

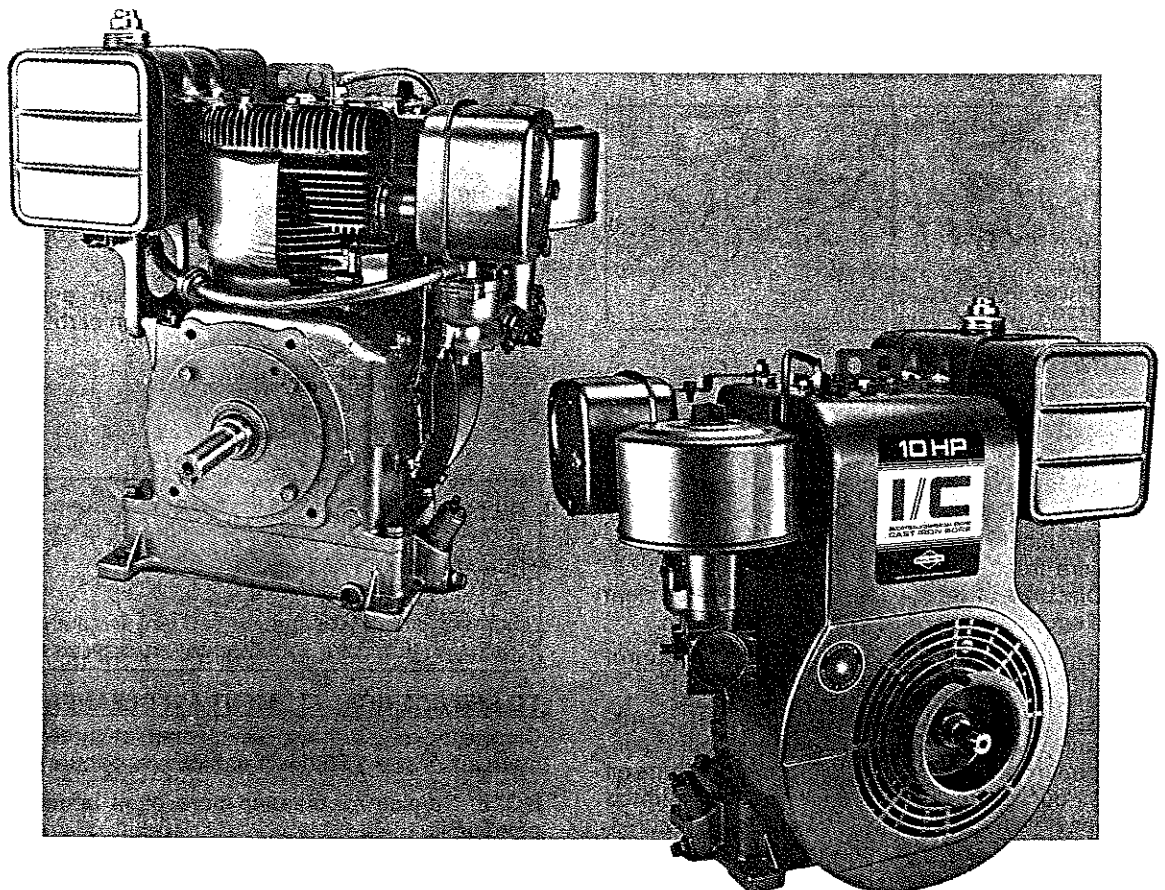
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# Operating and Maintenance Instructions

Model Series

243431, 326431, *302400*

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Briggs & Stratton Corporation  
Milwaukee, Wisconsin 53201

FORM NO. 270786-4/86  
PRINTED IN U.S.A.

# IMPORTANT SAFETY INFORMATION AND INSTRUCTIONS FOR ENGINE SELECTION ENGINE INSTALLATION ENGINE OPERATION

In the USA and Canada,  
our 24 hour hotline is:

18002333723

Briggs & Stratton Corporation  
Milwaukee, Wisconsin 53201

[www.briggsandstratton.com](http://www.briggsandstratton.com)

Keep these instructions for future reference.





**Before installing and operating this engine read and observe all warnings, cautions and instructions on both sides of this sheet, on the engine, and in the operating & maintenance instructions.**


**NOTE:** This sheet of instructions and safety information is not meant to cover all possible conditions and situations that may occur. Read entire Operating & Maintenance Instructions for this engine AND the instructions for the equipment this engine powers. Failure to follow instructions and safety information could result in serious injury or death.

The safety alert symbol () is used to identify safety information about hazards that can result in personal injury.

A signal word (DANGER, WARNING, or CAUTION) is used with the alert symbol to indicate the likelihood and the potential severity of injury. In addition, a hazard symbol may be used to represent the type of hazard.

