COBRA

Engines
Original Instructions

Model: DG350

Henton and Chattell Ltd: London Road, Nottingham NG2 3HW. UK.

CONTENTS

1. INTRODUCTION

Thank you for purchasing our engine. We want to help you to get the best results from your new engine and operate it safely. This manual contains information on how to do that; please read it carefully before operating the engine.

This manual should be considered as a permanent part of the engine and should remain with the engine if resold.

Review the instructions provided with the equipment powered by this engine for any additional information regarding engine startup, shutdown, operation, adjustments or any special maintenance instructions.

2. SAFETY MESSAGES

Your safety and the safety of others are very important. We have provided important safety messages in this manual and on the engine. Please read these messages carefully.

A safety message alerts you to potential hazards that could hurt you or others. Each safety message is preceded by a safety alert symbol  and one of three words, **DANGER, WARNING, or CAUTION.**

These signal words mean:

 **DANGER:** You WILL be KILLED or SERIOUSLY HURT if you don't follow instructions.

 **WARNING:** You CAN be KILLED or SERIOUSLY HURT if you don't follow instructions.

 **CAUTION:** You CAN be HURT if you don't follow instructions.

Each message tells you what the hazard is, what can happen, and what you can do to avoid or reduce injury.

3. SAFETY INFORMATION

Understand the operation of all controls and learn how to stop the engine quickly in case of emergency. Make sure the operator receives adequate instruction before operating the equipment.

Your engine's exhaust contains poisonous carbon monoxide. Do not run the engine without adequate ventilation, and never run the engine indoors.

The engine and exhaust become very hot during operation. Keep the engine at least 3 feet (1 meter) away from buildings and other equipment during operation. Keep flammable materials away, and do not place anything on the engine while it is running.

4. COMPONENT&CONTROL LOCATION

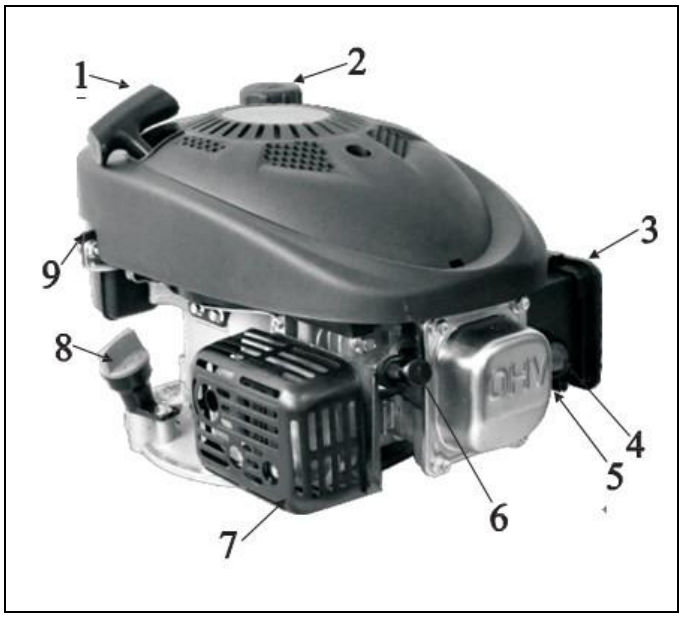

Fig. 1

1. Starter grip	2. Fuel cap	3.Air filter
4. Primer bulb	5. Carburetor	6.Spark plug
7. Muffler	8. Oil filter cap/dipstick	9.Fuel tank

5. PRE-OPERATION CHECKS

For your safety, and to maximize the service life of your equipment, it is very important to take a few moments to check the engine condition before operating Be sure to take care of any problem you find, or have your servicing dealer to correct it before you operate the engine.

WARNING: Improper maintenance to this engine, or failure to correct a problem before operation, can cause a malfunction in which you can be seriously hurt or killed. Always perform a preparation inspection before each operation, and correct any problem.

Always check the following items before you start the engine:

1. Fuel level
2. Oil level
3. Air cleaner
4. General inspection: Check for fluid leaks and loose or damaged parts.
5. Check the equipment powered by this engine.

Review the instructions provided with the equipment powered by this engine for any precautions and procedures that should be followed before engine startup.

6. OPERATIONS

6.1 SAFE OPERATING PRECAUTIONS

Before operating the engine for the first time, please review the SAFETY INFORMATION section on page 3 and the PRE-OPERATION CHECKS above.

