a length of rope into the spark plug hole to act as a piston stop. Install the clutch holder and use a torque wrench to tighten the bolt to 36-44 in. lbs. (4.1-5.0 Nm).

Install the clutch assembly by first placing the thick washers on the clutch holder mounting bosses. Lay the clutch assembly on top of the thick washers and secure the clutch with the 2 wave washers and bolts. Use a torque wrench to tighten the bolts to 65-87 in. lbs.(7.3-9.8 Nm).

Service note: Make sure the LO is facing out when you re-assemble the clutch to the clutch holder (See page 20, FIGURE 30).

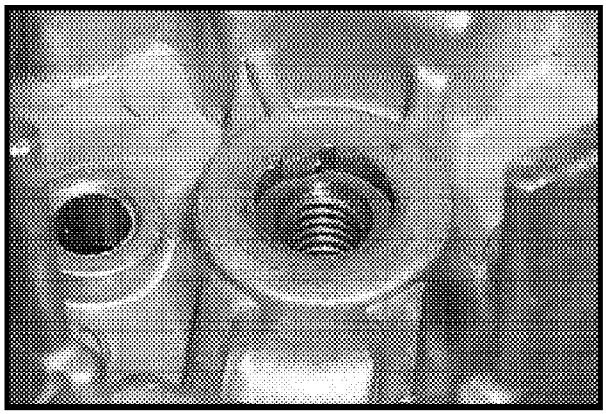


FIGURE 40

Install the rotor, aligning the cast-in key with the keyway on the crankshaft, and bolt. Use a torque wrench to tighten the bolt to 79-95 in. lbs. (8.9-10.7Nm).

Place the ignition module on the cylinder. Insert the 2 screws through the module and into the bosses on the cylinder. Leave the 2 screws loose enough so that the module can still slide to facilitate the air gap adjustment.

Check the routing of all wires

The ignition module air gap should be set to 0.012 to 0.016 .

Rotate the rotor so the magnets are 90° away from the ignition module. Place a plastic shim, P/N PS24306, over the magnets of the rotor.

Rotate the rotor and shim until the rotor magnets are directly under the ignition module legs.

Hold the ignition module against the shim and rotor and use a torque wrench to tighten the 2 screws to 62-78 in. lbs. (7.0-8.8Nm).

Remove shim. Install the blower and starter housing.

Apply thread-locking compound to the first few threads of each of the muffler retaining screws and install the muffler.

Install the heat dam, carburetor and the air filter assembly.

Install the cylinder and muffler covers and spark plug.

Install the fuel tank and fuel lines.

Torque all the fasteners to the proper specifications listed in the service guide and parts list.

THROTTLE HANDLE

HANDLE DISASSEMBLY SERVICING AND RE-ASSEMBLY GH24

To remove the handle from the **GH24** gear case, remove the screw and nut on the side case and pull the rear handle off of the gear case assembly.

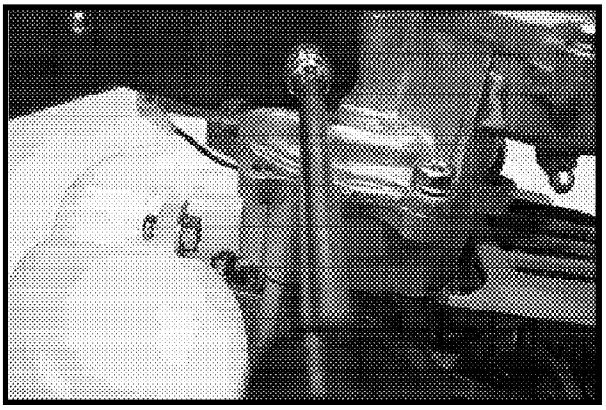


FIGURE 41

Remove the 2 screws holding the front handle onto the gear case.

Remove the 6 phillips head screws and nuts that secure the handle halves together. Carefully lift off the throttle lock side.

