

Cub Cadet.

OPERATOR'S MANUAL



Self Propelled Yard Vacuum/Chipper/Shredder with Vacuum/Hose — Model CSV 070

⚠ WARNING

**READ AND FOLLOW ALL SAFETY RULES AND INSTRUCTIONS IN THIS MANUAL
BEFORE ATTEMPTING TO OPERATE THIS MACHINE.
FAILURE TO COMPLY WITH THESE INSTRUCTIONS MAY RESULT IN PERSONAL INJURY.**

NOTE: This Operator's Manual covers several models. Features may vary by model. Not all features in this manual are applicable to all models and the model depicted may differ from yours.

CUB CADET LLC, P.O. BOX 361131 CLEVELAND, OHIO 44136-0019



Form No. 769-11754
(July 15, 2016)

Thank You

Thank you for purchasing this product. It was carefully engineered to provide excellent performance when properly operated and maintained.

Please read this entire manual prior to operating the equipment. It instructs you how to safely and easily set up, operate and maintain your machine. Please be sure that you, and any other persons who will operate the machine, carefully follow the recommended safety practices at all times. Failure to do so could result in personal injury or property damage.

All information in this manual is relative to the most recent product information available at the time of printing. Review this manual frequently to familiarize yourself with the machine, its features and operation. Please be aware that this Operator's Manual may cover a range of product specifications for various models. Characteristics and features discussed and/or illustrated in this manual may not be applicable to all models. We reserve the right to change product specifications, designs and equipment without notice and without incurring obligation.

If applicable, the power testing information used to establish the power rating of the engine equipped on this machine can be found at www.opei.org or the engine manufacturer's web site.

If you have any problems or questions concerning the machine, phone an authorized service dealer or contact us directly. Customer support telephone numbers, website address and mailing address can be found on this page. We want to ensure your complete satisfaction at all times.

Throughout this manual, all references to *right* and *left* side of the machine are observed from the operating position.

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Record Product Information

Before setting up and operating your new equipment, please locate the model plate on the equipment and record the information in the provided area to the right. You can locate the model plate by standing at the operator's position and looking down at the rear of the deck. This information will be necessary, should you seek technical support via our web site or with your local authorized service dealer.

MODEL NUMBER

SERIAL NUMBER

Customer Support

Please do NOT return the machine to the retailer or dealer without first contacting the Customer Support Department.

If you have difficulty assembling this product, have questions regarding the controls, operation, or maintenance of this machine, want to order replacement parts/attachments/accessories, or want to view an online How-To video; you can seek help from the experts. Have your full model number and serial number ready. Choose from the options below:

- ◇ Web: www.cubcadet.com/equipment/cubcadet/service-and-parts
- ◇ Phone: (800) 965-4CUB
- ◇ Mail: Cub Cadet LLC • P.O. Box 361131 • Cleveland, OH • 44136-0019

Important Safe Operation Practices



WARNING: This symbol points out important safety instructions which, if not followed, could endanger the personal safety and/or property of yourself and others. Read and follow all instructions in this manual before attempting to operate this machine. Failure to comply with these instructions may result in personal injury. When you see this symbol - **HEED ITS WARNING!**

CALIFORNIA PROPOSITION 65



WARNING: Engine Exhaust, some of its constituents, and certain vehicle components contain or emit chemicals known to State of California to cause cancer and birth defects or other reproductive harm.



DANGER: This machine was built to be operated according to the safe operation practices in this manual. As with any type of power equipment, carelessness or error on the part of the operator can result in serious injury. This machine is capable of amputating fingers, hands, toes and feet and throwing debris. Failure to observe the following safety instructions could result in serious injury or death.

Training

1. Read, understand, and follow all instructions on the machine and in the manual(s) before attempting to assemble and operate. Keep this manual in a safe place for future and regular reference and for ordering replacement parts.
2. Be familiar with all controls and their proper operation. Know how to stop the machine and disengage them quickly.
3. Never allow children under 16 years of age to operate this machine. Children 16 and over should read and understand the instructions and safe operation practices in this manual and on the machine and be trained and supervised by an adult.
4. Never allow adults to operate this machine without proper instruction.
5. Keep bystanders, pets, and children at least 75 feet from the machine while it is in operation. Stop machine if anyone enters the area.
6. Never run an engine indoors or in a poorly ventilated area. Engine exhaust contains carbon monoxide, an odorless and deadly gas.
7. Do not put hands and feet near rotating parts or in the feeding chambers and discharge opening. Contact with the rotating impeller can amputate fingers, hands, and feet.
8. Never attempt to unclog either the feed intake or discharge opening, remove or empty bag, or inspect and repair the machine while the engine is running. Shut the engine off and wait until all moving parts have come to a complete stop. Disconnect the spark plug wire and ground it against the engine.

Preparation

1. Thoroughly inspect the area where the equipment is to be used. Remove all rocks, bottles, cans, or other foreign objects which could be picked up or thrown and cause personal injury or damage to the machine.
2. Always wear safety glasses or safety goggles during operation and while performing an adjustment or repair, to protect your eyes. Thrown objects which ricochet can cause serious injury to the eyes.
3. Wear sturdy, rough-soled work shoes and close-fitting slacks and shirts. Loose fitting clothes or jewelry can be caught in movable parts. Never operate this machine in bare feet or sandals. Wear leather work gloves when feeding material in the chipper chute.
4. Before starting, check all bolts and screws for proper tightness to be sure the machine is in safe working condition. Also, visually inspect machine for any damage at frequent intervals.
5. Maintain or replace safety and instructions labels, as necessary.

Safe Handling of Gasoline:

To avoid personal injury or property damage use extreme care in handling gasoline. Gasoline is extremely flammable and the vapors are explosive. Serious personal injury can occur when gasoline is spilled on yourself or your clothes which can ignite. Wash your skin and change clothes immediately.

1. Use only an approved gasoline container.
2. Never fill containers inside a vehicle or on a truck or trailer bed with a plastic liner. Always place containers on the ground away from your vehicle before filling.
3. When practical, remove gas-powered equipment from the truck or trailer and refuel it on the ground. If this is not possible, then refuel such equipment on a trailer with a portable container, rather than from a gasoline dispenser nozzle.
4. Keep the nozzle in contact with the rim of the fuel tank or container opening at all times until fueling is complete. Do not use a nozzle lock-open device.
5. Extinguish all cigarettes, cigars, pipes and other sources of ignition.
6. Never fuel machine indoors.
7. Never remove gas cap or add fuel while the engine is hot or running. Allow engine to cool at least two minutes before refueling.
8. Never over fill fuel tank. Fill tank to no more than 1/2 inch below bottom of filler neck to allow space for fuel expansion.
9. Replace gasoline cap and tighten securely.
10. If gasoline is spilled, wipe it off the engine and equipment. Move unit to another area. Wait 5 minutes before starting the engine.
11. To reduce fire hazards, keep machine free of grass, leaves, or other debris build-up. Clean up oil or fuel spillage and remove any fuel soaked debris.
12. Never store the machine or fuel container inside where there is an open flame, spark or pilot light as on a water heater, space heater, furnace, clothes dryer or other gas appliances.

Operation

1. Do not put hands and feet near rotating parts or in the feeding chambers and discharge opening. Contact with the rotating impeller can amputate fingers, hands, and feet.
2. Before starting the machine, make sure the chipper chute, feed intake, and cutting chamber are empty and free of all debris.
3. Thoroughly inspect all material to be shredded and remove any metal, rocks, bottles, cans, or other foreign objects which could cause personal injury or damage to the machine.

4. If the impeller strikes a foreign object or if your machine should start making an unusual noise or vibration, immediately shut the engine off. Allow the impeller to come to a complete stop. Disconnect the spark plug wire, ground it against the engine and perform the following steps:
 - a. Inspect for damage.
 - b. Repair or replace any damaged parts.
 - c. Check for any loose parts and tighten to assure continued safe operation.
5. Do not allow an accumulation of processed material to build up in the discharge area. This can prevent proper discharge and result in kickback of material through the feed opening.
6. Do not attempt to shred or chip material larger than specified on the machine or in this manual. Personal injury or machine damage could result.
7. Never attempt to unclog either the feed intake or discharge opening while the engine is running. Shut the engine off, wait until all moving parts have stopped, disconnect the spark plug wire and ground it against the engine before clearing debris.
8. Never operate without vacuum bag and discharge chute properly attached to the machine. Never empty or change vacuum bag while the engine is running. Vacuum bag must be kept closed at all times during operation.
9. Never operate without either the inlet nozzle or optional hose attachment (if applicable) properly attached to the machine. Never attempt to attach or change either attachment while the engine is running.
10. Keep all guards, deflectors and safety devices in place and operating properly.
11. Keep your face and body back and to the side of the chipper chute while feeding material into the machine to avoid accidental kickback injuries.
12. Never operate this machine without good visibility or light. Always be sure of your footing and keep a firm hold on the handles.
13. Do not operate this machine on a paved, gravel or non-level surface.
14. Do not operate this machine while under the influence of alcohol or drugs.
15. Muffler and engine become hot and can cause a burn. Do not touch.
16. Never pick up or carry machine while the engine is running.
17. If situations occur which are not covered in this manual, use care and good judgement. Contact Customer Support for assistance and the name of the nearest service dealer.

Maintenance & Storage

1. Never tamper with safety devices. Check their proper operation regularly.
2. Check bolts and screws for proper tightness at frequent intervals to keep the machine in safe working condition. Also, visually inspect machine for any damage and repair, if needed.
3. Before cleaning, repairing, or inspecting, stop the engine and make certain the impeller and all moving parts have stopped. Disconnect the spark plug wire and ground it against the engine to prevent unintended starting.
4. Do not change the engine governor settings or overspeed the engine. The governor controls the maximum safe operating speed of the engine.
5. Maintain or replace safety and instruction labels, as necessary.
6. Follow this manual for safe loading, unloading, transporting, and storage of this machine.
7. Never store the machine or fuel container inside where there is an open flame, spark or pilot light such as a water heater, furnace, clothes dryer, etc.
8. Allow machine to cool at least 5 minutes before storing.

9. Always refer to the operator's manual for proper instructions on off-season storage.
10. If the fuel tank has to be drained, do this outdoors.
11. Observe proper disposal laws and regulations for gas, oil, etc. to protect the environment.
12. According to the Consumer Products Safety Commission (CPSC) and the U.S. Environmental Protection Agency (EPA), this product has an *Average Useful Life* of seven (7) years, or 60 hours of operation. At the end of the *Average Useful Life* have the machine inspected annually by an authorized service dealer to ensure that all mechanical and safety systems are working properly and not worn excessively. Failure to do so can result in accidents, injuries or death.

Do not modify engine

To avoid serious injury or death, do not modify engine in any way. Tampering with the governor setting can lead to a runaway engine and cause it to operate at unsafe speeds. Never tamper with factory setting of engine governor.

Notice Regarding Emissions

Engines which are certified to comply with California and federal EPA emission regulations for SORE (Small Off Road Equipment) are certified to operate on regular unleaded gasoline, and may include the following emission control systems: Engine Modification (EM), Oxidizing Catalyst (OC), Secondary Air Injection (SAI) and Three Way Catalyst (TWC) if so equipped.

Spark Arrestor



WARNING: This machine is equipped with an internal combustion engine and should not be used on or near any unimproved forest-covered, brushcovered or grass-covered land unless the engine's exhaust system is equipped with a spark arrestor meeting applicable local or state laws (if any).

If a spark arrestor is used, it should be maintained in effective working order by the operator. In the State of California the above is required by law (Section 4442 of the California Public Resources Code). Other states may have similar laws. Federal laws apply on federal lands.

A spark arrestor for the muffler is available through your nearest engine authorized service dealer or contact the service department, P.O. Box 361131 Cleveland, Ohio 44136-0019.

Safety Symbols

This page depicts and describes safety symbols that may appear on this product. Read, understand, and follow all instructions on the machine before attempting to assemble and operate.

Symbol	Description
	READ THE OPERATOR'S MANUAL(S) Read, understand, and follow all instructions in the manual(s) before attempting to assemble and operate.
	WARNING— ROTATING BLADES Keep hands out of inlet and discharge openings while machine is running. There are rotating blades inside.
	BYSTANDERS Keep bystanders, pets, and children at least 75 feet from the machine while it is in operation. Stop machine if anyone enters the area.
	WARNING— THROWN OBJECTS This machine may pick up and throw and objects which can ricochet.
	EYE PROTECTION Always wear safety glasses or safety goggles when operating this machine.
	WARNING— GASOLINE IS FLAMMABLE Allow the engine to cool at least two minutes before refueling.
	WARNING— CARBON MONOXIDE Never run an engine indoors or in a poorly ventilated area. Engine exhaust contains carbon monoxide, an odorless and deadly gas.