 **DANGER** indicates a hazard which, if not avoided, will result in death or serious injury.

 **WARNING** indicates a hazard which, if not avoided, could result in death or serious injury.

 **CAUTION** indicates a hazard which, if not avoided, might result in minor or moderate injury.

**CAUTION**, when used **without** the alert symbol, indicates a situation that **could result in damage to the engine.**

## HAZARD SYMBOLS AND MEANINGS



Fire



Explosion



Moving Parts



Toxic Fumes



Hot Surface



Shock



Kickback

(OVER)

FORM MS-6445-01/03

# ENGINE SELECTION



 <b>WARNING</b>



<b>Failure to select the correct engine could result in fire or explosion.</b>



- Some engines are unique and designed for specific applications or types of equipment. If this engine will be used to build new equipment, contact Briggs & Stratton to ensure that the engine is appropriate for the intended use.  
**Note: For all Go-karts use only a model 136200 series engine, which offers improved safety and performance.**
- Replacement engines should be the same model as the original engine, or be the Briggs & Stratton designated replacement engine. Refer to the Operation & Maintenance Instructions for engine identification information.  
**Note: For all Go-karts use only a model 136200 series engine, which offers improved safety and performance.**
- Do not use Briggs & Stratton engines on 3-wheel All-Terrain Vehicles (ATVs), motor bikes, air craft products, or vehicles intended for use in competitive events. Briggs & Stratton does not approve of or authorize such uses.

# ENGINE INSTALLATION



- [1] Do not attempt to install this engine if you do not have the appropriate tools and knowledge of small engine installation procedures. Use only Briggs & Stratton parts. Contact your Authorized Service Dealer for assistance.
- [2] Do not modify the engine in any way without Briggs & Stratton factory approval. Any such modification is at the owner's sole risk.
- [3] If the exhaust system on the old engine was supplied by the equipment manufacturer, you must transfer the exhaust system and related components (original muffler and related pipes, brackets, clamps, and shields) to the new engine. All components must be in good condition.
- [4] 



 <b>WARNING</b>	Install muffler (and muffler deflector if used) so outlet points away from operator, fuel tank, and equipment, and so muffler heat will not damage or deform engine and components.
	
- [5] 



 <b>WARNING</b>	Ensure all fuel lines and fittings are properly assembled and do not leak. Replacement parts must be the same model as the original.
	
- [6] 



 <b>WARNING</b>	Ensure all wiring, including safety switches and engine shut-off components are completely installed and functioning properly.
	
- [7] Set engine speed to equipment manufacturer's specification. Refer to equipment manufacturer's manual. Do not tamper with governor springs, or other parts that will increase engine speed above specification.

- [8] 







 <b>WARNING</b>	All engine parts, including fuel cap, spark plug, muffler, air cleaner, and covers and guards for drive components (gears, belts, shafts, couplings, etc.) must be in place before attempting to start engine.
	
- [9] 

 <b>WARNING</b>	If engine is installed on walk behind lawn mower, all mower components, including cutting blade, must be correctly installed before attempting to start engine.
	
- [10] 

 <b>WARNING</b>	When working on the engine or equipment, remove spark plug wire from spark plug. For electric start, remove negative wire from battery.
	
- [11] 

 <b>WARNING</b>	Do not check for spark with spark plug removed. Use Briggs & Stratton spark tester #19368.
	

# ENGINE OPERATION

	 <b>WARNING</b>
	<b>When adding fuel:</b>
<p>Turn engine off and let engine cool at least 2 minutes before removing gas cap.</p> <p>Fill fuel tank outdoors or in well-ventilated area. Fill tank to about 1 inch below lowest portion of neck to allow for fuel expansion.</p> <p>Keep gasoline away from sparks, open flames, pilot lights, heat, and other ignition sources.</p>	
	 <b>WARNING</b>
	<b>When starting engine:</b>
<p>Remove all external equipment/engine loads.</p> <p>Wait until spilled fuel is evaporated. Start engine outdoors.</p> <p>Pull cord slowly until resistance is felt, then pull rapidly.</p> <p>If engine floods, set choke to OPEN/RUN, place throttle in FAST and crank until engine starts.</p>	
	 <b>WARNING</b>
	<b>When operating equipment:</b>
<p>Do not tip engine or equipment at angle which causes gasoline to spill.</p> <p>Run engine outdoors. Do not run in enclosed area, even if doors or windows are open.</p> <p>Do not choke carburetor to stop engine.</p>	



## IN THE INTEREST OF SAFETY



**WARNING:** DO NOT RUN THE ENGINE IN AN ENCLOSED AREA. Exhaust gases contain carbon monoxide, an odorless and deadly poison.

