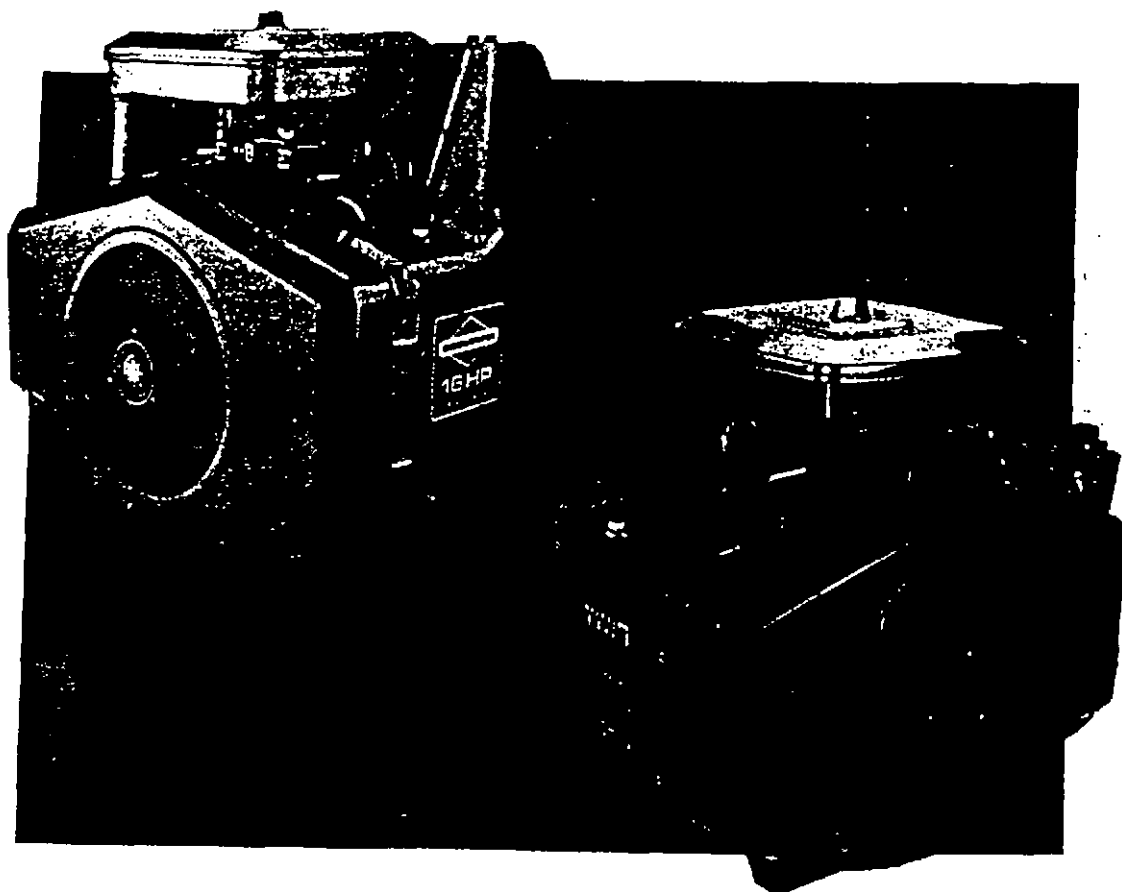

Operating and Maintenance Instructions

Model Series 400400, 402400, and 422400
With Fixed Jets



Briggs & Stratton Corporation
Milwaukee, Wisconsin 53201

FORM NO. 271123-4/86
PRINTED IN U.S.A.



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 or 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 muffler 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.

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

2. 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
3. Do not tamper with the engine speed selected by the original equipment manufacturer
4. DO NOT TOUCH hot mufflers, cylinders or fins as contact may cause burns.
5. Dirt and grass clippings or other debris, in cooling fins or governor parts can affect engine speed. See cleaning instructions in MAINTENANCE section.
6. 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.
7. ALWAYS KEEP HANDS AND FEET CLEAR OF MOVING OR ROTATING PART.
8. TO PREVENT ACCIDENTAL STARTING when servicing the engine or equipment, always remove the spark plugs or wire from the spark plugs, shown on page 4. 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.