WARNING: Carbon monoxide gas is toxic. Breathing it can cause unconsciousness and even kill you. Avoid any areas or actions that expose you to carbon monoxide.

Review the instructions provided with the equipment powered by this engine for any safety precautions that should be observed with engine startup, shutdown, or operation.

6.2 STARTING THE ENGINE

a) Push the red primer bulb 3-5 times. (Fig.2A)

Note：Priming is usually unnecessary when restarting a warm engine.

b) Standing behind the unit, grasp the brake control handle and hold it against the upper handle. (Fig 2B)

c）Pull the starter grip slowly until resistance is felt and then pull rapidly to avoid kickback.

WARNING: If you push the primer bulb too many times, excessive fuel will flood the carburetor and the engine will be difficult to start.

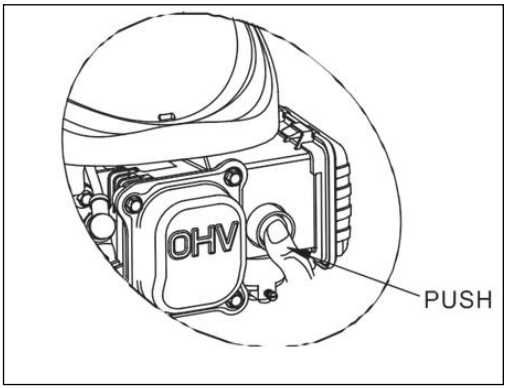

Fig. 2A

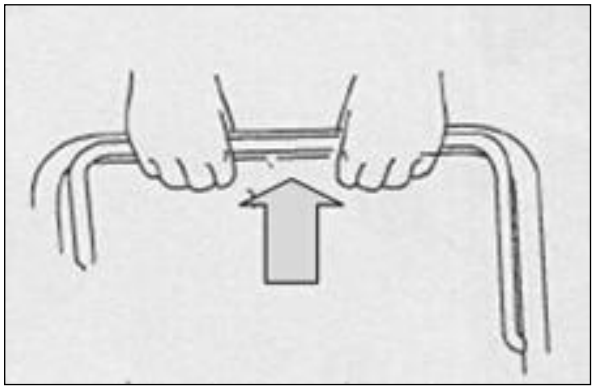

Fig. 2B

CAUTION: Do not allow the starter grip (1) to snap back against the engine. Return it gently to prevent damage to the starter. (See Fig. 3)

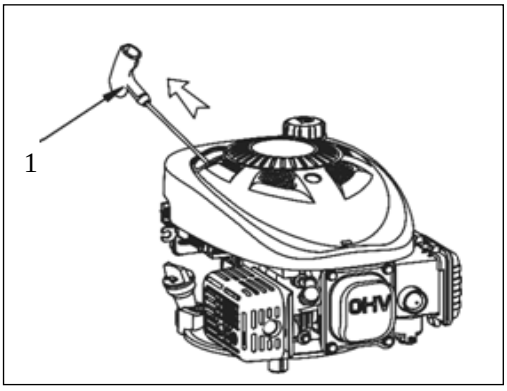

Fig.3

6.3 STOPPING THE ENGINE

Release the brake control handle (located on equipment) to stop the engine. (See Fig 4)

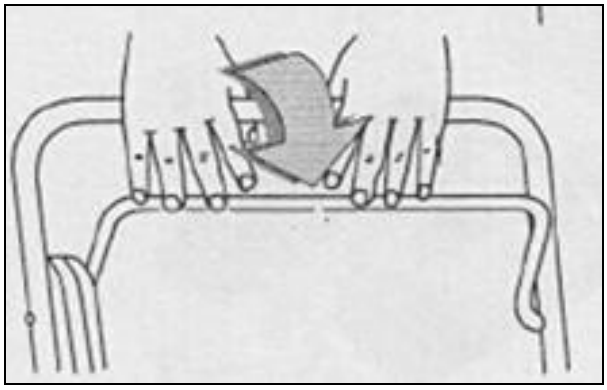

Fig. 4

7. SPECIFICATIONS

Type	DG350
Dry weight(kg)	9
Engine type	4-stroke, overhead valve, single cylinder
Displacement[Bore x Stroke]	98.5cc 56*40mm
Max. torque	5.1N.m at 3,000 min-1
Cooling system	Forced air
Lubrication systems	Forced splash
Ignition system	TCI
PTO shaft rotation	Counterclockwise