WARNING: Your Responsibility—Restrict the use of this power machine to persons who read, understand and follow the warnings and instructions in this manual and on the machine.

SAVE THESE INSTRUCTIONS!

Contents of Carton

- Chipper/Shredder Vacuum (1)
- Upper and Lower Handle (1)
- Bag (1)
- Operator's Manual (1)
- Hose Assembly (1)
- Bottle of Oil (1)
- Engine Operator's Manual (1)
- Safety Glasses (1)
- Hose Extension (1)

Assembly

NOTE: This unit is shipped without gasoline or oil in the engine. Fill up gasoline and oil as instructed in the accompanying engine manual BEFORE operating your chipper shredder vacuum.

Handle

1. Remove the hairpin clips from the handle brackets and the carriage screws and wing nuts from the lower handle.
 - a. Place the bottom holes in lower handle over the pins on the handle brackets and secure with hairpin clips. See Figure 3-1.

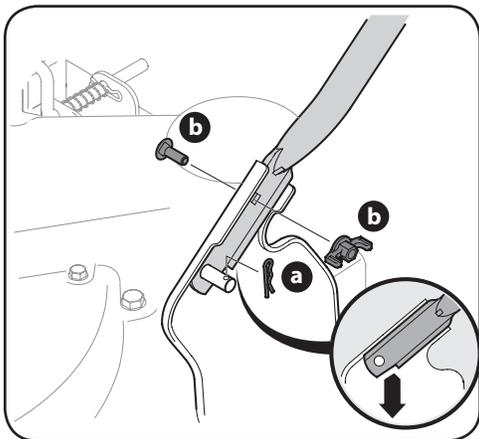


Figure 3-1

- b. Insert carriage screws through upper hole in lower handle from the inside and secure with wing nuts. See Figure 3-1.

3. Unfold the upper handle until it aligns with the lower handle. Make sure the rope guide is on the right side of upper handle. See Figure 3-2a.

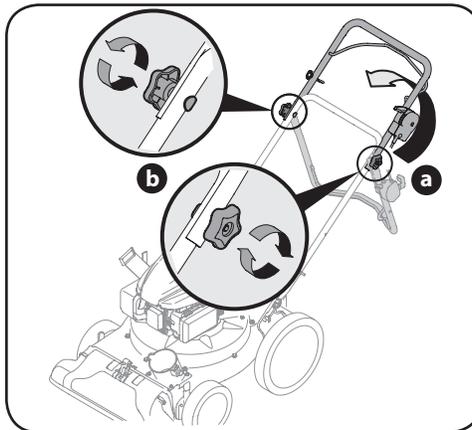


Figure 3-2

IMPORTANT: Make sure the cables are routed outside the lower handle. Also, do not crimp the cables while lifting up the handles.

4. Secure the two handles by tightening the star knobs (carriage bolts must be seated properly into the handle). See Figure 3-2b.
5. Pull the two cable ties attached to the cables tight approximately 8 inches from each cable end and place the cables into the cable guide.
6. Loosen the wing nut that secures the rope guide to the right side of upper handle.
 - a. Slowly pull starter rope out of engine.
 - b. Slip the starter rope into the rope guide. See Figure 3-3.

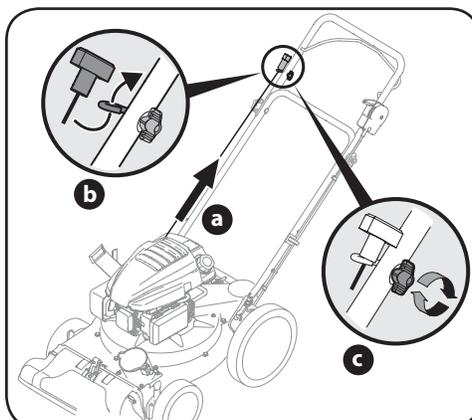


Figure 3-3

- c. Tighten the wing nut.

Hose Assembly

1. Slide hose adapter of hose assembly into the base adapter located on the left front of the chipper shredder vacuum. See Figure 3-4a.

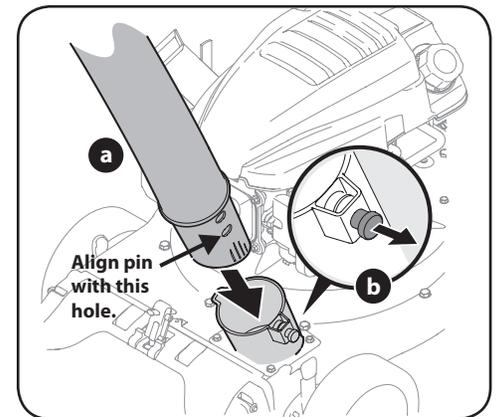


Figure 3-4

2. Pull spring loaded pin out on the base and align pin with the first hole (closest to the end of the tube) in the hose adapter. See Figure 3-4b.
3. Release the pin to lock the hose in place.
4. Lay hose tubing in curved end of hose handle next to chipper chute and into hose cradle. See Figure 3-5a & b.

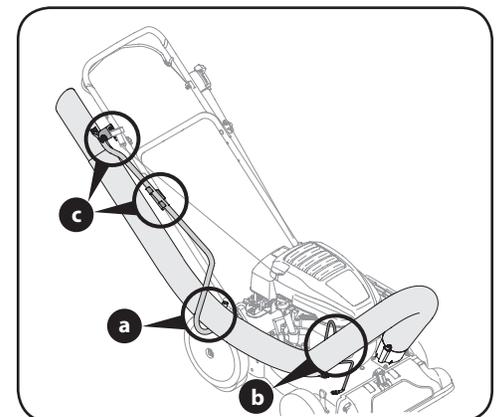


Figure 3-5

5. Snap the hose handle first into the upper hose handle bracket and then into the lower hose handle bracket. See Figure 3-5c.

Bag

1. Grasp bag handle with one hand and slide locking rod on mounting bracket with other hand toward engine. Use the end of mounting bracket as leverage when sliding the locking rod. See Figure 3-6.

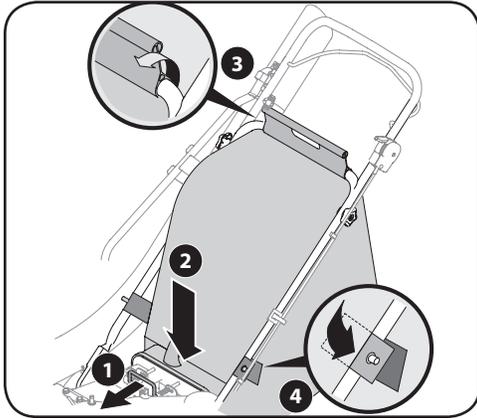


Figure 3-6

1. Slip bag over the rim of the discharge opening and release locking rod to secure bag in place.
2. Snap bag clip to the top of the lower handle.
3. Place the lower straps on the bag over the top of lower handle, hooking them on the studs. See Figure 3-6.

NOTE: The bag/chute switch button attached to the mounting bracket must be fully depressed by the tip of front tab on bag handle when securing the bag or engine will not start.

Adjustments

Nozzle Height

The nozzle can be adjusted to any six positions, ranging from 5/8" to 4 1/8" ground clearance. The nozzle height has to be adjusted according to chipper shredder conditions.

1. Depress nozzle height adjustment lever towards wheel. See Figure 3-7.

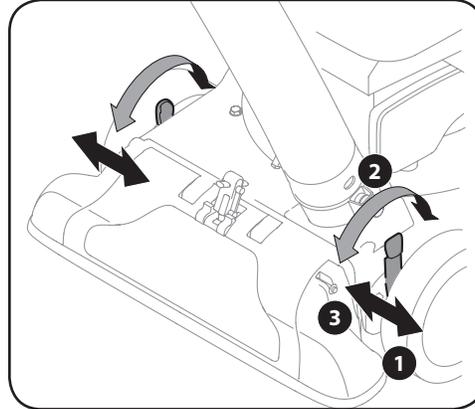


Figure 3-7

2. Move the height adjustment lever forward or backward to adjust the nozzle upwards or downwards. Make sure both levers are in the same position.
3. Release lever towards deck. See Figure 3-7.

NOTE: In general, raise the nozzle height to vacuum a thick layer of leaves. Lower the nozzle height for smoother surfaces.

Set-Up

Gas and Oil Fill-Up

Refer to the separate engine owner's manual for additional engine information.

1. Add oil provided before starting unit for the first time out of the box.
2. Service the engine with gasoline as instructed in the separate engine owner's manual.



WARNING: Use extreme care when handling gasoline. Gasoline is extremely flammable and the vapors are explosive. Never fuel the machine indoors or while the engine is hot or running. Extinguish cigarettes, cigars, pipes and other sources of ignition.



WARNING: Never fill fuel tank indoors with engine running or until the engine has been allowed to cool for at least two minutes after running.

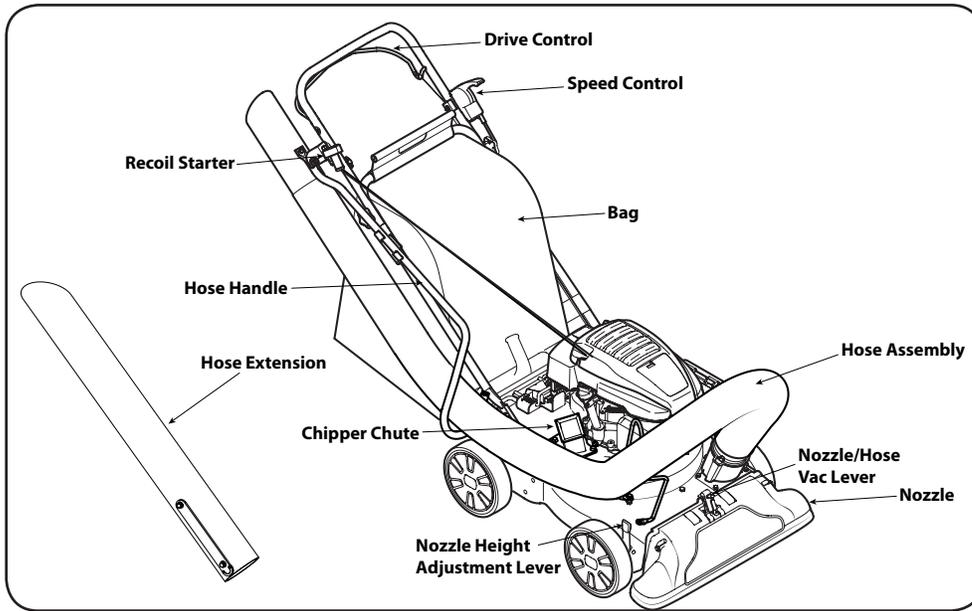


Figure 4-1

Controls



WARNING: The operation of any chipper shredder can result in foreign objects being thrown into the eyes, which can damage your eyes severely. Always wear the safety glasses provided with this unit or eye shields while operating or while performing any adjustments or repairs.

Drive Control

Located on the underside of the upper handle, the drive control is used to engage/disengage wheels. Fully squeeze the drive control against the upper handle to engage the wheels; release to disengage. (DO NOT slip clutch).

Speed Control

Located on the left side of the upper handle, the speed control is used to select the forward speed of the yard vacuum.

Chipper Chute

Allows twigs and small branches up to 1-1/2" in diameter to be fed into the impeller for chipping.

Nozzle Height Adjustment Lever

Used to adjust the nozzle ground clearance ranging approximately 5/8" to 4 1/8".

Nozzle

Yard waste such as leaves or pine needles can be vacuumed up through the nozzle for shredding.

Hose Assembly

Used as an alternative to the nozzle to vacuum yard waste such as leaves or pine needles.

Hose Extension

Used to vacuum yard waste in hard to reach places of yard.

Nozzle/ Hose Vac Lever

The nozzle/hose vac handle is located on top of the nozzle. Use it to switch vacuum suction between the nozzle and the hose assembly.

Hose Handle

Used to guide hose assembly when vacuuming.

Recoil Starter

The recoil starter is attached to the right upper handle. Stand behind unit and pull the recoil starter to start engine.

Operation

Starting & Stopping Engine

Refer to the Engine Operator's manual packed with your chipper/shredder vacuum for instructions on starting and stopping the engine.

To Empty Bag

1. Unhook bag straps from the lower handle.
2. Unsnap bag clip from the top of lower handle. See Figure 4-2.



Figure 4-2

3. Grasp bag handle with one hand and pull lock rod on mounting bracket with other hand toward engine to release.
4. Lift bag off back of unit.
5. Twist the two buttons on the back of the bag to unlock and empty contents. See Figure 4-3. Hold bag handle and bag clip while emptying the contents.