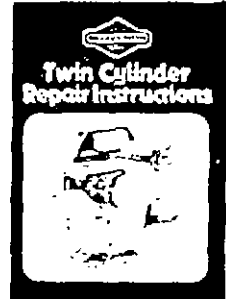
Each Authorized Service Center carries a stock of original Briggs & Stratton repair parts and is equipped with special service tools. Trained mechanics assure expert repair service on all Briggs & Stratton engines.

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 common specifications and detailed information covering the adjustment, tune-up and repair procedures for Twin Cylinder, 4 cycle models. It is available from any Authorized Briggs & Stratton Service Center. Order as Part Number 271172.



TUNE-UP SPECIFICATIONS

Spark Plug Type	Champion	Autolite
Resistor Long Plug	RJ-12	308
Spark Plug Gap	.030" (.76 mm)	
Intake Valve Clearance**	.004"-.006" (.10-.15 mm)	
Exhaust Valve Clearance**	.007"-.009" (.18-.23 mm)	

**with valve springs installed.

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 resistor spark plugs, be sure to use the same type of spark plugs for replacement.



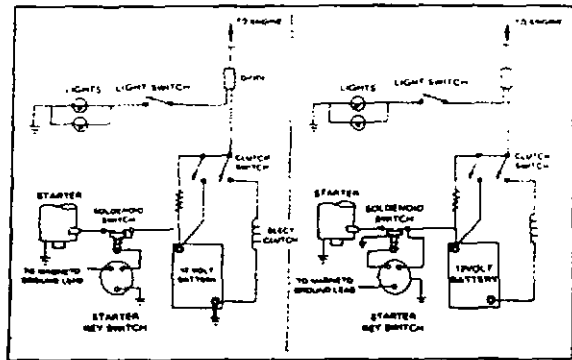
CAUTION: For personal safety always remove cable from the negative (-) terminal of battery before attempting any repairs or maintenance.

STORAGE INSTRUCTIONS

Engines to be stored over 30 days should be completely drained of fuel to prevent gum deposits forming on essential carburetor parts, fuel filter and tank.

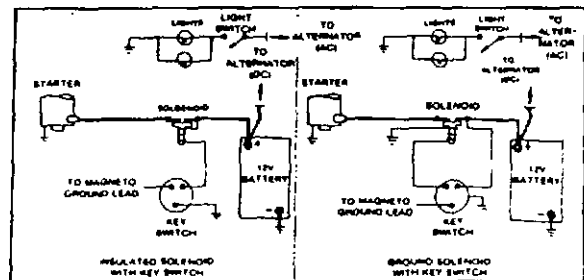
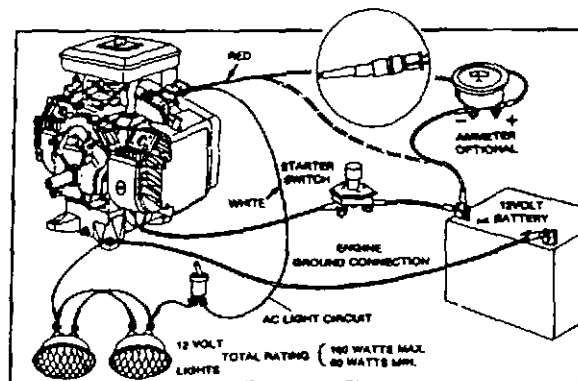
NOTE: The use of a fuel additive, such as STA-BIL®, or an equivalent, will minimize the formation of fuel gum deposits during storage. Such an additive may be added to the gasoline in the fuel tank of the engine, or to the gasoline in a storage container.

- All fuel should be removed from the tank. Run the engine until it stops from lack of fuel.
- While engine is still warm, drain oil from crankcase. Refill with fresh oil.
- Remove spark plugs, pour approximately one ounce (30 cc) of engine oil into each cylinder and crank slowly to distribute oil. Replace spark plugs.
- Clean dirt and chaff from cylinders, cylinder head fins, blower housing, rotating screen and muffler areas.
- Store in a clean and dry area.
- Charge battery and store as recommended by the manufacturer.