8. TUNEUP SPECIFICATIONS

ITEM	SPECIFICATION	MAINTENANCE
Spark plug gap	0.028-0.031 in (0.7-0.8 mm)	Refer to page 12
Valve clearance (cold)	IN:0.06±0.02mm EX:0.08±0.02mm	See your authorized dealer
Other specifications	No other adjustments needed	

9. SERVICING YOUR ENGINE

9.1 THE IMPORTANCE OF MAINTENANCE

Good maintenance is essential for safe, economical and trouble-free operation. It will also help reduce pollution.

WARNING: Improper maintenance, or failure to correct a problem before operation, can cause a malfunction in which you can be seriously hurt or killed. Always follow the inspection and maintenance recommendations and schedules in this owner's manual.

To help you properly care for your engine, the following pages include a maintenance schedule, routine inspection procedures, and simple maintenance procedures using basic hand tools. Other service tasks that are more difficult, or require special tools, are best handled by professionals and are normally performed by our technician or other qualified mechanics.

If you operate your engine under severe conditions, such as sustained high-load or high-temperature operation, or use in unusual wet or dusty conditions, consult your servicing dealer for recommendations applicable to your needs and use.

9.2 MAINTENANCE SAFETY

Some of the most important safety precautions follow. However, we cannot warn you of every conceivable hazard that can arise in performing maintenance. Only you can decide whether or not you should perform a given task.

WARNING: Failure to properly follow the maintenance instructions and precautions can cause you to be seriously hurt or killed. Always follow the procedures and precautions in this owner's manual.

9.3 SAFETY PRECAUTIONS

●Make sure the engine is off before you begin any maintenance or repairs. This will eliminate several potential hazards:

-Carbon monoxide poisoning from engine exhaust.

●Be sure there is adequate ventilation whenever you operate the engine.

-Burns from hot parts.

●Let the engine and exhaust system cool before touching.

-Injury from moving parts.

●Do not run the engine unless instructed to do so.

●Read the instructions before you begin, and make sure you have the tools and skills required.

●To reduce the possibility of fire or explosion, be careful when working around gasoline. Use only a nonflammable solvent, not gasoline, to clean parts. Keep cigarettes, sparks and flames away from all fuel related parts.

● Remember that an authorized servicing dealer of our company knows your engine best and is fully equipped to maintain and repair it.

●To ensure the best quality and reliability; use only our new genuine parts or their equivalents for repair and replacement.

9.4 MAINTENANCE SHCEDULE

● Service more frequently when used in dusty areas.

● Change engine oil every 25 hours when used under heavy load or in high ambient temperatures

● These items should be serviced by an authorized servicing dealer of our company, unless you have the proper tools and are mechanically proficient.

● For commercial use, long hours of operation to determine proper maintenance intervals.

Regular service period Item perform at every in dictated month or operating hour interval. Whichever comes first		Before each use	First month or 5 hrs	Every 3 months or 25 hrs	Every 6 months or 50 hrs	Every year or 100 hrs	Every two years or 200hrs	Note
Engine oil	Check	√						
	Replace	If necessary	√		√			
Air cleaner	Check							
	Clean				√			
	Replace						√	
Spark plug	Check-adjust							
	Replace					If necessary	√	
Flywheel brake pad	Check							
Spark arrester	Clean				If necessary			
Fuel tank and filter	Clean					√		Shop manual
Fuel tube	Check	Every 2 years （replace if necessary）						Shop manual
Valve clearance	Check-adjust	Not requires unless engine performance problems are noted						Shop manual
Combustion Chamber	Clean	After every 200 hours						

9.5 REFUELLING

Use unleaded gasoline with a pump octane rating of 86 or higher. This engine is certified to operate on unleaded gasoline. Unleaded gasoline produces fewer engine and spark plug deposits and extends exhaust system life.

WARNING: Gasoline is highly flammable and explosive, and you can be burned or seriously injured when refueling.

Stop engine and keep heat, sparks, and flame away.

Refuel only outdoors.
Wipe up spills immediately.

CAUTION: Fuel can damage paint and some types of plastic. Be careful not to spill fuel when filling your fuel tank. Damage caused by spilled fuel is not covered under the Warranty. Never use stale or contaminated gasoline or oil/gasoline mixture. Avoid getting dirt or water in the fuel tank.