A FIRE OR EXPLOSION CAN OCCUR RESULTING IN PERSONAL INJURY IF THE FOLLOWING INSTRUCTIONS ARE NOT FOLLOWED:

1. DO NOT FILL GASOLINE TANK while engine is running. Allow engine to cool for two minutes before refueling.
2. Do not operate the engine when an odor of gasoline is present or other explosive conditions exist.
3. If gasoline is spilled, move machine away from the area of the spill and avoid creating ANY source of ignition until the gasoline has evaporated.
4. DO NOT STORE, SPILL OR USE GASOLINE NEAR AN OPEN FLAME, or devices such as a stove, furnace, water heater which utilize a pilot light, or devices which can create a spark.
5. Refuel outdoors preferably, or only in well ventilated areas.
6. DO NOT OPERATE ENGINE WITHOUT A MUFFLER, inspect periodically and replace, if necessary.
7. Periodically clean the muffler area to prevent grass, dirt and combustible material from accumulating.
8. DO NOT use this engine on any forest covered, brush covered or grass covered unimproved land unless a spark arrester is attached to the muffler.
9. DO NOT operate the engine if air cleaner or cover directly over the carburetor air intake is removed.
10. When transporting equipment which is powered by an engine using a float feed carburetor and gravity fuel source, the fuel shut off valve must be closed to prevent fuel leaking from carburetor.
11. DO NOT choke carburetor to stop the engine.

**CAUTION:** DO NOT RUN ENGINE AT EXCESSIVE SPEEDS. Operating an engine at excessive speeds increases the danger of personal injury.

DO NOT TAMPER WITH GOVERNOR SPRINGS, GOVERNOR LINKS OR OTHER PARTS WHICH MAY INCREASE THE GOVERNED ENGINE SPEED.

A.N.S.I. Standard Safety Specifications for rotary power lawn mowers specify a maximum blade tip speed of 19,000 feet per minute (96.5 meters per second), primarily to reduce the danger from thrown objects.

Do not tamper with the engine speed selected by the original equipment manufacturer.

DO NOT TOUCH hot mufflers, cylinders or fins as contact may cause burns.

Dirt and grass clippings or other debris, in cooling fins or governor parts can affect engine speed. See cleaning instructions in MAINTENANCE section.

TO PREVENT HAND OR ARM INJURY, always pull starter cord rapidly to avoid kickback; starting engine with a loose blade or without a blade may cause a severe kickback.

ALWAYS KEEP HANDS AND FEET CLEAR OF MOVING OR ROTATING PARTS.

TO PREVENT ACCIDENTAL STARTING when servicing the engine or equipment, always remove the spark plug or wire from the spark plug shown on page 3. Disconnect negative wire from battery terminal if equipped with a 12 volt starting system.

### WHEN WORKING ON EQUIPMENT

DO NOT STRIKE FLYWHEEL with a hard object or metal tool as this may cause flywheel to shatter in operation, causing personal injury or property damage. To remove flywheel, use Briggs & Stratton approved tools only.

### IN THE INTEREST OF ENVIRONMENT

A muffler which leaks because of rust or damage can permit an increased exhaust noise level. Therefore, examine the muffler periodically to be sure it is functioning effectively. To purchase a new muffler, see SERVICE AND REPAIR INFORMATION.

**CAUTION:** If this engine is not equipped with a spark arrester and is to be used on any forest covered, brush covered, or grass covered unimproved land, before using on such land a spark arrester must be added to the muffler. The arrester must 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. See your Authorized Briggs & Stratton Service Center for spark arrester muffler options.



THIS SYMBOL MEANS WARNING or CAUTION. PERSONAL INJURY AND/OR PROPERTY DAMAGE MAY OCCUR UNLESS INSTRUCTIONS ARE FOLLOWED CAREFULLY.

# SERVICE & REPAIR INFORMATION

If service or repair is needed, contact an Authorized Briggs & Stratton Service Center. To serve you promptly and efficiently, the Service Center will need the model, type and code number on your engine.

Each Authorized Service Center carries a stock of original Briggs & Stratton repair parts and is equipped with special service tools. Trained mechanics assure expert repair service on all Briggs & Stratton engines.

Major engine repairs should not be attempted unless you have the proper tools and a thorough knowledge of internal combustion engine repair procedure.



Your nearest service center is listed in the "Yellow Pages" under "Engines, Gasoline" or "Gasoline Engines". He is one of over 25,000 authorized dealers available to serve you.

This illustrated book includes "Theories of Operation", common specifications and detailed information covering the adjustment, tune-up and repair procedures for 2 through 16 H.P. single cylinder, 4 cycle models. It is available from any Authorized Briggs & Stratton Service Center. Order as Part Number 270962.



# GENERAL INFORMATION

These engines are single-cylinder L-head, air-cooled type.