Tri-Circuit

TYPICAL WIRING DIAGRAMS



Dual Circuit

BEFORE STARTING

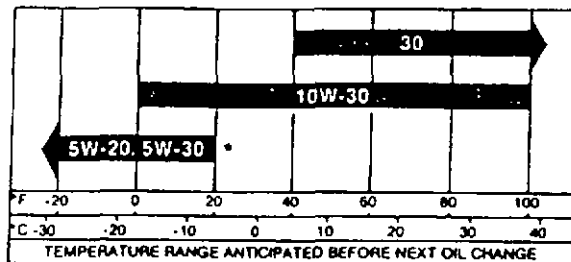
READ THE OPERATING INSTRUCTIONS OF THE EQUIPMENT THIS ENGINE POWERS

OIL RECOMMENDATIONS

Note: Engine is shipped WITHOUT oil.

Use a high quality detergent oil classified "For Service SF, SE, SD or SC." Detergent oils keep the engine cleaner and retard the formation of gum and varnish deposits. No special additives should be used with recommended oils.

RECOMMENDED SAE VISCOSITY GRADES



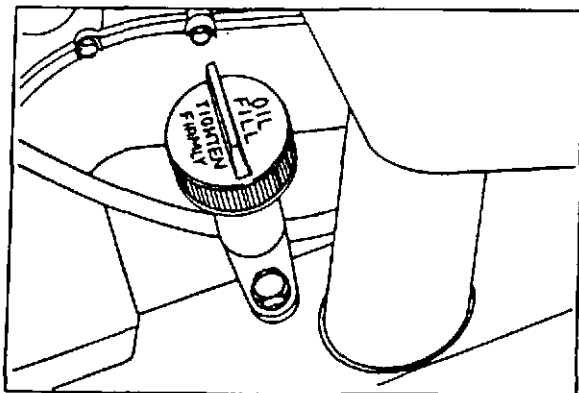
*If not available, a synthetic oil may be used having 5W-20, 5W-30 or 5W-40 viscosity.

NOTE: 10W-40 oil may be used if 10W-30 is not available.

FILL CRANKCASE WITH OIL

Place engine level. Clean area around oil fill before removing dipstick.

EXTENDED OIL FILL Remove cap and dipstick. **FILL TO FULL MARK** on dipstick. **POUR SLOWLY**. Capacity approximately 3 pints (1.4 liters). When checking oil level, screw dipstick assembly firmly but slowly until cap bottoms on tube. **DO NOT OVERFILL**. Dipstick assembly must be securely assembled into tube at all times when engine is operating.



CHARGE BATTERY

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

FUEL RECOMMENDATIONS

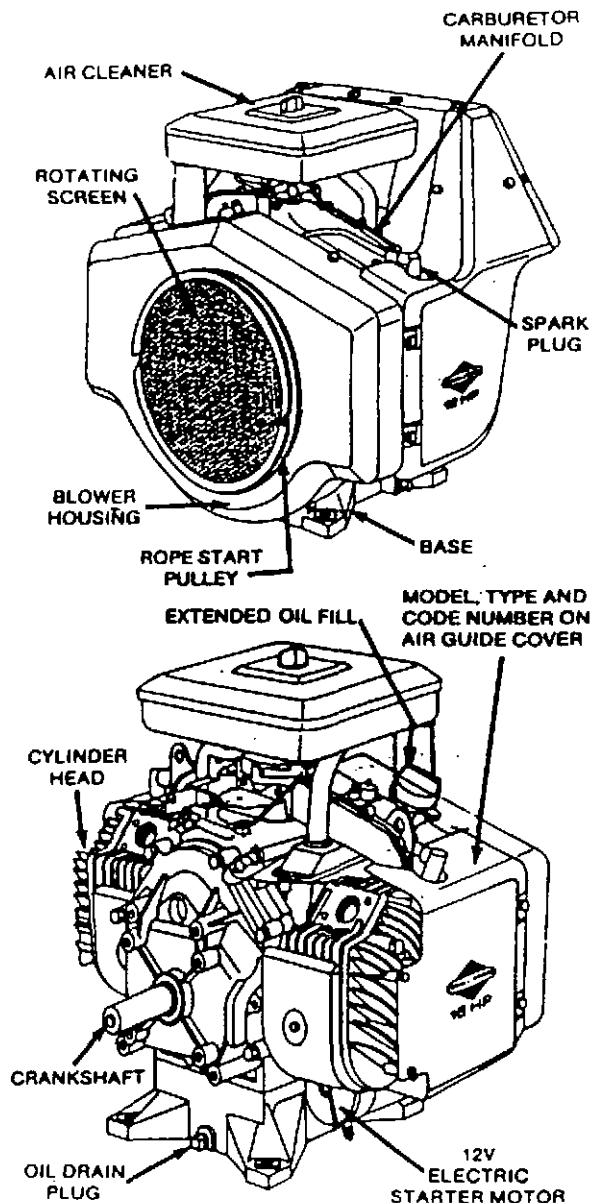
Our engines will operate satisfactorily on any gasoline intended for automotive use. **DO NOT MIX OIL WITH GASOLINE.**