9.5.1 ADDING FUEL

1. Remove the fuel cap (2).
2. Add fuel to the bottom of the fuel level limit in the neck of the fuel tank (9). (See Fig. 4)
3. Do not overfill. Wipe up spilled fuel before starting the engine.
4. Install and tighten the fuel cap.
5. Fuel tank capacity: 0.8L (0.21US gallon)

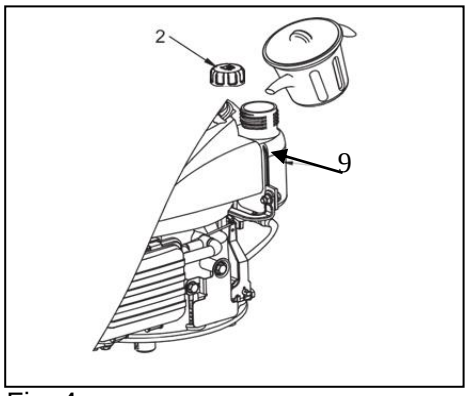

Fig. 4

9.6 ENGINE OIL

9.6.1 RECOMMENDED OIL

Use 4-stroke motor oil that meets or exceeds the requirements for API service classification SH, SJ, or equivalent. Always check the API service label on the oil container to be sure it includes the letters SH, SJ, or equivalent. (See Fig. 5)

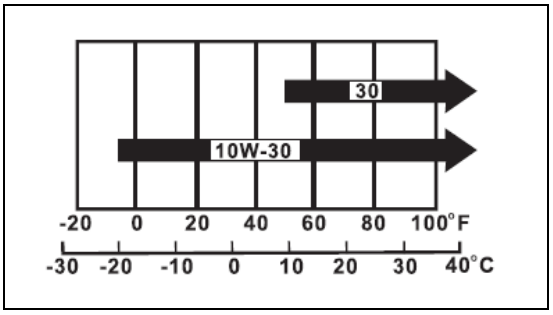

Fig. 5

SAE 10W-30 is recommended for general use. Other viscosities shown in the chart may be used when the average temperature in your area is within the indicated range.

9.6.2 OIL LEVER CHECK

1. Check the oil level when engine is stopped.
2. Remove the oil filler cap/dipstick (8) and wipe it clean.
3. Insert the oil filler cap/dipstick (8) into the oil filler neck as shown, but do not screw it in, then remove it to check the oil level.

4. If the oil level is near or below the lower limit mark on the dipstick, remove the oil filler cap/dipstick(8), and fill with the recommended oil to the upper limit mark (bottom edge of .the oil fill hole). Do not overfill.

5. Reinstall the oil filler cap/dipstick (8). (See Fig. 6)

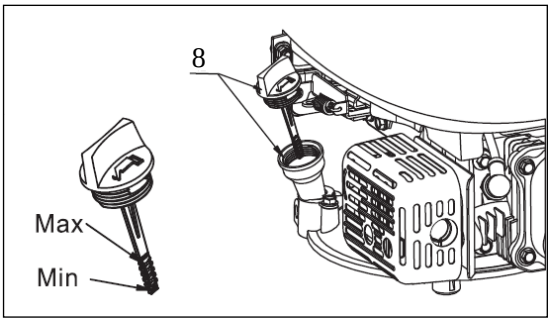

Fig. 6

CAUTION: This engine is delivered without oil, be sure to put oil in the engine before starting. Use a clean, detergent and high quality oil SAE30 and API.SG, SH or SJ classification.

9.6.3 OIL CHANGE

Drain the engine oil when the engine is warm, warm oil drain is quickly and complete. (See Fig. 7)

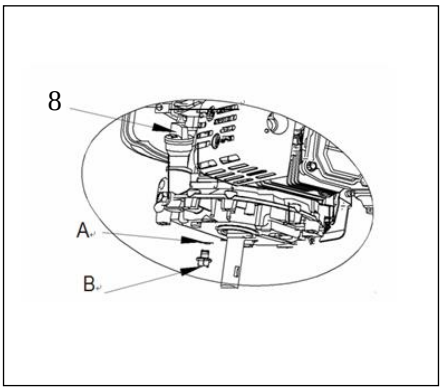

Fig. 7

8. Oil filter cap/dipstick

A. Sealing washer B. Drain bolt

1. Place a suitable container next to the engine to catch the used oil.

2. Drain the oil into the container by slightly tipping the engine toward the oil filler cap/dipstick after remove the drain bolt and sealing washer.