## MODEL SERIES 243431

Bore..... 3-1/16" (77.79 mm)  
 Stroke ..... 3-1/4" (82.55 mm)  
 Displacement ..... 23.94 cu. in. (392.3 cc)  
 Horsepower ..... 10.0 HP Max. @ 3600 RPM  
 Torque (Ft.-Lbs.) ..... 16.75 Max. @ 2400 RPM

## MODEL SERIES 326431

Bore..... 3-9/16" (90.49 mm)  
 Stroke ..... 3-1/4" (82.55 mm)  
 Displacement ..... 32.4 cu. in. (530.9 cc)  
 Horsepower ..... 16.0 HP Max. @ 3600 RPM  
 Torque (Ft.-Lbs.) ..... 25.8 Max. @ 2700 RPM

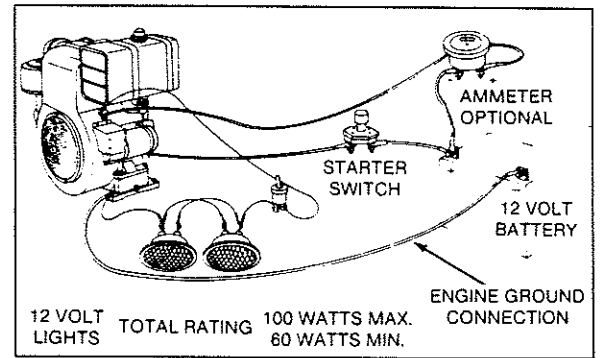
The horsepower ratings listed are established in accordance with the Society of Automotive Engineers Test Code-J607. For practical operation, the horsepower loading should not exceed 85% of this rating. Engine power will decrease 3-1/2% for each 1,000 feet (304.8 m) above sea level and 1% for each 10° above 60° F (16° C).

In some areas, local law requires the use of a resistor spark plug so as to suppress ignition signals. If an engine was originally equipped with a resistor spark plug, be sure to use the same type of spark plug for replacement.



**CAUTION:** For personal safety, always remove cable from negative (-) side of the battery before attempting any repairs or maintenance.

## TYPICAL WIRING DIAGRAMS



## TUNE-UP SPECIFICATIONS

Spark Plug Type	Champion	Autolite
Short Plug	CJ-8	235
Long Plug	J-8	295
Resistor Short Plug	RCJ-8	245
Resistor Long Plug	RJ-8	306

Spark Plug Gap ..... .030" (.76 mm)  
 Intake Valve Clearance .... .007"-.009" (.18-.23 mm)  
 Exhaust Valve Clearance .. .017"-.019" (.43-.48 mm)

BRIGGS & STRATTON ENGINES ARE MADE UNDER ONE OR MORE OF THE FOLLOWING PATENTS:

2,999,491	3,305,223	3,526,146	3,625,492	3,745,393	3,971,353	4,233,043
3,194,224	3,457,804	3,572,218	3,650,354	3,961,724	4,168,288	4,270,509
3,276,439	3,465,740	3,625,071	3,738,345	3,968,854	4,189,040	

DESIGN  
 D-247,177  
 OTHER PATENTS PENDING

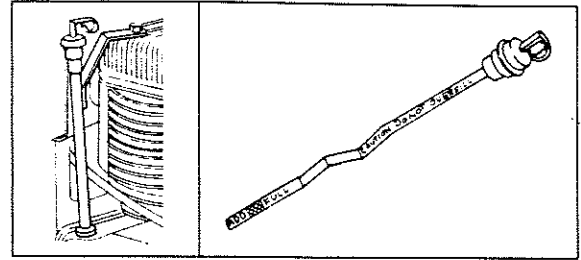
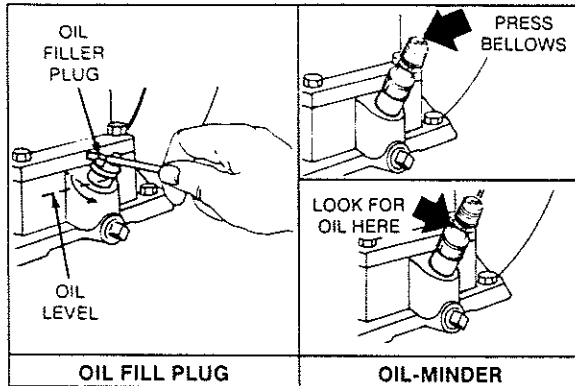


## BEFORE STARTING (Cont.)

### FILL CRANKCASE WITH OIL

Place engine level. Clean area around oil fill before removing oil fill plug, dipstick or oil-minder.

**OIL FILL PLUG.** Remove oil fill plug or (optional) oil-minder. Fill crankcase to point of overflowing. **POUR SLOWLY.** Capacity approximately 4 pints (1.9 liters). Replace oil fill plug or oil-minder.