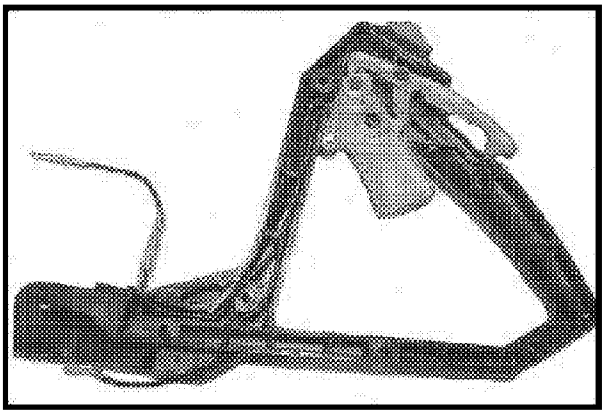


FIGURE 42

Take note of the wire and spring locations for re-assembly. The internal components of the control assembly can now be serviced or replaced as necessary.

Upon re-assembly be sure to place the trigger and trigger lock spring in the correct orientation for the components to perform properly.

Re-assemble the handle halves. Tighten the 6 phillips head screws to the proper specifications.

HANDLE DISASSEMBLY SERVICING AND RE-ASSEMBLY GH30

To remove the handle from the **GH30** gear case, remove the 2 bolts, nuts, washers, spacers, and isolators holding the rear anti-vibration handle onto the gear case.

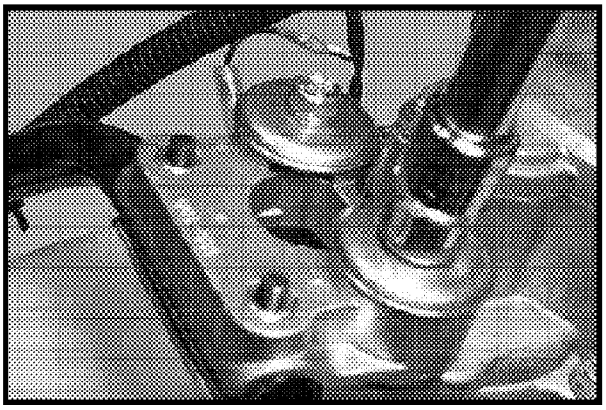


FIGURE 43

Remove the 1 bolt and nut holding the front handle onto the blade assembly.

Remove the grip clamp and the 2 phillips head screws holding the handle halves together.

Hold the safety latch against the throttle lock side and separate the handle halves.

THROTTLE HANDLE

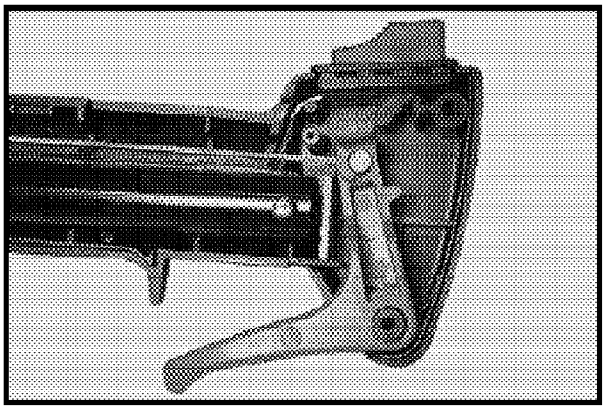


FIGURE 44

Take note of the wire and spring locations for re-assembly. The internal components of the control assembly can now be serviced or replaced as necessary.

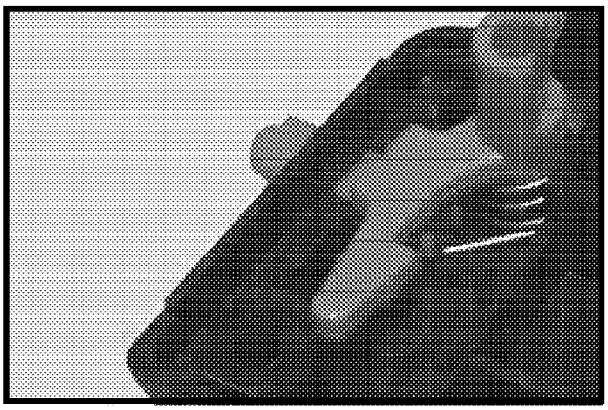


FIGURE 45

Upon re-assembly be sure to place the trigger and trigger lock spring in the correct orientation for the components to perform properly.