NOTE: Please dispose of used oil in a manner that is compatible with the environment. We suggest you take used oil in a sealed container to your local recycling center or service station for reclamation. Do not throw it in the trash or pour it on the ground or down a drain.

3. Remove the dipstick

4. Install and tighten the drain bolt and sealing washer after oil is totally drained out.

5 Pour the recommended oil slowly into the oil fill. Do not overfill. After adding oil, wait for one minute and then check the oil lever by using dipstick. Oil lever should be between lower limit and upper limit（See Fig. 9).

6. Install and tighten dipstick

Engine Oil Capacity: 0.42 US qt (0.4L)

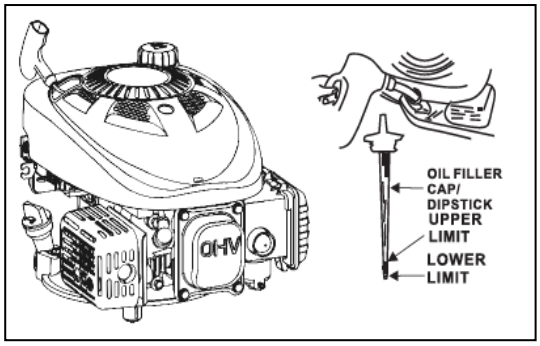

Fig. 9

CAUTION: Running the engine with a low oil level can cause engine damage. Reinstall the oil filler cap/dipstick securely.

9.7 AIR CLEANER

A dirty air cleaner will restrict air flow to the carburetor and cause poor engine performance. Inspect the air cleaner each time the engine is operated. You will need to clean the air cleaner more frequently if you operate the engine in very dusty areas.

WARNING: Operating the engine without an air cleaner, or with a damaged air cleaner, will allow dirt to enter the engine, causing rapid engine wear. This type of damage is not covered under the Warranty.

9.7.1 INSPECTION (See Fig. 10)

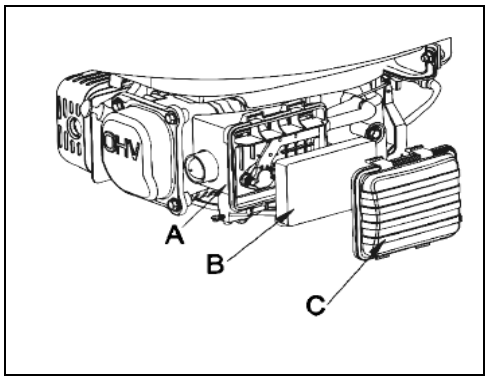

Fig. 10

A: Air cleaner case

B: Foam element

C: Air cleaner cover

1. Remove the air cleaner cover. Be careful to prevent dirt and debris from falling into the air cleaner case.

2. Remove the foam element from the air cleaner case.

3. Inspect the air cleaner elements. Replace any damaged elements. Clean or replace dirty elements.

9.7.2 CLEANING

The air cleaner system uses a foam element that can be washed and reused.

1. Remove the air cleaner cover(C).

2. Remove the foam element (B).

3. Wash the foam element in liquid detergent and water. Squeeze dry the foam element in a clean cloth.

4. Saturate the foam element with clean engine oil. To remove the excess engine oil, squeeze the foam element in a clean cloth.

5. Install the foam element into the air cleaner case

6. Close the air cleaner cover and tighten the two wing bolts securely.

9.8 SPARK PLUG

Recommended Spark Plug: BPR6ES or BPR7ES (NGK).

The recommended spark plug is the correct heat range for normal engine operating temperatures.

WARNING: Incorrect spark plugs can cause engine damage.

For good performance, the spark plug must be properly gapped and free of deposits.

1. Disconnect the cap from the spark plug, and remove any dirt from the spark plug area.

2. Use the proper size spark plug wrench to remove the spark plug.

3. Inspect the spark plug. Replace it if damaged, badly fouled, if the sealing washer is in poor condition, or if the electrode is worn.