### CHARGE BATTERY

Charge battery before use on engines equipped with (OPTIONAL) 12 volt electric starter motor. See equipment manufacturers' recommendations.

### FUEL RECOMMENDATIONS

Our engines will operate satisfactorily on any gasoline intended for automotive use. **DO NOT MIX OIL WITH GASOLINE.**

We recommend the use of clean, fresh, **lead-free** gasoline. Leaded gasoline may be used if lead-free is not available. A minimum of 77 octane is recommended. The use of lead-free gasoline results in fewer combustion deposits and longer valve life.

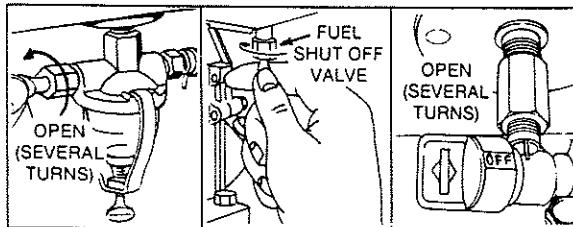
**NOTE:** We **DO NOT** recommend the use of gasoline which contains alcohol, such as gasohol. However, if gasoline with alcohol is used, it **MUST NOT** contain more than 10 percent Ethanol and **MUST** be removed from the engine during storage. **DO NOT** use gasoline containing Methanol. See **STORAGE INSTRUCTIONS.**

**DO NOT** fill fuel tank to point of overflowing. Allow approximately 1/4" of tank space for fuel expansion.

**EXTENDED OIL FILL.** Remove cap and dipstick. **FILL TO FULL MARK** on dipstick. **POUR SLOWLY.** Capacity approximately 4 pints (1.9 liters). When checking oil level, push dipstick assembly firmly but slowly until cap bottoms on tube. **DO NOT OVERFILL** or excessive smoking may occur when engine is run. Dipstick assembly must be securely assembled into tube at all times when engine is running.

## STARTING

**OPEN FUEL VALVE** — on engines so equipped.

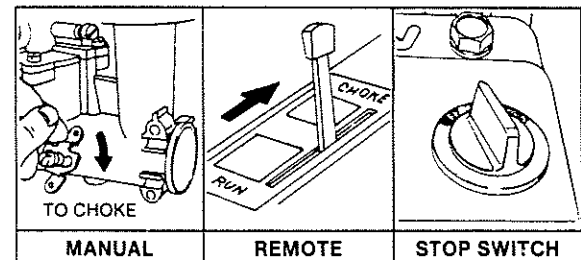


**CHOKE ENGINE:** Engine may be equipped with either manual or remote "CHOKE" controls.

**MANUAL CHOKE:** Move lever as illustrated.

**REMOTE CHOKE:** Move equipment control lever to "CHOKE" position.

**STOP SWITCH** — Move stop switch to "ON" position, if so equipped.



**NOTE:** This should fully close choke on carburetor. If it does not, remote control must be re-adjusted. See **ADJUSTMENT** section.


**NOTE:** A warm engine requires less choking than a cold engine.


**GOVERNOR SPEED CONTROL LEVER:** Move speed control lever to "RUN," "FAST" or "START" position if so equipped.


### TO START ENGINE

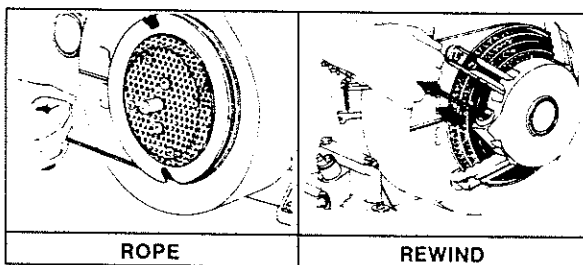
**WARNING:** ALWAYS KEEP HANDS AND FEET CLEAR OF MOWER BLADE OR OTHER ROTATING MACHINERY.

## STARTING (Cont.)

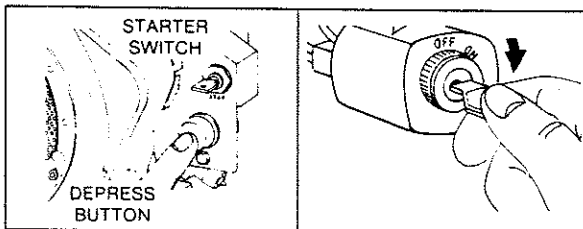
 **Rope Starter.** Wind the starter rope around the pulley in direction shown by arrow. **Pull the rope with a quick full arm stroke to overcome compression and prevent kickback.** Repeat if necessary with choke opened slightly. When engine starts open choke gradually.

 **NOTE:** When using rope starter to crank engine, use caution so knotted end of rope does not strike persons standing nearby.