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.



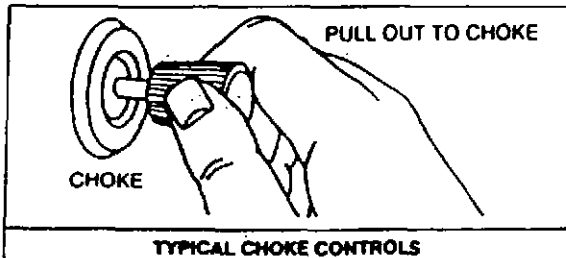
DO NOT FILL fuel tank to point of overflowing. Allow approximately 1/4" of tank space for fuel expansion.



STARTING

OPEN FUEL VALVE on engines so equipped.

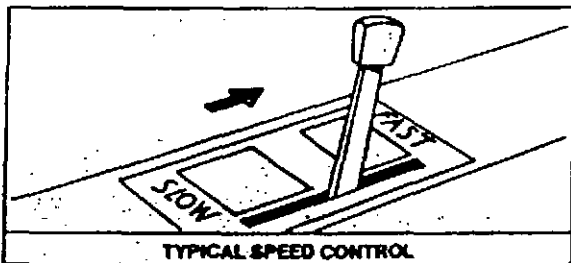
CHOKE ENGINE: Move equipment control lever to "CHOKE" position.



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. Engines equipped with a solenoid in the fixed main jet may require choking even when warm.

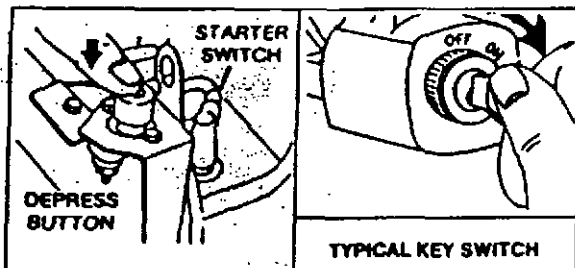
SPEED CONTROL LEVER: Move speed control lever to "RUN," "FAST" or "START" position if so equipped.



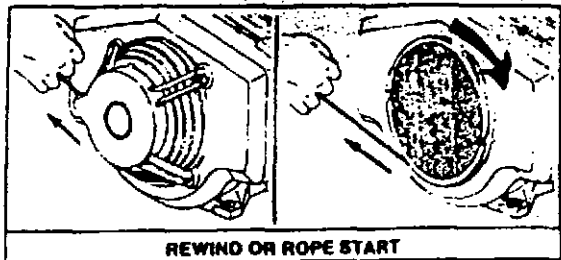
TO START ENGINE

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

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 starting motor if cranked more than 15 seconds per minute. Allow starter to cool 2 minutes. When engine starts open choke gradually.



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.



⚠ 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.

⚠ CAUTION: When using rope starter to crank engine, use caution so knotted end of rope does not strike person standing nearby.