4. Measure the electrode gap with a suitable gauge. The correct gap is 0.028 - 0.031 in (0.70 0.80 mm). If adjustment is needed, correct the gap by carefully bending the side electrode. (See Fig. 11)

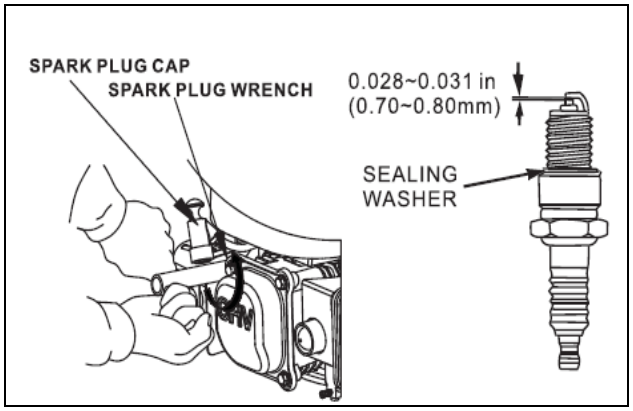

Fig. 11

5. Install the spark plug carefully, by hand, to avoid cross-threading.

6. After the spark plug is seated, tighten with the proper size spark plug wrench to compress the washer.

7. When installing a new spark plug, tighten 1/2 turn after the spark plug seats to compress the washer.

8. When reinstalling the original spark plug, tighten 1/8 1/4 turn after the spark plug seats to compress the washer.

WARNING: A loose spark plug can become very hot and can damage the engine. Over tightening the spark plug can damage the threads in the cylinder head.

9. Attach the spark plug cap to the spark plug.

9.9 FLYWHEEL BRAKE INSPECTION

1. Check to see if the inspection screw is contacting the brake bracket.

2. If the inspection screw is contacting the brake bracket, take the engine to an authorized engine servicing dealer for flywheel brake pad inspection.

3. Release the tarter control handle (located on equipment) and verify that there is a strong resistance when pulling on the recoil starter. Also verify that the governor arm is moved to the idle (slow), position and there is free play in the cable. The cable should 10~15 mm from the centerline as shown when the cable is new.

4. Move the starter control handle (located on equipment) to release the flywheel brake, and verify that there is clearance between the governor arm and the throttle return rod when the throttle return rod when the throttles in the fast (or high) position. Also verify that there is at least 2 mm clearance between the stopper and the

brake cable bracket. (See Fig. 12)

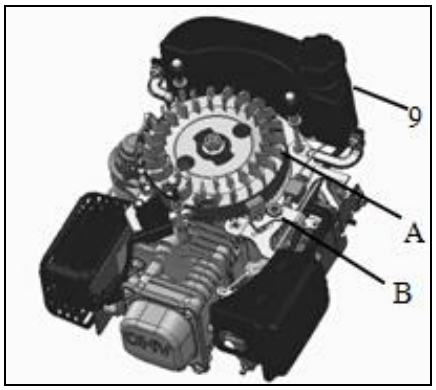

Fig12

9. Fuel tank A. Fly wheel B. Brake system

10. ENGINE ADJUSTMENT

WARNING: Do not change in any way the rated speed of the engine (carburetor side or regulator side).

WARNING: Your engine was adjusted in the factory and the non-respect of the homologation speed engine could be dangerous for your safety and others safety. If the rated speed is changed in any way, the factory warranty will be cancelled.

11. HELPFUL TIPS & SUGGESTIONS STORING YOUR ENGINE

11.1 STORING YOUR ENGINE

11.1.1 STORAGE PREPARATION

Proper storage preparation is essential for keeping your engine trouble free and looking good. The following steps will help to keep rust and corrosion from impairing your engine's function and appearance, and will make the engine easier to start when you use it again.

11.1.2 CLEANING

If the engine has been running, allow it to cool for at least half an hour before cleaning. Clean all exterior surfaces, touch up any damaged paint, and coat other areas that may rust with a light film of oil.

CAUTION: Using a garden hose or pressure washing equipment can force water into the air cleaner or muffler opening. Water in the air cleaner will soak the air filter, and water that passes through the air filter or muffler can enter the cylinder, causing damage.

11.1.3 FUEL

Gasoline will oxidize and deteriorate in storage. Deteriorated gasoline will cause hard starting, and it leaves gum deposits that clog the fuel system. If the gasoline in your engine deteriorates during storage, you may need to have the carburetor, and other fuel system components, serviced or replaced.