 **Rewind Starter.** Grasp starter grip as illustrated and pull slowly until starter engages. **Then pull cord rapidly to overcome compression, prevent kickback and start engine.** Repeat if necessary with choke opened slightly. When engine starts, open choke gradually.



**Electric Starter.** Turn key to "Start" position and/or press starter button on powered equipment. The best starter life is provided by using short starting cycles of several seconds. Prolonged cranking can damage the starter motor if cranked more than 15 seconds per minute. When engine starts open choke gradually.



**NOTE:** If fuel drips out of carburetor while trying to start engine, the engine is over-choked. Pull starter several times or actuate starter switch with choke open.


When equipment is not in operation, provide protection from direct exposure to weather.

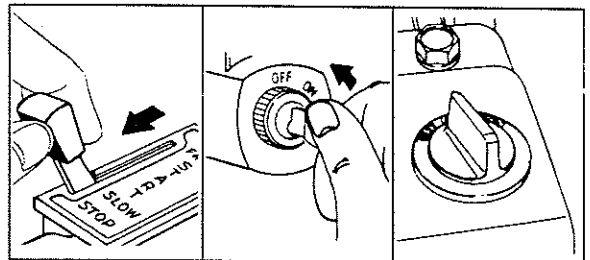
### COLD WEATHER STARTING HINTS


1. Be sure to use the proper oil for the temperature expected.
2. Declutch all possible external loads.
3. Set speed control at part-throttle position.
4. A slightly richer fuel mixture, obtained by turning carburetor needle valve 1/8 turn counterclockwise, will usually improve cold starting.
5. A warm battery has much more starting capacity than a cold battery.
6. Use fresh winter grade fuel.

**NOTE:** Winter grade gasoline has higher volatility to improve starting. Do not use gasoline left over from summer.

### TO STOP ENGINE


 Move speed control to SLOW, then STOP position if so equipped. Turn key or switch to STOP or OFF position. Do not choke carburetor to stop the engine.



 **CAUTION:** Always remove key from switch when leaving mower unattended or when mower is not in use.

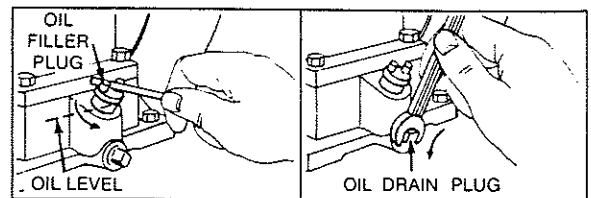
**NOTE:** Close fuel shut-off valve when engine is transported to prevent fuel leakage from carburetor.

## MAINTENANCE

 **CAUTION:** TO PREVENT ACCIDENTAL STARTING when servicing the engine or equipment, always remove the spark plug or wire from the spark plug shown on page 2. Disconnect negative wire from battery terminal if equipped with a 12 volt starting system.

**CHECK OIL LEVEL** regularly — after each five hours of operation. **BE SURE OIL LEVEL IS MAINTAINED.**

**CHANGE OIL** after first five hours of operation. Thereafter change engine oil every 50 hours of operation, under normal operating conditions. Change engine oil every 25 hours of operation if the engine is operated under heavy load, or in high ambient temperatures. Remove oil drain plug and drain oil while engine is warm. Replace drain plug. Remove oil fill plug, oil-minder or dipstick and refill with new oil of proper grade. Replace oil fill plug, oil-minder or dipstick.



### TO SERVICE DUAL ELEMENT AIR CLEANER

Clean and re-oil foam pre-cleaner at three month intervals or every 25 hours, whichever occurs first.

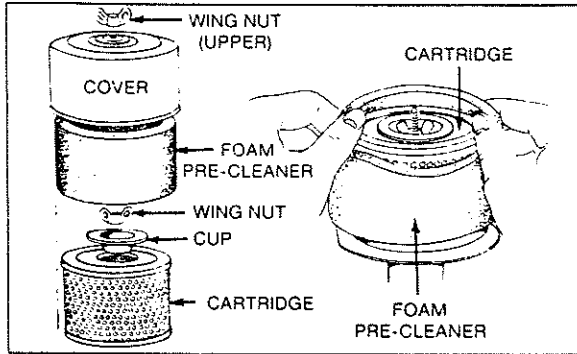
**NOTE:** Service air cleaner more often under dusty conditions.