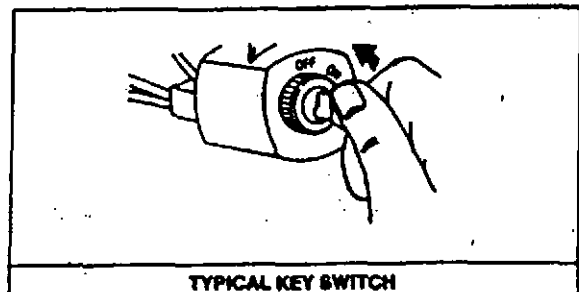
COLD WEATHER STARTING HINTS

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 warm battery has much more starting capacity than a cold battery.
5. 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

Turn key to "OFF" position. Do not choke carburetor to stop the engine.



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

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

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

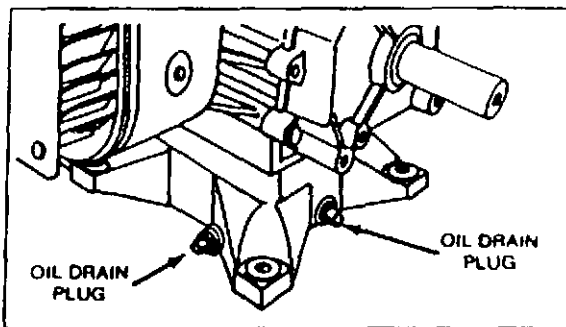
MAINTENANCE



CAUTION: TO PREVENT ACCIDENTAL STARTING when servicing the engine or equipment, always remove the spark plugs or wire from the spark plugs shown on page 4. Disconnect negative wire from battery negative terminal.

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 dipstick and refill with new oil of proper grade. Replace dipstick.



TO SERVICE DUAL ELEMENT AIR CLEANER

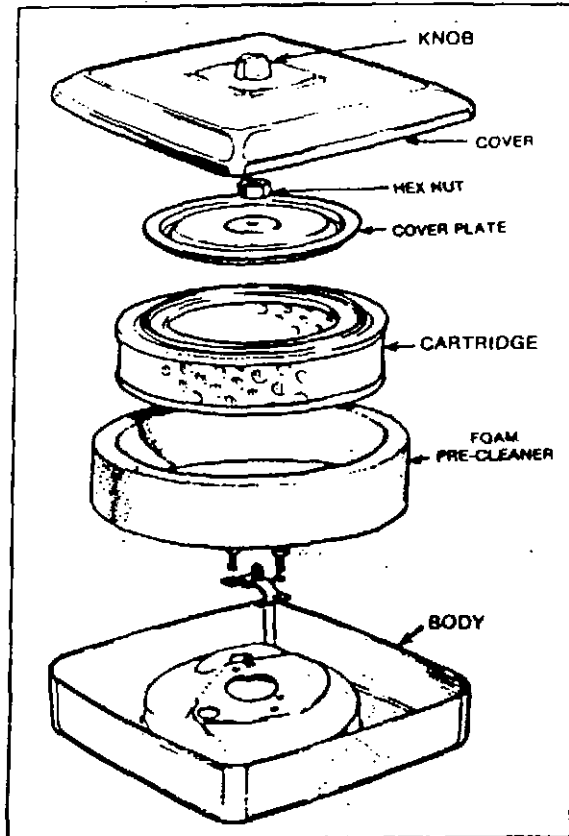
Clean and re-oil foam pre-cleaner at three month intervals or every 25 hours, whichever occurs first.

NOTE: Service air cleaner more often under dusty conditions.

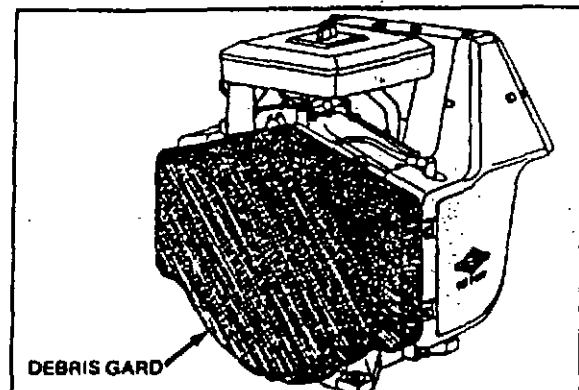
1. Remove knob and cover.
2. Remove foam pre-cleaner by sliding it off the paper cartridge.
3. a. Wash foam pre-cleaner in kerosene or liquid detergent and water.
b. Wrap foam pre-cleaner in cloth and squeeze dry.
c. Saturate foam pre-cleaner in engine oil. Squeeze to remove excess oil.
4. Install foam 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 OIL CARTRIDGE. DO NOT USE PRESSURIZED AIR TO CLEAN OR DRY CARTRIDGE.**