Hold the safety latch against the throttle lock side and re-assemble the handle halves.

Re-install the 2 phillips head screws and the grip clamp holding the handle halves together and tighten to the proper specifications.

GEAR CASE

DISASSEMBLY AND SERVICING

On the **GH30** remove the 3 nuts holding the debris collector onto the blade assembly.

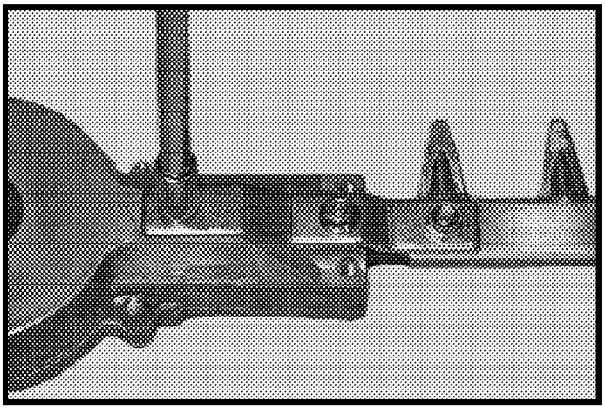


FIGURE 46

Remove the 3 nuts holding on the blade protector and reinforcing plate.

The **GH24** and the **GH30** utilize the same gear case assembly.

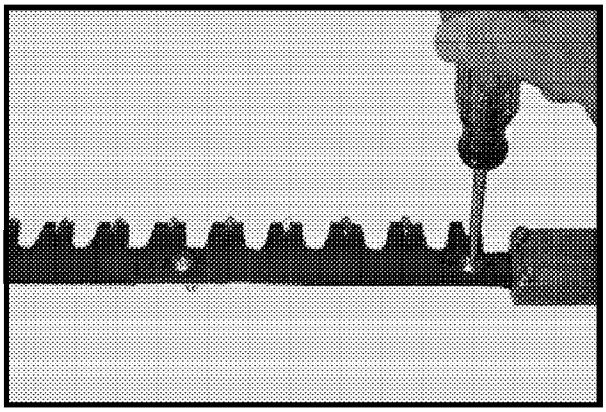


FIGURE 47

Remove the clutch drum by first tightening the blade screws.

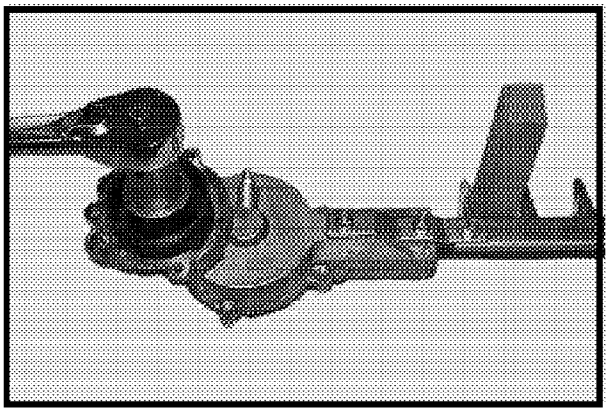


FIGURE 48

Turn the clutch drum counterclockwise with the special tool (Green Machine P/N UP03245).

Service note: If the blades move put a piece of wood between the cutters near the gear case end.

Remove the lower case cover by removing the 7 screws and lift it off.

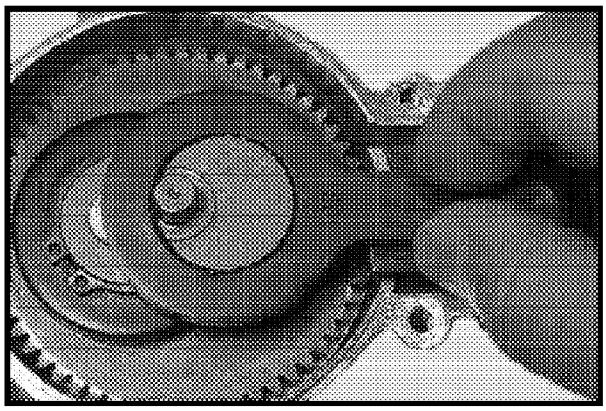


FIGURE 49

Service Note: Before removing the rods, apply a small amount of grease to the needles and turn the rod several times so the needles will not fall out of the rod when removed.