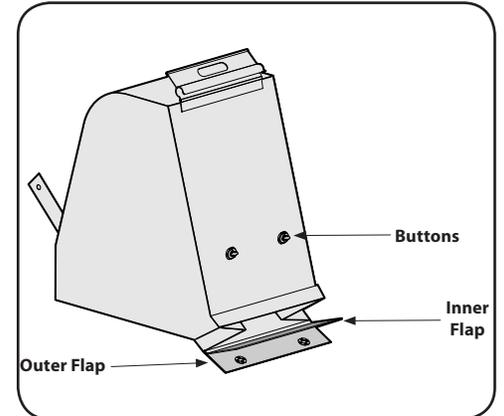


Figure 4-3

6. Compress bag opening and fold inner flap over opening.
7. Fold outer flap over inner flap and insert buttons on the bag through metal outlets. See Figure 4-3.
8. Twist the buttons to lock bag. Place bag back onto unit as instructed in the Assembly & Set-Up section of this manual.



WARNING: Do not at any time make any adjustments without first stopping engine and disconnecting spark plug wire.

Using The Nozzle Vacuum

Yard waste such as leaves and pine needles can be vacuumed up through the nozzle for shredding. After material has been shredded by the flail blades on the impeller assembly, it will be discharged into catcher bag. Do not attempt to shred or chip any material other than vegetation found in a normal yard (i.e. branches, leaves, twigs, etc.) Avoid fibrous plants such as tomato vines until they are thoroughly dried out. Materials such as stalks or heavy branches up to 1 1/2" in diameter may be fed into the chipper chute.

1. Place nozzle/hose vac lever in the top position on the nozzle to vacuum through nozzle. See Figure 4-4.

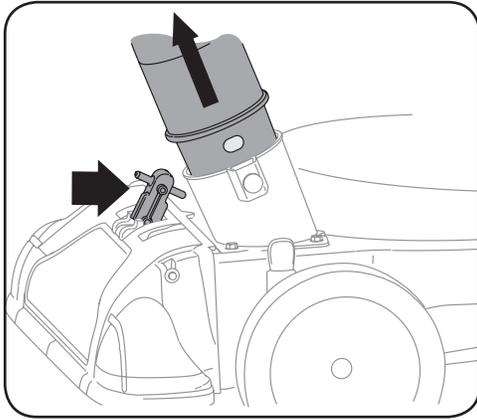


Figure 4-4

2. The spring loaded pin must be in the first hole (closest to the end of the tube) of the hose adapter to operate the nozzle vac. See Figure 4-4.
3. Place both hands on top of upper handle and fully lift the drive control against upper handle to propel unit over yard waste.
4. Use the speed control to choose either the high or low speed. The speed control may be moved either while the unit is propelling or before engaging the wheels.

IMPORTANT: Move the speed control only when the engine is running. Changing the speed control setting with the engine off can damage the chipper/shredder vacuum.



WARNING: Do not attempt to shred, chip, or vacuum any material larger than specified on the machine or in this manual. Personal injury or damage to the machine could result.

IMPORTANT: The flail screen is located inside the housing in the discharge area. If the flail screen becomes clogged, remove and clean as instructed in Product Care. For best performance, it is also important to keep the chipper blade sharp.

Using The Hose Assembly

1. Place nozzle/hose vac lever in the bottom position on the nozzle to redirect vacuum to the hose assembly. See Figure 4-5.

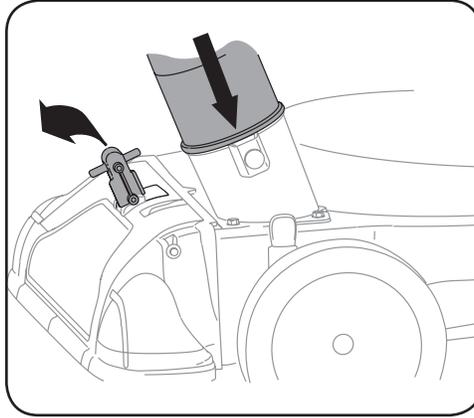


Figure 4-5

2. The spring loaded pin must be in the second hole of the hose adapter to operate the hose assembly. See Figure 4-5.
3. Unhook the hose from upper and lower hose handle brackets and grasp the hose handle to guide the hose while vacuuming yard waste such as leaves or pine needles.
4. If necessary, attach the hose extension to vacuum in hard to reach places as follows:
 - a. Insert round end of hose extension into end of hose assembly.
 - b. Secure strap on hose extension to pin on hose assembly. See Figure 4-6.

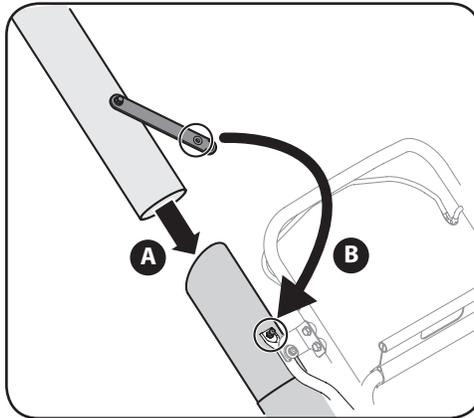


Figure 4-6

Maintenance

General Recommendations

- Always observe safety rules when performing any maintenance.
- The warranty on this chipper/shredder vacuum does not cover items that have been subjected to operator abuse or negligence. To receive full value from warranty, operator must maintain the equipment as instructed here.
- Changing of engine-governed speed will void engine warranty.
- All adjustments should be checked at least once each season.
- Periodically check all fasteners and make sure these are tight.



WARNING: Always stop engine, disconnect spark plug, and ground against engine before performing any type of maintenance on your machine.

Lubrication

1. Lubricate each wheel shoulder screw (rear wheel) and pivot arm axle (front wheel) once a season with light oil.
2. Lubricate the pivot points of the nozzle height adjustment levers once a season with light oil.
3. Lubricate the locking rod with light oil to ease the application of attaching on or removing bag.
4. Lubricate the nozzle/hose vac lever on top of the nozzle once a season with light oil. See Figure 7-1.

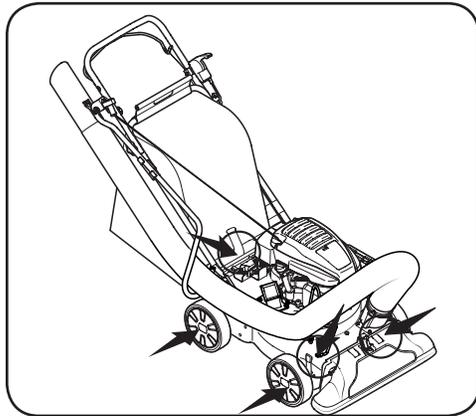


Figure 7-1

5. Follow the separate engine manual packed with your unit for lubrication instructions.

Equipment Care

- Clean the chipper/shredder vacuum thoroughly after each use.
- Wash periodically with water. Allow to dry thoroughly in shade.
- If the flail screen becomes clogged, remove and clean as instructed below.

NOTE: Cleaning with a forceful spray of water is not recommended as it could contaminate the fuel system.

Engine Care

Refer to the Maintenance section of the Engine Operator's manual packed with your unit. Read and follow instructions carefully.



WARNING: Before performing any type of maintenance on the machine, wait for all parts to stop moving and disconnect the spark plug wire. Failure to follow this instruction could result in personal injury or property damage.

- Check engine oil level before each use as instructed in the separate Engine Operator's manual.
- Clean or replace air cleaner every 25 hours under normal conditions. Clean every few hours under extremely dusty conditions. To service the air cleaner, refer to the engine manual.
- The spark plug should be cleaned and the gap reset once a season. Check engine manual for correct plug type and gap specifications.
- Clean engine regularly with a cloth or brush. Keep the top of the engine clean to permit proper air circulation. Remove all grass, dirt, and combustible debris from muffler area.

Removing the Flail Screen

If the discharge area becomes clogged, remove the flail screen and clean area as follows:

1. Stop the engine. Make certain the chipper/shredder vacuum has come to a complete stop.
2. Before unclogging the discharge chute, disconnect and ground the spark plug wire to retaining post.
3. Remove the vacuum bag from the unit as instructed in the Controls and Operation section to obtain access to flail screen.

4. Remove the three self tapping screws securing the belt cover, and remove belt cover. See Figure 7-2.

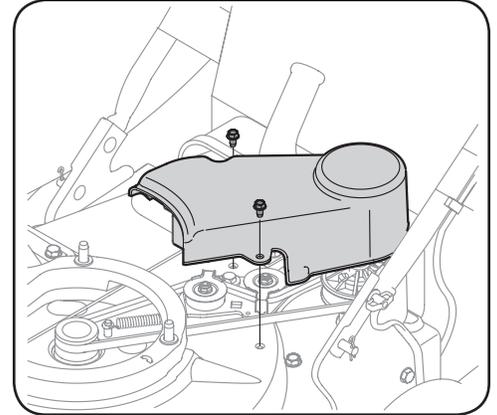


Figure 7-2

5. Remove self tapping screw on right side of unit that attaches to the flail screen. It may be necessary to remove the hose bracket hanger to get access to the screw. See Figure 7-3.

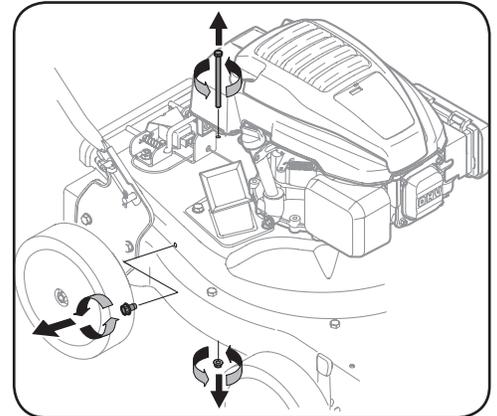


Figure 7-3

6. Remove hex screw on top of rear housing near mounting bracket and the flange lock nut that secures flail screen. See Figure 7-3.
7. Remove and clean the screen by scraping or washing with water. See Figure 7-4.

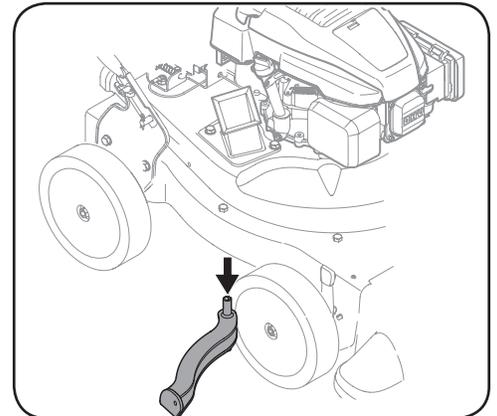


Figure 7-4

8. Reinstall the screen.

Adjustments

Drive Control Cable

Adjust the drive control cable if the yard vacuum does not self propel with the drive control engaged, or if the unit hesitates while the engine maintains the same speed after approximately 20 hours of use.

To move the z-fitting of the drive control cable from its factory set position in the front hole of the drive control to the rear hole, proceed as follows:

1. Push the right side of the control out of the right hole in the upper handle. See Figure 7-5.

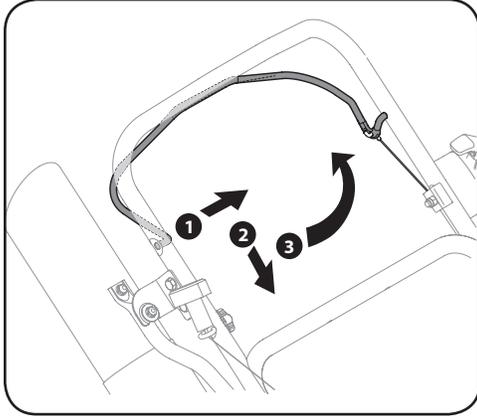


Figure 7-5

2. Pivot control down towards the lower handle.
3. Pivot straight up to remove it from the left hole in the upper handle. See Figure 7-5.
4. There is now sufficient slack in the drive control cable to grasp the z-fitting with your hand and move it from the front hole to the rear hole of the drive control. See Figure 7-6.

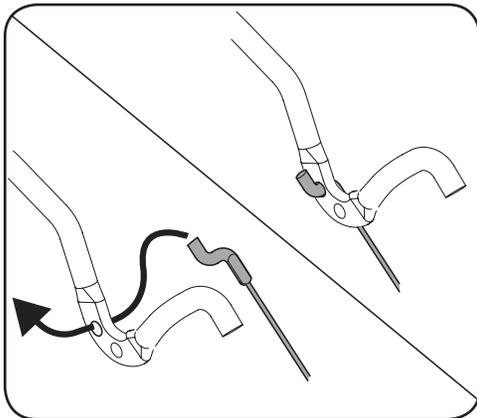


Figure 7-6

IMPORTANT: Make sure to insert the z-fitting into the rear hole as it was inserted in the front hole, that is from the outside of the drive control.