1. Remove wing nut and cover.
2. Remove foam pre-cleaner by sliding it off the paper cartridge



## MAINTENANCE (Cont.)

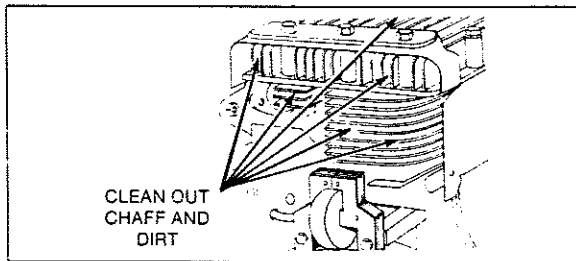
3. a. Wash foam pre-cleaner in kerosene or liquid detergent and water.
- b. Wrap foam pre-cleaner in cloth and squeeze dry.
- c. Saturate foam pre-cleaner in engine oil. Squeeze to remove excess oil.
4. Install foam pre-cleaner over paper cartridge. Re-assemble cover and screw down tight.



Yearly or every 100 hours, whichever occurs first, remove paper cartridge. Clean by tapping gently on flat surface. If very dirty, replace cartridge, or wash in a low or non-sudsing detergent and warm water solution. Rinse thoroughly with flowing water from inside out until water is clear. Cartridge must be allowed to stand and air dry thoroughly before using. Service more often if necessary.

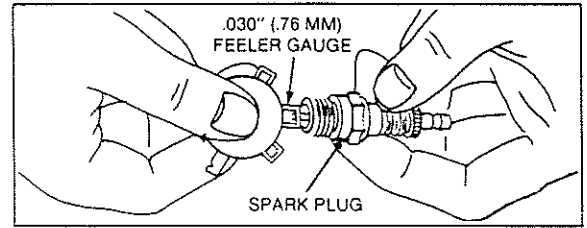
**CAUTION:** Petroleum solvents, such as kerosene, are not to be used to clean cartridge. They may cause deterioration of the cartridge. **DO NOT USE PRESSURIZED AIR TO CLEAN OR DRY CARTRIDGE.**

**CLEAN COOLING SYSTEM** — Grass, chaff or dirt may clog the rotating screen and the air cooling system, especially after prolonged service in cutting tall dry grasses. Yearly or every 100 hours, whichever occurs first, remove the blower housing and clean the areas shown to avoid overspeeding, overheating and engine damage. Clean more often if necessary.



**WARNING:** Periodically clean muffler area to remove all grass, dirt and combustible debris.

**SPARK PLUG** — Clean and reset gap at .030" every 100 hours of operation.



**NOTE:** Do not blast clean spark plug. Spark plug should be cleaned by scraping or wire brushing and washing with a commercial solvent.



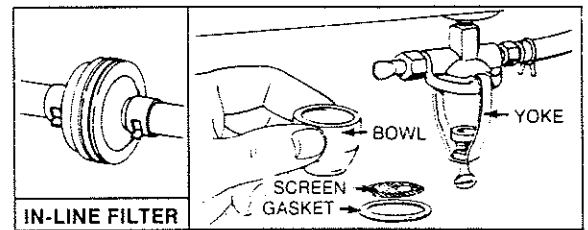
**CAUTION:** Sparking can occur if wire terminal does not fit firmly on spark plug, or if stop switch vibrates against spark plug. Reform terminal or repair switch if necessary.

**REMOVE COMBUSTION DEPOSITS** every 100-300 hours of operation. Remove cylinder head and cylinder head shield. Scrape and wire brush the combustion deposits from cylinder, cylinder head, top of piston and around valves. Use a soft brush to remove deposits. Re-assemble gasket, cylinder head and cylinder head shield. Turn screws down finger tight with the three longer screws around the exhaust valve, if so equipped. Torque cylinder head screws in a staggered sequence to 190 inch pounds (21.47 Nm).

**SPARK ARRESTER EQUIPPED MUFFLER** — If engine muffler is equipped with spark arrester screen assembly, remove every 50 hours for cleaning and inspection. Replace if damaged.

**CLEAN ENGINE** — Remove dirt and debris with a cloth or brush. Cleaning with a forceful spray of water is not recommended as water could contaminate the fuel system.

**FUEL FILTER** — Replace IN-LINE filter or clean screen and bowl every season.



## ADJUSTMENTS

### CARBURETOR ADJUSTMENTS

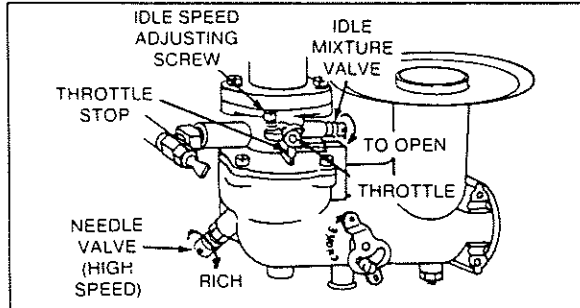
Minor carburetor adjustment may be required to compensate for differences in fuel, temperature, altitude or load.

**NOTE:** The air cleaner must be assembled to carburetor when running engine.

**TO ADJUST CARBURETOR** — Gently turn valves clockwise until they just close. Valves may be damaged by turning them in too far.