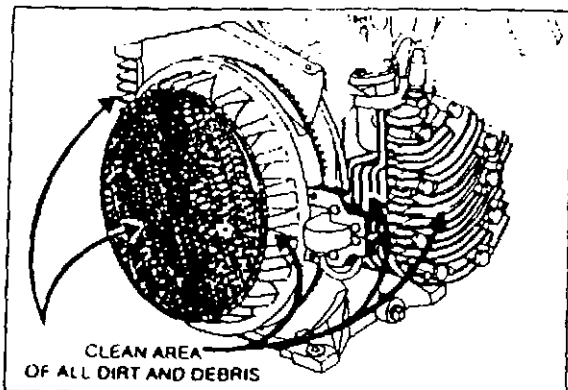
CLEAN DEBRIS GARD (Optional) — Brush grass, chaff and dirt from Debris Gard every 100 hours to prevent overheating and engine damage. Clean more often if necessary.



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

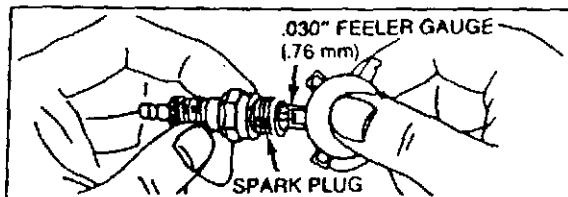
MAINTENANCE (Cont.)

shown to avoid overheating and engine damage. Clean more often if necessary.



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

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



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

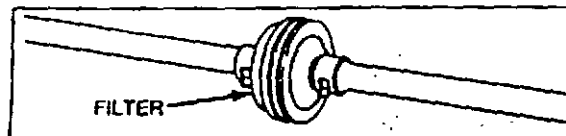
CAUTION: Sparking can occur if wire terminals do not fit firmly on spark plugs. Reform terminals if necessary.

REMOVE COMBUSTION DEPOSITS every 100-300 hours of operation. Remove cylinder heads and cylinder head shields. Scrape and wire brush the combustion deposits from cylinder, cylinder heads, top of pistons and around valves. Use a soft brush to remove deposits. Re-assemble gaskets, cylinder heads and cylinder head shields. 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 165 inch pounds (18.65 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 every season.



ADJUSTMENTS

CARBURETOR ADJUSTMENTS

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

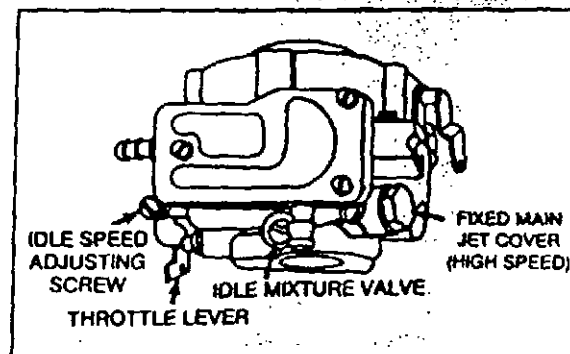
NOTE: The air cleaner must be assembled to carburetor when running engine.

THE TWIN CYLINDER ENGINE CARBURETOR FUEL MIXTURE ADJUSTMENT PROCEDURE IS UNIQUE. ADJUST CARBURETOR FUEL MIXTURE IN THE ORDER STATED AS FOLLOWS:

Gently turn the idle mixture valve clockwise until it just closes. Valve may be damaged by turning it in too far. Open idle valve 1-1/2 turns counterclockwise.

This initial adjustment will permit the engine to be started and warmed up prior to final adjustment.

Start engine and place equipment speed control lever in idle position. Hold carburetor throttle lever against idle stop, and adjust idle speed screw to obtain: 1200 to 1400 RPM. Turn idle mixture valve slowly clockwise (lean mixture) until speed just starts to slow. Then turn idle mixture valve 1/2 turn counterclockwise. Now adjust idle speed screw to obtain: 900 to 1200 RPM. Release throttle lever.