5. You may now carefully reinstall the drive control by performing the previous steps in the opposite order and manner of removal.

IMPORTANT: Once assembled and prior to restarting, make sure that the cable is properly adjusted. With the drive control disengaged, the unit should freely pull in reverse.

Service

Blade Care



WARNING: Before performing any type of maintenance on the machine, wait for all parts to stop moving and disconnect the spark plug wire. Failure to follow this instruction could result in personal injury or property damage.

NOTE: When tipping the unit, empty the oil and fuel tank and keep engine spark plug side up.

6. Disconnect and ground the spark plug wire to retaining post.
7. Remove bag assembly or blower chute.
8. Remove the three hex cap screws holding the hose hanger bracket and chipper chute to the upper housing. See Figure 7-7.

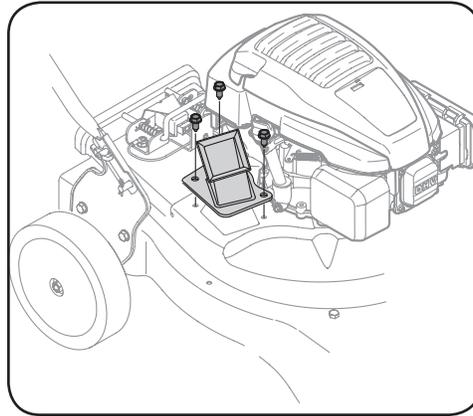


Figure 7-7

9. Remove the flange lock nuts, front wheels, and wave washers that attach to the pivot arm assemblies. See Figure 7-8.

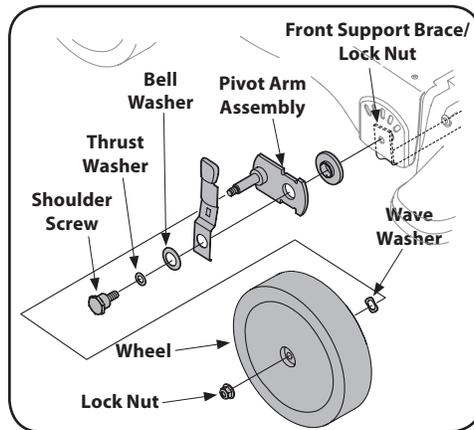


Figure 7-8

10. Remove the shoulder screws, thrust washers, and bell washers that go through the pivot arms to the front support brace. The front support brace and lock nut can be removed at this time as well.

11. Remove the four screws on the upper housing that secure the nozzle cover. See Figure 7-9.

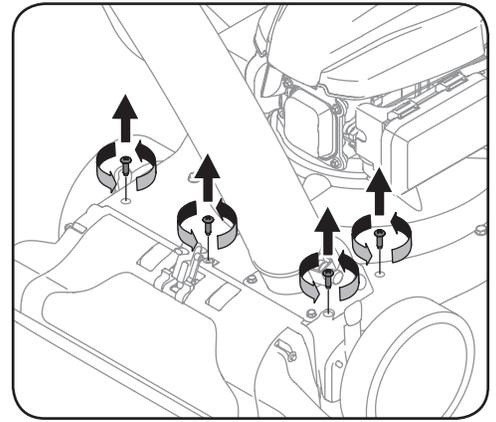


Figure 7-9

12. Carefully tilt and support the unit up to provide access underneath to the nozzle mounting hardware and impeller. Remove the three shoulder bolts securing the black plastic lower flail housing to the lower housing. Refer to Figure 7-10.

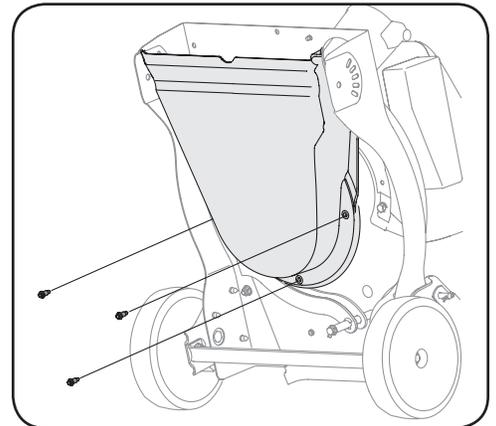


Figure 7-10

13. Tilt top of black plastic lower flail housing toward the engine to remove.
14. Using a 3/16" allen wrench, remove the flat head cap screws that hold the chipper blade to the impeller. These screws are accessible through the opening created when the chipper chute was removed earlier. See Figure 7-11.

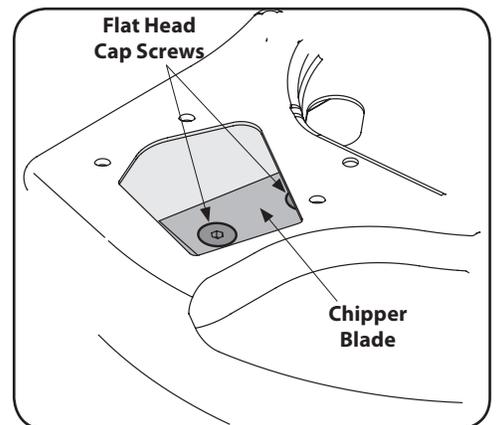


Figure 7-11

15. The nuts on the flat head cap screws can be reached from underneath using a 1/2-inch socket, universal, and extension. See Figure 7-12.

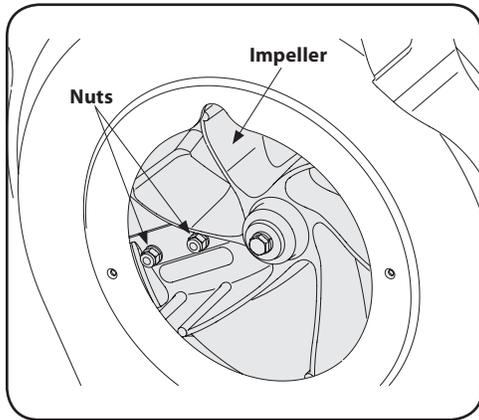


Figure 7-12

16. Replace or sharpen chipper blade. The blade can be sharpened with a file or on a grinding wheel.



WARNING: The chipper blade is sharp. When sharpening blade, wear leather work gloves to protect your hands and follow the original angle of grind.

17. Reassemble by performing the previous steps in the opposite order and manner of removal.
- NOTE:** Tighten blade screws to 210 - 250 in-lbs. Make certain chipper blade is reassembled with the sharp edge facing upward.

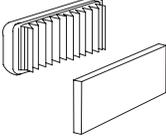
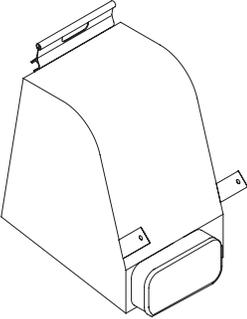
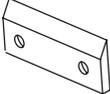
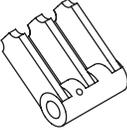
Off-Season Storage

- When storing the chipper/shredder vacuum in an unventilated or metal storage shed, care should be taken to rustproof the non-painted surfaces. Using a light oil or silicone, coat the equipment, especially any springs, bearings, and cables.

- Remove all dirt from exterior of engine and equipment.
- Follow lubrication recommendations.
- Refer to engine manual for correct engine storage instructions.
- Store equipment in a clean, dry area. Do not store in an area where equipment is present that may use a pilot light or has a component that can create a spark.

Troubleshooting

Problem	Cause	Remedy
Engine Fails to start	<ol style="list-style-type: none"> Throttle lever (if equipped) not in correct starting position. Engine switch (if equipped) in OFF position. Spark plug wire disconnected. Choke not in CHOKE position (if equipped). Fuel tank empty or stale fuel. Fuel shut-off valve closed (if equipped). Faulty spark plug. Bag/chute switch button is not fully depressed. 	<ol style="list-style-type: none"> Move throttle lever to FAST or START position. Move engine switch to ON position. Connect wire to spark plug. Move choke lever to CHOKE position. Fill tank with clean, fresh gasoline. Turn on fuel shut-off valve. Clean, adjust gap, or replace. Make certain the bag is correctly secured, and the bag/chute switch button is fully depressed.
Engine runs erratic	<ol style="list-style-type: none"> Spark plug boot loose. Unit running on CHOKE (if equipped). Blocked fuel line or stale fuel. Low engine RPM. Water or dirt in fuel system. Dirty air cleaner. Carburetor out of adjustment. 	<ol style="list-style-type: none"> Connect and tighten spark plug boot. Move choke lever to OFF position. Clean fuel line; fill tank with clean, fresh gasoline. Always run engine at full throttle. Drain fuel tank. Refill with fresh fuel. Refer to engine manual. See authorized service dealer.
Engine overheats	<ol style="list-style-type: none"> Engine oil level low. Dirty air cleaner. 	<ol style="list-style-type: none"> Fill crankcase with proper oil. Refer to engine manual.
Occasional skips (hesitates) at high speed	<ol style="list-style-type: none"> Spark plug gap too close. Carburetor idle mixture adjustment improperly set. 	<ol style="list-style-type: none"> Remove spark plug and adjust gap to .030". See authorized service dealer.
Excessive Vibration	<ol style="list-style-type: none"> Loose parts or damaged impeller. 	<ol style="list-style-type: none"> See authorized service dealer.
Unit does not discharge	<ol style="list-style-type: none"> Discharge area clogged. Foreign object lodged in impeller. Low engine RPM. Vacuum bag is full. 	<ol style="list-style-type: none"> Stop engine immediately and disconnect spark plug wire. Clean flail screen and inside of discharge opening. Stop engine and disconnect spark plug wire. Remove lodged object. Always run engine at full throttle. Empty bag.
Rate of discharge slows considerably or composition of discharged material changes	<ol style="list-style-type: none"> Low engine RPM. Chipper blade dull. 	<ol style="list-style-type: none"> Always run engine at full throttle. Replace chipper blade or see your authorized service dealer.
Unit fails to propel itself or slips when drive control is engaged	<ol style="list-style-type: none"> Drive control cable out of adjustment. Drive belt worn or damaged. 	<ol style="list-style-type: none"> Follow adjustment procedure in Maintenance & Adjustments section of manual. See authorized service dealer.

Component	Part Number and Description
	951-14437 Spark Plug
	951-14632 Air Cleaner Kit
	951-14407 Fuel Cap Assembly
	951-10358A Fuel Filter
	664-04040 Bag
	981-0490 Chipper Blade
	719-0329 Flail Blade (2 total)
	634-04665 Wheel (Front) 634-05040 Wheel (Rear)
	954-0369 Belt

Cub Cadet Genuine Parts can be ordered through your local authorized Cub Cadet dealer, online at cubcadet.com or by phone at 1-800-965-4Cub.
 To locate your nearest authorized Cub Cadet dealer, visit cubcadet.com or call 1-877-282-8684.

CUB CADET LLC

MANUFACTURER'S LIMITED WARRANTY FOR SNOW THROWERS, LOG SPLITTERS CHIPPER-SHREDDERS, CHIPPER-SHREDDER VACUUMS AND JET SWEEPS

The limited warranty set forth below is given by Cub Cadet LLC with respect to new merchandise purchased and used in the United States, its possessions and territories, and by MTD Products Limited with respect to new merchandise purchased and used in Canada and/or its territories and possessions.

This warranty is in addition to any applicable emissions warranty provided with your product.

For non-commercial use: Cub Cadet warrants this product (excluding *Normal Wear Parts* and the *Auger Gearbox*, as described below) against defects in material and workmanship for a period of three (3) years from the date of original retail purchase or lease.

For commercial uses and applications: Cub Cadet warrants this product (excluding *Normal Wear Parts* and the *Auger Gearbox*, as described below) against defects in material and workmanship for a period of one (1) year from the date of original retail purchase or lease.

"Cub Cadet" will, at its option, repair or replace, free of charge, any part found to be defective in materials or workmanship. This limited warranty shall only apply if this product has been operated and maintained in accordance with the Operator's Manual furnished with the product, and has not been subject to misuse, abuse, neglect, accident, improper maintenance, alteration, vandalism, theft, fire, water, or damage because of other peril or natural disaster. Damage resulting from the installation or use of any part, accessory or attachment not approved by Cub Cadet for use with the product(s) covered by this manual will void your warranty as to any resulting damage.

Normal Wear Parts are warranted to be free from defects in material and workmanship for a period of thirty (30) days from the date of purchase. Normal wear parts include, but are not limited to items such as: belts, skid shoes, shave plates, blades, debris collection bags, wheels and tires.