Remove the rod from the lower blade.

GEAR CASE

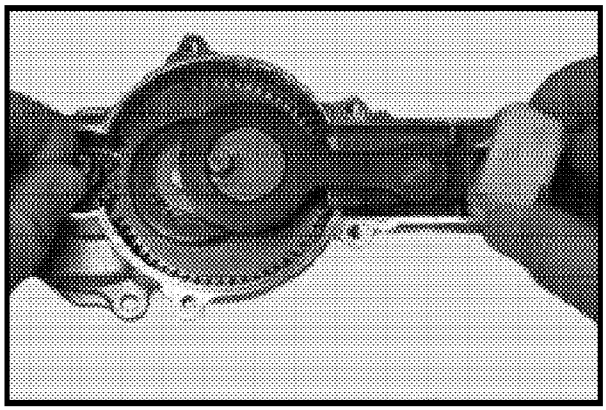


FIGURE 50

Remove the pinion gear and the felt seal. If the pinion gear is hard to remove, tap the pinion with a plastic hammer from the clutch side.

Remove the blade screws and remaining nuts. Note the proper location of the screws for re-assembly.

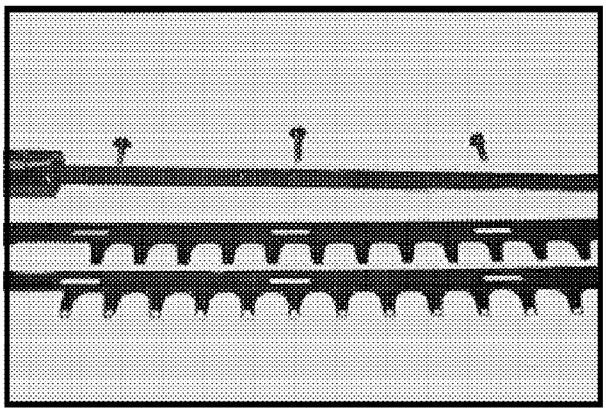


FIGURE 51

You can now remove the lower and upper blades.

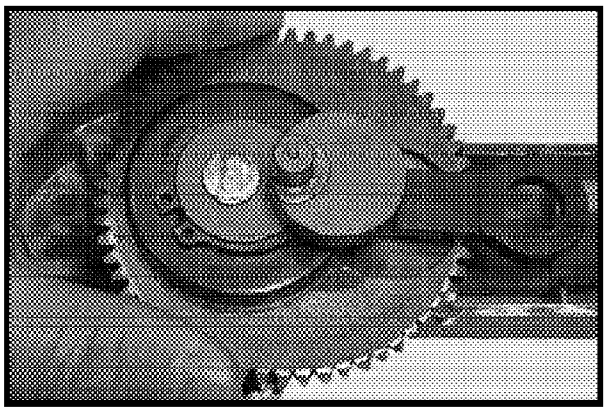


FIGURE 52

Lift the crank gear assembly from the upper case.

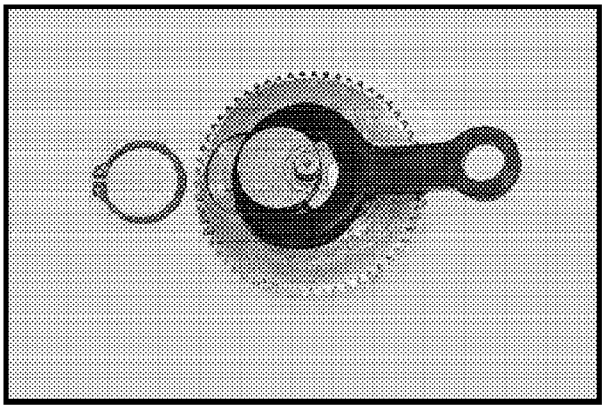


FIGURE 53

Remove the snap ring and rod from the crank gear.