The length of time that gasoline can be left in your fuel tank and carburetor without causing functional problems will vary with such factors as gasoline blend, your storage temperatures, and whether the fuel tank is partially or completely filled.

The air in a partially filled fuel tank promotes fuel deterioration. Very warm storage temperatures accelerate fuel deterioration. Fuel problems may occur within a few months, or even less if the gasoline was not fresh

when you filled the fuel tank.

Fuel system damage or engine performance problems resulting from neglected storage preparation are not covered under Warranty.

11.1.4 ADDING A GASOLINE STABILIZER TO EXTEND FUEL STORAGE LIFE

When adding a gasoline stabilizer, fill the fuel tank with fresh gasoline. If only partially filled, air in the tank will promote fuel deterioration during storage. If you keep a container of gasoline for refueling, be sure that it contains only fresh gasoline.

1. Add gasoline stabilizer by following the manufacturer's instructions.
2. After adding a gasoline stabilizer, run the engine outdoors for 10 minutes to be sure that treated gasoline has replaced the untreated gasoline in the carburetor.

11.1.5 DRAINING THE FUEL TANK AND CARBURETOR

WARNING: Gasoline is highly flammable and explosive, and you can be burned or seriously injured when handling fuel. Stop engine and keep heat, sparks, and flame away. Refuel only outdoors. Wipe up spills immediately.

1. Place an approved gasoline container below the carburetor, and use a funnel to avoid spilling fuel.
2. Remove the drain bolt, and then move the fuel valve lever to the “ON” position.
3. After all the fuel has drained into the container; reinstall the drain bolt and washer. Tighten the drain bolt securely. (See Fig. 13)

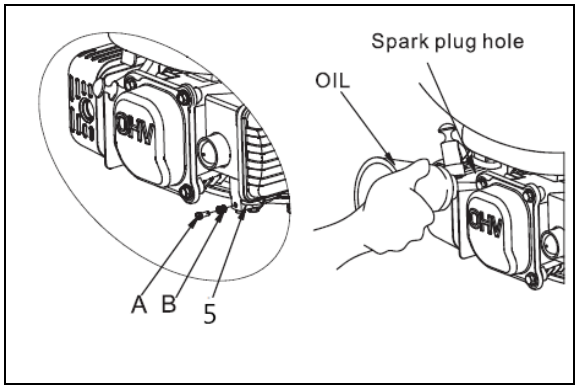

Fig. 13

A bolt B spring 5 carburetor

11.1.6 ENGINE OIL

1. Change the engine oil.
2. Remove the spark plug.
3. Pour a tablespoon (5 - 10 cc) of clean engine oil into the cylinder.
4. Pull the recoil starter several times to distribute the oil.
5. Reinstall the spark plug.

11.1.7 CLEAN FUEL STRAINER

WARNING: Gasoline is extremely flammable and is explosive under certain conditions Do not smoke or allow flames or sparks in the area.

1. Remove the fuel strainer from the fuel tank and fuel line.
2. Clean the fuel strainer (remove dirt which has accumulated on the mesh, and check that the mesh is not broken anywhere).
3. Reinstall the fuel strainer (A) and fuel line. (See Fig. 14)

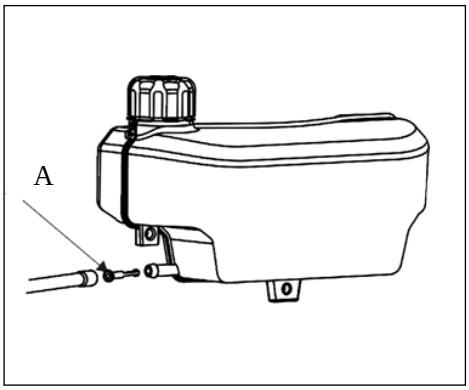

Fig. 14

11.1.8 STORAGE PRECAUTIONS

If your engine will be stored with gasoline in the fuel tank and carburetor, it is important to reduce the hazard of gasoline vapor ignition. Select a well-ventilated storage area away from any appliance that operates with a flame, such as a furnace, water heater, or clothes dryer. Also avoid any area with a spark producing electric motor, or where power tools are operated.

If possible, avoid storage areas with high humidity, because that promotes rust and corrosion.

If there is gasoline in the fuel tank, leave the fuel valve in OFF position.