Auger Gearbox — Cub Cadet warrants the auger gearbox (on three-stage snow thrower models only) against defects in material and workmanship for a period of five (5) years, commencing on the date of the snow thrower's original purchase.

HOW TO OBTAIN SERVICE: Warranty service is available, WITH PROOF OF PURCHASE, through your local authorized service dealer. To locate the dealer in your area:

In the U.S.A.

To locate the dealer in your area, check your Yellow Pages, or contact Cub Cadet LLC at P.O. Box 361131, Cleveland, Ohio 44136-0019, or call 1-877-282-8684, or log on to our Web site at www.cubcadet.com.

In Canada

Contact MTD Products Limited, Kitchener, ON N2G 4J1, or call 1-800-668-1238 or log on to our Web site at www.mtdcanada.com.

This limited warranty does not provide coverage in the following cases:

- a. Routine maintenance items such as lubricants, filters, blade sharpening, tune-ups, brake adjustments, clutch adjustments, deck adjustments, and normal deterioration of the exterior finish due to use or exposure.
- b. Log splitter pumps, valves, and cylinders have a separate one year warranty.
- c. Cub Cadet does not extend any warranty for products sold or exported outside of the United States and/or Canada, and their respective possessions and territories, except those sold through Cub Cadet's authorized channels of export distribution.
- d. Replacement parts that are not genuine Cub Cadet parts.
- e. Service completed by someone other than an authorized service dealer.
- f. Transportation charges and service calls.

No implied warranty, including any implied warranty of merchantability of fitness for a particular purpose, applies after the applicable period of express written warranty above as to the parts as identified. No other express warranty, whether written or oral, except as mentioned above, given by any person or entity, including a dealer or retailer, with respect to any product, shall bind Cub Cadet. During the period of the warranty, the exclusive remedy is repair or replacement of the product as set forth above.

The provisions as set forth in this warranty provide the sole and exclusive remedy arising from the sale. Cub Cadet shall not be liable for incidental or consequential loss or damage including, without limitation, expenses incurred for substitute or replacement lawn care services or for rental expenses to temporarily replace a warranted product.

Some states do not allow the exclusion or limitation of incidental or consequential damages, or limitations on how long an implied warranty lasts, so the above exclusions or limitations may not apply to you.

In no event shall recovery of any kind be greater than the amount of the purchase price of the product sold. **Alteration of safety features of the product shall void this warranty.** You assume the risk and liability for loss, damage, or injury to you and your property and/or to others and their property arising out of the misuse or inability to use the product.

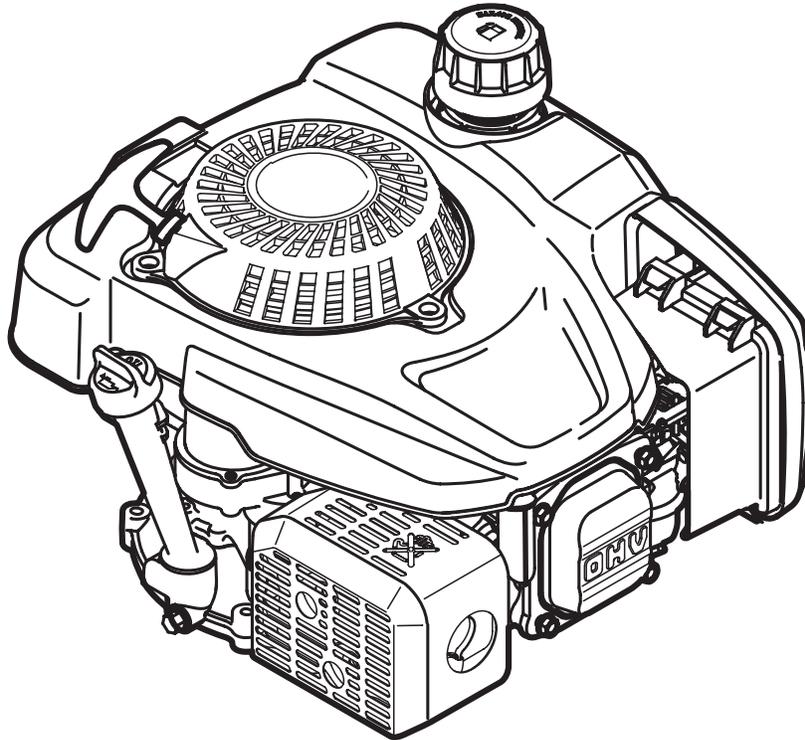
This limited warranty shall not extend to anyone other than the original purchaser or to the person for whom it was purchased as a gift.

HOW STATE LAW RELATES TO THIS WARRANTY: This limited warranty gives you specific legal rights, and you may also have other rights that vary in different jurisdictions.

IMPORTANT: Owner must present Original Proof of Purchase to obtain warranty coverage.

**Cub Cadet LLC, P.O. BOX 361131 CLEVELAND, OHIO 44136-0019; Phone: 1-877-282-8684
MTD Products Limited - KITCHENER, ON N2G 4J1; Phone 1-800-668-1238**

OPERATOR'S MANUAL



159 cc & 196 cc OHV Vertical Shaft Engine

⚠ WARNING

**READ AND FOLLOW ALL SAFETY RULES AND INSTRUCTIONS IN THIS MANUAL
BEFORE ATTEMPTING TO OPERATE THIS MACHINE.
FAILURE TO COMPLY WITH THESE INSTRUCTIONS MAY RESULT IN PERSONAL INJURY.**

MTD LLC, P.O. BOX 361131 CLEVELAND, OHIO 44136-0019



Thank You

This Operator’s Manual is an important part of your new engine. It will help you prepare and maintain the engine for the best performance. Please read and understand the contents before operating the engine.

Table of Contents

<i>Important Safe Operation Practices.....</i>	<i>3</i>	<i>Maintenance & Adjustments.....</i>	<i>9</i>
<i>Safety Labels</i>	<i>4</i>	<i>Troubleshooting.....</i>	<i>12</i>
<i>Set-Up.....</i>	<i>5</i>	<i>Replacement Parts.....</i>	<i>13</i>
<i>Controls & Features</i>	<i>6</i>	<i>Spanish</i>	<i>15</i>
<i>Operation</i>	<i>7</i>		

Record Product Information

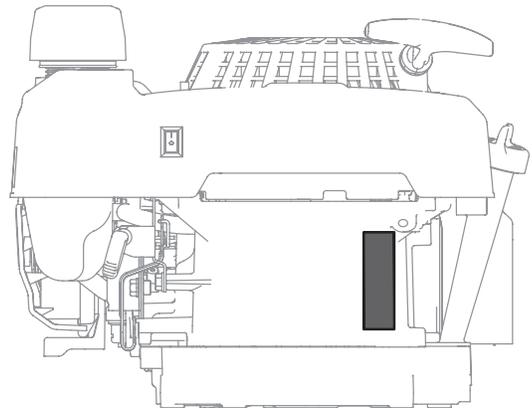
Before operating your new engine, please locate the model plate on the engine (shaded area in Figure below) and record the information in the provided area below. This information will be necessary, should you seek technical support via our web site or with your local dealer.

MODEL NUMBER

--	--	--	--	--	--	--	--

SERIAL NUMBER

--	--	--	--	--	--	--	--	--	--	--	--	--



Customer Support

Please do NOT return the machine to the retailer or dealer without first contacting the Customer Support Department.

If you have difficulty assembling this product, have questions regarding the controls, operation, or maintenance of this machine, want to order replacement parts/attachments/accessories, or want to view an online How-To video; you can seek help from the experts. Have your full model number and serial number ready. Choose from the options below:

- Web: www.mtdproducts.com/equipment/mtdproducts
- Phone: (800) 800-7310
- Mail: MTD LLC • P.O. Box 361131 • Cleveland, OH • 44136-0019

⚠ WARNING!

This symbol points out important safety instructions which, if not followed, could endanger the personal safety and/or property of yourself and others. Read and follow all instructions in this manual before attempting to operate the equipment. Failure to comply with these instructions may result in personal injury. When you see this symbol. **HEED ITS WARNING!**

⚠ WARNING!

CALIFORNIA PROPOSITION 65

Engine Exhaust, some of its constituents, and certain vehicle components contain or emit chemicals known to State of California to cause cancer and birth defects or other reproductive harm.

⚠ DANGER!

This engine was built to be operated according to the safe operation practices in this manual. As with any type of power equipment, carelessness or error on the part of the operator can result in serious injury. Failure to observe the following safety instructions could result in serious injury or death.

Preparation

1. Wear sturdy, rough-soled work shoes and close fitting slacks and shirts. Loose fitting clothes or jewelry can be caught in the moving parts. Never operate the machine in bare feet or sandals.
2. Disengage clutch levers and shift (if equipped) into neutral ("N") before starting the engine.
3. Never leave the engine running while unattended.
4. Never attempt to make any adjustments while the engine is running, except where specifically recommended in the operator's manual.

Safe Handling of Gasoline:

To avoid personal injury or property damage, use extreme care in handling gasoline. Gasoline is extremely flammable and the vapors are explosive. Serious personal injury can occur when gasoline is spilled on yourself and/or your clothes which can ignite. Wash your skin and change clothes immediately.

1. When adding fuel, turn engine OFF and let engine cool at least 2 minutes before removing the gas cap.
2. Fill fuel tank outdoors or in well ventilated area.
3. Use only an approved gasoline container.
4. Never fill containers inside a vehicle or on a truck or trailer bed with a plastic liner. Always place containers on the ground away from your vehicle before filling.
5. If possible, remove gas-powered equipment from the truck or trailer and refuel it on the ground. If this is not possible, then refuel such equipment on a trailer with a portable container, rather than from a gasoline dispenser nozzle.
6. Keep the nozzle in contact with the rim of the fuel tank or container opening at all times until fueling is complete. Do not use a nozzle lock-open device.
7. Do not overfill fuel tank. Fill tank to full as indicated by the fuel level indicator installed inside of the fuel tank or marked on the tank. Do not over-fill to allow space for fuel expansion. On some models, a fuel level indicator may NOT be present, in this instance, fill the tank no more than 1/2 inch below the bottom of the filler neck to allow space for fuel expansion.
8. Replace fuel cap and tighten until the cap ratchets.
9. If gasoline is spilled, wipe it off the engine and the equipment. Move the machine to another area. Wait five minutes before starting the engine.

10. To reduce fire hazards, keep the machine free of grass, leaves or other debris build up. Clean up oil or fuel spillage and remove any fuel-soaked debris.
11. Keep gasoline away from sparks, open flames, pilot lights, heat, and other ignition sources.
12. Never fuel equipment indoors because flammable vapors will accumulate in the area.
13. Extinguish all cigarettes, cigars, pipes, and other sources of ignition.
14. Check fuel line, tank, cap, and fittings frequently for cracks or leaks. Replace if necessary.

Operation

1. When starting the engine, make sure spark plug, muffler, and fuel cap are in place.
2. Do not crank engine with spark plug removed.
3. If fuel spills, wait until it evaporates before starting engine.
4. Allow muffler, engine cylinder, and fins to cool before touching.
5. Keep children away from hot or running engines. They can suffer burns from a hot muffler.
6. Remove accumulated combustibles from muffler and cylinder area.
7. Operate equipment with all guards in place.
8. Keep hands and feet away from rotating parts.
9. Tie up long hair and remove jewelry.
10. Do not wear loose-fitting clothing, dangling drawstrings or items that could become caught.
11. When starting the engine, pull cord slowly until resistance is felt, then pull rapidly (if not electric start).
12. Remove all external equipment/engine loads before starting engine.
13. Direct coupled equipment components such as, but not limited to blades, impellers, pulleys, sprockets, etc., must be securely attached.

Training

1. Read, understand and follow all instructions on the engine and in the manual(s) before attempting to assemble and operate. Keep this manual in a safe place for future and regular reference and for ordering replacement parts.
2. Be familiar with all controls and their proper operation. Know how to stop the engine and disengage them quickly.
3. Never allow children under 14 years of age to operate the engine. Children 14 and over should read and understand the instructions and safe operation practices in this manual and be trained and supervised by an adult.
4. Never allow adults to operate the machine without proper instruction.
5. Keep the area of operation clear of all persons, particularly small children and pets. Stop machine if anyone enters the area.

Maintenance & Storage

1. Keep the engine in safe working order
2. Allow the engine to cool at least five minutes before storing. Never tamper with safety devices. Check their proper operation regularly.
3. Check bolts and screws for proper tightness at frequent intervals to keep the engine in safe working condition. Visually inspect the engine for any damage.
4. Before cleaning, repairing or inspecting; stop the engine and make certain all moving parts have stopped. Disconnect the spark plug wire and ground it against the engine to prevent unintended starting.
5. Do not change the engine governor settings or over-speed the engine. The governor controls the maximum safe operating speed of the engine.
6. Maintain and replace safety and instruction labels as necessary.