Rotate all the bearings to check for roughness or binding. Replace if any roughness is felt.

BLADE SHARPENING

If the blade cutting edges are rounded and do not cut well, sharpen them before re-assembly.

Clamp the blade in a vise.

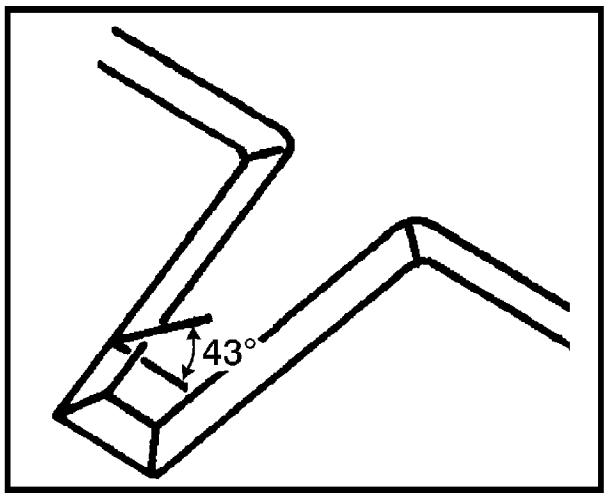


FIGURE 54

Sharpen the cutting edges of the teeth using a flat file. Keep a 43° cutting edge angle when sharpening the blades. Remove any burrs from the bottom of the blades. Check to be sure that the blade is flat and not warped.

RE-ASSEMBLY

Clean all parts to remove the old grease before re-assembly. Re-grease with multi-purpose grease (P/N 18453).

Install the rod and snap ring onto the crank gear.

Install the crank gear assembly into the upper case.

Replace the upper and lower blades.

Replace the blade screws.

Replace the pinion gear and the felt seal.

When replacing the rod, apply a small amount of grease to the needles so they will not fall out of the rod.

Replace the lower case cover and install the 7 screws.

Replace the clutch drum. First tightening the blade screws. Turn the clutch drum clockwise with the special tool (Green Machine P/N UP03245).

Service note: If the blades move put a piece of wood between the cutters near the gear case end.

Install the blade protector and reinforcing plate.

On the **GH30** re-install the debris collector onto the blade assembly.

Use a torque wrench to tighten all fasteners and components to the proper specifications listed in the service guide and parts list.

BLADE ADJUSTMENT

Blade adjustment procedures are identical for **GH24** and **GH30**.

Caution

Always wear leather gloves when handling cutting blades. Teeth are sharp. Make sure to stop the engine AND disconnect the spark plug wire before adjusting the blades.

Loosen the blade nuts.

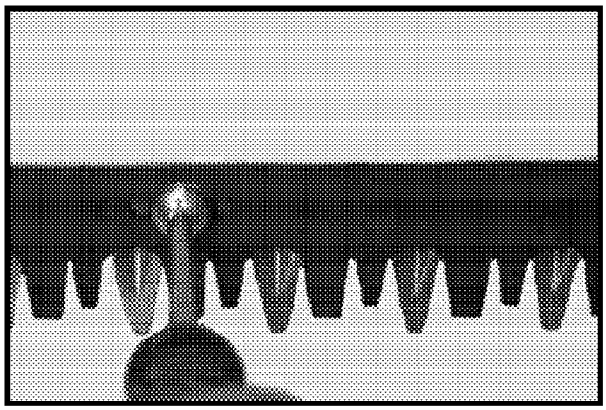


FIGURE 55

Turn the phillips head blade screws in lightly with a screwdriver until they stop turning (do not use force) and turn them back 1/4 to 1/2 turn.