WARNING: Keep the engine in horizontal level. Tilting can cause fuel or oil leakage.

With the engine and exhaust system cool, cover the engine to keep out dust. A hot engine and exhaust system can ignite or melt some materials. Do not use sheet plastic as a dust cover. A nonporous cover will trap moisture around the engine, promoting rust and corrosion.

11.2 REMOVAL FROM STORAGE

Check your engine as described in the PRE OPERATION

Check section of this manual.

If the fuel was drained during storage preparation, fill the tank with fresh gasoline. If you keep a container of gasoline for refueling, be sure it contains only fresh gasoline. Gasoline oxidizes and deteriorates over time, causing hard starting.

If the cylinder was coated with oil during storage preparation, the engine will smoke briefly at startup. This is normal.

11.3 TRANSPORTING

Keep the engine level when transporting to reduce the possibility of fuel leakage. Turn the fuel valve to the OFF position.

12. TAKING CARE OF UNEXPECTED PROBLEMS

ENGINE WILL NOT START	Possible Cause	Correction
1. Check fuel.	Out of fuel.	Refuel
	Bad fuel; engine stored without eating or draining gasoline, of refueled with bad gasoline.	Drain the fuel tank and Carburetor. Refuel With fresh gasoline.
2. Remove and inspect Spark plug.	Spark plug faulty, fouled, or Improperly gapped. Spark plug wet with fuel (flooded engine).	Replace the spark plug Dry and reinstall spark plug.
3.Check choke	Choke is opened	Shut off choke well
4. Take engine to an authorized our Servicing dealer, or refer to shop manual	Fuel filter clogged, carburetor malfunction, ignition malfunction, valves stuck, etc.	Replace or repair faulty components as necessary.
ENGINE LACKS POWER	possible Cause	Correction
1 check air cleaner	Air cleaner elements clogged	Clean or replace air cleaner elements
2 check fuel	Bad fuel, engine stored without treating or draining gasoline, of refueled with bad gasoline	Drain the fuel tank and carburetor. refuel with fresh gasoline
3 take engine to an authorized our servicing dealer, or refer to shop manual	Filter clogged,carburetor malfunction,gnition,malfunction, valaves stuck,etc	Replace or repair faulty components as necessary

13. TECHNICAL & CONSUMER INFORMATION TECHNICAL INFORMATION

13.1 SERIAL NUMBER LOCATION (See Fig. 15)

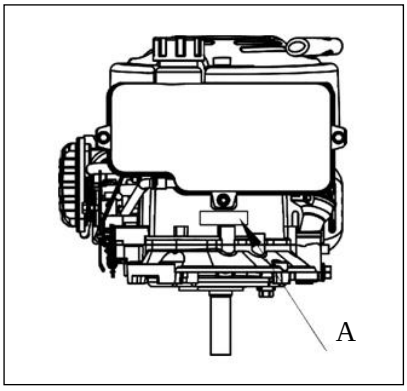

Fig. 15 A: Serial number location

Record the engine serial number in the space below. You will need this information when ordering parts and when making technical or warranty inquiries.

Engine serial number:

13.2 CARBURETOR MODIFICATIONS FOR HIGH ALTITUDE OPERATION

1. At high altitude, the standard carburetor air-fuel mixture will be too rich. Performance will decrease, and fuel consumption will increase.
2. A very rich mixture will also foul the spark plug and cause hard starting. Operation at an altitude that differs from that, at which this engine was certified, for extended periods of time, may increase emissions.
3. High altitude performance can be improved by specific modifications to the carburetor. If you always operate your engine at altitudes above 5,000 feet (1,500 meters), have authorized servicing dealer perform this carburetor modification. This engine, when operated at high altitudes with the carburetor modifications for high altitude use, will meet each emission standard throughout its useful life.
4. Even with carburetor modification, engine horsepower will decrease about 3.5% for each 1,000 feet (300 meters) increase in altitude. The effect of altitude on horsepower will be greater than this if no carburetor modification is made.

 **WARNING:** When the carburetor has been modified for high altitude operation, the air-fuel mixture will be too lean for low altitude use. Operation at altitudes below 5,000 feet (1,500 meters) with a modified carburetor may cause the engine to overheat and result in serious engine damage. For use at low altitudes, have an authorized servicing dealer return the carburetor to original factory specifications.