7. Always refer to the operator's manual for important details if the machine is to be stored for an extended period of time.
8. If the fuel tank has to be drained, do this outdoors.
9. Observe proper disposal laws and regulations for gas, oil, etc. to protect the environment.

Do not modify engine

To avoid serious injury or death, do not modify engine in any way. Tampering with the governor setting can lead to a runaway engine and cause it to operate at unsafe speeds. Never tamper with factory setting of engine governor.

Notice Regarding Emissions

Engines which are certified to comply with California and federal EPA emission regulations for SORE (Small Off Road Equipment) are certified to operate on regular unleaded gasoline, and may include the following emission control systems: Engine Modification (EM), Oxidizing Catalyst (OC), Secondary Air Injection (SAI) and Three Way Catalyst (TWC) if so equipped.

Spark Arrestor

▲ WARNING!

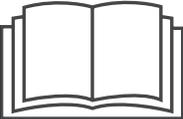
This machine is equipped with an internal combustion engine and should not be used on or near any unimproved forest-covered, brush covered or grass-covered land unless the engine's exhaust system is equipped with a spark arrestor meeting applicable local or state laws (if any).

If a spark arrestor is used, it should be maintained in effective working order by the operator. In the State of California the above is required by law (Section 4442 of the California Public Resources Code). Other states may have similar laws. Federal laws apply on federal lands.

A spark arrestor for the muffler is available through your nearest engine authorized service dealer or contact the service department, P.O. Box 361131 Cleveland, Ohio 44136-0019.

Safety Symbols

This page depicts and describes safety symbols that may appear on this product. Read, understand, and follow all instructions on the machine before attempting to assemble and operate.

Symbol	Description
	READ THE OPERATOR'S MANUAL(S) Read, understand, and follow all instructions in the manual(s) before attempting to assemble and operate.
	WARNING—GASOLINE IS FLAMMABLE Allow the engine to cool at least two minutes before refueling.
	WARNING— CARBON MONOXIDE Never run an engine indoors or in a poorly ventilated area. Engine exhaust contains carbon monoxide, an odorless and deadly gas.
	WARNING— ELECTRICAL SHOCK Do not use the engine's electric starter in the rain.
	WARNING— HOT SURFACE Engine parts, especially the muffler, become extremely hot during operation. Allow engine and muffler to cool before touching.

▲ WARNING! - SAVE THESE INSTRUCTIONS!

Your Responsibility — Restrict the use of this power machine to persons who read, understand and follow the warnings and instructions in this manual and on the machine.

Gas & Oil

NOTE: The engine is shipped without gasoline or oil in the engine. Running the engine with insufficient oil can cause serious engine damage and void the engine warranty.

▲ WARNING!

Always keep hands and feet clear of equipment moving parts. Do not use a pressurized starting fluid. Vapors are flammable.

Oil Recommendations

Before starting engine, fill with motor oil, capacity is 600 ml/20 oz. Refer to viscosity chart in Figure 3-1 for oil recommendations. Do not over-fill. Use a 4-stroke, or an equivalent high detergent, premium quality motor oil certified to meet or exceed U.S. automobile manufacturer's requirements for service classification of a minimum level SJ (higher letter ratings are acceptable such as SL and SM grades). Motor oil will display this designation on the container.

SAE 10W-30 is recommended for general, all temperature use. If single viscosity oil is used, select the appropriate viscosity for the average temperature in your area from the chart below.

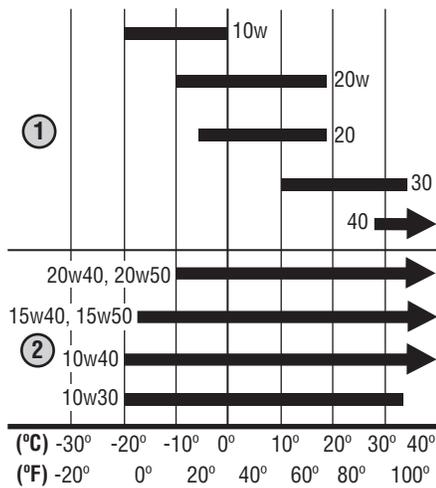


Figure 3-1

1. Single Viscosity
2. Multi Viscosity

▲ CAUTION

Do not use non-detergent oil or 2-stroke engine oil. It could shorten the engine's service life.

NOTE: A 5w30 synthetic oil may be used to improve start ability for cold weather (temperatures below 40° F).

Checking Oil Level

NOTE: Be sure to check the oil while on a level surface with the engine stopped.

3. Remove the oil filler cap/dipstick and wipe the dipstick clean.
4. Insert the dipstick into the oil filler neck. Turn the dipstick a 1/4 turn into the locked position to fully seat.
5. Remove dipstick. If the level is low, slowly add oil to the upper limit on the dipstick. See Figure 3-2 inset.

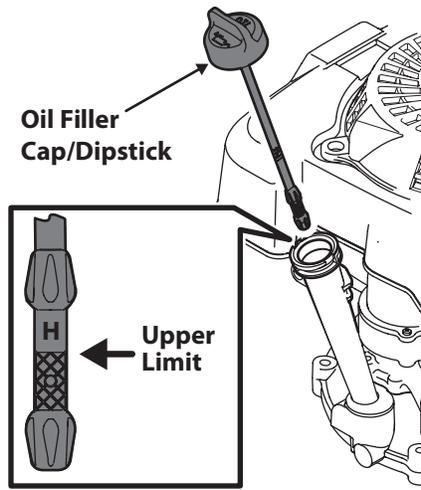


Figure 3-2

6. Reinsert the dipstick into the locked position before starting the engine.
- NOTE:** Do not overfill. Overfilling with oil may cause smoking, hard starting, spark plug fouling, or oil saturation of air cleaner.

Fuel Requirements

▲ CAUTION

Operating the engine with E15 or E85 fuel, an oil/gasoline mixture, dirty gasoline, or **gasoline over 30 days old** without fuel stabilizing additive may result in damage to your engine's carburetor. Subsequent damage would **not** be covered under the manufacturer's warranty.

Use automotive gasoline (unleaded or low leaded to minimize combustion chamber deposits) with a minimum of 87 octane. Gasoline with up to 10% ethanol (E10) or 15% MTBE (Methyl Tertiary Butyl Ether) can be used. Never use an oil/gasoline mixture or dirty gasoline. Avoid getting dirt, dust, or water in the fuel tank. **DO NOT use E15 or E85 gasoline.**

▲ WARNING!

Gasoline is extremely flammable and is explosive under certain conditions.

- Refuel in a well-ventilated area with the engine stopped. Do not smoke or allow flames or sparks in the area where the engine is refueled or where gasoline is stored.
- Do not overfill the fuel tank. After refueling, make sure the tank cap is closed properly and securely.
- Be careful not to spill fuel when refueling. Spilled fuel or fuel vapor may ignite. If any fuel is spilled, make sure the area is dry before starting the engine.
- Avoid repeated or prolonged contact with skin or breathing of vapor.

Adding Fuel

▲ WARNING!

An adult should fuel this engine. NEVER allow children to refuel the engine. Gasoline (fuel) vapors are highly flammable and can explode. Fuel vapors can spread and be ignited by a spark or flame many feet away from engine. To prevent injury or death from fuel fires, follow these instructions:

NOTE: Some engines may not have the fuel cap installed for shipping purposes. To install, remove and discard the fuel tank dust cap labeled "Discard". Remove the bubble wrap packaging from around the fuel cap and tighten securely.

- DO NOT use leaded fuel.
- Fuel must be fresh and clean. NEVER use fuel left over from last season or stored for long periods.
- NEVER mix oil with fuel.
- DO NOT use fuel containing Methanol (Wood Alcohol)

NOTE: Before refueling, allow engine to cool two minutes.

7. Clean around fuel fill before removing cap to fuel.
8. Fill tank until fuel reaches 1/2 inch below the bottom of the filler neck to allow space for fuel expansion. Be careful not to overfill.
9. Replace the gasoline cap and tighten securely. Wipe up spilled fuel before starting engine. If fuel is spilled DO NOT start engine. Move machine away from area of spillage. Avoid creating any source of ignition until fuel vapors are gone.

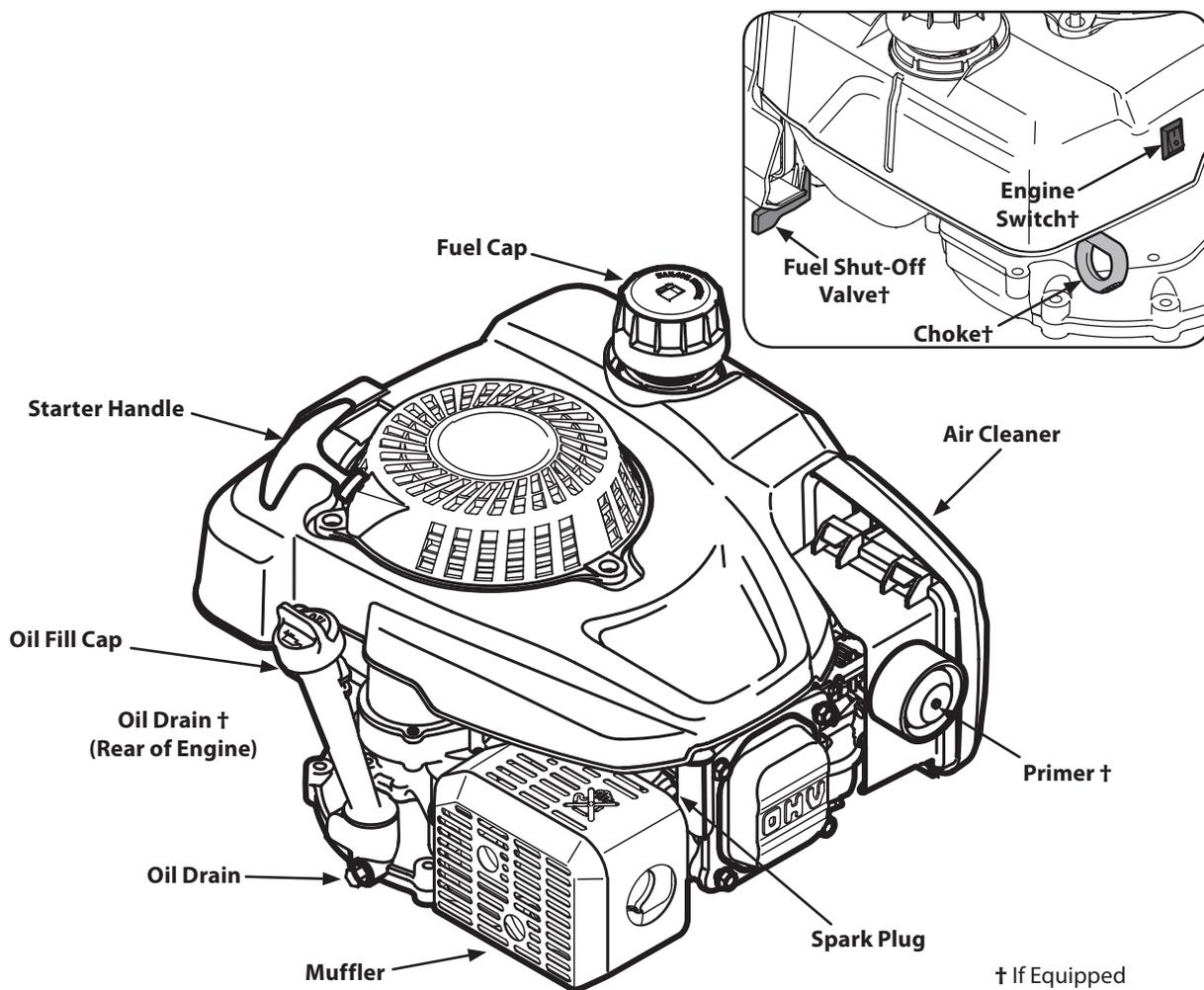


Figure 4-1

Engine Switch (If Equipped)

The engine switch is located on rear of the engine. Turn the switch ON when starting the engine and turn it to OFF when you want to shut it down.

Choke (If Equipped)

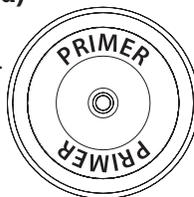
The choke control is located on the rear of the engine below the engine switch and when activated, closes the choke plate on the carburetor and aids in starting the engine. Pull the choke control to activate the choke on the engine. Use of the choke may not be necessary if the engine is warm or the air temperature is high.