GEAR CASE

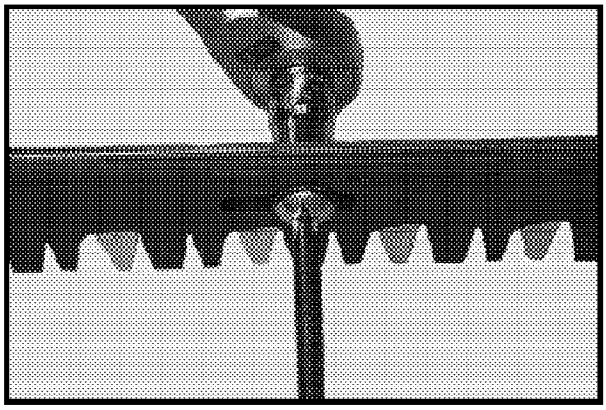


FIGURE 56

Hold the phillips head screw in place with a screwdriver and tighten the nut.

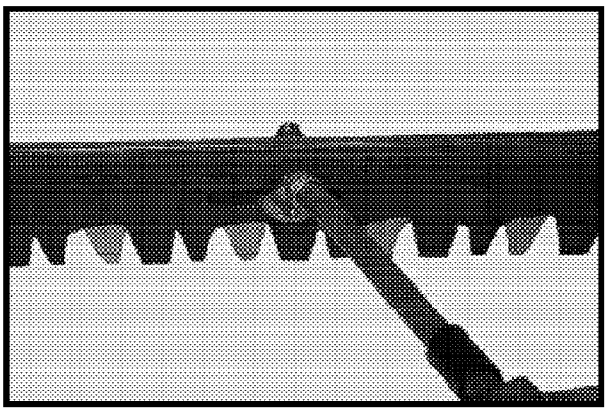


FIGURE 57

Lubricate the blades with light oil after adjustment.

Connect the spark plug wire and start the engine.

Operate the engine throttle on and off for a minute.

Caution: Stop engine and disconnect spark plug wire.

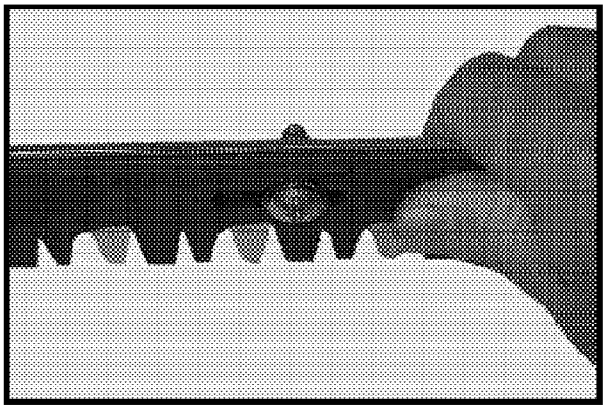


FIGURE 58

Lightly touch the blades with your hand.

If the blades are warm to the touch, but you can hold your finger to the blade, the adjustment was correct.

If the blade is too hot to continue to touch, turn back the screws another 1/4 turn.

Repeat this test procedure until the proper adjustment has been made.

NOTE: Blades that are too tight will result in premature wear and can cause clutch damage.

GENERAL MAINTENANCE

Preventive maintenance is the best way to insure that your Green Machine product will operate efficiently for many years.

A routine maintenance schedule is provided for the user in the operator s manual and in the appropriate service guide.

GEAR CASE

Apply multi-purpose grease (P/N 18453) to the gear case through the grease hole every 30 hours.

CARBURETOR ADJUSTMENT

Green Machine engines must comply with EPA (Environmental Protection Agency) and CARB (California Air Resource Board) regulations that require exhaust emission control. As a result, the carburetor s air/fuel mixture is non-adjustable.

If the factory installed carburetor does not deliver a satisfactory performance level, and the fault is not with other engine systems or components, replace the carburetor. Do not attempt to repair or modify the carburetor.

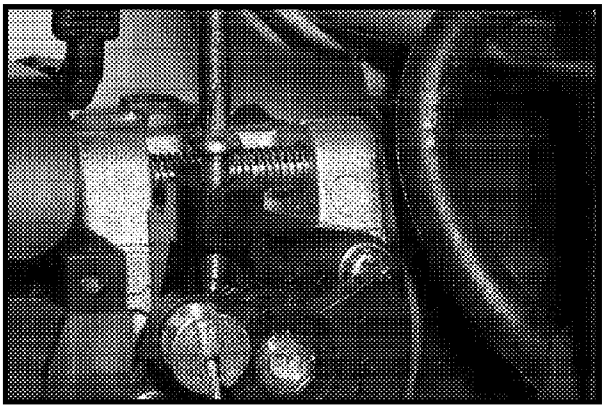


FIGURE 59

For Idle speed adjustment, turn the idle speed screw out until it no longer touches the carburetor throttle linkage. Then, turn the idle adjustment screw in, until it just touches the throttle linkage.