NOTE: Engines operated at altitudes of approximately 5000 feet, may require the installation of a high altitude carburetor main jet to achieve best engine performance. If erratic performance or lack of power is observed, select the fixed main jet part number 231333. It may be ordered through your nearest Briggs & Stratton Service Center.

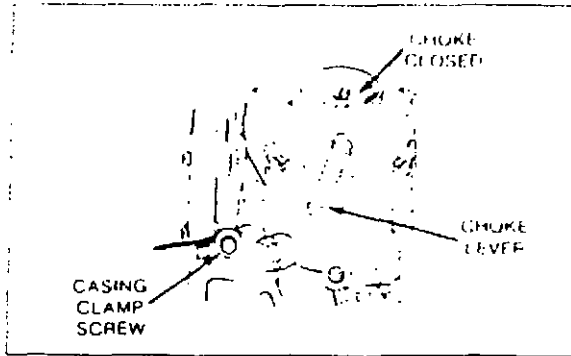
If the engine does not accelerate properly, re-adjust idle mixture valve approximately 1/8 turn counterclockwise (rich).

CONTROL ADJUSTMENTS

Proper choke and speed control operation is dependent upon proper adjustment of remote 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.

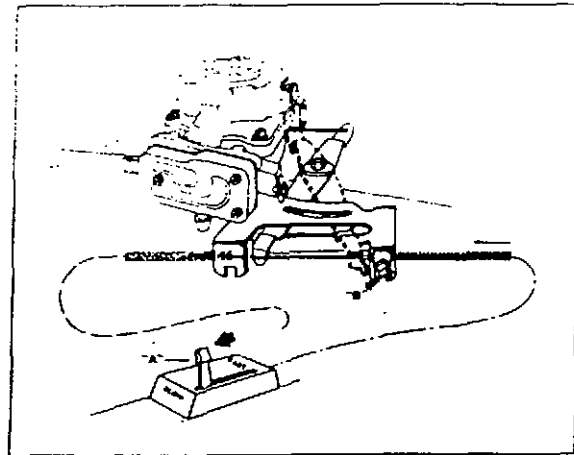
SPEED CONTROL ADJUSTMENT

The acceptable operating speed range is 1800 to 3600 RPM. Idle speed is 1400 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. Move control lever on equipment, "A" to slowest engine speed possible. Throttle lever on carburetor should touch idle speed adjusting screw. To adjust, loosen casing clamp screw "B". Move casing and wire in direction shown by arrow until throttle lever touches idle speed adjusting screw on carburetor. Retighten casing clamp screw "B"

CAUTION: Throttle lever on carburetor **MUST** touch idle speed adjusting screw when equipment control lever is in slowest position



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

MODEL SERIES 400400

Bore 3-7/16" (87.31mm)
 Stroke 2-5/32" (54.77mm)
 Displacement 40.00 cu. in. (656.0 cc)
 Horsepower 14 HP Max. @ 3600 RPM
 Torque (Ft.-Lbs.) 24.4 Max @ 2300 RPM

MODEL SERIES 402400

Bore 3-7/16" (87.31 mm)
 Stroke 2-5/32" (54.77 mm)
 Displacement 40.00 cu. in. (656.0 cc)
 Horsepower 402400 16 HP Max. @ 3600 RPM
 Torque (Ft.-Lbs.) 25.8 Max. @ 2700 RPM

MODEL SERIES 422400

Bore 3-7/16" (87.31 mm)
 Stroke 2-9/32" (57.94 mm)
 Displacement 42.33 cu. in. (694.0 cc)
 Horsepower 18 HP @ 3600 RPM
 Torque (Ft.-Lbs.) 28.6 @ 2600 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).

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
 4,194,224 3,457,804 3,572,218 3,650,354 3,961,724 4,168,288 4,270,509
 4,276,439 3,465,740 3,625,071 3,738,345 3,968,854 4,184,040

DESIGN
 D-247,177
 OTHER PATENTS PENDING