Fuel Shut-Off Valve (If Equipped)

The fuel shut off valve is located on the engine below the fuel tank. Be sure the valve is ON before starting the engine. Turn the valve OFF when towing or transporting equipment.

Primer (If Equipped)

The primer is located on the front of the air cleaner. Pressing the primer forces fuel directly into the engine's carburetor to aid in starting the engine.



Oil Drain

Removing the oil drain plug will drain the oil from the engine. The engine is equipped with a side drain.

NOTE: Select engines are equipped with an oil drain located on the rear of the engine.

Oil Fill Cap

Remove the oil fill cap to check the oil level and add oil.

Fuel Cap

Remove the fuel cap to add fuel.

Pre-Operation Check

The engine is shipped without gasoline or oil in the engine. See page 5 in the Set-Up Section of this manual for instructions on adding oil and gasoline.

Determine The Starting System

Before starting the engine, you must determine the type of starting system that is on your engine. Your engine will have one of the following types:

- **Auto-Choke System:** This features an automatic choke that does not have a manual choke or primer.
- **Primer System:** This features a primer on the engine.
- **Manual Choke System:** This features a choke on the engine and no primer. Choke systems located on the engine will feature an engine switch and may also feature a fuel shut-off valve.
- **Auto-Choke/Electric Start System:** This features an automatic choke and an electric start switch on the handle.

To start your engine, follow the instructions for your type of starting system.

NOTE: Equipment may have remote controls. See the equipment manual for location and operation of remote controls.

Starting the Engine

▲ WARNING!

Always keep hands and feet clear of equipment moving parts. Do not use a pressurized starting fluid. Vapors are flammable.

Auto-Choke System

1. Standing behind the mower, depress the blade control and hold it against the upper handle. See Figure 5-1.
2. Pull the starter grip lightly until resistance is felt, then pull rapidly to overcome compression, prevent kickback and start engine. Repeat if necessary.

IMPORTANT: Do not allow the starter grip to snap back against the engine. Return it gently to prevent damage to the starter.

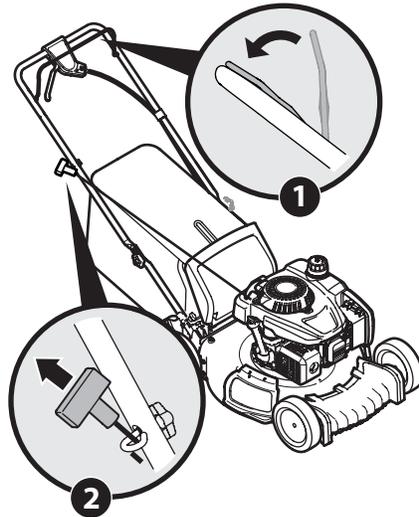


Figure 5-1

Primer System

1. Push primer three times. Wait about two seconds between each push. See Figure 5-2. In temperature below 50°F, prime five times. After the engine is warmed up, one prime may be needed for all temperatures.
2. Standing behind the mower, squeeze and hold the blade control against upper handle.
3. Pull the recoil starter lightly until resistance is felt, then pull rapidly to overcome compression, prevent kickback, and start the engine. Repeat if necessary. See Figure 5-2.

IMPORTANT: Do not allow the recoil starter to snap back against the rope guide.

If engine does not start, it may be necessary to re-prime the engine.

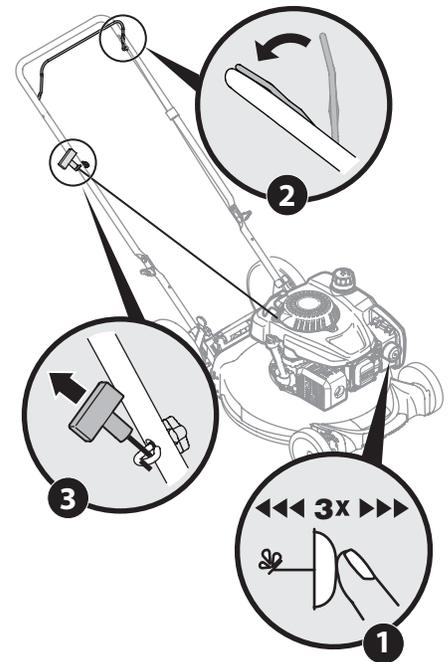


Figure 5-2

Manual Choke System

1. If equipped, turn on fuel valve located on the engine.
See Figure 5-3.
2. Pull out the choke knob located on the engine.
NOTE: Use of the choke may not be necessary if the engine is warm or the air temperature is high.
3. Press engine switch to on.
4. Pull the starter grip lightly until resistance is felt, then pull rapidly to overcome compression, prevent kickback and start engine. If engine does not start after ten seconds of repeated pulls, wait a few minutes and repeat.
IMPORTANT: Do not allow the starter grip to snap back against the rope guide. Return it gently to prevent damage to the starter.
5. When engine warms up, push in the choke knob.

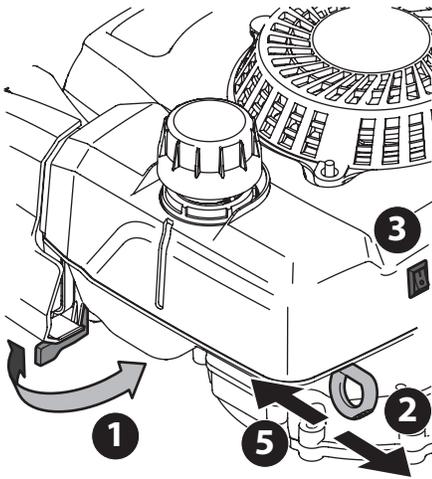


Figure 5-3

Auto-Choke/Electric Start System

1. Insert plastic Electric Starter Push Key into starter housing located on the right side of upper handle until it snaps in place. **(Electric Start units only)**
2. Standing behind the mower, pull the blade control back against the drive control. See Figure 5-4.
3. **Recoil Start:** While holding the blade and drive controls together firmly, pull the recoil starter lightly until resistance is felt, then pull rapidly to overcome compression, prevent kickback, and start the engine. Repeat if necessary.

IMPORTANT: Do not allow the recoil starter to snap back against the rope guide. Return it gently to prevent damage to the starter.

Electric Start (If Equipped): Push the electric starter push key to start the engine. See Figure 5-4.

NOTE: Electric starter is equipped with an internal circuit breaker. If unit fails to start when starter button is depressed, wait one minute for breaker to reset, then attempt to start again.

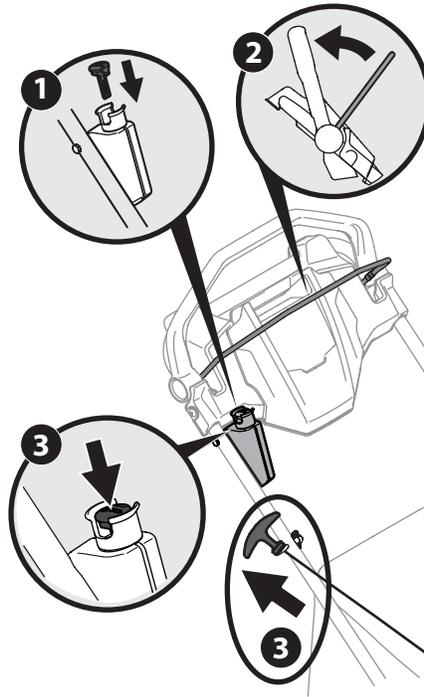


Figure 5-4

Stopping Engine

1. Release blade control or turn off the engine switch (if equipped).
2. Remove Electric Starter Push Key if mower is to be left unattended, stored, or serviced **(Electric Start units only)**. To remove key, grasp the key's top push button and pull it straight up and out. Keep key in a safe place out of the reach of children.

▲ WARNING!

Shut off the engine before performing any maintenance. To prevent accidental start-up, disconnect the spark plug boot.

IMPORTANT: If engine must be tipped to transport equipment or to inspect or remove grass, keep spark plug side of engine up. Transporting or tipping engine spark plug down may cause smoking, hard starting, spark plug fouling, or oil saturation of air cleaner.

Periodic inspection and adjustment of the engine is essential if high level performance is to be maintained. Regular maintenance will also ensure a long service life. The required service intervals and the kind of maintenance to be performed are described in the table below. Follow the hourly or calendar intervals, whichever occur first. More frequent service is required when operating in adverse conditions.

▲ WARNING!

If the engine has been running, the muffler will be very hot. Be careful not to touch the muffler.

Maintenance Schedule

	First 5 Hours	Each Use or Every 5 Hrs.	Every Season or 25 Hours	Every Season or 50 Hours	Every Season or 100 Hours	Service Dates
Check Engine Oil Level		✓				
Change Engine Oil ††	✓			✓		
Check Air Cleaner		✓				
Service Air Cleaner †					✓	
Service Carbon Canister Filter †					✓	
Check Spark Plug			✓			
Replace Spark Plug					✓	
Clean Engine Shroud		✓				
Clean around muffler		✓				
Replace Fuel Filter					✓	

† Service more frequently when used in dusty areas.

†† Every season or 25 hours if operating under heavy load or high ambient temperature.

Oil Service

- Check oil level regularly.
- Be sure correct oil level is maintained. Check every five hours or daily before starting engine. See oil checking procedure in the Operation section.

Oil Change

IMPORTANT: Be sure to check engine on a level surface with the engine stopped. Drain the oil while the engine is still warm to assure rapid and complete draining.

NOTE: Select engines are equipped with an oil drain located on the rear of the engine. For these engines see the equipment manual for oil change procedure.

1. Remove all fuel from tank by running engine until it stops from lack of fuel.
2. Remove drain plug and allow oil to drain into a suitable container. See Figure 6-1.

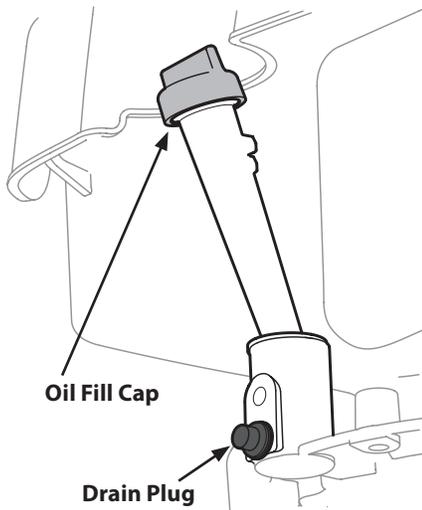


Figure 6-1

⚠ WARNING!

Before tipping engine or equipment to drain oil, drain fuel from tank by running engine until fuel tank is empty.

3. Reinstall the drain plug and tighten it securely.
4. Refill with the recommended oil and check the oil level. Refer to page 5 in the Set-Up section.
5. Reinstall the oil fill cap securely.

IMPORTANT: Used motor oil may cause skin cancer if repeatedly left in contact with the skin for prolonged periods. Although this is unlikely unless you handle used oil on a daily basis, it is still advisable to thoroughly wash your hands with soap and water as soon as possible after handling used oil.

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

Air Filter Service

Paper filters cannot be cleaned and must be replaced once a year or every 100 operating hours; more often if used in extremely dusty conditions.

⚠ WARNING!

Never use gasoline or low flash point solvents for cleaning the air filter element. A fire or explosion could result.

IMPORTANT: Never run the engine without the air filter. Rapid engine wear will result.

1. Press down on the tabs securing the air filter cover. Pull back and remove the cover. See Figure 6-2.

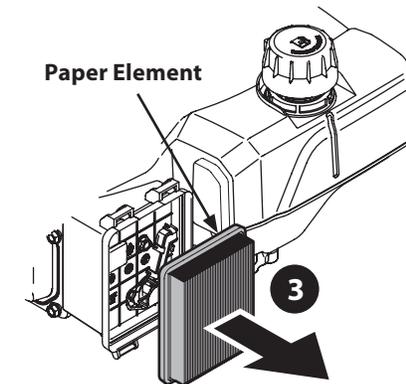
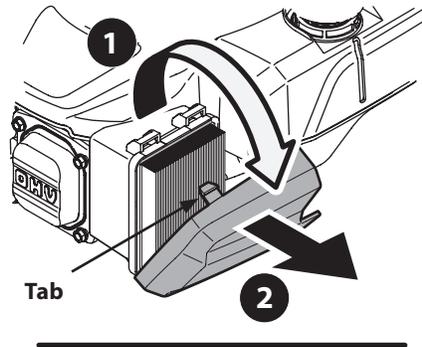


Figure 6-2

2. Remove the paper element. To loosen debris, gently tap the filter on a hard surface. If the filter is excessively dirty or damaged, replace with a new filter.
3. Insert the cover's bottom tabs into slots in bottom of base.
4. Tilt the cover up into place and secure with tabs.