Next, turn the idle adjustment screw an additional 3 to 4 turns. Turning the idle screw in or clockwise will raise the idle speed. Turning the screw out, or counterclockwise will lower idle speed.

The proper idle speed is 2600RPM.

Warning

The cutting blades should not move when the trigger is fully released (engine idle).

Use a tachometer to check the idle speed.

When starting and running the engine, let the engine warm up for at least 5 minutes before making any adjustments.

Refer to the Specifications pages in the service guide for proper idle and full load speeds.

Adjust the idle speed so it does not exceed the maximum RPM as indicated in the specifications.

Follow the instructions in the operator s manual to assure safe and proper operation and use.

FUEL FILTER

A periodic inspection of the fuel filter is needed to insure proper operation.

Use a wire hook to pull the fuel filter through the fuel tank opening.

Inspect the fuel filter for buildup of dirt and debris. If the filter is discolored or appears yellow; or if dirt streaks are visible, replace the fuel filter.

GENERAL MAINTENANCE

AIR FILTER

Remove the air filter cover by pushing the tab inward on the right side while pulling on the cover.

The air filter housing is fitted with a reusable foam element. If a buildup of dust can be seen on the filter, it must be cleaned or replaced. Remove as much loose dust from around the filter as possible. Remove the foam air filter. Tap the filter firmly against a flat surface to loosen and remove the dust. After several cleanings the filter may be washed in warm soapy water. Rinse and dry before use.

MUFFLER EXHAUST PORT

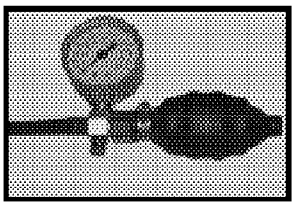
The exhaust port can become clogged with carbon. Remove the carbon by scraping and tapping gently with a screwdriver or similar tool.

FIGURE 60

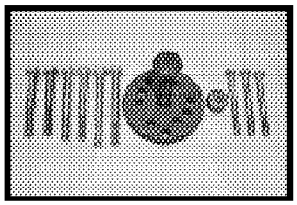
Caution

Do not allow carbon particles to enter into engine ports.

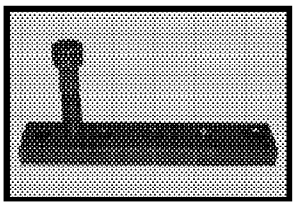
SPECIAL TOOLS



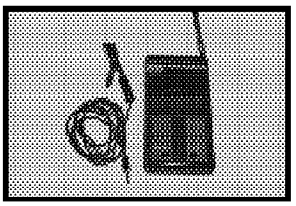
94197
Carburetor / Crankcase
Pressure Tester



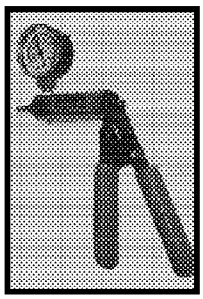
98488
Rotor Removal Tool
(various units)



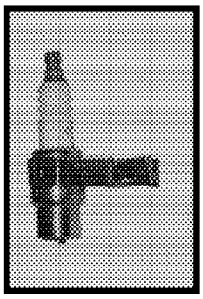
A98059
Removal Tool
Starter Cup / Clutch Holder
(various units)



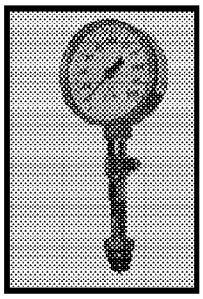
18416
Digital Tachometer



A08279
Vacuum Tester



JA313164
Spark Tester



94194
Compression Tester

NOTES

NOTES