Now open needle valve 1-1/2 turns counterclockwise and idle valve one turn. This initial adjustment will permit the engine to be started and warmed up (approximately 5 minutes) prior to final adjustment.

# ADJUSTMENTS (Cont.)



## FINAL ADJUSTMENT

Place speed control lever in "FAST" position. Turn needle valve in until engine slows (clockwise — lean mixture). Then turn it out past smooth operating point (rich mixture). Now turn needle valve to the midpoint between rich and lean. Next, adjust idle RPM. Rotate throttle counterclockwise and hold against stop while adjusting idle speed adjusting screw to obtain 1200 RPM. While holding throttle against idle stop, turn idle valve in (lean) and out (rich). Set at midpoint between rich and lean. Recheck idle RPM. Release throttle. If engine will not accelerate properly, the carburetor should be re-adjusted, usually to a slightly richer mixture.

## CONTROL ADJUSTMENTS

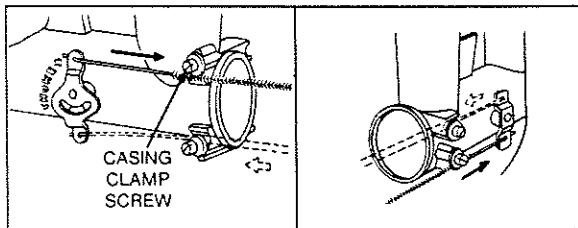
Proper choke and stop switch operation is dependent upon proper adjustment of controls on the powered equipment.

### TO CHECK OPERATION OF CHOKE CONTROLS:

Move control lever to "Choke" position. The carburetor choke should be closed.

### TO ADJUST CHOKE:

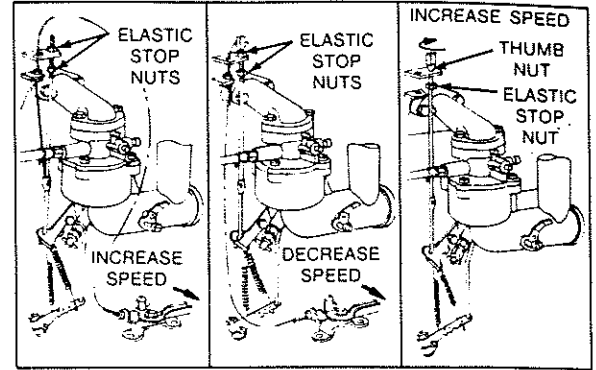
Place control lever on equipment in "CHOKE" position. Loosen casing clamp screw. Move casing and wire until choke is completely closed. Tighten casing clamp screw.



## SPEED CONTROL ADJUSTMENTS

The acceptable operating speed range is 1800 to 3600 RPM. Idle speed is 1200 RPM. The manufacturer of the equipment on which the engine is used, specifies the top governed no load speed at which the engine may be operated. DO NOT EXCEED this speed.

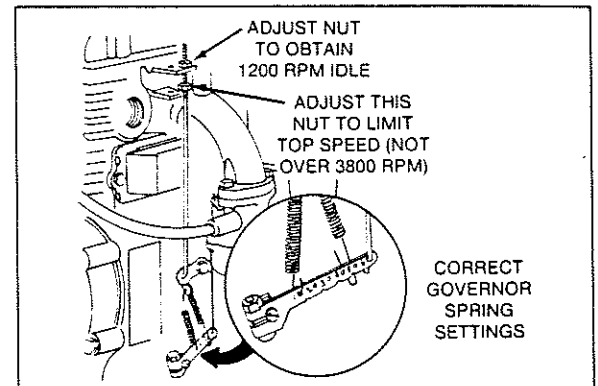
Engine speed is controlled by movement of the control lever. To adjust: Move control lever to HIGH speed position. Loosen screw on swivel. Move wire through swivel until desired operating speed is obtained. Retighten swivel screw, bend loose end of wire around swivel. Cut off excess wire.



## GOVERNED IDLE SPEED ADJUSTMENT

The shorter spring keeps the engine on governor, even at idle speed. If moderate loads are applied at idle, the engine will not stall.

First make final carburetor mixture adjustments. Then place remote control in idle position. Hold throttle shaft in closed position and adjust idle speed screw to 1000 RPM. Release the throttle. With remote control in idle position, adjust upper elastic stop nut to obtain 1200 RPM.



## THUMB NUT ADJUSTMENT (FIXED SPEED)

To increase speed, turn nut (clockwise) or move lower end of governor spring farther away from governor lever shaft.

To reduce speed, turn nut (counterclockwise) or move lower end of spring closer to governor lever shaft.

If the speed of the engine is not steady although the carburetor has been properly adjusted, move the spring farther away from the governor lever shaft.

If the speed variation between no load and full load is too great, move spring closer to governor lever shaft.