Spark Plug Service

⚠ WARNING!

DO NOT check for spark with spark plug removed.
DO NOT crank engine with spark plug removed.

To ensure proper engine operation, the spark plug must be properly gapped and free of deposits.

1. Remove the spark plug boot and use a spark plug wrench to remove the plug. See Figure 6-3.

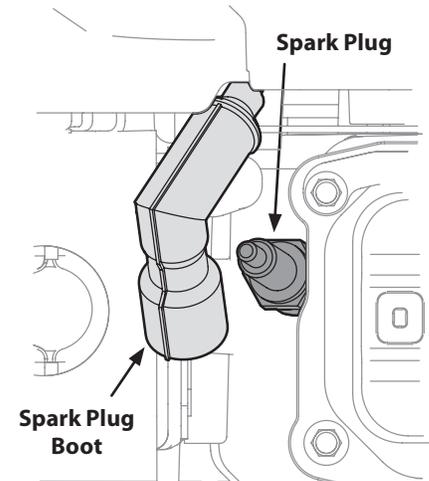


Figure 6-3

⚠ WARNING!

If the engine has been running, the muffler will be very hot. Be careful not to touch the muffler.

2. Visually inspect the spark plug. Discard the spark plug if there is apparent wear, or if the insulator is cracked or chipped. Clean the spark plug with a wire brush if it is to be reused.
3. Measure the plug gap with a feeler gauge. Correct as necessary by bending side electrode. See Figure 6-4. The gap should be set to 0.030 in.

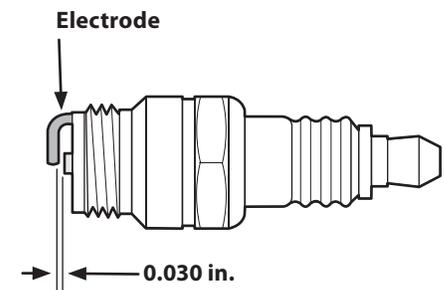


Figure 6-4

4. Check that the spark plug washer is in good condition and thread the spark plug in by hand to prevent cross-threading.

- After the spark plug is seated, tighten with a spark plug wrench to compress the washer.

NOTE: When installing a new spark plug, tighten 1/2 turn after the spark plug seats to compress the washer. When reinstalling a used spark plug, tighten 1/8-1/4 turn after the spark plug seats to compress the washer.

IMPORTANT: The spark plug must be securely tightened. An improperly tightened spark plug can become very hot and may damage the engine.

Fuel Filter Service

The fuel filter cannot be cleaned and must be replaced once a year or every 100 operating hours; more often if run with old gasoline.

- Remove all fuel from tank by running engine until it stops from lack of fuel.
- Remove hose clamp from fuel line and remove fuel line from tank outlet. See Figure 6-5.

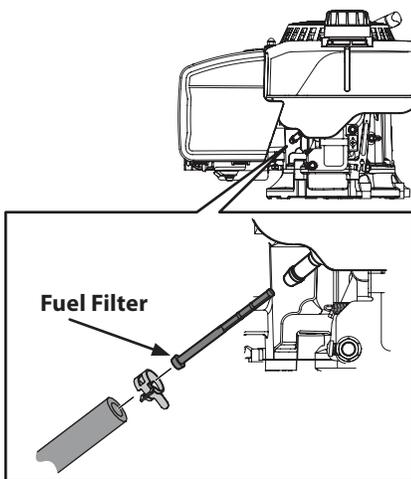


Figure 6-5

- Pull out old fuel filter from tank outlet. Replace when dirty or damaged.
- Grasp new fuel filter from shouldered end and insert it completely to the shoulder into the tank outlet. See Figure 6-5 inset.
- Replace fuel line and c-clamp.

Clean Engine

If the engine has been running, allow it to cool for at least half an hour before cleaning. Periodically remove dirt build-up from engine. Clean finger guard and around muffler. Clean with a brush or compressed air.

IMPORTANT: Do not spray engine with water to clean because water could contaminate fuel. Using a garden hose or pressure washing equipment can also force water into the air cleaner or muffler opening. Water in the air cleaner will soak the paper element, and water that passes through the element or muffler can enter the cylinder, causing damage.

▲ WARNING!

Accumulation of debris around muffler could cause a fire. Inspect and clean before every use.

Storage

▲ CAUTION

Failure to use a fuel stabilizing additive or completely run the engine until it's out of fuel before off-season storage may result in damage to your engine's carburetor. Subsequent damage would **not** be covered under the manufacturer's warranty.

Gasoline that will be stored longer than 30 days needs to be pre-treated upon purchase with fuel stabilizer to prevent gum and varnish from forming in the engine's fuel and intake system. Improper fuel storage can result in hard starting, no starting, stalling and poor performance. If the gasoline in your engine deteriorates during storage, you may need to have the carburetor, and other fuel system components, serviced or replaced.

- Remove all fuel from tank by running engine until it stops from lack of fuel.

▲ WARNING!

Never leave engine unattended while running.

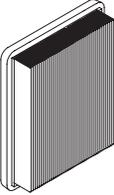
- Change oil. See Oil Change section on page 10.
- Remove spark plug and pour about 1/2 an ounce of engine oil into cylinder. Replace spark plug and crank slowly to distribute oil.
- Clean debris from around engine, under finger guard, and under, around and behind muffler. Touch up any damaged paint, and coat other areas that may rust with a light film of oil.

- Store in a clean, dry and well ventilated area away from any appliance that operates with a flame or pilot light, 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, also avoid storage areas with high humidity, because that promotes rust and corrosion.
- Keep the engine level in storage. Tilting can cause fuel or oil leakage.

Removing From Storage

- Check your engine as described in Pre-Operation Check on page 7 of Operation 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, make certain it contains only fresh fuel. 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.

Problem	Cause	Remedy
Engine fails to start	<ol style="list-style-type: none"> 1. Blade control disengaged (Lawn mower only). 2. Spark plug boot disconnected. 3. Fuel tank empty or stale fuel. 4. Fuel shut-off valve closed (if equipped). 5. Engine not primed (if equipped with primer). 6. Faulty spark plug. 7. Reduced fuel flow/blocked fuel filter. 8. Engine flooded. 9. Engine not choked (if equipped with choke). 	<ol style="list-style-type: none"> 1. Engage blade control. 2. Connect wire to spark boot. 3. Fill tank with clean, fresh gasoline. 4. Turn on fuel shut-off valve. 5. Prime engine as instructed in the Operation section. 6. Clean, adjust gap, or replace. 7. Replace fuel filter as instructed in the Maintenance section. 8. Wait a few minutes to restart, but do not prime. 9. Choke engine. See Operation section.
Engine fails to start with electric starter (Electric Start Units Only)	<ol style="list-style-type: none"> 1. Electric starter push key not fully inserted. 2. Battery not charged. 3. Circuit breaker tripped. 	<ol style="list-style-type: none"> 1. Insert electric starter push key into starter housing until it snaps into place. 2. Charge battery. See Service section of equipment Operator's Manual. 3. Debris may be blocking blade operation. Stop engine, remove electric starter push key, and disconnect spark plug boot. Verify grass or other debris are not obstructing the blade. Carefully clean out debris if necessary. Reattach spark plug boot and reinsert electric starter push key. Wait one minute after tripping for circuit breaker to automatically self-reset then reattempt start.
Engine runs erratic	<ol style="list-style-type: none"> 1. Spark plug boot loose. 2. Reduced fuel flow/blocked fuel filter. 3. Vent in gas cap plugged (if equipped). 4. Water or dirt in fuel system. 5. Dirty air cleaner. 6. Unit running with CHOKE (if equipped) applied. 	<ol style="list-style-type: none"> 1. Connect and tighten spark plug boot. 2. Replace fuel filter as instructed in the Maintenance section. 3. Clear vent. 4. Drain fuel tank. Refill with fresh fuel. 5. Refer to Maintenance section. 6. Push CHOKE knob in.
Engine overheats	<ol style="list-style-type: none"> 1. Engine oil level low. 2. Air flow restricted. 	<ol style="list-style-type: none"> 1. Fill crankcase with proper oil. 2. Clean area around and on top of engine.
Occasional skips (hesitates) at high speed	<ol style="list-style-type: none"> 1. Spark plug gap too close. 	<ol style="list-style-type: none"> 1. Adjust gap to .030".
Idles poorly	<ol style="list-style-type: none"> 2. Spark plug fouled, faulty, or gap too wide. 3. Dirty air cleaner. 	<ol style="list-style-type: none"> 1. Reset gap to .030" or replace spark plug. 2. Refer to Maintenance section.
Engine stalls with full tank	<ol style="list-style-type: none"> 1. Carbon canister vent line(s) pinched/kinked (if equipped with carbon canister). 	<ol style="list-style-type: none"> 1. Refer to Carbon Canister Filter Service section on page 13 to remove engine shroud and relieve pinched/kinked vent line(s). Re-install engine shroud making sure vent line(s) are not pinched or kinked.

Component	Part Number and Description
	951-14437 Spark Plug
	751-15245 Air Cleaner
	751-15255 Fuel Cap Assembly
	951-12296 Fuel Filter

Phone (800) 800-7310 or (330) 220-4683 to order replacement parts or a complete Parts Manual (have your full model number and serial number ready).
 Parts Manual downloads are also available free of charge at www.mtdproducts.com.



The EZ Start Promise Provisions of Your Limited Warranty

In addition to the other terms and conditions of the Limited Warranty applicable to your new mower, MTD LLC ("MTD") hereby warrants that your mower's engine will start on the first or second attempt by an able-bodied adult (subject to the limitations described below) for the duration of the manufacturer's limited warranty applicable to your product. If the engine on your mower fails to conform to this limited warranty, MTD will cover the cost of parts and labor associated with any adjustments and/or repairs necessary to return your engine to its warranted condition. In order to make a claim under these provisions of your warranty, you must bring the product and proof of purchase to an authorized MTD service provider. In many cases, the retailer who sold you your mower is not equipped to provide warranty service, so please locate the authorized service dealer nearest you by either calling the phone number provided in your Operator's Manual or looking up an authorized service dealer on-line at www.mtdproducts.com.

Items and Conditions Not Covered

The EZ Start Promise does not cover and/or apply to the following:

- Cost of regular maintenance service or parts, such as filters, fuel, lubricants, oil changes, spark plugs, air filter, blade sharpening, worn blades, cable/linkage adjustments, or brake and clutch adjustments
- Transportation costs to and from an authorized MTD service provider
- Any engine used for commercial, rental, institutional, governmental, or non-residential applications
- Any product or part that has been altered or misused or required replacement or repair due to misuse, accidents, or lack of proper maintenance
- Repairs necessary due to improper battery care, electrical supply irregularities, or failure to properly prepare the mower prior to any period of non-use over three months
- Pickup and/or delivery charges
- Operational misuse, neglect, accidents, unauthorized repairs or attempted repairs of the engine or its components by anyone other than an authorized MTD service provider.

- Repairs or adjustments to correct starting difficulties due to any of the following: failure to follow proper maintenance procedures — rotary mower blade striking an object — contaminants in the fuel system — improper fuel or fuel/oil mixture (consult your Operator's Manual if in doubt) — failure to drain the fuel system prior to any period of non-use over three months.
- Any starting problem which results from the use of inappropriate fuels, lubricants, or additives.
- Special conditions or circumstances that normally require more than two pulls to start, specifically: 1) First start-up following your initial purchase, 2) first time starts after extended period(s) of non-use over one month or seasonal storage, 3) cool temperature starts such as those found in early spring and late autumn, and 4) difficult starting that results from the operator's failure to follow the proper starting procedures identified in the Operator's Manual. If you are having difficulty starting your unit, please check the Operator's Manual to ensure that you are using the correct starting procedures. This can save an unnecessary visit to a Service Dealer.

Owner Responsibilities

You must maintain your mower (including its engine) by following the maintenance procedures and starting instructions described in the Operator's Manual. Such routine maintenance, whether performed by a dealer or by you, is at your expense. In addition, please retain your proof of purchase and service receipts as these may be required to validate a claim.

General Conditions

An authorized MTD service provider using approved replacement parts must perform all repairs covered by the EZ Start Promise. Repair by an MTD authorized service dealer is your sole remedy under this warranty. MTD is not liable for indirect, incidental, or consequential damages in connection with the use of the products covered by these warranties, including any cost or expense of providing substitute equipment or service during reasonable periods of malfunction or non-use pending completion of repairs under this warranty.

Some states do not allow exclusions of incidental or consequential damages, or limitations on how long an implied warranty lasts, so certain exclusions and limitations may not apply to you.